

A TENTATIVE COURSE OF STUDY
FOR THE
RURAL SCHOOLS OF MORRIS COUNTY, KANSAS

A THESIS
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EDUCATION AND THE GRADUATE COUNCIL OF THE
KANSAS STATE TEACHERS COLLEGE OF EMPORIA
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FOR THE DEGREE OF MASTER OF SCIENCE

BY

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A TENTATIVE COURSE OF STUDY IN ELEMENTARY SCIENCE FOR
RURAL SCHOOLS OF MORRIS COUNTY, KANSAS

STATEMENT OF THE PROBLEM

That elementary science needs to play an important part in the organization of the program of either private, public, city, or rural schools is an undisputed belief of educators everywhere.

The problem of this study is to develop a tentative curriculum in elementary science: (a) to make the child conscious of his environment, and (b) to provide for a living rich in experience and appreciation of nature.

Because of the crowded program elementary science has received no definite attention, according to the reports of many schools. Little has been done other than to identify a few common insects, animals, birds, and flowers. The interdependence of man upon the world in which he lives has not been even suggested. Since nature is life, real living has been overlooked.

This Tentative Course of Study for Morris County, Kansas has been attempted with the hope that it may make the child conscious of his environment and provide for rich living in experience and appreciation through a knowledge of life of the neighborhood.

SOURCES OF MATERIAL

To secure aid in the organization of the problem the writer has investigated present practices in elementary science. The

following courses of study were examined for objectives and content:

ELEMENTARY SCIENCE

Course Issued By	Title of Course	Date	Grades Included
Baltimore, Md.....	Elementary Science.....	1929...	4-6
Berkeley, Calif.....	Nature Study.....	1931...	K-6
Cleveland, Ohio.....	Elementary Science.....	1926-7...	K-6
Denver, Colo.....	Science-Course of Study..... Monograph #21	1927...	1-6
Detroit, Mich.....	Course in Nature Study.....	1927...	1-2
Kansas.....	Course of Study for Elementary Schools.....	1932...	1-8
Kern County, Calif..	Manual of Elementary Science..	1930...	1-8
Kern County, Calif..	Elementary Science.....	1925...	1-8
Grand Rapids, Mich..	Course in Elementary Science..	1931...	1-6
Minneapolis, Minn...	Outline for Elementary Science.....	1927-8...	1-2
Missouri.....	Course of Study for Elementary Schools.....	1931...	1-8
New York City.....	Tentative Course of Study in (Horace Mann School) Elementary Science.....	1927...	1-6
Pittsburg, Kansas...	Nature Study.....	1930-1...	2-6
Pittsburgh, Penn....	Course of Study in Nature Study and Elementary Science..	1928...	K-6
Portland, Oregon....	Tentative Course in Nature Study.....	1928...	1-7
San Francisco, Cal...	Elementary Science-Curriculum Bulletin 2.....	1929...	4-6
Bloomington, Ill....	Study of Nature.....	1923...	1-6
Chicago, Ill.....	The Course in Nature-Study and Elementary Science (University Elementary School).....	1924...	1-6

Besides these Contributions to Education, source books, year books, texts, and professional literature have been examined. Supervisors, teachers of science, county superintendents, farmers, bankers, butcher, baker, and children themselves have been questioned.

GENERAL PROCEDURES

Many of the courses of study in natural science are called "nature study". The treatment of such courses consists chiefly

in bringing objects to school for study, or from a study of the unusual, or in a sort of picture study of the material. It has been endeavored here to present elementary science as much as possible in the place where it is found, in the environment by trips and direct observation.

Nature study, as was stated above, has become mostly an object-lesson study. It has been incidental and often ignored, depending largely upon the interest of the teacher. It has often been a make-shift for the English lesson. This tentative course of study has attempted to organize nature study on the same basis as other school subjects, so that there will be no conglomeration of busy work and questions and answers. It has tried to provide for the child's present and future living. An attempt has been made to decide what elementary science should do in the rural schools in using the environment of the child, so that it will be of value now and in the time to come.

When certain laws are understood, man often changes his mind and thus builds up new social situations, new behaviors, and new cultures. Proper rules of health, the preservation of life, and the well-being of the community and the individual are due to the laws of nature, which are developed in the suggested studies in nature. New researches will make a course of study a changing procedure. Practically all of man's early explanations and ideas of nature have been replaced by scientific research. The child learns that man's idea of truth is constantly changing.

Buffaloes were once common animals in Morris County. Only

trails and an occasional wallow remain. Prairie chickens have gone the way of the buffalo, and the quail is following. The child sees the need of preservation of animals for his happiness and service. He is also conscious that plants are in need of preservation, since already in his brief life-time certain plants are less frequently found.

To be able to identify materials as means to other goals and not as an end in themselves, is an objective. Migration, means of protection, adaptation, parental care, life habits, and value to the environment are, for example, the significant classifications for the study of the robin.

GENERAL PLAN OF THE COURSE

The writer has endeavored to present material which will answer the questions of real interest to children regarding soil, plants, animals, etc. It has been planned with an accumulative value in mind. What the child learns about stars in the first grade will be the nucleus to which material is added grade by grade suggesting advance in the future.

The units chosen with a few exceptions* are of the child's environment and provide for experience, which should lead to appreciation. These units have been prepared for each grade under the following heads:

1. Birds
2. Mammals
3. Amphibians
4. Fish

*Reindeer.

- 5. Reptiles
- 6. Insects
- 7. Wild plants - mosses - ferns - weeds
- 8. Tame plants
- 9. Trees
- 10. Gardening
- 11. Rocks and Soil
- 12. Sky and weather
- 13. Stars

A trip was made with Dr. John William Breukelman, Head of the Department and Professor of Biology and Geology of the Kansas State Teachers College of Emporia, to each of the district schools to identify the various forms of nature of the environment. Dr. Breukelman has kindly arranged the animal list, also the rocks and soils of the curriculum.

Professor Frank U. G. Agrelius, Associate Professor of Biology of the Kansas State Teachers College of Emporia, has classified and grouped the plants and weeds. He has given suggestions for the study of the stars.

ASSUMPTIONS

1. Every child is a part of some social group as well as of the whole social group of man; therefore, the school should enrich his experiences. Right attitudes developed tend to carry over into adult-hood, hence child development is adult development. Activities which present opportunities for appreciation, skill, and judgment should be presented.

2. The school will not engage in activities which are effectively experienced through other avenues of social development.
3. Elementary science will create within the child an interest in and an appreciation of his environment to the extent that his curiosity will make the world about him an ever present teacher.
4. By experimenting the child learns by himself and is not prone to accept the opinions of others as final.
5. Man's idea of truth is constantly changing through scientific study.
6. Principles which may be applied to health and civic situations may be learned through scientific laws.
7. Material which will answer the questions of real interest to the child should be presented.
8. Elementary science provides for growth, gives diversity of experience, creates a desire for beautiful surroundings, and plans for pleasant and profitable use of leisure time.
9. Through curiosity a child evinces an interest in his surroundings.
10. Plants and animals need to be preserved for the happiness and service of man.
11. Identification of material is a means to other goals and not an end in itself.
12. This course of study in elementary science proceeds on the assumption that school work shall not only help the pupil to do his daily work well, but that it shall also help him to enjoy his natural environment.

CURRICULUM OBJECTIVES

- A. Efficiency in physical development and health.
- B. Leisure-time interests and activities.
- C. Efficiency in unspecialized activities.
- D. Social and civic activities.
- E. Efficiency in fundamental processes.

INTERMEDIATE OBJECTIVES

- A. Efficiency in physical development and health.
 - 1. To understand the value of pure air and sunshine.
 - 2. To understand the processes involved in providing pure food and drinks.
 - 3. To understand the proper disposal of sewage and other waste products on the farm, so that there may be no place for disease germs to grow.
 - 4. To learn how we get our clothing and to learn to take care of it.
 - 5. To know the conditions which make for health-proper clothing-ventilation-food-exercise.
 - 6. To understand how to keep the farm home neat and attractive.
 - 7. To observe the forces which make for health and strength in the environment.
 - 8. To know the effect of uncared for teeth.
 - 9. To know the essentials of keeping the body clean.
 - 10. To know how to make healthful conditions for animals and plants.

11. To understand how important cleanliness on the farm is to those who do not live on farms.

12. To rid the home of pests harmful to health.

B. Leisure-time interests and activities.

1. To find recreation in reading about nature.

2. To gain knowledge by taking nature walks.

3. To learn of nature through birds.

4. To learn of nature through observing animals.

5. To enjoy the out-doors more by knowing what the flowers are.

6. To learn bird calls.

7. To sing songs and imitate animal voices.

8. To play games.

9. To tell stories about nature.

10. To observe the habits of animals and birds.

11. To estimate the probable food of birds.

12. To take a fishing trip.

13. To go on a picnic and observe life about.

14. To gather seeds and classify as to modes of travel.

15. To collect nature pictures and make booklets.

16. To make nature scrap books.

17. To read about animals of long ago.

18. To make a leaf collection.

19. To make leaf prints.

20. To read nature myths.

21. To make plans for gardens.

C. Efficiency in unspecialized activities.

1. To collect flowers and rocks.
2. To read about nature.
3. To sing nature songs.
4. To draw flowers, animals, etc.
5. To collect leaves.
6. To collect insects-cocoons-eggs-cast off skins.
7. To collect feathers.
8. To tell of observations.
9. To arrange flowers in bouquets.
10. Brush the teeth daily.
11. To make leaf dolls and vegetable children.
12. To keep nature charts.
13. To grow a plant.
14. Feed birds.
15. Care for pets.

D. Social and Civic Activities.

1. To know how animals live together, the division of work, and planning of the community.
2. To know how insects live together.
3. To know how flowers live together.
4. To understand the pollination of flowers.
5. To observe the migration of birds.
6. To learn about the life cycle of insects.
7. To learn how animals and plants protect themselves.
8. To learn how animals keep clean.
9. To understand the processes of food production.
10. To know how man is housed.
11. To know how man is fed.

12. To know how man is clothed.
13. To know how man is sheltered.
14. To bring about an adjustment of human personalities and the making of better citizens.
15. To extend the child's social understanding.
16. To develop observation.
17. To develop right attitudes.
18. To extend the child's social understanding of life about him.
19. To develop sympathy.
20. To develop appreciation.
21. To provide broader experience and understanding.
22. To provide experience for leisure time.
23. To develop the power to solve problems independently.
24. To develop initiative.
25. To develop the power of judgment.
26. To remove superstition.

E. Efficiency in fundamental processes.

1. To stimulate a desire for reading for knowledge and pleasure.
2. To develop good enunciation, clear speaking, good posture, eliminate errors of speech, increase the vocabulary, and to have something to talk about.
3. To develop the ability to solve problems, stimulate the reasoning ability, to develop skills in adding, multiplying, subtracting, and dividing.
4. To learn "near", "far", "more", "less".

5. To spell corresponding words used in writing-letters-
invitations-compositions.

6. Writing to develop legibility, speed, and neatness in
writing.

7. Development of the individual's handwriting style and
neatness.

8. Development of the individual's handwriting style and
neatness.

9. Development of the individual's handwriting style and
neatness.

10. Development of the individual's handwriting style and
neatness.

11. Development of the individual's handwriting style and
neatness.

12. Development of the individual's handwriting style and
neatness.

13. Development of the individual's handwriting style and
neatness.

14. Development of the individual's handwriting style and
neatness.

15. Development of the individual's handwriting style and
neatness.

GRADE I

Unit-One-----Birds-----Chicken

Leisure-time interests and activities.

- A. Specific Objective: To learn the life history of the chicken.
- B. Organization of the activities and subject matter of this unit.
1. A hen and chicks may be kept in the school room for a few days in a crate. Some other farm bird may be brought in for a day's observation.
 2. The hen's clothing will be observed. Notice the color and difference of the feathers. Where are the warmest looking feathers? In what way is this like an overcoat? Which feathers are something like a raincoat? How are these different from those like an overcoat? How does she stand in the rain? Why? Which feathers are like underwear? How does she keep her feathers in order? What part of a house would her rain feathers be? When does a chicken wear only the feathers like underwear?
 3. Children can gather the various kinds of feathers from the chicken yard at home and paste in Nature Book. They can make statements about the hen's clothing.
 4. Crow like a rooster -- call the little ones, sing like a happy hen say, "Here's a nice fresh egg", as a hen would. Feed the hen.

Materials:

Hen and chickens

Feathers

FRANK I

Cage

Food

Paste

Paper for book

Picture of chicken

Suggested Activities:

Study of turkey - goose - duck - pigeon - guinea hen. How they look - what they do - food - use.

Teacher's Reference:

Comstock, Anna Bradford - HANDBOOK OF NATURE STUDY - Comstock Publishing Company, Ithaca, N. Y., 1929, pp. 41-44.

Children's Reference:

Kendall, Calvin N. and Caroline I. Townsend, PRIMER, D. C. Heath and Company, Boston, 1917, p. 39-40.

Withers, Sarah and Others, THE CHILD'S WORLD PRIMER, John-son Publishing Company, N. Y., 1917, p. 33.

GRADE I

Unit-Two-----Birds-----Spring Birds

Leisure-time interests and activities.

- A. Specific Objective: To observe the birds which come back to us in the spring.
- B. Organization of the activities and subject matter of this unit.
1. Talk about the birds to find out what birds children know and what they have observed. Take a trip at the noon hour to observe the birds. Have the children report of their observations to and from school.
 2. Make a bird chart and list the birds that go away. Keep pictures and names of birds. This chart may be used all the year to show migration.
 3. Children compose stories about birds which teacher will keep to be read. Sketch birds.

Teacher's Reference:

Reed, Chester A., BIRD GUIDE, Doubleday, Page and Company, N. Y., pp. 228.

Children's Reference:

Nida, Wm. L., OUR PETS, D. C. Heath and Company, Boston, pp. 76-82.

Book I Science Readers.

GRADE I

Unit-Three-----Birds-----Birds That Stay All Winter

Leisure-time interests and activities.

- A. Specific Objective: To know what birds stay all winter.
- B. Organization of the activities and subject matter of this unit.

1. Find out which birds stay all winter. We find the crow, sparrow, chickadee, quail, owl, hawk, woodpecker, and the cardinal the winter birds of Morris County and a choice may be made for special study. Size, color, where it lives. What it does.

2. A discussion of how these birds are prepared for winter - enemies, how protected, food, shelter, and ways and means will be proposed to make the birds more comfortable.

3. Put out crumbs for the birds, meat scraps, suet, cracked wheat, oats, sunflower seeds. Have a bird bath and keep water in it during school week.

Write a poem about a winter bird.

Draw pictures of winter birds to put in Nature Book.

Teacher's Reference:

Comstock, Anna Bradford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1929. pp. 44-46.

Children's Reference:

Benton, Josephine, POEMS FOR THE CHILDREN'S HOUR, Milton Bradley Company, Springfield, Mass., pp. 64-65-66. 1925

GRADE I

Unit-Four-----Birds-----Cardinal

Leisure-time interests and activities.

- A. Specific Objective: To take a nature walk to learn about the cardinal.
- B. Organization of the activities and subject matter of this Unit.

Take a nature walk to observe the cardinal.

1. Why is he called the Cardinal?
2. How many names do you know for him?
3. How big is he?
4. How can you tell the father cardinal from the mother cardinal?
5. Where shall we look for her nest?
6. What is it made of? Whistle the song.
7. What are their enemies?
8. How shall we invite them to our school?
9. Draw the cardinal.
10. Find an old nest.
11. Take a trip to see the cardinal at home.
12. Write the names of the things which the cardinal likes to eat. Count them.
13. What are ways to show friendship for the cardinal?
14. Write a story of our trip to visit the cardinal for the Nature Study Book.
15. Sing cardinal song.
16. Make a poem about the cardinal.

Materials:

Poem of cardinal

Song of cardinal

Picture of cardinal

Teacher's Reference:

Miller, Harriet Mann, **THE SECOND BOOK OF BIRDS**, Houghton Mifflin and Company, N. Y., 1915, p. 83.

AUDUBON EDUCATIONAL LEAFLET, No. 18, National Association Audubon Society, No. 1974, Broadway, N. Y.

Children's Reference:

Wynne, Annette, **FOR DAYS AND DAYS**, Frederick A. Stokes Company, N. Y., 1919, p. 76, 109.

Smith, Carrie J., **THE EASY ROAD TO READING PRIMER**, Lyons and Carnahan, Chicago, 1923, pp. 48.

GRADE I

Unit-Five-----Birds-----Early spring birds---Robin

Leisure-time interests and activities.

A. Specific Objective: To take a nature walk to learn about the robin.

B. Organization of the activities and subject matter of this unit.

1. On walks to and from school and in their goings about the children will be looking for the return of birds. This is recorded on the chart made earlier in the year. When the first robin is reported is a good time to study spring birds.

1. Where has the robin been?

2. Why did he go away?

3. How does the robin look?

4. What does he eat?

5. How does he get his food?

6. How do they build their nests?

7. Where do they build their nest?

8. How do the father and mother take care of the babies?

9. Why do we like the robin?

2. A robin's nest may be watched.

A robin book may be made.

A robin chart may be made of large sheets of wrapping paper fastened together at the top to turn over as a calendar.

Answers to these questions made be written for a Bird

Book for Mother's Day.

If the mother and father have four children, how many will there be in the robin family?

How does the robin keep clean?

Sing robin's song.

Materials:

Robin's nest	Poems
Robins	Old Nests
Paper	
Colors	
Pictures	
Stories	
Songs	

Teacher's Reference:

Craig, John Bradford, NATURE STUDY, Book I, McIndoo Publishing Company, Kansas City, Mo., 1921, pp. 51-57.

WORLD BOOK COMPANY, Roach Fowler and Company, Kansas City, Mo., pp. 273-274.

Rhodes, Harry L., BIRD NOTES, Published, Charles Hillebrant, Wellington, Kansas.

Any bird of the child's environment may be studied.

Children's Reference:

Bouton, Josephine, "Traveling Light", POEMS FOR THE CHILDREN'S HOUR, Milton Bradley Company, Springfield, Mass., 1927, pp. 155. "What Will Robin Do"?, pp. 156.

Robinson, Bertha, BIRDS WE KNOW, Whitman, Racine, Wis., (For pictures.)

Seegmiller, Wilhelmina, "Redbreast in the Cherry Tree", in
A NEW GARDEN OF VERSES FOR CHILDREN, Rand McNally and Com-
pany, Chicago, p. 46.

- a. [Faint text]
- b. [Faint text]
- c. [Faint text]
- d. [Faint text]
- e. [Faint text]
- f. [Faint text]
- g. [Faint text]
- h. [Faint text]
- i. [Faint text]
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- q. [Faint text]
- r. [Faint text]
- s. [Faint text]
- t. [Faint text]
- u. [Faint text]
- v. [Faint text]
- w. [Faint text]
- x. [Faint text]
- y. [Faint text]
- z. [Faint text]

GRADE I

Unit-Six-----Mammals-----The Horse

Leisure-time interests and activities.

- A. Specific Objective: To know the uses of the horse.
- B. Organization of the activities and subject matter of this unit.
1. The horse that carries some child to school may be studied.
 2. How does he look?
 3. What color is he?
 4. Are all horses the same color?
 5. Feed a horse.
 6. How else do we care for him?
 7. Ride him.
 8. How does his coat feel?
 9. What happens to his coat when winter comes?
 10. How does he keep cool?
 11. What does he eat?
 12. How does he keep clean?
 13. What can he do?
 14. What makes horses mean?
 15. How can he protect himself?
 16. How does he earn his home?
 17. How do we treat him?
 18. Tell how to treat a horse.
 19. Count the ears of corn to feed a horse.
 20. Measure oats to feed a horse.
 21. Feed the horse some sugar.

22. How does the horse talk?
23. What is its baby called?
24. Compare the horse and the cow.
25. Read stories about horses.
26. Sing a song about horses.
27. Play you are a horse. Trot - gallop, run, tell you are hungry, play.

Teacher's Reference:

Craig, John Bradford, TEACHERS' MANUAL OF NATURE STUDY, Mc Indoo, Kansas City, Missouri, 1920, pp. 67-71.

THE WORLD BOOK, Vol. 5, pp. 2838-2842.

Lowden, Frank O. in KANSAS STATE BOARD OF AGRICULTURE TWENTY-SEVENTH BIENNIAL REPORT, Topeka, Kansas, 1931, p. 278.

Buckley, Arabella, THROUGH THE LOOKING GLASS, D. Appleton and Company, 1890, pp. 195-208.

Children's Reference:

Lindsay, Maud, MORE MOTHER STORIES, "Dumpy the Pony", Milton Bradley Company, Springfield, Mass., 1916, p. 117.

Mitchell, Lucy Sprague, "Once the Barn Was Full Of Hay" and "Old Dan Gets The Cool", in HERE AND NOW STORY BOOK, 1921, pp. 301-308.

GRADE I

Unit-Seven-----Mammals-----The Rabbit

Leisure-time interests and activities.

- A. Specific Objective: To know about a rabbit.
- B. Organization of the activities and subject matter of this unit.
1. Any animal of the farm not previously observed may be studied.
 2. A child may bring his pet rabbit to school to be observed.
 3. What color is it?
 4. What are its feet like?
 5. Its legs?
 6. Its ears?
 7. Its nose?
 8. Its eyes?
 9. Its fur?
 10. How does it walk?
 11. What does it eat?
 12. Where shall we look for its home?
 13. When does it get its food?
 14. How does he get away from things after him?
 15. What things are not friends to rabbits?
 16. Of what use are rabbits?
 17. How does a rabbit keep clean?
 18. How do the little ones look?
- Draw a rabbit.
- Make a rabbit out of oil cloth for Easter for little sister.

Examine the fur on girls' coats.

How may rabbits be kept from eating the bark on fruit trees?

Berry bushes, strawberries, and cabbages?

Write the story of pet rabbit for Nature Book.

Draw rabbit's tracks.

Materials:

Rabbits - a family if possible.

Stories of rabbits.

Song of rabbits.

Carrots.

Clover.

Alfalfa.

Teacher's Reference:

Comstock, Anna Bradford, HANDBOOK OF NATURE STUDY, Comstock
Publishing Company, Ithaca, N. Y., 1929, p. 213-217.

Children's Reference:

Bouton, Josephine, "The Rabbits", POEMS FOR THE CHILDREN'S
HOUR, Milton Bradley Company, Springfield, Mass., pp. 70.

GRADE I

Unit-Eight-----Mammals-----Reindeer

Leisure-time interests and activities.

- A. Specific Objective: To know the use of the reindeer.
- B. Organization of activities and subject matter of this unit.
1. Some children may have been to Kansas City to see the reindeer the "Star" parades at Christmas time. The children may ask such questions as:
 1. How did they look?
 2. How many were there?
 3. What color were they?
 4. What did they do?
 5. Did they pull a real sleigh?
 6. What did they eat?
 7. What are they good for?
 2. This will lead to the importance of the reindeer to people of the North as food, clothing, shelter, and transportation. It will lead to a comparison with the cow of the farm.
 3. In the far North the reindeer is the Eskimo's cow. It gives milk. The mother makes clothing from its skins. The father makes a sled and the frame work for skins of a summer home from the bones. When boys and girls are naughty, the mother heats a reindeer bone and burns the bad child. When the baby cries a piece of frozen reindeer milk is thawed to feed it. Reindeer is also used for meat. When the Eskimo boy gets sleepy, he goes to

bed on a pile of reindeer skins, and reindeer skins are his blankets.

1. Draw a reindeer.
2. Draw the articles of clothing made from reindeer skin.
3. Make a list of the uses of the reindeer.
4. Draw a picture showing the reindeer giving an Eskimo a ride.

Teacher's Reference:

THE WORLD BOOK, Vol. 8, Roach and Fowler Publisher, Kansas City, Mo., pp. 4964-4965.

Children's Reference:

Perdue, H. Avis, CHILD LIFE IN OTHER LANDS, Rand McNally and Company, Chicago, 1918, pp. 32-33.

Nida, William L. and Stella H. Nida, TRAILING OUR ANIMAL FRIENDS, Book 2, D. C. Heath and Company, Boston, 1928, pp. 139-142.

GRADE I

Unit-Nine-----Amphibians-----Frogs

Leisure-time interests and activities.

- A. Specific Objective: To know how to tell a frog from toad.
- B. Organization of activities and subject matter of this unit.
1. The croaking of nearby frogs suggests that we know more about this fellow who is singing close by. We make a trip at noon to the place where he may be found. We note his color, his legs, what he does.
 2. We take a few eggs which we find by the water's edge for the aquarium and watch them develop.
 3. We secure a toad and compare with the frog as to shape, color, covering, feeling to touch.
 4. Secure a few toad eggs and put in a glass jar. Observe.
 5. Watch a toad catch flies.
 6. Decide upon the use of frogs and toads.
 7. Decide if they are friends.
 8. How should we treat the toad in the garden?

Summary:

1. Put a little frog in the aquarium. (Don't forget a rock or board for him to rest upon when out of the water.)
2. Draw a frog.
3. Record the changes in the eggs of both toad and frog daily.
4. Feed the frog.
5. Read about frogs.
6. Tell how frogs and toads help us.
7. Tell why the frog changes color.

What shall we do with our hands after handling frogs and toads? Why?

Teacher's Reference:

- 1. Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 181-196.
- Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, TEACHER'S MANUAL, McIndoo Publishing Company, Kansas City, Missouri, pp. 21-25.
- Holtz, Frederick L., NATURE STUDY, Charles Scribner's Sons, New York, 1908, pp. 148-164.

Children's Reference:

- Huber, Miriam Blanton and Others, "Frogs At School", pp. 12-14 and "The Toad and the Rabbit", THE POETRY BOOK, Rand McNally and Company, Chicago.

Teacher's Reference:

- Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 181-196.
- Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, TEACHER'S MANUAL, McIndoo Publishing Company, Kansas City, Missouri, pp. 21-25.
- Holtz, Frederick L., NATURE STUDY, Charles Scribner's Sons, New York, 1908, pp. 148-164.

GRADE I

Unit-Ten-----Fish-----Goldfish

Leisure-time interests and activities.

- A. Specific Objective: To know how to care for the goldfish.
- B. Organization of activities and subject matter of this unit.
- Observe the goldfish in the aquarium. Learn how to care for and not over feed him.
1. When the fish becomes swollen, what shall we do for him?
 2. How can we give a fish medicine?
 3. How often should the water be changed?
 4. What does a goldfish eat?
 5. Of what use is a goldfish?

Summary:

1. Draw a gold fish.
2. Find a picture of a goldfish for Nature Book.
3. Get water plants for aquarium.
4. Swim like a fish.

Teacher's Reference:

Comstock, Anna Botford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1929, pp. 149-180.

Children's Reference:

Seegmiller, Wilhelmina, "Schools for Fish", THE BOOK OF POETRY, Book I, p. 15, Rand McNally and Company, Chicago, 1925.

Seegmiller, Wilhelmina, "Do the Fishes Know?", A NEW GARDEN OF VERSES FOR CHILDREN, Rand McNally and Company, Chicago, 1925, p. 53.

GRADE I

Unit-Eleven-----The Turtle

Leisure-time interests and activities.

- A. Specific Objective: To know what the turtle looks like.
- B. Organization of activities and subject matter of this unit.
1. A small turtle may be observed in the aquarium.
 1. How much can be seen when he walks?
 2. Touch him.
 3. What does he do?
 4. Of what use is the shell to the turtle?
 5. What shall we feed him? (Earthworms, chopped fresh beef, lettuce leaves.)
 6. Why shouldn't we keep two turtles in the same aquarium?
 7. How does he fight for himself?
 2. Tell how the turtle protects himself.
 3. Tell why the turtle is a friend.
 4. Find a picture of a turtle for the Nature Book.
 5. Read about the turtle.

Materials:

Aquarium

Turtle

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1929, pp. 208-212.

Holtz, Frederick L. Nature Study, Charles Scribner's Sons, New York, 1908, pp. 163-164.

Children's Reference:

Lindsay, Vachel, "The Little Turtle", in SILVER PENNIES, MacMillan Company, N. Y., 1925, p. 53.

- A. ...
- B. ...
- 1. ...
- 2. ...
- 3. Which ...
- 4. What ...
- 5. What ...
- 6. ...
- 7. ...
- 8. ...
- 9. ...
- 10. ...
- 11. ...
- 12. ...
- 13. ...
- 14. ...
- 15. ...
- 16. ...
- 17. ...
- 18. ...
- 19. ...
- 20. ...

GRADE I

Unit-Twelve-----Insects-----Caterpillar

Leisure-time interests and activities.

- A. Specific Objective: To know the life cycle of the butterfly.
- B. Organization of activities and subject matter of this unit.
- How can we tell a butterfly from a moth? One has feathery feelers and the other has knobs on the end of its feelers. Which has feathery feelers?
1. Put cocoons into a glass or box.
 2. Put caterpillar into a glass or box with leaves and observe.
 3. Which way does the caterpillar weave first?
 4. What does he do after he has spun threads the long way?
 5. What does the cocoon look like?
 6. Draw the cocoon.
 7. Draw the butterfly.
 8. Draw the moth.
 9. Sing a butterfly song.
 10. Fly like a butterfly.
 11. Dance butterfly dance.
 12. Make clothespin butterflies for curtain tie backs for Mother's Day.

Material:

Moth

Butterfly

Clothespin

Stories

Poems

Songs

Paper (colored)

Paste

Scissors

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 315-364.

Holtz, Frederick L., NATURE STUDY, Charles Scribner's Sons, 1908, pp. 236-243.

Miller, Ellen Robertson, BUTTERFLY AND MOTH BOOK, Charles Scribner's Sons, 1931, pp. 281.

Children's Reference:

Rossetti, Christina G., SING - SONG, MacMillan Company, N. Y., 1924, p. 81.

Swinburne, Algernon Charles, "White Butterflies," POEMS FOR THE CHILDREN'S HOUR, Milton Bradley Company, Springfield, Mass., 1927, pp. 239-240.

GRADE I

Unit-Thirteen-----Insects-----Bumblebee

Leisure-time interests and activities.

- A. Specific Objective: To know what the bumble bee does.
 B. Organization of activities and subject matter of this unit.

1. A walk at noon will give us a chance to see the bee at work. What does he look like? What does he do? Where do we find him? A bee may be captured and brought into the room for a lesson. We can notice his size, his stripes, his dusty legs, and hear his voice. How does he keep himself clean? Free him. Sometimes when he finds a mouse dead in its hole the bee covers him with balls of honey.

Children dictate a story about the bees for the Nature Book.

Tell bee stories.

Make a bee play.

Talk like a bee.

Possibly some child has found a bumblebee's Nest. Tell about it.

Take the bee's picture. (Draw it.)

Count the flowers the bee visits.

Materials:

Bumblebees

Glass jar with lid with small opening.

Sugar

Teacher's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, Mc Indoo Publishing Company, Kansas City, Missouri, Fourth Grade,

1921, pp. 29-34.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 442-444.

Children's Reference:

Wood, Edna D., "Bumblebee", in POEMS FOR THE CHILDREN'S HOUR, Milton Bradley Company, Springfield, Mass., 1927,

pp. 121-6.

Seegmiller, Wilhelmina, "To A Bee", in A NEW GARDEN OF VERSES FOR CHILDREN, Rand McNally and Company, Chicago, 1925,

pp. 78-79.

GRADE I

Unit-Fourteen-----Wild Flowers

Leisure-time interests and activities.

A. Specific Objective: To know the colors of the fall flowers.

B. Organization of activities and subject matter of this unit.

1. On our walk to observe the bumblebee, we often found him visiting the yellow flowers along the roadside. There were beetles also on these yellow blossoms. Because the plants grew so straight a child suggests that they are a rod. The name "goldenrod" is given him. We look at the color. The stiff, rough leaves, and the blossoms in a row like houses on a street. We notice there are little balloons with seeds ready to fly away. As we return through the field we came upon the sunflower. The sunflower and the goldenrod are both yellow. Their leaves are rough. Both are yellow fall flowers.

1. Tell of our trip.

2. Draw the goldenrod.

3. Draw the sunflower.

Teacher's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Company, Kansas City, Missouri, Fourth Grade, pp. 66-69.
Comstock, Anna Botsford, HAND BOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1929, pp. 555-557.

Children's Reference:

Troeger, John W. H., HAROLD'S RAMBLES, Book II, D. Appleton and Company, N. Y., 1898, pp. 30-33.

GRADE I

Unit-Fifteen-----Wild Flowers-----Spring

Leisure-time interests and activities.

- A. Specific Objective: To know what the earliest spring wild flowers are.
- B. Organization of activities and subject matter of this unit.
1. The violet and the sheep sorrel are among the first comers and may be seen on a trip to observe spring flowers. Notice the blossoms, leaves, and roots. Where do they grow?
 2. Transplant some violets to the school yard rock garden.
 3. Taste the sheep sorrel. Those who like sour things may wash some sorrel leaves and make a sandwich for lunch.
 4. Press some sorrel leaves and blossoms for Nature Book.
 5. Count the spring flowers you know.

Teacher's Reference:

Craig, John Bradford, NATURE STUDY FOR GIRLS AND BOYS, McIndoo Publishing Company, Kansas City, Mo., Vol. 3, p. 27-31.

Children's Reference:

Larcom, Lucy, "Calling the Violet", in THE POETRY BOOK I, Rand McNally and Company, Chicago, pp. 86-88.

GRADE I

Unit-Sixteen-----Tame Flowers-----Crocus

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the crocus.

B. Organization of activities and subject matter of this unit.

1. The crocuses are in bloom in the rock garden planted last fall in the school yard. We note the deep rich purple and orange, the glossy leaves that snuggle around the blossom. We remember we planted some bulbs. As the tulips and jonquils open we may continue our observation of spring flowers.

1. Children make a crocus border for the room.

2. Sing about tulips.

3. Play a flower story.

4. If six tulips bloom this week and six next week, how many tulips will there be in our garden?

Materials:

Garden

Flowers

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 603-606, p. 596-602.

Children's Reference:

Olcott, Frances Jenkins, "Why Crocus Holds Up His Golden Cup", in THE WONDER GARDEN, Houghton Mifflin Company, Boston, 1919, pp. 107-108.

GRADE I

Unit-Seventeen-----Wild Plants-----Weeds

Leisure-time interests and activities.

- A. Specific Objective: To know what a weed is.
- B. Organization of activities and subject matter of this unit.
1. We visit a cornfield at noon to see how the corn looks. We notice many plants which do not look like corn plants that are coming up looking like little green soldiers in a long row. What are the other plants? We find that a weed is a plant growing where we do not want it to grow.
 2. We talk about some plants that are weeds poison ivy, thistles, dandelions, sunflowers.
 3. We discuss what to do about weeds. Weeds are easy to pull when they are little.
 4. When we go home from school we are going to pull as many weeds as we are years old and that many more. How many will that be for each of us?
 5. Keep record of our weed pulling for a week. How many did we pull?

Materials:

Weeds

Catalogs for pressing

Teacher's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 25, pp. 31-34, Sixth Book.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock

Publishing Company, Ithaca, N. Y., 1925, pp. 594-595.

Children's Reference:

Field, Robena Ellen, "A Legend of the Dandelion", HALF A
HUNDRED STORIES", Milton Bradley Company, Springfield, Mass.,
1925, pp. 158-159.

GRADE I

Unit-Eighteen-----Buds

Leisure-time interests and activities.

- A. Specific Objective: To learn about buds on a nature walk.
- B. Organization of activities and subject matter of this unit.
1. On a field trip notice the branches and twigs of the different trees, bushes, and shrubs.
 2. The oak bud is protected by fuzz and the old leaf hangs on tight. Some buds are protected by fuzz. Some are thick and shiny. Others are sticky.
 3. Put some twigs of the willow, apple, and lilac in water. Watch developments.
 1. Draw a picture of the twig the day it is put in water.
 2. Leave room on the page for a later picture of the same twig.
 3. We find that the willow sends out blossoms from the buds.
 3. The apple sends out blossoms from the end buds and leaves from the side buds.
 4. The lilac sends out leaves first before the blossoms.

Teacher's Reference:

THE WORLD BOOK, Vol. 2, Roach and Bowler, Chicago, 1925, pp. 975-976.

Children's Reference:

Chase, Annie, BUDS, STEMS, AND ROOTS, Educational Publishing Company, Boston, 1897, pp. 136.

GRADE I

Unit-Nineteen-----Trees

Leisure-time interests and activities.

A. Specific Objective: To learn about trees on a nature walk.

B. Organization of activities and subject matter of this unit.

When the leaves are colored on the trees take a field trip.

The leaves have turned color because they are no longer eating. What color do we turn when we do not eat? What foods do the trees give us? Which tree food do you like best?

1. Arrange leaves in a design on a card, paste, and press.

2. Draw a tree.

3. Play a tree game.

4. Draw a picture of the tree food you like best.

Materials:

Leaves

Rake

Paper

Paste

Colors

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1929, pp. 726-816.

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 40-44, Fourth Grade.

Children's Reference:

Coleridge, Sara, "Trees" in POEMS FOR THE CHILDREN'S HOUR,

Milton Bradley Company, Springfield, Mass., 1927, pp. 197-198.
 Seegmiller, Wilhelmina, "Winter Trees", A NEW GARDEN OF VERSES
 FOR CHILDREN, Rand McNally and Company, Chicago, 1926, pp.115.

GRADE I

Unit-Twenty-----Gardening

Leisure-time interests and activities.

A. Specific Objective: To plant an early flower garden.

B. Organization of activities and subject matter of this unit.

First select a spot suitable for a garden. Consult nursery catalogs to decide what to plant. We find that jonquils, narcissus, and crocus may be planted in the fall and come up early in the spring. The Inter-State Nurseries offer a group of bulbs. The first grade choose daffodils--six bulbs for thirty cents. We read how to prepare for them - "Dig deep and fertilize with manure. Put bulbs at least four inches deep." We measure four inches.

One of the larger boys will bring a sack of well rotted barn yard soil.

Put the bulbs six inches apart. Measure.

Find how much each one will have to pay if there are fifteen children in school and the cost is thirty cents.

1. Draw a daffodil.
2. Draw a picture of a bulb.
3. Tell how we made our garden.
4. What did we plant?
5. What did we do first?
6. How did we get the soil ready?
7. How deep did we plant the bulbs?
8. How far apart did we plant the bulbs?
9. How much did we each pay?

Material:

Catalogs

Bulbs

Money

Spade

Fertilizer

Rake

Ruler

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1925, pp. 601-602.

Craig, John Bradford, NATURE STUDY, Book 3, McIndoo Publishing Company, 1928, Kansas City, Mo., pp. 109-111.

Children's Reference:

Justus, May, "A Garden Path" in POEMS FOR THE CHILDREN'S HOUR, Milton Bradley Company, Springfield, Mass., 1927, p.212.

Coleridge, Sara, "The Garden Year", in CHIMNEY CORNER POEMS, Milton, Balch and Company, N. Y., 1929, pp. 54-55.

GRADE I

Unit-Twenty-one-----Rocks

Leisure-time interests and activities.

- A. Specific Objective: To collect rocks for the rock garden.
- B. Organization of the activities and subject matter of this unit.
1. After discussing the location and size of our rock garden, we decide upon a trip to gather rocks. Children may exercise their judgment as to which rocks will suit our garden. As they crack them about the rock flour showers on to their clothes. This leads the child to grind rocks together to make more flour. Other observations we made that wind and water grind rocks against each other and make soil.
 2. Children tell of other uses of rocks such as barns, houses, foundations, bridges, tombstones, salt, lime.
 3. Play "jacks" with stones.
 4. Remove stones from road that may cut automobile tires.
 5. What use does father make of rocks on the farm?
 6. Collect some rocks to put in the bottom of our geranium can. Why?

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1925, pp. 542-847.

Children's Reference:

Allen, Annie E., "Stony and Rocky" in IN THE CHILD'S WORLD, Milton Bradley Company, Springfield, Mass., 1923, pp. 230-232.

GRADE I

Unit-Twenty-two-----Weather-----Snow

Leisure-time interests and activities.

- A. Specific Objective: To notice the shapes of the snowflake.
- B. Organization of the activities and subject matter of this unit.

1. A snow storm offers a good opportunity to study snowflakes. Their beauty may be seen on the coats. We notice the shape. How many points? Whenever the big flakes fall some folks say Old Lady of the sky is picking her geese. When the snowflake melts what is left?
2. Gather pictures of snow scenes.
3. Draw your picture sliding down hill.
4. Look for animal tracks.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1920, pp. 850-866.

Children's Reference:

Dodge, Mary Mapes, "Snowflakes", in THE POETRY BOOK I, Rand McNally and Company, Chicago, 1926, pp. 53. Ibid., "Winter Night", p. 54.

GRADE I

Unit-Twenty-three-----Weather

Leisure-time interests and activities.

- A. Specific Objective: To observe the signs of fall.
- B. Organization of the activities and subject matter of this unit.

1. We are walking to see signs of fall.
2. How do the leaves tell?
3. How do grass and corn tell?
4. Where is the wheat?
5. What are wild geese doing?
6. Where are the birds?
7. How do apples look?
8. What flowers are blooming?
9. What is the squirrel doing?
10. How do the winds behave?
11. Which way is it blowing today?
12. How can we tell?
13. What is the wind doing?

The wind is air in motion.

1. Make pin wheels out of paper.
2. Fly kites.
3. Blow a balloon full of air. Put in a cool place. Measure.
4. Blow a balloon full of air and put in a very warm place. Measure. Why is the one in the warm place larger?

Warmer air grows lighter.

Cold air pushes the warm air up and makes it move, so we have wind.

Teacher's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, Book 4, McIndoe Publishing Company, Kansas City, Mo., 1921, pp. 174-178.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 866-886.

Children's Reference:

Seegmiller, Wilhelmina, "One Misty, Moisty Morning", pp. 60, A GARDEN OF VERSES FOR CHILDREN, Rand McNally and Company, Chicago, 1925. Ibid., "The Windy Man", pp. 69-70, Ibid., "Good-by", pp. 190, Ibid., "Jolly October", p. 112.

Aldis, Dorothy, "Hot Weather", in EVERYTHING AND ANYTHING, Milton, Balch and Company, N. Y., 1927, p. 37.

GRADE I

Unit-Twenty-four-----Weather-----Rain

Leisure-time interests and activities.

- A. Specific Objective: To know where the rain comes from.
- B. Organization of activities and subject matter of the unit.
1. The rain is splashing against the window. We stand and watch it.
 2. Why does it come slanting?
 3. What is it doing to the window?
 4. What is it doing to the trees, roofs, flowers, and all out of doors?
 5. What clothing do we wear on rainy days?
 6. How do birds keep dry?
 7. What do animals do in the rain?
 8. What does the rain do for us?
1. Write answers on board for reading and language.
 2. Make a pin wheel and a boat. Fold an umbrella.
 3. Make some free hand cuttings to show a rainy day; chicken standing in the rain, father ready for chores.

Teacher's Reference:

THE WORLD BOOK, Vol. 8, Roach and Fowler, Chicago, pp. 4921-4923.

Children's Reference:

Hawkshaw, Ann, "Little Raindrops", in THE POETRY BOOK I, Rand McNally and Company, Chicago, 1926, pp. 78-79.

Hammond, Eleanor, "Rain in April", Ibid., p. 80, Ibid., p. 77.

GRADE I

Unit-Twenty-five-----Health

Efficiency in physical development and health.

- A. Specific Objective: To know how to keep the house clean.
- B. Organization of activities and subject matter of this unit.
1. What does mother do when she cleans house?
 2. What can we do to make our school house clean?
 3. Let children carry out their own suggestions as far as possible. (Dust the erasers and library books.)
 2. Clean up the school yard. Let every child take part.
- Why should we have clean yards?
3. Why should open fruit tins be buried, or at least overturned?
1. Cut pictures showing the things needed to clean house.
 2. Draw a picture of mother's bedding airing.

Teacher's Reference:

Olfers, Sibylle v., WHEN THE ROOT CHILDREN MAKE UP, Frederick A. Stokes Company, N. Y., 1931, p. 91.

Children's Reference:

Repford, Eben, "A Sign of Spring" in POEMS FOR THE CHILDREN'S HOUR, Milton Bradley and Company, Springfield, Mass., 1927, p. 189.

GRADE I

Unit-Twenty-six-----Sky and Stars-----Sun

Leisure-time activities and interests.

- A. Specific Objective: To know the sun gives us light, heat, and health.
- B. Organization of activities and subject matter of this unit.
1. Walk in the sunshine.
 2. What does the sunshine do?
 3. How do the cows enjoy the sunshine? Why?
 4. Little colts?
 5. The dog?
 6. Why are the plants mother has had in the basement so pale?
 7. Why are the store keepers so pale?
 8. Why are boys and girls pale who stay in the house too much?
 9. Bring an onion to school that has been in the cellar all winter. Lay it in the sun and see what happens.

Teacher's Reference:

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, 1925, pp. 5624-5626.

Collins, Frederick A., THE BOOK OF STARS, D. Appleton and Company, N. Y., 1920, Chapter 3.

Holden, Edward S., THE FAMILY OF THE SUN, D. Appleton and Company, N. Y., 1904, pp. 252.

Children's Reference:

Bryce, Catherine T. and Rose Lees Hardy, "The Wind and the

Sun", in PLAYTIME, Newson and Company, N. Y., 1927, pp. 52-56.

What am I?

I shine.

I shine brighter than the candle.

I am brighter than the moon.

The wind can not blow me out.

Can you guess what I am?

Children's Reference: GRADE II

Unit-One-----Birds-----The Crow

Leisure-time interests and activities.

A. Specific Objective: To observe the habits of the crow.

B. Organization of activities and subject matter of the unit.

1. Review of the birds studied last year. Study some of the neighborhood. Study the crow.

2. Where do we find him?

3. Where will we find his nest?

4. How does he look?

5. What does he do?

6. What does he say?

7. Where does he spend the night?

8. Is he a friend or enemy? Why?

2. Play a bird game after review of last year's birds. One child describes himself as a bird, if the "rest" can guess the Bird described he gains a bird for his nest. One child plays he is a nest.

Be on the watch for birds at home and on the way to and from school. Tell what they are doing. Watch for the blackbirds. How do they move about? What do they do? How many in a tree? Why do they get together in such bands?

Play bird game for health.

For round shoulders, fly with arms outstretched and chest out.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Ithaca, N. Y., pp. 129-132.

GRASS

Children's Reference:

Bailey, Carolyn S. and Clara M. Lewis, "The Crow and the Pitcher", in FOR THE CHILDREN'S HOUR, Milton Bradley Company, Springfield, Mass., 1926, p. 329. Ibid., p. 331.

When white men...
Europe...
and went out...

- 1. The...
- 2. The...
- 3. The...

What...
What...
What...

What...
What...
What...

What...
What...
What...

What...
What...
What...

What...
What...
What...

GRADE II

Unit-Two-----Birds-----Turkey

Leisure-time interests and activities.

- A. Specific Objective: To observe the habits of the turkey.
- B. Organization of activities and subject matter of this unit.

When white men first came to this country there were many wild turkeys. If the family needed meat the father took his gun and went out into the woods and shot a turkey out of a tree.

Now there are only a few wild turkeys.

1. The turkey may be studied in connection with Thanksgiving.
2. How is it different than a hen?
3. What does it look like?
4. How can you tell the father turkey from the mother?
5. What does the turkey say?
6. What does the turkey eat?
7. Where are his feathers which are something like a rain coat? An over coat? Like underwear?
8. Where does he like to sleep?
9. Write answers to the questions for a reading or language lesson.
10. Play a turkey game. Hide the button. When found gabble.
11. Sing a song about a turkey.
12. If John has 5 turkeys, May 5 turkeys, and Mary 2 turkeys, how many turkeys all together.
13. Draw a picture of a turkey.

Material:

Turkey

Feathers

Paper

Paste

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Ithaca, N. Y., pp. 143-146.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., 1920, pp. 35-37.

Children's Reference:

Bryant, Sara Cone, STORIES TO TELL TO CHILDREN, Houghton Mifflin Company, 1907, pp. 19-23.

GRADE II

Unit-Three-----Birds-----Nests

Leisure-time interests and activities.

- B. Specific Objective: To make a collection of birds' nests.
- B. Organization of the activities and subject matter of this unit.
1. After the birds are gone, take a field trip to secure old nests. Children may bring them in as they are found later.
 2. Arrange the nests so that they are objects of interest only, not things to clutter up the room.
 3. Label each nest.
 - a. Name of bird.
 - b. Where the nest was built.
 - c. Material used.
 4. Observe the way in which the nests are made.
 5. List the materials found in each nest.
 6. Draw a bird's nest.

Teacher's Reference:

Huber, Miriam Blanton, *THE POETRY BOOK I AND OTHERS*, Rand McNally and Company, Chicago, 1926, pp. 103, 104, 98.

Children's Reference:

Author Unknown, "The Turtle Dove's Nest" in *THE POETRY BOOK I*, Rand McNally and Company, 1926, pp. 102. Ibid., "What Does Little Birdie Say?", p. 103.

GRADE II

Unit-Four-----Mammals-----Mouse

Leisure-time interests and activities.

- A. Specific Objective: To observe the habits of the mouse.
- B. Organization of activities and subject matter of this unit.
1. Bring a mouse into the room to study. This will give a chance to treat him kindly. A cage can be made of screen nailed over a wooden box.
 2. Feed and water him. He needs much water.
 3. A substantial string may be fastened in the middle of the box. The mouse will often do acrobatic stunts for the children.
 4. What color is his fur?
 5. Describe his eyes and ears.
 6. Where does he live?
 7. How does he make his nest?
 8. How does he talk?
 9. Why do we trap him? Mice not only spoil food but destroy clothing, bedding, and set fires.
 10. How should we treat a trapped mouse?
 11. What kind of trap is best?
 12. How do mouse get from place to place?
 13. How do mouse tracks look in the snow?
 14. Write answers to the questions for reading or language.
 15. Make a mouse trap.
 16. Learn a poem about mice.
 17. Sing a song about mice.

Materials:

Mice	Food
Wire	Water
Tacks	String
Box	Small pan

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1926, pp. 224-228.

Burroughs, John, SQUIRRELS AND OTHER FUR BEARERS, Houghton Mifflin Company, N. Y., 1900, Chapter 13.

Children's Reference:

Huber, Miriam Blanton and Others, THE POETRY BOOK I, Rand McNally and Company, 1926, p. 4.

Donaldson, Lois, IN THE MOUSE'S HOUSE, Laidlow Brothers, N. Y., 1930, pp. 32.

Cook, Eliza, "The Mouse and the Cake", in ONE THOUSAND POEMS FOR CHILDREN, George W. Jacobs and Company, Philadelphia, 1920, pp. 39-40.

GRADE II

Unit-Five-----Fish-----Catfish

Leisure-time interests and activities.

- A. Specific Objective: To know about the habits of the catfish.
- B. Organization of activities and subject matter of this unit.
1. Put a small bullhead into the aquarium to observe. Put in seaweed and later mud and gravel.
 2. How is the bullhead different from the goldfish?
 3. What is another name for him?
 4. Where do we find them?
 5. What do they eat?
 6. What is its covering?
 7. What is he good for?
 8. How does mother cook it?
 9. Make a net to catch a small bullhead. Choose the smallest one.
 10. Write answers to these questions.
 11. Tell about going fishing.
 12. If a boy caught 3 catfish and his father caught 3 bullheads, how many catfish were there?
 13. John paid 5 cents for a fish hook and twice as much for a line. How much did the line cost?
 14. Swim like a fish.
- Fish are good food but they should be well or little cooked.

Materials:

Jar

Net

Teacher's Reference:

Lizards

GRADE II

Unit-Six-----Reptiles-----Lizards

Leisure-time interests and activities.

- A. Specific Objective: To know the habits of the lizard.
- B. Organization of activities and subject matter of this unit.
1. Bring a lizard into school. Keep him in the terrarium.
 2. Of what does his covering make you think?
 3. How many legs has he?
 4. Describe his feet.
 5. Where does he live?
 6. What does he eat?
 7. Of what use is he?
 8. The lizard lays eggs in loose sand. Sometimes she lays them in tunnels under flat rocks. Its food is mostly grasshoppers and crickets. Most lizards do not bite and only the large Gila monster is poisonous. The lizard moves so quickly that it is hard to see.
 9. Draw a lizard.
 10. Play an animal guessing game.

I am not very big.

I am usually gray but sometimes I am black. Some of us have six stripes down our backs. I lay my eggs in sand or in tunnels under a rock. I eat grasshoppers and crickets. I run so fast that you can hardly see me.

What am I?
 11. By pantomime show you are a lizard.

Materials:

Lizard

Terrarium

Box - screen

Teacher's Reference:

Burt, Charles E., THE LIZARDS OF KANSAS, Transactions of the Academy of Science, Vol. 26, No. 1, Aug. 1928.

THE WORLD BOOK COMPANY, Vol. 6, Roach and Fowler, Chicago, p. 3470.

Children's Reference:

King, E. L. M., FIFTY COUNTRY RHYMES FOR CHILDREN, D. Appleton and Company, N. Y., 1926, p. 5.

GRADE II

Unit-Seven-----Insects-----The Butterfly

Efficiency in unspecialized activities.

A. Specific Objective: To know the life history of the butterfly.

B. Organization of the activities and subject matter of this unit.

1. Review how plants get ready for winter. Let us find out how insects get ready for winter. Who has seen a yellow furry fellow in the garden, on plants, on the road coming to school? Shall we bring in some to watch in the schoolroom? How shall we take care of them?

2. Glass tumblers may be the cage for each child to carry on his own experiment.

3. What must we do beside getting a cage?

4. What do they eat? Give them fresh leaves every day.

5. Observe the caterpillar. Each child makes a contribution until all the facts are given.

Fill in blanks.

6. The caterpillar rolls up into a _____.

7. This caterpillar has a _____ coat.

He has a _____ head.

He has _____ feet.

He eats _____.

In a week or two the caterpillar will show how he gets ready to spend the winter. We may be able to see him make his cocoon. What is it made of? The caterpillar spins the threads from his mouth. After examining the cocoon from the

outside, clip open a cocoon and notice the inside. This brown thing is called the pupa. Tell all you see in it. How can we tell it is alive? What will it be by and by? We will find the answer next spring. The child may take his glass home and put it in the cool cellar to be brought to school again in April.

8. Finish the blanks.

The cocoon is made of _____ and _____.

The caterpillar is a _____ in the cocoon.

The pupa is _____.

We kept the pupa cool all _____.

9. Draw the cocoon.

Materials:

Caterpillars

Glasses

Scissors

Cabbage leaf

Chard leaf

Beet leaf

Cocoons

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 308-457.

Comstock, Anna Botsford, HOW TO KNOW BUTTERFLIES, Comstock Publishing Company, Ithaca, N. Y.

Comstock, Anna Botsford, WAYS OF THE SIX FOOTED, Comstock Publishing Company, Ithaca, N. Y.

GRADE II

Unit-Eight-----Insects-----Grasshopper

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits of the grasshopper.
- B. Organization of activities and subject matter of this unit.
1. Grasshoppers are common in the fall. The red-legged grasshopper is found along the roads, in yards, and fields. There is a dark gray grasshopper some two inches long that is almost the color of the road dust. He is called the road grasshopper. The olive green grasshopper is found in garden and cornfields. It hops mostly.

Every child should have a glass jar with some mosquito net for a cover. This can be held in place by a rubber band.

Here the feed habits and observations can readily be seen.

A terrarium for the school may be made by older boys. A frame two feet long, six inches wide and twelve or fifteen inches high may be covered with screen. To secure cricket eggs a lantern chimney may be set in a flower pot full of soil.

What does he look like? Where are his eyes? How many legs has he? How many wings, has he? What kind of a mouth has he? Put a grass leaf in and watch him nibble. What are his feelers for? Get some grasshopper eggs. Put some soil in a jar and pat it down. Put several female grasshoppers in the jar. You may be rewarded by seeing her lay her eggs. Put the eggs away in a cool place and next spring there will

be young grasshoppers. What do they look like? What do they eat? Are they friends or enemies? What are their enemies? How do they sing.

Fill blanks.

Some grasshoppers have ____ legs.

Some grasshoppers look like _____.

Some grasshoppers are @ _____.

Grasshoppers are not _____.

Birds eat _____.

Toads eat _____.

Snakes eat _____.

Materials:

Lantern chimney

Flower pot

Soil

Wood

Screen

Tacks

Glass jars

Grasshoppers

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., p. 311-314.

THE WORLD BOOK, Vol. 4, Roach and Fowler, Chicago, pp. 2577-2578.

Children's Reference:

Holbrook, Florence, THE BOOK OF NATURE MYTHS, Houghton, Mif-

lin and Company, 1902, pp. 83-86.

_____ "Grasshopper Green", in THE HOME BOOK OF VERSE FOR YOUNG FOLKS, Henry Holt and Company, N. Y., pp. 275.

Lindsay, Vachel, THE SINGING WORLD, Harcourt Brace and Company, N. Y., 1923, p. 154.

1. Bring out the...
2. Where are the...
3. How do they...
4. How are they...
5. What is their...
6. How do they...
7. What is their...
8. How is it that...
9. Describe their...
10. Not all of them...
11. Sing a song...
12. How do they...
13. Draw a picture...
14. Tell how to...

Public School Curriculum GRADE II

Unit-Nine-----Insects-----Cricket

Leisure-time interests and activities.

- A. Specific Objective: To learn the habits of the cricket.
- B. Organization of activities and subject matter of this unit.
 1. Bring crickets to school.
 2. Where are they found?
 3. How do they differ from a grasshopper?
 4. How are they like a grasshopper?
 5. What do they eat?
 6. How do they sing?
 7. What do the eggs look like?
 8. Why is it so shiny? It makes him hard to hold if caught.
 9. Crickets live in cellars and dark places. Why?
 10. Not all crickets are black. What colors are they?
 11. Sing a cricket song.
 12. Hop like a cricket.
 13. Draw a cricket.
 14. Tell how to control crickets.

Materials:

Cricket

Lantern globe

Soil

Flower pot

Terrarium

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock

Publishing Company, Ithaca, N. Y., 1925, pp. 375-378.

WORLD BOOK, Vol. 3, Roach and Fowler, Chicago, p. 1634.

Hook, Stella Louise, LITTLE PEOPLE, Charles Scribner's Sons, N. Y., 1888, pp. 30-36, 228.

Patch, Edith M., FIRST LESSONS IN NATURE STUDY, MacMillan Company, N. Y., 1926, pp. 203-205.

Miller, Olive Thorn, LITTLE FOLKS IN FEATHER AND FURS, E. P. Dutton and Company, N. Y., 1908, p. 357.

Hungerford, H. B., "Insect Pests About the House", in TWENTY-FOURTH BIENNIAL REPORT OF KANSAS STATE BOARD OF AGRICULTURE, p. 20, 193-195.

Brownell, L. W., "Our Midsummer Orchestra", in NATURE MAGAZINE, Aug. '33, pp. 77-80.

GRADE II

Unit-Ten-----Insects-----Beetles

Leisure-time interests and activities.

- A. Specific Objective: To learn the habits of the beetle.
- B. Organization of the activities and subject matter of this unit.
1. Bring in a potato-beetle on the leaves of a potato vine. Put in a breeding cage or terrarium. Notice how many leaves the larvae eats in a day. If there is dirt in the bottom of the breeding cage the larvae will burrow into it.
 2. When do we see them?
 3. What is the shape?
 4. Color?
 5. How does it travel?
 6. What does it do when you take it in your hand? Why?
 7. Why isn't it afraid?
 8. The beetle was first an egg which the mother beetle laid on the underside of a potato leaf. In about a week this little humpbacked fellow appeared. He began at once to eat. He grew so big he had to have four new skins. He would make a very small boxing-glove.
 9. Is the potato beetle a friend or enemy?
 10. How shall we get rid of them?
 11. Children visit a potato patch and observe the beetle at work. Notice how he eats the leaf.
 12. Help father get rid of these beetles by picking them off and dropping them into kerosene in a can.

13. Tell how father protects the potato from the beetle.
14. A nice baked potato is good food for boys and girls.
15. Draw a picture of the potato beetle.

Teacher's Reference:

THE COLORADO POTATO BEETLE, Chittenden, Bulletin of U. S.

DEPARTMENT OF AGRICULTURE, Washington, D. C.

THE WORLD BOOK, Vol. 2, Roach and Fowler, Chicago, pp. 661-662.

Children's Reference:

King, E. L. M., FIFTY COUNTRY RHYMES FOR CHILDREN, D. Appleton and Company, N. Y., 1926, p. 23.

GRADE II

Unit-Eleven-----Insects-----The Cecropia Moth

Leisure-time interests and activities.

- A. Specific Objective: To know the life cycle of the moth.
 B. Organization of activities and subject matter of this unit.

1. By addressing the Cortecilli Silk Company, schools may obtain silk worm cocoons to observe. We find we will need some mulberry leaves for the silkworm to eat. We observe how he makes his cocoon. By throwing these cocoons into water the worm is killed and the silk is unwound. This is twisted into thread which makes the silk we wear. The Cecropia is a wild silkworm. We do not take the time to tame him as the Chinese and Japanese do. Children have brought in cocoons last fall. Notice signs of the moth coming out. Notice the small opening through which it comes. Watch how the Cecropia becomes dry.

2. Gather cocoons.
3. Draw the moth.
4. Measure the moth.
5. Fill the blanks:

What does it eat?

Mary's dress is made of _____.

Silk was made by the _____.

The Cecropia is a wild _____.

The Cecropia sleeps in a _____.

He comes out a _____.

Materials:

Silkworm cocoon.

Cecropia cocoons.

A box to contain cocoons. In winter cocoons should be dampened three times a week.

Teacher's Reference:

WAYS OF THE SIX-FOOTED.

Comstock, Anna Botsford, **HANDBOOK OF NATURE STUDY**, Comstock Publishing Company, Ithaca, N. Y., pp. 330-364.

Comstock, Anna Botsford, **MANUAL FOR THE STUDY OF INSECTS**, Comstock Publishing Company, Ithaca, N. Y.

Children's Reference:

Meyer, Zoe, **FIELD AND TREE**, Little Brown and Company, Boston, 1929, pp. 138-143.

GRADE II

Unit-Twelve----Wild Flowers-----Fall

Leisure-time interests and activities.

- A. Specific Objective: To know the late fall flowers.
- B. Organization of activities and subject matter of this unit.

1. Take a walk at noon to observe flowers. Notice the most common flowers. Sunflower, golden rod, asters, milk weed, thistles, evening primrose, rosin weed, blazing stars. Note the colors.

Have children name different plants. Gather a few for a chart. Insist that only few be taken as there will be no beauty if we do not let the seeds ripen.

At school describe these flowers. Play a game. Describe yourself. Let someone who has chosen to be the "Garden" guess who you are. Then you belong to the garden or pressed sprays.

Fastened flowers to chart of card board by strips of paper. Teacher read Helen Hunt Jackson's "September".

Teacher's Reference:

Arnett, Anna W., THE KANSAS PRIMER, State of Kansas Publishing Company, Topeka, 1920, p. 46.

Children's Reference:

Sawyer, Nettie Alice, THE LITTLE KINGDOM PRIMER, Rand and McNally Company, Chicago, 1912, pp. 18, 33.

Smedley, Eva A. and Martha C. Olsen, THE NEW PRIMER, Hall and McCreary Company, Chicago, 1926, pp. 50-59.

GRADE II

Unit-Thirteen-----Wild Plants-----Weeds

Leisure-time interests and activities.

A. Specific Objective: To know the different weed seeds.

B. Organization of this unit.

1. On our field trip we gathered some seed pods of these weeds. We gathered cockleburs and made a basket, a chair, and other out door furniture for our doll house. We noticed the hooks on the cocklebur. What is their use? When the wire grass stuck to our stockings we knew one way cockleburs sow seed. We removed the tumble weeds that were held fast in the fence corner. We put them into the stove? Why? We gathered a spray of morning-glory and observed the round seed pods. How did this help the seeds to travel?

2. Make a collection of weed seeds. These may be contained in small corked bottles. Professor Agrelius of Kansas State Teachers College, Emporia, suggests an attractive way of arranging seeds. Two pieces of glass of the desired size are fastened tightly together by passepartout over holes the size of a nickel bored in wall-board. Seeds may be examined from either side. Are these weeds friends or enemies? How?

3. Play a weed game. Describe how you travel. Let others

guess what you are.

4. What is a weed? A weed is a plant out of place.

5. Fill in the blanks:

1. Cockleburs _____ rides.

2. Wire grass _____ rides..

3. Tumble weeds _____ rides.

4. Morning-glories _____ about.

Play you are a cocklebur or other weed. Tell about a trip you have taken.

Why must we get at weeds early?

Help in the family garden by weeding.

Material:

Glass.

Passepartout (paper and paste may be used.)

Wall board or compa board.

Seeds.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., p. 594-595.

Children's Reference:

Smith, Carrie J., THE EASY ROAD TO READING PRIMER, Lyons and Carnahan, Chicago, 1923, pp. 64-67.

GRADE II

Unit-Fourteen-----Trees-----Pussy Willows

Leisure-time interests and activities.

A. Specific Objective: To gather find out what pussy willows are.

B. Organization of the activities and subject matter of this unit.

1. Early in March as possible have children bring in twigs of all the different willows of the neighborhood. Put in jars of water and keep in a warm sunny window. Watch for the pussies to come out.

Notice which comes first the pussies or leaves. What colors are the hood?

2. Take a trip to the nearby willows. What is the sound we hear? What are they after? How do willows help bees?

3. How can we grow pussy willows?

4. Of what use is the willow? In some countries boys and girls wear shoes made of willow. Some people who have lost an arm or leg have wooden limbs made of willow.

5. Make a spray of pussy willows.

6. Pussy willows may be pasted on a fence which the children have drawn. Ears and tails may be added and natural looking gray pussies appear.

7. Write the uses of willows - keep banks of creeks from waving in - furnish early honey and bee bread, make boys and girls happy.

Materials:

Pussy willows

Willow twigs

Sharp knife

Moist soil

Teacher's Reference:

Comstock, Anna Betsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, pp. 765-770.

Children's Reference:

Howliston, Mary H., CAT-TAILS, A. Flanagan Company, Chicago, 1899, pp. 66-68.

Huber, Miriam Blanton and Others, THE POETRY BOOK I, Rand McNally and Company, Chicago, 1926, pp. 66-67, Ibid., Book II, p. 93.

GRADE II

Unit-Fifteen-----Trees-----The Oak Tree

Leisure-time interests and activities.

- A. Specific Objective: To learn of the oak by taking a nature walk.
- B. Organization of the activities and subject matter of this unit.

1. The oak tree is one of our strongest trees. On a walk at noon we observe it. How can we tell an oak from a willow tree? What do we call the nut of the oak? What color do its leaves turn? (White oak turns dark red. Black oak a dingy yellow. Chestnut oak yellow. Scarlet oak brilliant red.) Where does it grow? Reach around the trunk. How are the limbs arranged on the tree? Of what use are oak trees?

Draw an oak tree.

Draw an oak leaf.

Draw an acorn.

Write five uses of oak trees.

Visit a furniture store. Find out the uses of oak in the furniture store.

Materials:

Oak tree

Leaves

Acorns

Teacher's Reference:

Craig, John Bradford, NATURE STUDY, BOOK III, McIndoo Pub-

lishing Company, Kansas City, Mo., 1921, pp. 123-136.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y. pp. 748-754.

Children's Reference:

Smith, Carrie J., THE EASY ROAD TO READING PRIMER, Lyons and Carnahan, Chicago, 1923, pp. 62-64, 29-38.

GRADE II

Unit-Sixteen-----Gardening

Leisure-time interests and activities.

A. Specific Objective: To grow a garden at school.

B. Organization of activities and subject matter of this unit.

1. In the fall we have gathered seeds. Radish, lettuce, pumpkin, and beans are easily obtainable. Encourage the planting of a home garden. Second graders can take care of a small garden of flowers and vegetables of their own. Cosmos and nasturtiums are good plants for flowers.

2. Window gardens teach children how to care for plants. Eggshell gardens may be used. Dish gardens are interesting. Each child can arrange this as he would like to have his home look. An early school garden can be made in a box. Have a row marked for lettuce. Let each child plant his seeds. Another row could be onions or beans. Put down the date when planted and the date of first appearance. How many leaves does lettuce have, radishes, beans, onions, squash or pumpkin? The plants may be removed into larger containers and the child take it home for further observation. Radishes, lettuce, and onions may be planted out very early.

3. Children measure the growth of plants daily. Keep a chart.

Play a garden game. Pantomime.

"This is the way we spade our garden."

"This is the way we rake our garden."

"This is the way we hoe our garden."

"This is the way we make the rows." etc.

Get pictures of vegetables which we will grow in our garden,
also flower pictures.

Read "The Seed".

Sing garden songs.

Write five good things about a garden.

Teacher's Reference:

THE WORLD BOOK, Vol. 4, pp. 2383-2387, Roach and Fowler,
Chicago, 1925.

Children's Reference:

Huber, Miriam Blanton, THE POETRY BOOK II AND OTHERS, Rand
McNally and Company, Chicago, 1926, pp. 64, 114-115.

GRADE II

Unit-Seventeen-----Weather

Leisure-time interests and activities.

A. Specific Objective: To make a weather chart.

B. Organization of activities and subject matter of this unit.

1. Make a weather chart on a sheet of card board. An older pupil may rule it with spaces for every day of the month.

Sunshine days make a yellow sun. Make splashes for rainy day. Black for cloudy day. White splashes for snow.

Children may be taken outside. What kind of a day? Why is it so bright? Where is the sun? How do the trees and buildings look where the sun is shining? What are the dark places where the sun does not shine? Is your shadow longer or shorter than you? Where is the sun when you get up? When we eat lunch? When we go home?

The sun is shining. The sun is in the sky. The sky is blue.

The sun is warm. The sun makes us healthy.

2. Why can't you see your shadow? Where is the sun? What color is the sky? What can you do on a rainy day? Why do we need rain?

Make a picture of the way a hen would stand today.

Gather pictures suggesting different kinds of weather for the Nature Book.

Read a rain poem.

Sing a rain song.

Play a rain game. Hide the button and for a sign of "hot" or "cold" rain with fingers on the desk.

Teacher's Reference:

THE WORLD BOOK, Vol. 10, Roach and Fowler, Chicago, pp. 6229-6232.

Children's Reference:

Huber, Miriam Blanton, THE POETRY BOOK II, Rand McNally and Company, Chicago, 1926, p. 89.

Harris, Ada VanStone, POEMS BY GRADES, Charles Scribner's Sons, N. Y., 1910, Vol. I, p. 65.

GRADE II

Unit-Eighteen-----Stars-----The North Star

Leisure-time interests and activities.

- A. Specific Objective: To know how to locate the North Star.
- B. Organization of activities and subject matter of this unit.
1. Review the story of the Big Dipper. With stones or beans make the Big Dipper and the Little Dipper. Color the first star in the handle of the Little Dipper. This star always points north. When we face north which direction does our right hand point? Our left hand? Where is south? Each point to the direction he lives. If one should be lost at night how could he find his way home by the North Star? Children make star groups at home for father and mother. Make star groups with stones. Look for Little Dipper at night.
- Tell star stories.
- Recite star poem.
- Sing star songs.
- Dramatize an original star story.
- Make a "Star" acrostic.

Teacher's Reference:

Proctor, Mary, STORIES OF STARLAND, Potter and Putnam Company, 1898, p. 186.

Pratt, Mara Louise, STORYLAND OF STARS, 1892.

Children's Reference:

Harris, Ada VanStone, POEMS BY GRADES, Vol. p. 69, Chas. Scribner's Sons, 1910.

Wynne, Annette, FOR DAYS AND DAYS, Frederick A. Stokes Com-
pany, N. Y., 1919, p. 56.

1. The first part of the story is a description of the
 2. The second part is a description of the
 3. The third part is a description of the
 4. The fourth part is a description of the
 5. The fifth part is a description of the
 6. The sixth part is a description of the
 7. The seventh part is a description of the
 8. The eighth part is a description of the
 9. The ninth part is a description of the
 10. The tenth part is a description of the
 11. The eleventh part is a description of the
 12. The twelfth part is a description of the
 13. The thirteenth part is a description of the
 14. The fourteenth part is a description of the
 15. The fifteenth part is a description of the
 16. The sixteenth part is a description of the
 17. The seventeenth part is a description of the
 18. The eighteenth part is a description of the
 19. The nineteenth part is a description of the
 20. The twentieth part is a description of the
 21. The twenty-first part is a description of the
 22. The twenty-second part is a description of the
 23. The twenty-third part is a description of the
 24. The twenty-fourth part is a description of the
 25. The twenty-fifth part is a description of the
 26. The twenty-sixth part is a description of the
 27. The twenty-seventh part is a description of the
 28. The twenty-eighth part is a description of the
 29. The twenty-ninth part is a description of the
 30. The thirtieth part is a description of the
 31. The thirty-first part is a description of the
 32. The thirty-second part is a description of the
 33. The thirty-third part is a description of the
 34. The thirty-fourth part is a description of the
 35. The thirty-fifth part is a description of the
 36. The thirty-sixth part is a description of the
 37. The thirty-seventh part is a description of the
 38. The thirty-eighth part is a description of the
 39. The thirty-ninth part is a description of the
 40. The fortieth part is a description of the
 41. The forty-first part is a description of the
 42. The forty-second part is a description of the
 43. The forty-third part is a description of the
 44. The forty-fourth part is a description of the
 45. The forty-fifth part is a description of the
 46. The forty-sixth part is a description of the
 47. The forty-seventh part is a description of the
 48. The forty-eighth part is a description of the
 49. The forty-ninth part is a description of the
 50. The fiftieth part is a description of the

GRADE II

Unit-Nineteen-----The Sky-----The Moon
 Leisure-time interests and activities.

- A. Specific Objective: To know how to tell direction.
- B. Organization of activities and subject matter of this unit.

From our study of the North Star, we found when we face north our right hand points to the east and our left hand toward the west.

1. Where is the sun when we come to school?
2. Where is it at noon?
3. Where is it when we go home?
4. Which way do you live from the schoolhouse?
5. When the moon is full where does it rise?
6. Where does it set?
7. Walk toward the north of the school yard.
8. Walk toward the east.
9. Walk toward the west.
10. Report several evenings of the moon at sunset.
11. Find out when the sun rises and sets on Thanksgiving Day, Christmas Day, Washington's Birthday, Easter.
12. When is there most sunshine?
13. Put three bowls of water on the desk - one cold, one warm, one hot. Let child put a finger in the bowl of cold water and then in warm water. What about the second bowl? Have another child put his hand in the jar of hot water, then in the warm water and tell about the second jar. We want to know what the temperature really is. What do we

have to tell us how hot or cold it is?

14. Observe the thermometer.

Teacher's Reference:

THE WORLD BOOK, Vol. 9, Roach and Fowler, 1925, Chicago, pp. 5624-5626. Ibid., Vol. 6, pp. 3939-3941.

Children's Reference:

Whitcomb, Charlotte Townsend and Others, MY HEALTH HABITS, BOOK I, Rand McNally and Company, N. Y., 1929, pp. 101-106.

Wiggin, Kate Douglas and Nora Archibald Smith, THE POSY RING, Doubleday, Page and Company, N. Y., 1909, pp. 30-31.

Wynne, Annette, FOR DAYS AND DAYS, Frederick A. Stokes, N.Y., 1919, pp. 180.

Huber, Miriam Blanton and Others, THE POETRY BOOK I, Rand McNally and Company, 1926, p. 31.

GRADE II

Unit-Twenty-----Health

Efficiency in physical development and health.

- A. Specific Objective: To know how to care for the hands.
- B. Organization of activities and subject matter of this unit.
1. Have a hand inspection.
 2. What do we do with the hands?
 3. How many parts to the hand?
 4. How many parts to the arm?
 5. What do the muscles do for the hand?
 6. How shall we care for the hands?
 7. Draw a picture of the hands.
 8. Draw a picture of the soap.
 9. Draw a picture of the towel.

Teacher's Reference:

Newmayer, Weir and Edwin C. Broome, THE WAY TO KEEP WELL,
American Book Company, N. Y., 1928, p. 262.

Payne, E. George, WE AND OUR HEALTH, BOOK II, The American
Viewpoint Soc. Inc., N. Y., 1924, p. 133.

Children's Reference:

Whitecomb, Charlotte Townsend and Others, MY HEALTH HABITS I,
Rand McNally and Company, N. Y., 1929, pp. 24-25.

GRADE II

Unit-Twenty-One-----Health-----Rules

Efficiency in physical development and health.

- A. Specific Objective: To make a health book.
- B. Organization of activities and subject matter of this unit.
1. Make a health book. Call it "What I Do Health Book".
Put in it the things that are done for health.
 2. Find a picture of a child washing its hands.
 3. Write under the picture, "I wash my hands before I eat."
 4. Find a picture of a child drinking milk.
 5. Write under it, "I drink three glasses of milk every day."
 6. Find a picture of children playing in the sunshine.
 7. Write under it, "I play in the sunshine and fresh air every day."
 8. The child may put in its own picture and write under it, "I do things to be happy."
 9. Find a picture of vegetables.
 10. Write under it, "I eat these every day." These pictures may be drawn.

Materials:

Paper

Pictures

Paste

Teacher's Reference:

Whitcomb, Charlotte Townsend and Others, MY HEALTH HABITS,
BOOK I, Rand McNally and Company, N. Y., 1929, pp. 149.

Huber, Miriam Blanton and Others, THE POETRY BOOK I, Rand McNally and Company, Chicago, 1926, p. 49. Ibid., Book II, p. 85.

Children's Reference:

Whitcomb, Charlotte Townsend and Others, MY HEALTH HABITS, Rand McNally and Company, N. Y., 1929, pp. 149.

Write the names

grass

of

which

gold

can

be

made

from

what

water

is

used

bread

is

made

from

what

is

1. Write the names of the things which are made from wheat.

2. Write the names of the things which are made from gold.

3. Write the names of the things which are made from iron.

4. Write the names of the things which are made from silver.

5. Write the names of the things which are made from copper.

6. Write

the names

of the things which are made from

the things which are made from

the things which are made from

the things

which are made from the things which are made from

the things which are made from the things which are made from

GRADE II

Unit-Twenty-two-----Health-----Food

Efficiency in physical development and health.

- A. Specific Objective: To know the proper foods to eat.
- B. Organization of the activities and subject matter of this unit.

Write the name

peas	peach	apple	milk
pear	egg	beets	tomato
pudding	oatmeal	carrots	cookie
water	plums	potato	orange
bread	soup	lettuce	soup
banana	grapes	toast	spinach

1. Write the names of the foods you eat for breakfast.
2. Write the names of the foods you eat for lunch.
3. Write the names of the foods you eat for dinner.
4. Write the names of the drinks you have for breakfast.
5. Write the names of the drinks you have for dinner.

Material:

List of words

Teacher's Reference:

Whitcomb, Charlotte Townsend and Others, MY HEALTH HABITS,
BOOK I, Rand McNally and Company, N. Y., 1929, pp. 123.

Children's Reference:

Whitcomb, Charlotte Townsend and Others, MY HEALTH HABITS,
BOOK I, Rand McNally and Company, 1929, N. Y., pp. 123.

GRADE III

Unit-One-----Birds-----Chicken

Leisure-time interests and activities.

- A. Specific Objective: To learn the life history and habits of the chicken.
- B. Organization of the activities and subject matter of this unit.
1. Have some child bring a hen. Provide for some eggs. Get suitable place to raise some chickens at school.
 2. What things are necessary to make the hen comfortable?
 3. How long does it take a hen to hatch?
 4. How many eggs do we need?
 5. What kind of a place shall we choose for the nest?
 6. How shall we feed the hen?
 7. What shall we feed the hen?
 8. How will we know when the eggs are ready to hatch?
 9. How do the little chickens look when first hatched?
 10. How do they get out of the shell?
 11. What becomes of the little tooth?
 12. Where is it?
 13. How old should the chickens be before being fed the first time?
 14. How can little chickens be put to sleep?
 15. How do chickens eat?
 16. How do they drink?
 17. Why does it swallow little stones?
 18. Where do the little chickens sleep?

19. How do hens sleep?
 20. What is the food of chickens?
 21. What are the enemies of the chicken?
 22. What sound does she make when danger is near?
 23. How does she call when she has found food?
 24. How does she sing when happy?
 25. What does the rooster look like?
 26. How does he fight?
 27. What breeds of chickens do your mothers raise?
 28. Of what use is the chicken?
2. Write the answers to the questions. Put them in the Nature Book. Use for a reading lesson.
 3. Tell stories about chickens. "Chicken Little" is suggested.
 4. Read about chickens.

Material:

Chickens

Feed

Box

Straw or hay

Teacher's Reference:

Craig, John Bradford, NATURE STUDY FOR GIRLS AND BOYS, BOOK 3, McIndoo Publishing Company, Kansas City, Mo., pp. 95-102.
 Scudder, Horace Elisha, CHILDREN'S BOOK, Houghton Mifflin Company, n. d., pp. 21-22.

GRADE III

Unit-Two-----Birds-----Flicher

Leisure-time interests and activities.

- A. Specific Objective: To learn the life history and habits of the flicher.
- B. Organization of the activities and subject matter of this unit.
1. On a trip to see birds that are back we hear a rat-a-tat-tat.
 2. We locate a woodpecker pounding on a telephone pole.
 3. What is the flicher?
 4. What other names has he?
 5. What color is he?
 6. Where does he make his home?
 7. How do the robin and the flicher compare in size?
 8. How is a flicher like a rabbit?
 9. How many eggs does the mother lay?
 10. How does it hold to a tree when making his home?
 11. What is its nest like?
 12. What does he do while the mother is brooding?
 13. How do they feed their young?
 14. What do they like to eat?
 15. How does he get his food?
 16. How many ants would make the flicher a good dinner?
 17. How can we invite them to our homes?
 18. Of what use is he to the neighborhood?
 19. What is his voice?

2. When we return to school the above questions are asked. We write the answers to them for a lesson to read to the fourth grade.

Materials:

Auger

Old tree

Telephone pole

High fence post

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY,
McIndoo Publishing Company, Kansas City, Mo., pp. 113-114.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo. Book 4, pp. 76-81, pp. 76-81.

Roberts, Elizabeth Madox, "The Woodpecker" in THE POETRY BOOK I, Rand McNally and Company, Chicago.

GRADE III

Unit-Three-----Birds-----Spring Birds

Leisure-time interests and activities.

A. Specific Objective: To take a nature walk to find out what birds are back.

B. Organization of the activities and subject matter of this unit.

A trip at noon or better before school in the morning when the birds do much of their singing. Before going we make a list of things we want to know about. How does it look? Where do we find it? What does it do? What is its song? How does it look? How can you tell the male? Where is the nest? How many eggs? When do they hatch? How do the young look? What does it say? What does it eat? How does it eat? Is it a friend or enemy?

When we return to school if more than one new bird is seen we may choose the one we would like to write about. These may be put into the Nature Book.

Keep a picture record of the birds of each month. (The Singer Sewing Machine Company distributes pictures of birds of a good size.)

Make a bird house.

Sing bird songs. Practice until you can sing a real birds' song.

Read about birds.

Study the meadowlark, mourning dove, and swallow according to the outline.

Tell how to see birds outside. A pair of field glasses is a fine way to study birds outdoors.

A bird project may be carried out by setting a hen at school.

Places to learn about birds.

Pictures, parks, trees, cages, books.

Material:

Field glass

Note books

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 25-147.

Children's Reference:

Craig, John Bradford, NATURE STUDY, BOOK I, McIndoo Publishing Company, Kansas City, Mo., pp. 37-46, pp. 51-57, pp. 71-75, pp. 95-102.

Hawkshaws, Ann, "The Clocking Hen", in ONE THOUSAND POEMS FOR CHILDREN, George W. Jacobs Company, Philadelphia, p. 31.

GRADE III

Unit-Four-----Mammals-----Cat

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the cat.

B. Organization of the activities and subject matter of this unit.

1. Some child will be glad to bring his cat to school for a day. Each child may tell about his cat. How does a cat say, "Please give me some milk"? How does she call her little ones? What does she say when something hurts her? How does she tell she is happy? How does she act when she is displeased? What do you feed your cat? How does she catch her food? How does she move her family? Where are her sharp claws? Why can you hear a dog walk? Describe her feet. Why does the cat make only two tracks in the snow? How does she sharpen her claws? How does she climb? How high can she jump? What color are her eyes? How are cats' eyes different from dogs' eyes? How many teeth has she? How are they used? How many whiskers has she? What is their use? How does her nose help her? Describe her ears? Where are they when she is angry? What colors are cats? How do the fur of the dog and cat differ? How does the cat keep clean? How does the mother cat punish her kittens? How do the kittens learn to hunt? How can a cat be taught not to catch birds? What are the cat's enemies? Where does she like to lie? How can we make her comfortable? If she were a farmer what would she plant in her garden? When does

she hunt?

A story may be written by each child about his pet cat.

Materials:

Cats

Pictures

Books

Songs

Game (Cat and the Rat)

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 43-44.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 268-274.

WORLD BOOK, "A Cat's Story," Vol. 2, Roach Fowler and Company, Kansas City, Mo., pp. 1221.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, BOOK 3, McIndoo Publishing Company, Kansas City, Mo., pp. 61-67.

WORLD BOOK, Vol. 2, Roach Fowler and Company, Kansas City, Mo., pp. 1220-1222.

Miller, Olive Thorne, LITTLE FOLKS IN FUR AND FEATHER, E. P. Dutton and Company, pp. 38-42.

GRADE III

Unit-Five-----Mammals-----Squirrel

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits of the squirrel.
 B. Organization of activities and subject matter of this unit.

1. Often children have a pet squirrel in a cage. Take a tramp into the woods with field glasses. A squirrel often appears in trees around school houses. How does the squirrel act when surprised? What is the squirrel's coat like in the spring and fall? How does he protect himself? What are his enemies? How can you tell a rabbit from a squirrel's track? Where are his roads? What are his bridges? How does he get about? How does he climb? How does he come down a tree? What does he like to eat? How does he eat? How does he open nuts? Where are his cupboards? What harm do squirrels do? When are the young squirrels born? Where is their nest? How does he protect himself? What is the summer home like? How does he talk? How many kinds of squirrels do you know? Of what use is a squirrel? How is he like a cat? He is sometimes called the chickaree.

Draw a picture of a squirrel.

Express surprise as a squirrel does.

Express excitement as a squirrel does.

Express joy or anger.

Draw the tracks made by a squirrel in the snow.

Material:

Squirrel

Field glasses

Stories

Books

Poems

An old squirrel's nest

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 233-239.

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., Book 4, pp. 70-75.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., Book 4, pp. 70-75.

Barton, Bernard, "The Squirrel" in ONE THOUSAND POEMS FOR CHILDREN, George W. Jacobs and Company, Philadelphia, p. 258.

GRADE III

Unit-Six-----Mammals-----Pig

Leisure-time interests and activities.

- A. Specific Objective: To observe the life habits of the pig.
- B. Organization of activities and subject matter of this unit.
1. Children may observe the pig at home and discuss at school. What is the difference between a pig and a hog? How many swine does your father raise? Since the "AAA" law how many will he raise? The hog was once a fierce wild animal in Europe. His hair or bristles would stand up to make him look bigger and fiercer. What other animals do we know that do the same thing? What color are hogs? What do they eat? How do they find their food? Where are there wild hogs now? How do they fight? How do they keep cool in summer and warm in winter? Hogs need to be kept clean? Why? What is his covering like? What are the uses of the hog? What things do you know that come from the hog? A packer once said that all of the pig is used except the squeal. The pig has a very wonderful nose. What does he use it for? What other animal do you know that has a wonderful nose? Pigs not only root with their noses but they smell with their noses. In some countries pigs are trained to hunt birds. In other countries they hunt for truffles - a plant which grows on the roots of trees and which are rare food. In some countries they were used instead of plows and threshing machines. They are smart and easily trained for a pet.

2. Dramatize the "Three Pigs."

Draw a picture of a pig. Write the word "ham" on the part of the pig from whence it comes. Write "bacon" on the part of the pig from whence it comes.

Materials:

Pictures

Bristles

Buttons

Brushes

Books

Teacher's Reference:

Craig, John Bradford, *A TEACHER'S MANUAL OF NATURE STUDY*, McIndoo Publishing Company, Kansas City, Mo., p. 115-118.

Children's Reference:

Richards, Laura E., "The Pig Brother", in *THE PIG BROTHER AND OTHER FABLES AND STORIES*, Little Brown and Company, Boston, 1912, pp. 1-4.

Richards, Laura E., "The Pig Brother", in *THE PIG BROTHER PLAY BOOK*, Little Brown and Company, Boston, 1920, p. 1-7.

Monteith, John and Caroline, "Our Pig" in *SOME USEFUL ANIMALS*, American Book Company, N. Y., 1903, pp. 87-93.

GRADE III

Unit-Seven-----Reptiles-----Turtle

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the turtle.
- B. Organization of the activities and subject matter of this unit.

1. Bring a turtle into the schoolroom. There are several varieties in Morris County. How does he look when walking? Tap him gently. What does he do? What is the shape and color of the upper shell? It is called the corapace. The lower shell? Why is the upper shell dark? Draw the upper shell. The lower shell. What is the shape of the head? How many feet has he? How many claws on the front foot? How many on back? Tell about its eyes. How does it wink? Where is its nose? What kind of mouth has it? What is the throbbing in the throat? What are a turtle's enemies? How does he escape them? Where does the turtle live? What does he eat? Of what use is the turtle? How many kinds of turtles do you know?

Take the questions home and ask father or mother what they know about turtles.

Ask mother about turtle soup. She can find out about it in a cook book.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1921, pp. 208-212.

THE WORLD BOOK, Vol. 10, Roach and Fowler, Chicago, pp. 5920

Children's Reference:

Holbrook, Florence, **THE BOOK OF NATURE MYTHS**, Houghton Mifflin Company, Boston, 1902, pp. 142-145.

GRADE III

Unit-Eight-----Amphibians-----The Toad

Leisure-time interests and activities.

- A. Specific Objective: To know the toad's life history.
- B. Organization of the activities and subject matter of this unit.
1. Make an aquarium for toads and tadpoles. A washpan or earthen bowl may be used. Get some small stones from the pond where there are tadpoles. Put these in the bottom of the pan. Add mud and leaves taken from the bottom of the pond. Put some of the growing plants of the pond among the rocks in the dish or pan. Do not let the dish remain in the sun. Keep well filled with water. Feed bits of hard boiled egg and prepared fish food. A trip may be taken to the pond and the tadpoles studied there. The development may be observed better in the school-room.

Questions

Where do we find the toad? How? Can you tell a toad from a frog? What are the bumps on the toad? Where does the toad get its food. What is his food? How does he eat? What does he do after he has swallowed? (Rubs and pats his stomach.) How does he sleep? When and where does the toad lay her eggs? How are the eggs protected? What are baby toads called? How do they look? How does the father toad look? How does the toad act when frightened? How does he talk? Where is his winter home? What are the enemies of the toad? What is its worst enemy? Look for a tree toad.

Write the answers to the questions for the Nature Book.

Read about toads.

Write a conversation between a toad and an angle worm.

List the ways in which toads help farm. A toad caught 50 flies in a shed. How many flies would he catch in 5 days?

In 10 days?

Materials:

Pan or dish

Rocks

Water plants

Hard boiled eggs

Angle worms

Fish food

Net

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo. pp. 21-25.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 181-195.

THE USEFULNESS OF THE AMERICAN TOAD, UNITED STATES DEPARTMENT OF AGRICULTURE, Farmer's Bulletin, No. 196.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 9-16.

Martin, John, "The Toad and the Rabbit" in THE POETRY BOOK I, Rand McNally and Company, Chicago, 1926, pp. 19.

Schwartz, Julia Augusta, "Hop, Flop, the Toad" in WONDERFUL

LITTLE LIVES, Little Brown and Company, 1909, Chapter 10.

The first thing I noticed when I stepped
 out of the car was a sense of relief.
 The air was fresh and the sun was warm.
 I had been waiting for this moment for so long.
 It felt like a dream that had finally come true.
 I looked around at the people and the buildings.
 Everything seemed so new and so full of life.
 I had heard so much about this place, but now
 I was here, and it was everything I needed.
 I had found a new home, a new family.
 I had found a place where I belonged.
 I had found a place where I could be myself.
 I had found a place where I could start over.
 I had found a place where I could live.
 I had found a place where I could love.
 I had found a place where I could be happy.
 I had found a place where I could be little lives.
 I had found a place where I could be me.

GRADE III

Unit-Nine-----Insects-----Dragon-fly

Leisure-time interests and activities.

- A. Specific Objective: To know that the dragon-fly is not a snake-feeder and that he will not sew up one's mouth.
- B. Organization of activities and subject matter of this unit.
1. The young may be secured in April and May when we are getting material for the aquarium. They may be found in slow moving water or ponds. They are not friendly enough to be put in the regular aquarium. To feed them tie a bit of meat to a thread and remove after a short time. They are better studied out of doors in early autumn.

Catch a dragon-fly. Put it under a glass. What is its shape? Notice the eyes. How do the hind wings differ from the front wings? Draw a front wing and a back wing. What is its longest part? What do they eat? Why do the dragon-flies dip down into the water? See if you can find any flies clinging to weeds or water plants with part of the body in the water. What is she doing? Of what use are dragon-flies? Draw a dragon-fly.

Write the answers to these questions and put in the Nature Book.

What names do a dragon-fly have?

Study of caddis-flies.

Study the damsel-fly.

Material:

Aquarium

Dip-net

Dragon-fly

Glass

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, 1920, pp. 382-386.

Children's Reference:

Holbrook, Florence, "The Story of the Bees and the Flies", in THE NATURE OF NATURE MYTHS, Houghton, Mifflin Company, 1912, pp. 93-95.

GRADE III

Unit-Ten-----Insects-----Leaf Galls

Leisure-time interests and activities.

- A. Specific Objective: To know what a leaf gall is and its purpose.
- B. Organization of activities and subject matter of this unit.
1. Have a trip at noon to discover as many kinds of galls as we can find. Gather and bring to school.
- On what plant do we find this gall? (Hold up those found).
- We find a prickly gall on oak leaves, a gall on oak twigs, a gall on the midrib of the oak leaf, a gall on the acorn, oak apple gall on the leaf of the red oak, the willow gall, the goldenrod gall, and the rose gall. Open a gall of each. What do we find inside? What do the houses do beside shelter the insect?
- Put some galls in glasses. Cover with netting and observe.
- Draw a picture of each gall for the Nature Book.

Material:

Galls

Glasses

Knife

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1921, pp. 360-364.

Wright, Julia MacNair, "With a House on His Back", in SEA SIDE AND WAY SIDE, Book 4, D. C. Heath and Company, Boston, pp. 285-291,

Children's Reference:

Holbrook, Florence, "Was It the First Turtle?" in THE BOOK OF NATURE MYTHS, Houghton, Mifflin Company, Boston, pp. 142-145.

GRADE III

Unit-Eleven-----Tame Plants-----Cosmos

Leisure-time interests and activities.

A. Specific Objective: To know how to grow flowers for bouquets.

B. Organization of the activities and subject matter of this unit.

1. Cosmos are a common garden grown flower. Children may bring in some for a school bouquet.

What colors do we find in cosmos?

Where does it grow? Does it grow from a cutting, a bulb, or seed? When is it planted? What kinds of roots has it? (Long? Spreading? Few? Many?) Arrange a bouquet artistically. Care for it. How are the flowers fertilized? How shall we make the flowers live a long time? How are the seeds scattered? Decide whether or not the cosmos is a good cut flower. Decide why the cosmos is a good garden flower.

Name some flowers which make you think of the cosmos.

Gather seed for the school garden.

Draw a cosmos for the Nature Book.

Where about the home is a good place to plant cosmos?

Material:

Cosmos or other fall flowers.

Teacher's Reference:

Burpel's Seed Manual.

Children's Reference:

Seegmiller, Wilhelmina, "A Little Seed", in A NEW GARDEN OF

VERSES FOR CHILDREN, Rand McNally and Company, Chicago, p.6.

Keats, John, "The Daisy's Song", in ONE THOUSAND POEMS FOR CHILDREN, George W. Jacobs and Company, Philadelphia, pp.166.

GRADE III

Unit-Twelve-----Flowers-----Apple Blossoms

Leisure-time interests and activities.

- A. Specific Objective: To know how the life history of the apple blossom.
- B. Organization of activities and subject matter of this unit.

1. Bring in a spray of apple blossoms. Care must be taken to discourage gathering fruit blossoms. Better make a trip to an apple tree.

How are the buds protected in winter? What becomes of the brown scale blankets? Every year the scales drop and leave a ring. How old is this twig? Where do we find the blossoms? Where would we find them on a cherry tree? What is the gray fuzz on the outside of the apple blossoms? Draw an open apple blossom. How many parts? Of what other flower does it remind you? What does the bee do for the apple? Why are the buds so pink and the blossoms so white? What do the bees do for the apple blossom? After the blossom falls what part remains? Where is the apple? What is in the center of the apple? What are the enemies of the apple? How does father keep them away? Observations should be made of buds until the apple is completely formed. Why shouldn't we gather fruit blossoms for bouquets? Children should write answers to their questions to put in the Nature Book.

Draw a spray of apple blossoms.

Sing about apple blossoms.

Dramatize an original apple blossom story.

Material:

Apple blossoms

Apples

Apple tree

Tell how apples were kept before there were cellars.

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY,

McIndoo Publishing Company, Kansas City, Mo., pp. 97-102.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock

Publishing Company, Ithaca, N. Y., pp. 782-789.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIn-

doo Publishing Company, Kansas City, Mo., 1921, Book II,

pp. 40-44.

GRADE III

Unit-Thirteen-----Trees-----Cottonwood

Leisure-time interests and activities.

- A. Specific Objective: To know why there are so many cottonwood trees in Morris County.
- B. Organization of activities and subject matter of this unit.

1. Bring in twigs in February and put in water. Watch for catkin and coming of the leaves. Some of the twigs are round and some have sides. Why? How are the buds kept warm? What use do the bees make of this covering? The cottonwood grows rapidly and with little care. Why are there so many in Morris County? What color is the catkin? Draw a catkin. Why do you think it is called cottonwood? How do its seeds travel? Why is a cottonwood a good tree for a dusty country? Of what other use is cottonwood?
2. Visit a nursery.
3. List the trees of the neighborhood and the name of its seed.

Write five things about the cottonwood.

Tell why people do not plant cottonwood now.

Sketch a cottonwood tree for Nature Book. Press a catkin, a leaf, and a seed for the Nature Book.

Tell how to plant a tree.

List nut trees of district.

List fruit trees of district.

Materials:

Buds

Water

Jar

Tree

Wood

Books

Leaves

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1921, pp. 770-773.

Children's Reference:

ANONYMOUS, "Tree on the Hill" in ONE THOUSAND POEMS FOR CHILDREN, George W. Jacobs and Company, Philadelphia, 1920, pp. 137-138.

Burt, Mary E., STORIES FROM PLATO, Ginn and Company, Boston, 1898, Lesson 22.

GRADE III

Unit-Fourteen-----Trees-----Walnut

Leisure-time interests and activities.

- A. Specific Objective: To know the walnut tree, its leaves, and fruit.
- B. Organization of activities and subject matter of this unit.
1. Talk about going nutting. How many have been nutting? Where did you go? What nuts did you get? Where did you find the nuts? If a tree is near the school house a visit can be made to it. How can you tell the walnut from other trees? What color is its bark? What kind of branches has it? Where are the nuts on the branches?
- Gather some leaves. Develop the idea that leaflets are not the whole leaf. Count the number of leaflets. Measure the leaf with a ruler. Is the leaf rough or smooth?
- Bring in some nuts with hulls on. How can we crack a nut without breaking the inside? What is the inside called? What two uses has the kernel?
- Plant some nuts either in a box to be placed outside for the frost to open or in a corner of the school yard.
- Crush some nut on clean paper. Brush it off. What is left? The walnut should not be eaten between meals. For what does mother use walnuts?

Materials:

Nuts

Bark

Wood

Leaf

Teacher's Reference:

THE WORLD BOOK, Vol. 10, Roach and Fowler, Kansas City, Mo., pp. 6130-6131.

Children's Reference:

Wiltse, Sara E., "The Walnut That Wanted to Bear Tulips" in B. STORIES FOR KINDERGARTEN AND PRIMARY SCHOOLS, Ginn and Company, Boston, 1915, pp. 90-95; Ibid., pp. 96-99, "The Walnut Tree that Bore Tulips".

GRADE III

Unit-Fifteen-----Gardening----Planning the Spring Garden
Leisure-time interests and activities.

- A. Specific Objective: To know that a successful garden is planned.
- B. Organization of the activities and subject matter of this unit.
1. Review the vegetables we found in our gardens last fall. Each child should tell something. He may have additional information that he has learned since. What vegetable did mother grow in the house in a box, out of doors in the hot bed, or bought from the storekeeper? Where do we get the tomatoes that we ate during the winter? When the tomatoes mother canned are gone where do we get tomatoes? Next time you are in town look in the store windows and see if there are fresh tomatoes. Where do they come from?
- In some parts of our country it is as warm as our summer even in winter. Here vegetables grow out-of-doors. Our fresh tomatoes come from this south country. How do they get here? (Shipping of goods may be reviewed.) Some green houses raises tomatoes in winter.
- We might raise some tomatoes of our own. What will we need to get tomato plants? We have seeds that we saved last fall. In order to get tomatoes early we must have the little plants ready to set out when it is warm enough. What will we need beside seeds? Who can bring a box? Who some soil? Maybe you will want to plant some at home. If individual

plants are wanted small paper sacks may be dipped in parafin. These will hold moisture and may be easily removed when the plant is ready to set in the ground. Soil mixed with sand grows good tomatoes. Arrange the soil in the box or paper sack. Pat it down smooth. Plant two or three seed about one-fourth of an inch deep. If a box is used a piece of glass should be put over it until the seeds come up. Keep the soil moist.

Keep a place in the Nature Book for observation of the plant, as

March 1. We planted tomato seed.

March 9. The plants are coming up.

March 11. There are two leaves on the tomato plant.

Notice when the first leaves come; where the second leaves appear; how each differs from the other.

Fill blanks with shape:

Tomato seeds are _____.

Radish seeds are _____.

Lettuce seed is _____.

Popcorn seeds are _____.

Nasturtium seeds are _____ and _____.

Pansy seeds are _____ and _____.

Play a seed game.

Make drawings of plants as they come up.

Make a plan of a garden in the sand table. Read about seeds.

Sing.

Make seed poem.

Material:

Seed

Soil

Box

Sacks

Parafin

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., p. 20.

Children's Reference:

Seegmiller, Wilhelmina, "Garden Company" in A NEW GARDEN OF VERSES FOR CHILDREN, Rand McNally and Company, Chicago, 1925, pp. 101.

GRADE III

Unit-Sixteen---Sky and Weather-----Dew

Leisure-time interests and activities.

- A. Specific Objective: To know how dew is formed.
- B. Organization of activities and subject matter of this unit.
1. Some simple experiments to show that there is moisture in the air.
 2. Hold a glass over boiling water. Observe results.
 3. Put ice into a pitcher.
 4. Where do the drops come from?
 5. Why doesn't this happen in a cold room?
 6. Where do we see moisture in the sky?
 7. What is fog?
 8. When may we look for dewy nights?
 9. Why doesn't dew form on the leaves of fall trees or bushes?
 10. Where do we find dew?
 11. From where does the dew come?
 12. What happens if the weather becomes cold enough to freeze in the night?
 13. Write up the experiments and answers.

Material:

Pitcher

Ice

Teakettle

Glass

Teacher's Reference:

THE WORLD BOOK, Vol. 3, Roach and Fowler, Chicago, pp. 1782.

Children's Reference:

Bryce, Catherine A., "The Dewdrop" in FABLES FROM AFAR,
Newson and Company Publisher, N. Y., 1910, pp. 138-139.

GRADE III

Unit-Seventeen-----Stars-----Orion

Leisure-time interests and activities.

- A. Specific Objective: To know the group of stars called Orion.
 B. Organization of activities and subject matter of this unit.

1. Review the Big Dipper and Little Dipper. Teacher tells this story as she arranges the stones.

Orion is a great hunter who wears a great belt and sword. This little star is his spur. This big bright star is the end of his club. He strides across the sky and disappears. Try to find him in the sky tonight.

Finish: Orion is a _____.

He wears a _____ and _____.

There are _____ stars in his belt.

There are _____ stars in his sword.

He wears a _____ at his heel.

Materials:

Stones

Gold Stars

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 896-897.

WORLD BOOK, Vol. 9, Roach and Fowler, Kansas City, Mo., pp. 5528-5529.

Martin, Martha Evans, THE FRIENDLY STARS, Harper Brothers,

N. Y., pp. 188-196.

Children's Reference:

Wiltse, Sara E., "Peep Star" in STORIES FOR KINDERGARTEN AND PRIMARY SCHOOLS, Ginn and Company, Boston, 1915, pp. 64-69;

Seegmiller, Wilhelmina, "The Wish Star" in A NEW GARDEN OF VERSES FOR CHILDREN, Rand McNally and Company, Chicago, 1925, pp. 125. Ibid., "Twinkle, Twinkle, Little Star" and "Little Star".

GRADE IV

Unit-One-----Birds-----Oriole

Leisure, time interests and activities.

- A. Specific Objective: To know the life history of the oriole.
- B. Organization of the activities and subject matter of this unit.

Take a nature walk to see the oriole at home. When does it return?

The oriole remains here all winter. It was one of the birds which the early settlers in America saw. The people of Maryland called it the Baltimore oriole because they thought his coat looked like the one Lord Baltimore, their governor, wore.

How does the male look?

How does the female look?

An old nest may be brought into the school room. It is said that the oriole occasionally returns to the same nest the second year.

Where was the nest?

What is its shape?

How long is it?

Of what material is it made?

How was it fastened to the limb?

Who was the weaver?

While the mother sits on the eggs the father sings her a sweet song from a near-by limb.

What is its song? Try to whistle it.

What are the young like?

What is its food? He knows how to remove the meat from a hairy caterpillar and not get the hairs.

How many eggs does the oriole lay?

What color are they?

Of what use is the oriole to the neighborhood?

Draw an oriole for the Nature Book.

Finish:

1. The Baltimore oriole was named for _____.
2. The oriole has _____ wings, _____ wings, _____ tail, _____ head, and _____ breast.
3. The oriole spends the winter _____.
4. The young orioles are of a _____ color like their mother.
5. The nest is made of _____, and _____.
6. It looks like a little _____.
7. There are _____ white eggs with _____ spots in the nest.
8. The oriole eats _____, _____, and _____.
9. The father oriole helps _____ material to build the nest.
10. It is not hard to make friends with the _____.

Materials:

Pictures

Books

Poems

Songs

Nest

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, New York, 1926, pp. 125-128.

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, BOOK

4, McIndoo Publishing Company, Kansas City, Mo., 1927, p. 60-65.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., 1927, p. 110.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR GIRLS AND BOYS, McIndoo Publishing Company, Kansas City, Mo., pp. 60-65.

Holbrook, Florence, THE BOOK OF NATURE MYTHS, Houghton, Mifflin Company, Boston, 1902, pp. 86-89.

GRADE IV

Unit-Two-----Birds-----Quail

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the quail.
- B. Organization of the activities and subject matter of this unit.

1. The quail seems to keep close to man. So many quails have been shot that there are few left. He is the one of the farmer's best weed destroyers. He eats great quantities of weed seeds besides many army worms, potato beetles, and cutworms.

How does his color help him? What does he look like? What does he do? What is his song? What do we call him? Where do we look for him? How does the father look? How do they sleep? Why? How do they keep warm in winter? Where is the nest? How many eggs in the nest? How does the mother arrange the eggs in the nest? What do the young look like? How do they act when danger is near? How does the wise farmer protect quails? Some one has said that the quail is the life of the woods.

The answers to these questions should be written and put in the Nature Book.

Draw a picture of the father quail.

Give the quail call.

Tell how the quail sleeps.

Write a description of a quail.

List the weed seeds that a quail eats.

Get pictures of the quail.

A trip to see quail. Field glasses are a help.

Material:

Pictures

Stories

Songs

Poems

Game laws

Signs (Keep out) (No hunting allowed)

Teacher's Reference:

THE CLASSROOM TEACHER, Vol. IX, The Classroom Teacher Inc.,
Chicago, 1927, p. 158.

Doze, Robert, "Give Bob White A Chance" in KANSAS STATE
BOARD OF AGRICULTURE, TWENTY-EIGHT BIENNIAL REPORT, Topeka,
Kansas, pp. 38-42.

Children's Reference:

Holbrook, Florence, "How the Quail Became A Snipe" in THE
BOOK OF NATURE MYTHS, Houghton, Mifflin Company, Boston,
1902, pp. 43-46.


Meyer, Zoe, "Mother Quail's Trick" in IN THE GREEN FIELDS,
Little, Brown and Company, Boston, 1929, pp. 13-17.

GRADE IV

Unit-Three-----Birds-----Sparrows

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the sparrow.
 B. Organization of the activities and subject matter of this unit.

1. The English sparrow was brought to this country from Europe eighty years ago to kill insects. No one knew much about him. He has developed into a pest because he is more fond of grain than insects. Some states have set aside money to destroy English Sparrows. This  represents their food and this much is grain. Very little of the food is insects. They rob other birds of food and drive them away from their nests. They destroy fruit buds and blossoms besides pecking at the ripened fruit. During the winter many fly to the city and town to get food easily from streets and homes and where there are more places to get in out of the cold. They build nests in drain troughs, and are not neat builders. Bring in a pair of sparrows.

How does he look? How does she look? Where is the nest built? What is it like? How does he get his food? What does he eat? What is his song? How can they be told from other sparrows? How many they be driven away? Of what use are they? Do not weary the child with questions. Lead him to ask questions. Be sure it is interest and not mere questioning.

Write a description of the sparrow.

Have a debate to decide whether or not the English sparrow should be driven out.

Fill blanks:

The father sparrow has a _____ throat.

The mother sparrow has a _____ throat.

The sparrows roost at night in _____, _____, _____.

The sparrow often builds nests in _____.

They should be _____ from building near the house.

Study sparrow hawks.

Study chicken hawks.

Study bluejays.

Study owls.

Study Martins or other birds. Watch for the Starling.

Material:

Sparrow

Pictures

Books

Teacher's Reference:

WORLD BOOK, Vol. 9, pp. 5481-5482.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 84-87.

ENGLISH SPARROW IN NORTH AMERICA, UNITED STATES DEPARTMENT OF AGRICULTURE, Bulletin.

Children's Reference:

Miller, Mrs. Harriet Mann, TRUE BIRD STORIES, E. P. Dutton and Company, N. Y., 1892, pp. 88-86.

Poulsen, Emilie, IN THE CHILD'S WORLD, Milton Bradley Com-

pany, Springfield, Mass., 1923, pp. 285-6.

Miller, Olive Thorne, TRUE BIRD STORIES, E. P. Dutton and Company, N. Y., 1892, pp. 97-101.

Thompson, Ernest Seton, "A Street Toubador" in LIVES OF THE HUNTED, Scribner's Sons, 1910, pp. 109-136.

GRADE IV

Unit-Four-----Mammals-----The Cow

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the cow.
- B. Organization of activities and subject matter of this unit.
1. Observe cows that are grazing near the school house. What kind of cows do we have on our farms? How do cows differ? What are the points of a good milk cow? What does a cow eat? How does she eat? What is she chewing? What is her cud? How does she chew? Where are her teeth? What is her foot called? Why is it split? Which can run faster, a cow or a horse? How does she protect herself? What is the difference between a cheese cow and a butter cow? (Cheese 7,000 pounds a year. Butter 5,000 pounds a year.) What is the young of the cow called? What is its voice? What does it eat? What is cow meat called? What is calf meat called? What else does the cow do for man? How should we care for the cow? Say, "Come here", in cow language.
- Bring milk to school everyday to drink.
- Make some butter.
- Write a description of your pet cow.
- Make a list of all the things you can think of that we get from the cow. (Milk, cheese, butter, in food, buttons, glue, mortar, imitation amber, artificial onyx, coating for papers, shoes, jackets, straps, etc.)
- Make some mortar and put hair in it? Why?
- Draw a picture of your cow for Nature Book.

Make some butter.

Study the manufacture of leather.

Materials:

Cow

Milk

Hair

Glue

Mortar

Cheese

Butter

Leather

Bone meal

Buttons

Teacher's Reference:

Patch, Edith M., FIRST LESSONS IN NATURE STUDY, MacMillan Company, N. Y., 1926, pp. 19-26.

WORLD BOOK, Vol. 3, Roach and Fowler, Kansas City, Mo., pp. 1617-1618.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 295-302.

Children's Reference:

Poulsen, Emile, "Story the Milk Told Me", in CHILD'S WORLD, Milton Bradley, Springfield, Mass., 1923, pp. 160-161.

GRADE IV

Unit-Five-----Mammals----Milk all over the world

Leisure-time interests and activities.

- A. Specific Objective: To know about milk over the world.
 B. Organization of activities and subject matter of this unit.

Milk has been used as food for centuries. The cow was known about in earliest times by the Lake Dwellers in Switzerland.

Where is that? The people of the Scandinavian countries have used milk a very long time.

The goat, which is a member of the sheep family, is the milk-giving animal in many countries. In Italy, South Africa, South America, Germany, Spain, and Bulgaria, the goat is the popular source of milk. Locate these countries. They also have cows. Throughout the world more goat's milk is used than cow's milk.

In Australia, New Zealand, and Russia, the sheep furnishes the milk. In China, the buffalo and Yak are the milk-givers. (Find pictures of these animals.) The Eskimo children drink reindeer milk so that boys and girls all over the world drink milk. (Pictures of children and animals of the various lands will help the story.)

The following may be given children to read and then told as chapters.

In China the coolie balances a yoke-like bar across his shoulders. On each end of the bar or pole is a pail of buffalo or yak milk. He dips it out for the housewife at the door.

In Italy the goatherd drives the goat through the streets and milks it at each home. If this person is quite an important person, the goat is driven up the stairs into the parlor and milked. This may be satisfactory if the goat behaves. At the home of a less important person, the housewife lowers from an upstairs window a basket with a bottle or bucket in it. When the goatherd has milked the amount wanted the housewife pulls the basket up.

In India, goat's milk is delivered in hollow bamboo trunks, the rings of which are the measuring marks. What is bamboo? The Mexican milkman swings two cans of milk over the back of a donkey, then he sits astride the creature and with a stick makes him go.

The Eskimo child who lives in Greenland, Alaska, Labrador, or the islands of the Arctic Ocean, has reindeer milk for breakfast. The father allows the milk to freeze, then he breaks it up into chunks and puts it away. When the children are hungry, he thaws out a block.

In some countries, horses are used for milk.

In our country, the transportation of milk is quite another thing. How is it transported from your home to the town?

Play a milk game.

For breakfast this morning, I had a glass of milk. My milkman wears a pole across his shoulders. On each end of the pole is a bucket of buffalo or yak milk. From what country am I?

Materials:

Milk

Books

Typewritten pages

Teacher's Reference:

Comstock, Anna Betsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N.Y., 1920, pp. 295-302.

THE CLASSROOM TEACHER, Vol. 3: 512-514; 7: 255-257; 8: 11; 12: 296-297; 5: 64, 55, The Classroom Teacher, Inc., Chicago, 1929.

Children's Reference:

Lambin, Nina B., "Good Times Together" in AMERICAN CHILDHOOD, April 1932, pp. 23-24.

Rosetti, Christina G., SING-SONG, MacMillan Company, N. Y., 1924, pp. 25.

GRADE IV

UNIT Six-----Mammals-----Buffalo

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the buffalo that once lived in Morris County.

B. Organization of activities and subject matter of this unit.

1. There are still buffalo trails and buffalo wallows in Morris County. On a trip, we may go over these old trails getting dimmer daily. How were these trails made? What was the use of the wallow? Why did they travel in herds? It is said when the herd was set upon by wolves the calves were placed in the center of a circle made by the buffalo with their heads and horns ready to fight. When a bold bear attacked them, they hooked him into the center and gored him to death. The father buffalo had strong, sharp horns, and a strong neck. He tossed, hooked, trampled, and kicked his enemies. Cattle do not like the smell of blood and often these wild cattle stampeded when they smelled it. When flies bothered the buffalo, he hunted a wallow and made him a coat of mud to keep them off.

How did the buffalo look? What color was he? How did he differ from our cow? What did he eat? Where did he live?

Of what use was he to man? What became of the buffalo?

Where will we find them? Where do we often see the buffalo?

(On a nickel.)

Take a trip and visit the trails and a wallow.

Suggested activities:

There are people still living in Morris County who were here when buffaloes roamed about. Ask them to tell you about buffaloes. Draw a buffalo for the Nature Book.

Material:

Pictures

Books

Nickel

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 295-299.

THE WORLD BOOK, Vol. 3, Roach and Fowler, Chicago, pp. 1617-1618.

Children's Reference:

Monteith, John and Caroline, SOME USEFUL ANIMALS, American Book Company, N. Y., 1903, pp. 63-68.

Huber, Marian Blanton and Others, THE POETRY BOOK 4, Rand McNally and Company, Chicago, pp. 108-110.

GRADE IV

Unit-Seven---Mammals-----Woodchuck

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the woodchuck.
- B. Organization of the activities and subject matter of this unit.

1. The woodchuck may be studied by the children outside. He goes to bed about October first and sleeps until the end of March or early April. Answer these questions as observations are made.

How can you tell whether or not you have discovered a woodchuck burrow? Where is he found? What does he eat? When does he eat? How does he fight? What are his enemies? How does he walk? How does he make his burrow? What does he do with the dirt? How does he keep from being flooded out? Of what is the nest made? How does he pack in the bedding? How can you tell if he is at home? How can you tell the back doors from the front doors? What color is he? Describe his fur. How do his feet differ? What are they used for? Beside walking and running? Of what use is his tail? How does he keep dirt from getting in his ears when digging? How does he get ready for winter? Where does he spend the winter? Why does a woodchuck come out in the spring? How many chucklings are there? When are they born? What are the enemies of the woodchuck? Is he a friend or enemy? When is Ground Hog's Day?

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., p. 229-232.

Craig, John Botsford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 86-88.

THE WORLD BOOK, Vol. 4, Roach and Fowler and Company, Chicago, pp. 2627-2628.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., Book 4, pp. 18-22.

GRADE IV

Unit-Eight-----Mammals-----Beaver

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the beaver.
- B. Organization of activities and subject matter of this unit.
1. Children who live on Clark's Creek may have an opportunity to visit a beaver at home. We were listing the fur bearing animals of Morris County. A beaver is named. There are beavers on Clark's Creek. There are pictures in the geographies. What does he look like? What color is he? How big? Where does he live? What is his house like? What sort of fur has he? Some beavers are black and others are white. What color is the Morris County beaver? What is peculiar about his tail? Of what use is it to him? What does he build beside a house? How does he build a dam? Why does he build a dam? What do these dams sometimes do to the rivers? What is his food? How does he prepare for winter? What other animals do we know that belong to the same family as the beaver? Why are there so few beavers?

Fill blanks:

1. The beaver belongs to the _____ family.
2. He is a _____ animal with a broad _____.
3. He has _____ eyes, _____ ears, and a _____ nose.
4. His front feet are _____ and his back feet have _____.
5. His fur has _____ hair and _____ hair.
6. Most beavers are a _____ color.
7. His tail is oval _____. It is covered with _____. He uses

it as an _____ when swimming and a loud whack warns the others of _____.

8. He gnaws down _____ and makes a dam.

9. Sometimes these dams change the course of a _____.

10. He makes a big _____ room house. In one room he _____. In the other he _____ twigs, bark, roots, and water plants.

Materials:

Pictures

Books

Beaver fur

Teacher's Reference:

Schwartz, Julia Augusta, WILDERNESS BABIES, Little, Brown and Company, Boston, 1905, pp. 75-91.

THE WORLD BOOK, Vol. i, pp. 640-642.

Wood, Carolyn D., ANIMALS THEIR RELATION AND USE TO MAN, Ginn and Company, Boston, 1912, pp. 84-89.

Children's Reference:

Wright, Julia McNair, SEA-SIDE AND WAY-SIDE, D. C. Heath and Company, 1895, pp. 166-173.

Long, William J., WAYS OF WOOD FOLK, Ginn and Company, Boston, p. 77-100.

Bass, Florence, STORIES OF ANIMAL LIFE, D. C. Heath and Company, Boston, 1912, pp. 86-91.

GRADE IV

Unit-Nine-----Mammals-----Skunk

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the skunk.

B. Organization of activities and subject matter of this unit.

1. A dog that comes to school has been chasing a skunk. How many have seen a skunk? What does he look like? What sort of a noise does he make? How does he protect himself? How do they get their food? What kind of housekeeper is the skunk? Where is the house? Describe it. When are the young skunks born? What do they look like? What other animals protect themselves as the skunk does? Is the skunk a friend or enemy?

Use these words in sentences about the skunk:

striped	woodchuck	valuable protection
grunt	weasel	gait
disagreeable	injurious	awkward

Material:

Books

Pictures

Make tracks like a skunk

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 166-168.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 247-249.

THE WORLD BOOK, Vol. 9, Roach and Fowler and Company, Chicago,

pp. 5401-5402.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIn-
doe Publishing Company, Kansas City, Mo., 1920, pp. 82-86.

THE WORLD BOOK, Vol. 9, Reach and Fowler and Company, Chicago,
pp. 5401-5402.

GRADE IV

Unit-Ten-----Fish-----Minnows

Leisure-time interests and activities.

A. Specific Objective: To know the characteristics of minnows.

B. Organization of activities and subject matter of this unit.

1. Name all the parts of the fish you can see. How does it swim? What other movement has the fish? How many fins has it? Where are they? The back fin is the dorsal fin; the one at the end is the tail fin. Just in front of the tail fin is the anal fin. In front of the anal fin are the ventral fins. Nearest the head are pectoral fins. Of what do these fins appear to be made?

With what is the body covered? They remind one of what?

Describe the eyes, nose, and mouth. How does he breathe?

What are the flaps at the side of the body just back of the head? How do fish eat? What does it eat?

The tail fin is used to push the fish about. The dorsal and anal fins help steer and balance the fish. The pectoral fins are fans that make water flow to the mouth.

The fins are bony ribs called rays, covered with a thin membrane. Some are called spines. Spines are used to fight.

Spines are used to fight other fish sometimes.

The fish breathes by means of gills. These gills are under the flaps that move in and out. Water taken in at the mouth flows over the gills and out. The gills take air out of the water and send it to all parts of the body.

What are the fish of Morris County?

What do the fishermen do with the fish they catch? How do they fish? What fish can be bought at the butcher shop? What does this fish cost a pound? Where do they come from? (Shipping.)

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 149-153.

THE WORLD BOOK, Vol. 4, pp. 2184-2188.

Children's Reference:

Holbrook, Florence, THE BOOK OF NATURE MYTHS, Houghton, Mifflin and Company, Boston, 1902, pp. 138-141.

Wright, Julia McNair, SEASIDE AND WAYSIDE, Book 3, D. C. Heath and Company, Boston, 1901, pp. 218-222.

King, E. L. M., FIFTY COUNTRY RHYMES FOR CHILDREN, D. Appleton and Company, N. Y., 1926, p. 50.

GRADE IV

Unit-Eleven-----Snakes-----Water Snakes

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the water snake.

B. Organization of activities and subject matter of this unit.

1. Capture a snake. Put in a box with glass over the top. Watch snakes at home. Do all snakes look alike? How large do they grow? Where do they live? What is the color of a water snake? How does he swim? How do they fight? What do they eat? When are the little snakes born? How do they look? Of what use is he? Some one says a snake which has a head like the hand with fingers together is not poisonous, but one with a head shaped like the fist is. There are only two poisonous snakes in Morris County.

Finish:

1. All snakes ____ not look ____.
2. Water snakes live ____ the ____.
3. The ____ is dirty brown with ____ running crossways.
4. He swims with his ____ about an ____ above water.
5. The little snakes are born in ____.
6. They are ____ gray with ____ cross-bands on them.
7. The water snakes eats mostly ____ and ____.
8. He is of no especial ____ but is interesting.

Material:

Snake

Box

Glass

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 125-126.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 206-207.

WORLD BOOK, Vol. 9, Roach and Fowler and Company, Kansas City, Mo., pp. 5419.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 108-112, Book 4.

Chailln, Paul Du, THE WORLD OF THE GREAT FOREST, Charles Scribner's Sons, 1911, pp. 156-157.

Holbrook, Florence, THE BOOK OF NATURE MYTHS, Houghton, Mifflin Company, Boston, 1902, pp. 47-49.

GRADE IV

Unit-Twelve-----Ants

Leisure-time interests and activities.

- A. Specific Objective: To know how the life history of the ant.
- B. Organization of activities and subject matter of this ant.
1. Make a formicarium. Put some of an ant hill into a tumbler. Stand it in water. Visit the ants at home. Where shall we look for ants? What does he look like? How does his head compare with his body? Where are his eyes? How many legs has he? Where are the wings? Which ants have wings? Of what is their house made? How do they make their houses? What kind of housekeepers are they? How do they take a bath? What animal bathes the same way? How many kinds of ants live in the same house? What is the female called? What is the male called? How do the workers take care of the babies? How does the ant fight? What do they eat? How may they be controlled? What are its enemies? Feed the ants sugar.

Make a formicarium. Observe ants out-of-doors. Write the answers to the above questions as they are observed.

Materials:

Ant hill

glass

Saucer

Magnifying glass

Sugar

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoe Publishing Company, Kansas City, Mo., 1921, pp. 32-34.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 419-424.

THE WORLD BOOK, Vol. 1, Roach Fowler, Kansas City, Mo., pp. 268-275.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoe Publishing Company, Kansas City, Mo., pp. 31-36.

Patch, Edith M., FIRST LESSONS IN NATURE STUDY, MacMillan Company, N. Y., 1926, pp. 12-16; pp. 287.

Miller, Olive Thorne, LITTLE FOLKS IN FEATHERS AND FUR, E. P. Dutton and Company, N. Y., pp. 188-191.

_____ Vamba, THE PRINCE AND HIS ANTS, Henry Holt and Company, N. Y., 1910, pp. 275.

Hungerford, H. B., "Insect Pests About the House" in TWENTY-FOURTH BIENNIAL REPORT OF KANSAS STATE BOARD OF AGRICULTURE, pp. 20-23.

Holbrook, Florence, THE BOOK OF MYTHS, Houghton, Mifflin Company, Boston, pp. 98-102.

GRADE IV

Unit-Thirteen-----Insects-----Bee

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the bee.

B. Organization of the activities and subject matter of this unit.

1. On our walk to observe spring flowers we find the bee visiting them. Children should watch the bee whenever possible.

Describe the bee you see on the flower. If you wish to find out more about him put one in a glass and observe him. Watch the bee put his tongue down into the flowers. What flowers does the bee seem to like best? How is the body covered? How many legs has he? How many wings? Where are the eyes? Pollen is carried from flower to flower by these hairs on the bee's body. It gets brushed off onto the pistil to help make seeds.

When the bee flies he hooks the two wings on each side together and he looks to have two wings instead of four.

Alfalfa, goldenrod, the clovers, most of the fruit tree blossoms and many of our garden flowers give the bee honey.

Why does a bee's sting hurt so? The little barb sticks fast and holds the drop of poison which the bee has also left.

2. Get some honey in the comb. What shape are the honey cells? How many layers? About how much honey does each hold? Of what is the comb made?

When was ix needed some of the bees eat honey until they can hold no more. Soon they grow sleepy and hang up to sleep. Many hang to the top of the hive with the claws on their front feet. Other bees hang to the hind legs of the first ones. As they sleep the honey digests some thin wax oozes from the under side of the body. There it hardens in little pocket dents.

The bee rakes these particles off with his hind legs. Bees put the wax in their mouths and chew it until it becomes soft. The bees mold it into six-sided cells with their jaws, tongue, and claws.

What were the bees doing when we saw them at the flowers? The bee draws honey or nectar from the flowers, swallows it. Some change occurs in the bee's stomach. The honey goes into a sack under her wings. When she gets the sacks full, she flies home and presses on the sack when the honey comes back to her mouth and she puts it in the cell.

There are little pollen sacks on the bee's back legs. Pollen is made into bee bread, the food of the bees.

3. What do we call the bee's home? A bee family consists of a queen, several drones, and workers. The ones we see around the flowers and buzzing around the hive are the workers. The queen lays eggs. If the queen dies, the home is broken up. The man who owns the bees must get a new queen. The drones are father bees. The eggs would not hatch unless fertilized by them.

Fill blanks:

1. The bees gather nectar from the _____ with their _____.
2. The bee swallows the _____ and it is changed _____ in the bee's stomach.
3. The cells in the comb have _____ sides.
4. The bees' home is called a _____.
5. The bee family is the _____, _____, and _____.

If 60,000,000 tons of honey are made in the United States, this year ask father how much money that would be at the present cost a pound.

Materials:

Bee

Glass

Magnifying glass

Honey

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 445-455.

THE WORLD BOOK, Vol. 1, Roach and Fowler, Chicago, pp. 647-656.

Children's Reference:

Holbrook, Florence, THE BOOK OF NATURE MYTHS, Houghton, Mifflin Company, Chicago, 1902, pp. 93-95.

Wright, Julia McNair, SEASIDE AND WAYSIDE, D. C. Heath and Company, Boston, pp. 45-67.

GRADE IV

Unit-Fourteen-----Insects-----Mosquito

Leisure, time interests and activities.

- A. Specific Objective: To know the life history of the mosquito.
- B. Organization of activities and subject matter of this unit.

1. Mosquito eggs may be found in stagnant pools, rain barrels, and tin cans. The black cartridge-like rafts are fastened securely together in rows like a soldier. Some may be taken into the school room to watch the wrigglers hatch and develop. They cannot stay under water all the time but come to the surface to eat. They drop quickly to the bottom if they are disturbed. The little breathing tubes which are in the tail close at this time. They always swim backwards. The wriggler is the pupa stage of the mosquito. When he develops into a mosquito he sheds his skin and rests upon it until he is ready to fly. He can be easily drowned just after he crawls out.

The female mosquito bites. She sucks the blood of animals and people alike. The disease germs are transferred from one to another. It is poison which makes the bite itch. Mosquitos with spotted wings are more dangerous. They carry fever germs.

Oil placed on rain barrels will kill wrigglers. Fish are fond of mosquito wrigglers, dragon flies, water beetles, and tadpoles are also fond of them.

Phoebes, chimney swifts, and swallows are birds which eat many grown up mosquitoes.

1. What does the mosquito look like?
2. Where does he live?
3. Where do they lay their eggs?
4. What do they eat?
5. Why does the mosquito sing?
6. How does she make her song?
7. Why are most mosquitoes dangerous?
8. How may mosquitoes be killed?
9. Why does a mosquito bite itch?
10. How many kinds of mosquitoes are there?
11. Which is the more dangerous? Why?
12. Why should we get rid of mosquitoes?
13. Fill blanks:

1. Larvae of mosquitoes live in _____.
2. We call them _____.
3. The pupae live in _____, too.
4. Mosquitoes larvae and pupae may be destroyed by putting _____ on the water.
5. Fever is caused by _____.

Material:

Larvae

Eggs

Glass

Netting

Oil

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY,

McIndoe Publishing Company, Kansas City, Mo., pp. 107-109.
THE WORLD BOOK, Vol. 7, Roach and Fowler, Chicago, pp. 3965-
3968.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIn-
doo Publishing Company, Kansas City, Mo., pp. 55-59.

Pierson, Clara Dillingham, AMONG THE MEADOW PEOPLE, E. P.
Dutton and Company, 1899, pp. 171-176.

GRADE IV

Unit-Fifteen-----Gardening-----Vegetables

Leisure-time interests and activities.

- A. Specific Objective: To know the vegetables for a garden.
 B. Organization of activities and subject matter of this unit.

Put in "Almost all countries."

Bring in vegetables grown in the home garden.

1. What is your favorite vegetable?
2. What vegetables do you enjoy?
3. What part of the plant is the onion? The potato? The turnip? The carrot? The beet?
4. What part of the plant is the tomato, the cabbage, spinach, cucumber?
5. How can you tell a child who eats plenty of vegetables?
6. What part of the body do vegetables build up?
7. What makes the blood red?
8. What is your favorite vegetable dish? Tell how to prepare it.
9. Consulting a seed catalog, make out a list of the vegetables you will grow in your garden and find the cost.
10. List the vegetables which may be eaten raw.

Teacher's Reference:

Fullerton, Edith Loring, THE BOOK OF THE HOME GARDEN, D. Appleton and Company, N. Y., 1919, pp. 260.

Children's Reference:

Wynne, Annette, FOR DAYS AND DAYS, Frederick A. Stokes Company, N. Y., pp. 98-129.

GRADE IV

Unit-Sixteen-----Spring Wild Flowers

Leisure-time interests and activities.

A. Specific Objective: To make a spring flower chart.

B. Organization of activities and subject matter of this unit.

1. On our trip what were the earliest wild flowers we found?

The dog tooth violet, spring beauty, and violet may be seen.

Why can these flowers bloom so early? These plants have underground stems. Spring beauties have roots like a potato. Dog-tooth violets have bulbs like onions. Violets have very thick root stocks. What is the use of the underground stems? These plants have stored up food in the summer. They have their flower buds all ready in the summer so the first thing in spring they pop up.

How long do the dog-tooth violets stay in bloom?

Summarize:

Make a chart of wild flowers

Flower	Where Found	Color	Leaf	Root	How Fert- iliz- ed	Abund- ance	Value
--------	-------------	-------	------	------	--------------------	-------------	-------

Flower							
Where found							
Color							
Leaf							
Root							
How fertilized							
Abundance							
Value							

Teacher's Reference:

Dana, Mrs. William Starr, HOW TO KNOW WILD FLOWERS, Charles

Scribner's Sons, N. Y., 1912, pp. 346.

THE CLASSROOM TEACHER, The Classroom Teacher Inc., 1929, 9:
45, 487, 489.

Children's Reference:

Olcott, Frances Jenkins, THE RED INDIAN FAIRY BOOK, Houghton,
Mifflin Company, 1924, pp. 37-39.

GRADE IV

Unit-Seventeen-----Plants-----Pumpkin

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the pumpkin.

B. Organization of the activities and subject matter of this unit.

1. Bring in two or three pumpkins. Flowers may be secured late, also leaves. The pumpkin is found in many parts of the world. Its leaves are used for greens and its fruit is made into pies and soup. Mexican boys and girls eat pumpkin seeds as we eat peanuts. Years and years ago the pumpkin was a vine that grew among trees. Why does father plant it in the corn rows? What is the shape of its petals? Its stamens, and pistil? How long does it bloom? How many kinds of flowers do you find on the pumpkin vine? Describe its leaves. How large does the pumpkin grow? How large did it grow when it grew in the woods? Who first planted pumpkins in this country? How do we keep pumpkins? How do we know that the pumpkin used to be a climber? How do the bees help the pumpkin? What color is the pumpkin when it is ripe? Of what use is it?

Teacher read poems about pumpkin. Riley's "When the Frost Is On the Pumpkin" and Whittier's "The Pumpkin".

Make a pumpkin Jack-o'-lantern.

How much does your largest pumpkin weigh?

Materials:

Pumpkins

Blossoms

Leaves

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL FOR NATURE STUDY, McIndoo Publishing Company, Chicago, pp. 118.

THE WORLD BOOK, Vol. 8, pp. 4870-

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 88-91.

Bouten, Josephine, POEMS FOR THE CHILDREN'S HOUR, Milton Bradley Company, Springfield, 1927, pp. 249-250.

Miller, Olive Beaupre, IN THE NURSERY OF MY BOOK HOUSE, The Bookhouse for Children Pub., Chicago, 1925, Vol. 1, pp. 368-373.

GRADE IV

Unit-Eighteen-----Gardening-----Onion

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the onion.

B. Organization of activities and subject matter of this unit.

What plants grow in our gardens which do not come from seeds?

Potatoes, onions, iris, gladioli.

Bring in onions of various colors. Some onion sets, seeds,

a complete plant. What is an onion? Examine it. What do

we find at the lower end? At the top? What flower have we

studied that has the same kind of root? We call it a bulb.

A bulb is really an underground stem. What covers the bulb?

Why is it in the paper covering? Remove it and let the

onion lie. What happens? Cut the onion across. How is it

made? Where are the layers closer together? Why? An

onion can be put in a bottle so that only the roots are in

the water. It may be planted on stones like the tulip.

Watch developments. What is the use of the bulb?

How do we plant onions in our gardens? Why do you plant

sets? Examine a set. What is it? How do we get sets?

When can sets be planted? How should they be planted?

Onions like fine rich soil.

What color are the seeds? Where do we get seeds? How

shall we plant them? How far apart shall the rows be? How

close together shall the plants be? How shall we care for

them?

What kinds of onions do you grow in your garden? What is

the multiplier onion like? The winter onion?

Cut onion bulbs to show the various colors of the onion.

Find pictures of onions.

Write a sentence about each variety of onion found.

Tell how onions are produced for market.

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY,
McIndoo Publishing Company, Kansas City, Mo., p. 209.

THE WORLD BOOK, Vol. 7, pp. 4377-4378, FARMERS' BULLETINS,
United State Department of Agriculture, Washington, D. C.

Children's Reference:

Bouton, Josephine, POEMS FOR THE CHILDREN'S HOUR, Milton
Bradley Company, Springfield, 1927, p. 252.

FARMERS' BULLETINS, United States Department of Agriculture,
Washington, D. C.

GRADE IV

Unit-Nineteen-----Weeds-----Morning Glory

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the morning glory.
- B. Organization of activities and subject matter of this unit.
1. Children may bring in a vine. They may be observed on a stroll about the school yard.
- How does the vine climb? Where do they grow? Often corn stalks are made quite beautiful in their twining morning glories. Describe the leaves. Where are the leaves on the stem? When does the morning glory begin to blossom? How long does a flower last? How long do they stay open? How often does the same flower open? Mark one and see. What do the buds look like? Bring in flowers that have just bloomed, some that bloomed three or four days ago, some green pods, and some ripe. What part of the flower made the seed pod? What shape is the pod? How many rooms in it? What color is the seed? How are the seeds scattered? The pod bursts open and scatter their seed. These seed lie in the ground ready to come up early in the spring. Count the number of pods on one vine. Find out how many seeds one vine would sow.
- Draw a morning glory vine.
- Read a morning glory story.

Material:

Morning glory

Vine

Seed

Teacher's Reference:

THE WORLD BOOK, Roach and Fowler, Chicago, Vol. 7, pp. 3953-

Children's Reference:

Olcott, Frances Jenkins, THE WONDER GARDEN, Houghton, Mifflin Company, 1919, pp. 175-178.

Poulsen, Emilie, IN THE CHILD'S WORLD, Milton Bradley and Company, 1923, pp. 399-400.

GRADE IV

Unit-Twenty-----Weeds-----Burdock

Leisure-time interests and activities.

- A. Specific Objective: To know a tramp plant.
- B. Organization of activities and subject matter of this unit.
1. How do tramps get about the country? (Walk and steal rides.) There are plants that steal rides. Which ones do? Wire grass, cocklebur, sandbur, stick-tights, beggar lice, burdock. Observe them in the neighborhood. Bring in specimens of each. What does the burdock look like? How tall does it grow? Count its branches. Where are the leaves? Describe them. Count the burs on each branch. How does it cling to an object? Which way do the burs point that stick to your clothes? Of what use is this? How many seeds are there? Examine several burs to see if they contain the same number of seeds. Where do the plants grow? Some plants do not have burs. Why? How can you get rid of burdock? Try experiments. Cut the plant off at various heights - even with the ground - an inch below the ground - two inches below the ground - cut the top off and pour gasoline into the center - put salt in the center.
- Burdock is a common nuisance. The hair of the farm dog, the tails of the horse and cow, and the wool of the sheep are often matted with them. The first year a flat large-leaved plant grows from the seed. The plant with the tall stem and seed is two years old. It will die this year. If the top is cut off the plants live several years. The burs

are brittle. They hang with the top down so that the seeds can roll out. Burdock came to us from Europe. It perhaps stole a ride over. Some people use the root for medicine. Make a chart of plant tramps.

Material:

Burdock plant

Knife

Oil

Salt

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 566-569.

THE WORLD BOOK, Vol. 2, Roach and Fowler, Chicago, pp. 1002.

Children's Reference:

THE WORLD BOOK, Vol. 2, Roach and Fowler, Chicago, pp. 1002.

GRADE IV

Unit-Twenty-One-----Trees-----Shade Trees--Elm

Leisure-time interest and activities.

- A. Specific Objective: To know why many elm trees are grown by people in Morris County.
- B. Organization of activities and subject matter of this unit.
1. A leaf test may be given by way of review of trees studied so far. Name all the trees we know in the neighborhood. Put some twigs of elms and other trees in water to observe the development of bud and leaves. Draw the twig when it is put in the water and as changes occur. Take a walk for observing the tree. What is its shape? Note the large branches. Count them. Walk from the trunk of the tree out to where you stand directly under the end of the twig on the longest limb. Measure the distance. What do the buds look like? How many, shape, color on a twig? How are the leaves folded in the buds? Draw one just unfolded. Press one for the Nature Book. How is an elm leaf different from an oak leaf? What does the fruit look like? Where is the seed? How does it travel? Where do you find young elms? What uses are the elm? There are some famous elms. Do you know the Custer Elm? Visit it in Council Grove.
 2. We discuss the elm under the above questions. We find that the elm is a valuable shade tree. It is really a giant umbrella. It blossoms in early April. The flowers are small and are given color by their reddish green cup. The leaf buds open in May. Each leaf is snugly packed away

like a little fan. Many leaves come from one bud. The fruit is ripe when the leaves are full grown. The disks on the seeds make the wind carry them far away. In some places the Chinese Elm is being set out for shade because it is not bothered so greatly by bugs.

Elm is very tough wood. It is made into furniture, barrel staves, hubs for wheels, and for posts.

Ask some old settler to tell you about the Custer Elm which is in Sample Town in Council Grove. Write the conversation for the school paper.

Read about the Washington Elm.

Teacher's Reference:

TREES IN KANSAS, KANSAS STATE BOARD OF AGRICULTURE, 1928, Vol. 57, No. 186-A, pp. 12-14.

Children's Reference:

Cheyney, E. G., WHAT TREE IS THAT? D. Appleton and Company, N. Y., 1930, p. 103.

GRADE IV

Unit-Twenty-Two---Trees (Podbearing)-----Honey Locust
Leisure-time interests and activities.

- A. Specific Objective: To know which trees of the neighborhood bear pods.
- B. Organization of activities and subject matter of this unit.

Which are the pod bearing trees in the neighborhood? The most common in Morris County are the red bud, coffee bean, and honey locust trees. A choice may be made. Gather pods from all the pod trees of the neighborhood. Where does the locust grow? The oldest tree in Topeka is a locust. Tell about its bark. Tell about its leaves, to decide whether or not it is a good shade tree. What is its color? Study a pod. Measure its length and width. Find out how many seeds there are. How are they fastened in the pod? Of what do the pod and seeds make you think? Put pods on the seed chart. How are the pods of the different trees alike?

Each leaf of the locust is really several small leaves. We call it a compound leaf. The seeds are fastened to one side of the pod like a bean. What use is made of honey locust? How does the honey locust protect itself? What color are the red bud flowers? When do they open? What shape are its leaves? How long is the pod?

The coffee bean has branched leaflets. One leaf may appear a twig. How does it shed its leaves? How do these pods differ from the locust or red bud pods? The seeds of the

coffee bean were used for coffee by people who long ago settled in Kentucky.

The catalpa bears round pods. Notice the seeds.

How do they travel?

Fill the blanks:

1. The honey locust grows _____ for protection.
2. It has _____ leaves.
3. It is used for _____.
4. The pod of the honey locust is _____ and flat.
5. The red bud has _____ leaves.
6. The pod of the red bud is _____.
7. The red bud has _____ flowers.
8. The flowers come before the _____.
9. The catalpa has _____ pods.
10. It has large clusters of _____ flowers.

Teacher's Reference:

TREES IN KANSAS, KANSAS STATE BOARD OF AGRICULTURE, Topeka,
1928, Vol. 57, No. 186-A.

Children's Reference:

Cheyney, E. G., WHAT TREE IS THAT? D. Appleton and Company,
N. Y., 1930, p. 137.

GRADE IV

Unit-Twenty-three-----Rocks and Soils----Mulching
Leisure-time interests and activities.

- A. Specific Objective: To know what mulching is.
- B. Organization of activities and subject matter of this unit.
1. In caring for our gardens, the question arises why do we hoe? An experiment may demonstrate, "Take two lamp chimneys filled half full with loam. Pour in the same amount of water in each until the soil is thoroughly wet. Cover the top of one with an inch deep of dry, loose earth. Which dries out first?"

What does harrowing and cultivating do for our planted crops?

Why do we hoe our garden? What else may be used for mulch?

Where do we see mulch in the woods? Remove some leaves.

How is the ground under them? Mulch must be dry.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 847-848.

GRADE IV

Unit-Twenty-four-----Sky and Weather-----Wind

Leisure-time interests and activities.

- A. Specific Objective: To know the cause of wind.
- B. Organization of activities and subject matter of this unit.
1. Which way is the wind blowing to-day? How can you tell?
What is wind? Blow a balloon full of air and set in a warm place. Blow another full of air and set in a cold place. Observe the results. Measure. Why does the teakettle send out steam? Take the temperature of the room on the floor. At the teacher's desk; at the ceiling. Do this for several days. Call it a heat chart and put it down.
 2. Open the door on a cold day and try the temperature near the floor: at the top of the door.
 3. Put a feather over the stove, radiator, or register. What does it do?
 4. Write up the experiments and their results.
 5. Keep a record of the wind for a month. See from which direction most of our wind comes.
 6. What is the work of the wind?
Some child said the wind is a big sweeper. Prove he was right.

Read Riley's "The Wind".

Materials:

Balloons

Feather

Thermometer

Books

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 866-877.

THE WORLD BOOK, Vol. 10, Roach and Fowler, Chicago, pp. 6300-6310.

Children's Reference:

Poulsson, Emilie, IN THE CHILD'S WORLD, Milton Bradley Company, Springfield, Mass., 1923, pp. 19-72.

Holbrook, Florence, THE BOOK OF NATURE MYTHS, Houghton, Mifflin Company, Boston, 1902, pp. 165-168.

GRADE IV

Unit-Twenty-five-----Sky and Weather----Water

Leisure, time interests and activities.

- A. Specific Objective: To know from where water comes.
- B. Organization of activities and subject matter of this unit.
1. We are pumping fresh water for lunch. We should drink several glasses of water a day. Where does the water come from? Water is a great and constant traveler. The water goes to the air and back to the earth constantly. When water heats it rises or evaporates. Put some water in a dish. Let stand. What becomes of it? Why does mother hang her clothes on the line? What becomes of the rain and snow? What makes ice steam? Where does it go?
 2. Put some ice in a glass. Why do the drops gather on the outside?
 3. Why do plants wither?
 4. Develop the rain-cycle.
 5. What are clouds?
 6. What are the forms of water?
 7. The uses of water.

Rain, snow, sleet, hail, dew, fog, frost, ice.

Fill blanks:

1. Water is in the _____ about us.
2. Water evaporates when it is _____.
3. Clouds are _____ and _____.
4. When water strikes something _____ it gets heavy and _____.
5. Some forms of water are _____ (name).

6. The water in our well was once in the _____.

Material:

Water

Dish

Cloth

Ice

Glass

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., p. 222.

Comstock, Anna Botsford, Handbook of Nature Study, Comstock Publishing Company, Ithaca, N. Y., p. 850-856.

WORLD BOOK, Vol. 7, Roach Fowler, Chicago, pp. 4420-4421.

Children's Reference:

Murch, Vincent F., SCIENCE READERS, Book 3, MacMillan Company, 1913, pp. 19-25.

Holbrook, Florence, THE BOOK OF NATURE MYTHS, Houghton, Mifflin Company, Boston, 1902, pp. 155-159.

Wynne's, Annette, FOR DAYS AND DAYS, Frederick A. Stokes Company, N. Y., 1919, pp. 92-94.

Ibid., p. 112.

GRADE IV

Unit-Twenty-six-----Stars-----Milky Way

Leisure-time interests and activities.

A. Specific Objective: To know where the Milky Way is and what it is.

B. Organization of the activities and subject matter of this unit.

1. Review the star bodies. There is a river of stars in the sky. Who has seen the "Milky Way"? It is thought to be made up of suns. There are so many and they are so far away that their path seems milky. We see only one-half of it at a time. Every star is a great sun. Perhaps they, too, have worlds spinning around them. We are so small that we could not be seen from the nearest star. Stars are so far away that when we are told how far we can not think how great it is. The large dark stars are young stars. The small dark stars are old stars.

2. One group of stars looks like a chair. See if you can find it tonight. Arrange its shape with stones.

3. Another group is called the Northern Cross. Can you find it?

Make a map of the star bodies you know.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 889-911.

WORLD BOOK, Vol. 9, Roach and Fowler, 1925, pp. 5528-5529.

Children's Reference:

Martin, Martha Evans, THE FRIENDLY STARS, Harper Brothers, New York, pp. 188-196, pp. 264.

Bouton, Josephine, POEMS FOR THE CHILDREN'S HOUR, Milton Bradley Company, Springfield, Mass., 1927, pp. 43-44.

Kinney, Muriel, STARS AND THEIR STORIES, D. Appleton and Company, N. Y., 1929, pp. 73.

GRADE IV

Unit-Twenty-seven---Health--Fall Activities--Games

Leisure-time interests and activities.

A. Specific Objective: To know what games we play in the fall.

B. Organization of activities and subject matter of this unit.

1. What games do we play in the fall? Which one do you like best? Why? What do you play at home? Which games need a leader? Which games use your arms and hands?

How do we make a swing? When we swing, what parts of our body do we use? What does the swing make you think of at home? The swing is a pendulum. What muscles do you use? This is one way you are getting plenty of fresh air.

What makes you go down the slide? Which do you like better, a long, high slide or a short slide? Why? Here again you get fresh air.

The teeter-totter is a balance. How do you teeter? What do you do first before you can have fun?

Running, jumping, skipping rope, playing ball, all make you use your muscle. Much fresh air must be breathed so both your body and mind are improved by out-door games.

Teacher's Reference:

Bancroft, Jessie, GAMES, MacMillan Company, N. Y., 1927, pp. 456.

Children's Reference:

Newmayer, S. Weir and Edwin C., THE PLAY ROAD TO HEALTH, American Book Company, N. Y., 1928, pp. 144.

Turner, C. E. and Grace T. Hallock, THE WAY TO KEEP WELL, American Book Company, 1928, pp. 264.

GRADE V

Unit-One---Birds-----Bluebird

Leisure-time interests and activities.

- A. Specific Objective: To know the habits of the bluebird.
- B. Organization of the activities and subject matter of this unit.

"Winged lute that we call a bluebird,
 You blend in a silver strain
 The sound of the laughing waters,
 The patter of the springs sweet rain,
 The voice of the winds, the sunshine,
 And fragrance of the blossoming things.
 Oh! You are an April poem
 That God has dowered with wings."

-----The Bluebird Rexford

1. Observe a bluebird. This should be done individually and by each pupil.
- During the springs which came to the early Pilgrim settlers, the bluebird was a welcome guest. His blue back reminded them of the skies of England and his red breast of the robin. They called him the "Blue robin." The bluebird and the thrushes are cousins of the robin and in New England he comes shortly before the robin.
- The song of the bluebird and robin resemble each other somewhat. The robin pipes, "Cherries are ripe", while the bluebird sings a soft "tru-al-ly, tru-al-ly".
- The bluebird is found in open fields, old orchards and even

near the homes of man. They do about in groups of three or four until it is time to mate.

They do not hop about on the ground looking for food but perch on the branch of a tree keeping their sharp eyes on the ground below. The nest is built in a hole in a tree or fence post. Its soft grass lined nest is often found in a hollow apple tree. They will live in suitable houses made by man.

To make a nest for a bluebird, a hole ten inches deep and six inches wide will afford room. The hole should not be more than two and one-half inches in diameter and no door-step. An old tree trunk will make a good home if fastened fifteen feet from the ground. Put barbed wire or tin below the nest to keep cats from crawling up.

The eggs are bluish white. The young have spotted backs and whitish breasts flecked with brown. Their food is almost entirely insects. The old ones eat wild berries and fruits besides many seeds. Harmful beetles, caterpillars, and grasshoppers form part of their food. The bluebird is always a friend to man.

In the fall bands of bluebirds pass through the country. These are probably those which have been farther North and are on their way to the Gulf. They are the only birds from the North which sing in the winter.

2. When does the bluebird come?
3. Which comes earlier, the bluebird or the robin?
4. How do the robin and bluebird look alike?

5. How do they differ?
6. Tell of the bluebird's song.
7. Describe the bluebird. Head, back, breast, under parts, wing, tail.
8. How can we tell the male from the female?
9. Where do they stay?
10. How do they catch their food?
11. Where do they build their nests?
12. Of what do they build them?
13. Who builds the nest?
14. What color are the eggs?
15. How do the young look?
16. What do they eat?
17. Where do they spend the winter?
18. How do they help man?
19. What can we do to invite the bluebird to live near us?
20. How can we protect them?
21. What are its chief enemies?

(These questions may be given to the pupils to be followed by reading about the bluebird.)

22. Make a colored picture of the bluebird for Nature Book.
23. Tell how to make a suitable house for a bluebird.

Material:

Pictures

Stories

Books

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 60-62.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 156-159.

Hodge, Clifton F., NATURE STUDY AND LIFE, Ginn and Company, 1902, Chapters 18-21.

Children's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 60-62.

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., Book 5, pp. 156-159.

Leblanc, Georgette, THE BLUEBIRD, Silver Burdette and Company, N. Y., pp.

GRADE V

Unit-Two-----Birds-----Goose

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the goose.

B. Organization of activities and subject matter of this unit.

1. A goose may be brought to school. It is better to study it at home. Questions may be developed, observations made, and reported on at different times.

The goose is one of our most intelligent farm creatures.

They are easily trained. Years ago in Greece, girls often made pets of geese. They became such good friends that if the girl should die the figure of a goose was carved on her tombstone. The high ridge above the beak resembles a Grecian nose.

The feathers of the goose are soft and beautiful. They are very heavy and bring a good price when sold. The "picking" is done in late summer when the moulting season is on. A bag is slipped over the bird's head. It is turned breast up with the head held firmly under the arm or between the knees while the feathers from the breast and under the wings are plucked.

Domestic geese can not fly very much. They take little flying hops. The goose walks more gracefully than a duck because the legs are not set so far back. The track is three-cornered and has two little scallops on one side made by the webs between the three front toes.

The common gray goose is known as the Toulouse. The white

goose with orange bill and blue eyes are Embdens. There are other species of geese.

Geese live together year after year and seldom have any divorces. The gander protects the nest. He talks to his goose and keeps her company while she is sitting.

Goose eggs are twice as large as a hen's. They are more rounded. It takes four weeks for them to hatch. When the family start for the water, the mother leads the procession and the father brings up the rear. For the first swim, both the goose and the gander push them in with their bills.

When a gander fights, he lowers his head, grabs with his strong beak and flays with his wings.

Geese are almost vegetarians. Clover and grass are the feeding they like and nothing is more toothsome than dandelions.

Geese are raised by some people to supply the demand for goose liver sausage. The creature is put in very close confinement and "stuffed" with food in order that the liver may greatly enlarge. When you eat goose liver sausage, you are tasting the enlarged liver.

The goose is considered the Christmas meat. The dark meat is very rich.

Where can you find out how many geese were raised in Morris County this year?

In what ways are a duck and a goose alike?

How do their beaks differ?

What is the difference in the shape of the necks?

For what purposes are geese raised?

When are geese "picked"?

How are they picked?

Which feathers are used?

How do geese use their wings?

What is the shape of the tail when flying?

What is its use?

How are the legs and feet of a goose different from those of a duck?

Describe the goose's foot.

What shape is the goose's track?

How many kinds of geese do you know?

What do they eat?

How does a goose's nest differ from a chicken's nest?

When do the geese mate?

What is the father called? The mother? The young?

Compare the eggs of a goose and hen.

How do the goslings look?

How do they teach the young to enter the water?

How do they protect the goslings?

How do they fight?

How does the goose clean herself?

How does she keep her feathers dry?

How do geese talk?

Talk to show the different feelings expressed by a goose.

Tell some interesting things you have seen geese do.

Write a story of a goose, its appearance, and nesting habits.

Read about geese.

Study of Canada or wild goose. Migration - south - when - north when, manner of.

Study of the duck. Using the outline which has been given for the goose.

Study of feather industry.

Feathers used for trimming.

Feathers used for upholstering furniture.

Preparation of feathers for market.

Cost of duck and goose feathers.

Materials:

Geese

Feathers

Cushion or pillow

Teacher's Reference:

FARMERS' BULLETINS, United States Department of Agriculture, Washington, D. C.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 136-142.

Children's Reference:

FARMERS' BULLETINS, United States Department of Agriculture, Washington, D. C.

GRADE V

Unit-Three-----Birds-----Chimney Swift

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the chimney swift.
- B. Organization of activities and subject matter of this unit.
1. These birds should be studied first hand. The questions may be given the children for observation.

The chimney swift is not a swallow. He is more nearly related to the humming bird. He is a swift moving fellow having been known to fly 110 miles an hour. Why are they called "chimney swifts"?

Years ago these birds built their nests in hollow trees and caves. When man began to build chimneys which were not used in the summer, the swift moved in. Perhaps modern manufacturers got their idea of wall vases from the chimney swift's nest. These were made of small sticks of practically the same length glued together and fastened to the wall by saliva from the bird's mouth. Watch them enter and leave a chimney. Since chimneys are not so common any more, they have taken to barns and other buildings. When flying, its tail is a sharp point. The body has a cigar shape. How does a swallow look? What is the color of the swift?

When flying, it appears more like a bat than a swallow.

1. What is its shape? What color is it?
2. What does its tail look like when flying?
3. How does it fly?

4. What is the shape of its wings?
5. How does it fly? How does it enter and leave the nest?
6. Describe its beak.
7. Describe its feet.
8. How does it get its food?
9. What is its food?
10. Where does it nest? How has it changed its nesting habits?
11. Describe its nest. Material - shape - lining.
12. Describe its eggs. Number - color - shape.
13. What is their song?
14. How does he sleep?
15. Of what benefit to the environment is the chimney swift?

Summary:

1. Draw the chimney swift.
2. Compare the chimney swift and the swallow in physical characteristics and habits, and contribution to the environment.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 112-119.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 183-184.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 117-121.

Peterson, Frederick, "Wild Geese" in ONE THOUSAND POEMS FOR CHILDREN, Geo. W. Jacobs and Company, Philadelphia, 1920, p. 276.

GRADE V

Unit-Four-----Mammals-----Sheep

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the sheep.
- B. Organization of activities and subject matter of this unit.
1. Questions should be given the pupils for observation at home. The sheep provides material for composition.
 1. How is a sheep's covering different from other animals? How does wool differ from hair? Why was wool valuable to wild sheep?
 2. Where do wild sheep live? What value is wool to them? What do sheep eat? Why do not cows and sheep do well in the same pasture? How are the sheep's teeth arranged? What happens to a pasture after sheep have been in it? Why are sheep not allowed in our forest preserves? What are the sheep's chief enemies? How does it escape? Why do sheep follow a leader? How do they fight? How do they express anger? Tell of your pet lamb.
 3. Describe its ears. What is peculiar about them? Describe its eyes.
 4. What other animal chews a cud? Why was cud chewing useful to these animals when they were wild?
 5. What is a young sheep called? The male? The female? Describe a lamb? Describe their legs. Some one has said that lambs are mostly legs with a connecting body a means of making milk into more leg. Of what use is its tail? Why doesn't the sheep's tail stay long? How do lambs play?

6. Why do sheep bleat? What is their language? How do they act when afraid? How do they protect themselves in a storm?

7. Of what use are sheep? How many breeds do you know?

8. What are the sheep's enemies? How do dogs kill sheep?

9. How does a collie tend sheep? What is wool called?

How much does it produce a year? Why shear sheep? What are the uses of wool?

Gather some wool. Twist it into thread. Weave a mat.

Tell how wool is made into cloth.

Read about the wild sheep. "Krag, the Kootenac Ram".

List products made from sheep.

Write of a visit to a sheep ranch.

Keep a record of the sheep market as given by the local paper for a week.

Compare wool and cotton.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 281-285.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 88-92.

Jackson, Helen Hunt, RAMONA.

Children's Reference:

NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 23-28.

Sheep Story

Sheep are read of from our earliest history. Man has always been a herder. While shepherds were tending their sheep, our first Christmas story was told. Sheep were brought to Florida in 1565 by Spanish explorers. The English brought sheep to Virginia in 1609.

Because of its many enemies, sheep must be guarded either by a good fence, a shepherd, or a dog. They like rough country where their sure feed take them about eating leaves from bushes and low hanging branches.

The sheep always follows a leader. If there is a feeling of danger, it remains still, otherwise their bleat tells of their contentment.

When a storm arises they gather together and keep moving around a center.

His only means of defense is either running or jumping.

The sheep has been one of man's best friends. From early years, it has provided clothing and food.

The clipped wool is called fleece. There are men whose business is sheep shearing. They charge a certain price for shearing an animal. A sheep will produce ten to twelve pounds of fleece. The amount depends upon the care the animal receives. The price varies. What is it now?

What is the male called? The female? The young?

Sheep have long tails but for cleanliness, the tails are cut to within three inches of the body.

The finest and best wool comes from the Merino sheep.

The Sheep which provide meat are the Shropshire, and the Southdown.

The ewe often has twins. These are first frail until after they are a month old. The sheep, the wool, and the lamb give the farmer a profitable industry.

The sheep is often kept to help the farmer keep the farm free from weeds and brush. They are fond of many kinds of plants. The teeth are so sharp that grass and plants are eaten so close that they often die. The sharp hoofs of the sheep make the animal hard on sandy soil.

The sheep of the United States raise one-ninth of the world's mutton and wool crop. What other countries raise wool? What things do you know which are made of wool?

GRADE V

Unit-Five-----Mammals-----The Bat

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the bat.
 B. Organization of activities and subject matter of this unit.

1. Get a bat and keep him for a time in a cage. He can be fed flies and bits of meat from a small stick.

When do we see bats? How does his flying differ from a bird's? Of what animal does he remind you?

2. Describe his wings. Note the frame work, and finger bones. If a boy's fingers were as long accordingly, they would be four feet long. What do the hind legs do? The tail? How does he fold his wings?

3. How does he rest?

4. How does he walk? What hinders him from walking well? How does his thumb help him?

5. What does he do in the day time?

6. Describe the bat. Head, ears, eyes, nose, mouth.

7. How does he catch his food? (Mouth and apron.)

8. Why does he hunt at night?

9. How does the mother care for her young? How many has she? When? How does she carry them? How does she feed them? When do we find bats? What becomes of them in the winter?

What are some of the superstitions about bats?

How does a bat take a bath?

Of what use are bats?

Tell a story of a bat you have read about.

Play you are a bat. Write about yourself.

Read about the large vampire bat.

The little brown bats measure sometimes nine inches across the wings. There are bats in Asia that measure five feet across.

Materials:

Bat

Pictures

Books

Stories

Teacher's Reference:

Craig, John Bradford, *A TEACHER'S MANUAL OF NATURE STUDY*, McIndoo Publishing Company, Kansas City, Mo., pp. 118-120.

Hodge, Clinton F., *NATURE STUDY AND LIFE*, Ginn and Company, Boston, 1902, pp. 405-406.

Comstock, Anna Botsford, *HANDBOOK OF NATURE STUDY*, Comstock Publishing Company, Ithaca, N. Y., pp. 243-246.

Children's Reference:

Craig, John Bradford, *NATURE STUDY FOR BOYS AND GIRLS*, McIndoo Publishing Company, Kansas City, Mo., p. 91-95.

Vernon, Bailey, "Bats of Carlsbad Cavern" in *NATIONAL GEOGRAPHY MAGAZINE*, Sept. 25, pp. 321-330.

GRADE V

Unit-Six-----Reptiles---Garden or Garter Snake

Leisure-time interest and activities.

A. Specific Objective: To know the life history of the garden snake.

B. Organization of activities and subject matter of this unit.

1. Capture a snake and put him in a box covered with glass. Snakes should be seen where they live.

Snakes are easily made pets. Garter snakes are the most common of Morris County snakes. They vary much as to size and color. They may be greenish gray, black, or brown with a yellow, green, or white stripe down the middle of the back. Sometimes the stripes are broken or spotted and sometimes they are stripeless. He likes to live on rocky hillsides where he may find a nice deep crack when afraid, or where he can dig his tunnel. He sleeps all winter. Sometimes a large number form a colony together. Their food is insects, frogs, earthworms, toads, and other water insects. The little snakes are six inches long. They are born in July. One mother have from eleven to fifty snakelings. She stays near to protect them but each little snake gets his own food. He must have plenty of food or he does not grow up the first year. The snake has many enemies. What are they? No scientist has ever seen a snake swallow her young to protect them.

1. How long is your snake? What color is he? How is he marked? What is the shape of its head?

2. Describe its eyes, ears, nose, and mouth.
3. How does it try to scare you? What shape is its tongue?
4. How does it rest? How does it move? When it crawls across your hand, what do you feel?
5. What is its food? How does it swallow a frog?
6. Where does it spend the winter? When does it come out in the spring?
7. When do we see young snakes?
8. How does a snake get ready for winter?
9. What does he do with his old skin?
10. Is he a friend or enemy?
11. Shall we kill all snakes that we see? Why?

Draw a picture of this snake sleeping.

Give a description of the snake.

Write all the reasons you can think of why all snakes should not be killed.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 201-203.

Children's Reference:

DuChaillu, Paul, THE WORLD OF THE GREAT FOREST, Charles Scribner's Sons, 1911, Chapter 24.

Freidlander, Gerald, THE JEWISH FAIRY BOOK, Frederick A. Stokes Company, 1920, Chapter 15.

GRADE V

Unit-Seven-----Garden Pests-----Tomato Worm--Sphinx Moth

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the tomato worm.

B. Organization of activities and subject matter of this unit.

1. Get a tomato worm. Observe and answer these questions:

Where will he be found? What is its color? How do the stripes run? Of what use is his color to him? Where is the horn on the caterpillar? Of what use is it? Of what

use is the eye-spot? Where is it? The divisions of the caterpillar are called segments. How does it rest? How

many legs has he? What are his pro-legs? For what are they used? Where is the prop-leg? What is its use?

How does he breathe? How many breathing pores has he?

How does he grow? Where does he break open?

How does he eat? What does he eat?

What are the white objects we see often on the caterpillar?

Where does the caterpillar change to a pupa? What is the long handle that is curled up in the pupa?

Why is it a pest? What does it become? How is it controlled?

Describe the sphinx moth.

Where will you find this sphinx moth?

Of what particular plant is he very fond?

What did you think it was?

What sound did it make?

What flowers does it like to visit? Why?

How does it get the nectar?

How many wings has it?

Describe the antennae.

What is it? Where is it when the moth is flying?

Of what use is the moth?

Draw the tomato worm.

Draw the sphinx moth.

Write the life history of the Sphinx Moth.

Put some soil in a jar or ice cream container. Put the tomato worm in the jar and tie netting over the top. Feed it tomato leaves. Watch it eat. How many leaves does it eat? How does it move about? Count its feet. After a month (put down the date when he disappears) dig down in the earth and see what has happened. He is now a pupa. Keep it cool and moist through the winter. Watch for the moth.

Materials:

Jar

Box

Netting

Worm

Moth

Teacher's Reference:

Comstock, Anna Botsford, Handbook of Nature Study, Comstock Publishing Company, Ithaca, N. Y., pp. 344-346.

Miller, Ellen Robertson, BUTTERFLY AND MOTH BOOK, Charles Scribner's Sons, 1931, pp. 69-73.

Children's Reference:

Weed, Clarence M., BUTTERFLIES, Nelson, Doubleday, Inc.,
Garden City, N. Y., 1926, pp. 13-14.

Cragin, Belle S., INSECT FRIENDS AND FOES, G. P. Putnam and
Company, N. Y., 1904, pp. 132-136.

GRADE V

Unit-Eight-----Insects-----Cockroach

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the cockroach.
- B. Organization of activities and subject matter of this unit.
1. Put a cockroach in a bottle with food so that he may be observed leisurely and at close range.

In spite of the fact that no one wants a cockroach in her kitchen, they are interesting insects that have come like the English sparrow from Europe. He is so flat that he can slip under pots, scurry into mop-boards or hide in dark corners. He has a varnished body so nothing can stick to him and he can slip out of danger easily. His long feelers make in serving him in deciding upon food or they may be thrust backward when he needs them out of the way. His mouth parts work sidewise - just opposite yours and mine. His eyes are hard to see. Some have varnished coated wings. The leg spines are also varnished. He spends much time keeping himself clean. He draws his antenna through his jaws; each leg is washed from the body down; he gnaws the dirt off his feet, and brushes his head with the upper part of the leg. The eggs are laid in bundles. These are also varnished. Carbon bisulphide, some say, is the only way to get rid of them. This is a dangerous way and only those who know how should attempt it. Roach pastes are also sometimes tried.

2. Where will we find cockroaches?
3. Why is his shape and covering of use to him?
4. How does he use his antennae? How does he eat?
5. Describe his eyes.
6. Why can the cockroach run so fast?
7. What are the eggs like?
8. What causes cockroaches often?
9. How can you get rid of cockroaches?
10. How many species of cockroaches do you know?

Draw a cockroach.

Write a description of the cockroach.

Compare the cockroach and the cricket.

Material:

Roach

Bottle

Food

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 379-380.

Holtz, Fredrick L., NATURE STUDY, Charles Scribner's Sons, N. Y., 1908, pp. 215.

Children's Reference:

Cragin, Belle S., INSECT FRIENDS AND FOES, G. P. Putnam's Sons, N. Y., 1904, pp. 267-268.

THE BOOK OF KNOWLEDGE, The Grolier Society, London, Vol. 17, pp. 6070.

GRADE V

Unit-Nine-----Wild Plants-----Ferns

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the fern.
 B. Organization of activities and subject matter of this unit.

1. On a trip through the woods, we find wild ferns. Where do they grow? What does a fern need to grow? Ferns may be studied at home, in the woods, or in the school.

The leaf of the fern is called the frond. The frond is made up of leaf-like branches called pin nae. One is called pin na. What do the new fronds just starting look like?

Some people think they look like fiddle heads. How do they grow? What does the root look like? This stem is called a rhizome. Ferns have all of their stem underground. Under the rhizome are the roots. By removing a rhizome in the spring or fall ferns may be grown at home or school. They should not be removed unless there are many. There are small dark spots under the leaf. How are they arranged? They are spores. If examined under the glass, the spores look like dust. These produce new plants. Ferns are a flowerless seedless plant.

Gather and press a leaf of the kinds of ferns in the neighborhood. Mount and label them in your Nature Book.

Compare a wild fern and a tame fern.

Plant some ferns at home or school.

Care for a fern in the school room.

Read about ferns.

Materials:

Ferns

Poems

Books

Teacher's Reference:

Holtz, Frederick L., NATURE STUDY, Charles Scribner's Sons, N. Y., 1908, pp. 388-391.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1925, pp.

Children's Reference:

Dana, Mrs. William Starr, PLANTS AND THEIR CHILDREN, American Book Company, 1896, pp. 214-217.

Maxon, Wm. R., "Ferns as a Hobby" in NATIONAL GEOGRAPHIC MAGAZINE, May 1925, pp. 541-586.

GRADE V

Unit- Ten-----Wild Plants-----Milkweed

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits of the milkweed.
- B. Organization of activities and subject matter of this unit.
1. Take a field trip to find the later spring plants. The milkweed when coming up is wrapped in flannel. After the sun shines upon them awhile the leaves open up and the flannel side turns under. Should a leaf or stalk get broken, it is quickly mended with a sticky juice. This hardens like rubber. It is not sap but is the mending material of the plant. The leaves are arranged so that one does not stand in the sun light of another. The flower has a delicate color and much nectar. Why? There are some little bags of nectar for the bee, moth, or butterfly. The seeds are kept in rough green pods that are lined with silk. When the pod opens, the brown flat seeds sail away with their balloons. Sometimes milkweed silk is used to mix with cotton. What use do you think milkweed may be in the future to man?
 2. Where do we find the milkweed?
 3. What does it look like when it first comes up?
 4. When do its leaves turn the "fur side" under?
 5. Describe the mending juice of the milkweed.
 6. In what other ways does this juice serve the plant?
 7. Why are the leaves arranged as they are?
 8. How do the flowers invite the bees?

9. How are its seeds sown?

Make a milkweed border.

Draw the milkweed pod and a seed.

Read a milkweed story.

Read a milkweed poem.

Write an original fable as to how milkweed got its milk.

Material:

Milkweed (young)

Pod

Seeds

Plant

Stories

Poems

Songs

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 542-545.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 189-190.

Scott, Charles B., NATURE STUDY AND THE CHILD, D. C. Heath and Company, Boston, 1900, pp. 371-381.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 141-145.

GRADE V

Unit-Eleven-----Weeds-----Dandelion

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits and control of the dandelion.
- B. Organization of activities and subject matter of this unit.
1. Observe the dandelion growing. The dandelion is a native of Asia and Europe. It received its name from the toothed appearance of its leaves. The French called it "dent de lion" or teeth like a lion. Some names by which it is known are Blowball, Lion's Tooth, and Peasant's Clock. These questions may be given and the children may find the answers from the dandelions.
 1. Where does it grow? How does it grow?
 2. How does it protect itself?
 3. Break one off. What do you find?
 4. What use is its juice?
 5. What kind of a stem has the blossom?
 6. Why can it grow when once planted?
 7. Why is it called "lion's teeth"?
 8. How are the leaves arranged?
 9. How does it prepare for winter?
 10. How is the blossom protected?
 11. What is the dandelion blossom?
 12. Which of the flower-head opens first?
 13. How do the buds look?
 14. When does the blossom open?

15. How long does it take it to open?
16. What part of the head opens the first day?
17. How long does it stay open?
18. Are all parts of the flower the same color?
19. What does it do on dark days? Before a rain?
20. How is the dandelion fertilized?
21. Watch the stem before the head opens.
22. What does it do?
23. When all the flowers of the family have opened what do they do next?
24. How long are they closed up?
25. How does it look when they come out again?
26. Blow the seed away.
27. Look at the place where the seeds were.
28. What do you find?
29. Look at a seed under the glass.
30. After the little balloon has carried the seed away, how is the seed prepared to remain fast?
31. What insects visit the dandelion?
32. When does the dandelion bloom?
33. Tell all of the ways in which a dandelion tries to get ahead of us.
 1. Makes seeds a long time.
 2. Grows any place.
 3. Grows long roots for food and moisture.
 4. Spreads out. Crowds other plants out.
 5. It is enjoyed by many insects.

6. Has many seeds. Easily scattered.
7. Grows leaves in the fall for early growth.
8. Easily mended.
9. Of what use are dandelions?
10. How may they be controlled?

Teacher's Reference:

Craig, John Bradford, A TEACHER'S HANDBOOK OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 39-40.

Comstock, Anna Bostford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 572-575.

WORLD BOOK, Vol. 3, Roach Fowler and Company, Kansas City, Mo., pp. 1697-1698.

WILD FLOWERS IN KANSAS, Kansas State Board of Agriculture, p. 132.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Mo., Book 3.

Blanchan, Niltje, WILD FLOWERS, Nelson Doubleday, 1926.

Test

Matching

1. The dandelion is a native of _____ and _____.
2. Its name means _____.
3. The dandelion is a pest of _____.
4. It protects itself by having a _____ taste.
5. It grows _____ to the ground except in the _____ where it seems to feel safer.
6. The dandelion closes when it is going to _____ to protect the _____.

7. The dandelion sows itself with a _____.
8. It blooms any _____ in the year.
9. The dandelion keeps ahead of man in these ways:
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.
 - 7.
10. The dandelion leaf is used for _____.
11. Geese are very fond of its _____. The blossom is sometimes used to make wine, the root is used for _____ and to adulterate _____. Dandelion roots sell for six cents a pound.
12. Dandelions may be killed by pouring _____ or _____ into the center of the plant.
1. salt or coal oil.
 2. Asia and Europe.
 3. lawns.
 4. balloon.
 5. time.
 6. greens.
 7. leaves - medicine- coffee.
 8. lion's tooth.
 - 9.
1. Makes seeds a long time.

2. Grows any place.
3. Grows long roots.
4. Spread out.
5. Many insects enjoy it.
6. Has many seeds.
7. Grows leader in fall for early growth.
10. rain - seeds.
11. close - fields.
12. bitter.

GRADE V

Unit-Twelve-----Tame Plants-----Daffodil

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits of the daffodil.
- B. Organization of activities and subject matter of this unit.
1. Bring flowers to school to study their form, the way its seed is produced and how it is grown by bulbs. Seed catalogs will tell of the care. Peter Henderson's and Company, New York City, Henry Field Seed Company, Shenandoah, Iowa, Burpee and Company, Philadelphia, Vicks' Seed Company, Rochester, New York, have catalogs. Look in advertizing of seed firms for other catalogs.
 2. Describe the color of the daffodil.
 3. Tear off the sepals and petals. What do we have left? What does it look like? Open the crown.
 4. What is the difference between the length of the pistil and the stamens? The bees and other insects which visit the flower to get honey must rub against this pistil in order to get at the little well of honey. This pollenizes the pistil.
 5. Where is the seed box or ovary? Cut it longways. How many rooms? Cut it crosswise. How are the seeds arranged? Notice that there are two rows and three rooms. What do you find on the end of each stigma? From these knobs a fine tube leads to each of the seed boxes or ovaries. Through this tube the root of the pollen grain reaches the seed and it begins to grow. This is called fertilization.

Pollen must reach the pistil. The bee or some insect must bring the pollen.

The daffodil has both seeds and bulbs. The seeds take much longer to develop than the bulb. Too they may not produce the same sort of flower. Besides the bulb there are also roots which grow out sometimes the distance of a foot.

6. To plant the daffodil. Dig a trench and place in it rich soil. The bulbs should be placed six inches deep and one foot apart. Plant in October. Cover six inches with four or five inches of barn manure. They will come up year after year.

7. Draw a daffodil.

8. Read Daffodil poems.

9. Sing daffodil song.

10. Compare the daffodil and jonquil.

11. Draw a daffodil for Nature Book.

Compare the jonquil and daffodil.

Study the narcissus according to the plan for daffodil.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 599-602.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., Book 5, pp. 179-180.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., Book 5, pp. 109-111.

Warner, Anna R., "Daffy-Down-Dilly" in ONE THOUSAND POEMS FOR
Children, George W. Jacobs and Company, Philadelphia, 1920,
p. 465.

GRADE V

Unit-Thirteen-----Tame Plants----Nasturtium

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the nasturtium.
- B. Organization of the activities and subject matter of this unit.

1. Observe the nasturtium in the garden. Bring in a complete plant. Have children examine the plant and report on what they see. There are two varieties of the plant, vining, and dwarf. Observe both.

What kind of a stem has it? Describe the leaves. When does it blossom? What color is the bud? What colors are the flowers? Why are they good for bouquets?

The nasturtium is wild in Peru and Chile in South America. Find these countries. The leaves are quite as interesting as the flower. They are shields to protect the growing seeds. The flower grows tall and straight to be plainly seen by bees and other insects. When the seed pod is formed, the flower stem twists around and draws the pod containing the three little seeds down behind the rounded leaves. Some people are very fond of the spicy taste of the nasturtium seed and add them to pickles or they may be a pickle themselves. The flower consists of five sepals. They are joined together at the base. The back one forms a tube or spur which contains honey at its tip. There are five petals, they are arranged around this tube. The two upper ones stand tall

and bear lines that meet. These are the trails that lead to the hidden treasure. The lower petals make a landing place for the bee. The entrance to the flower is guarded against any small insect. The lower petals each become very narrow and has guarding it fringe and bristles. These prevent small insects from entering. When a flower opens, all the stamens hang down. When an anther is ready to shower pollen, this will filament lifts it up and it guards the treasure. The bee or insect is shot with a shower of dust. As soon as the pollen is gone the anther dries up and others come up. As soon as the anthers are all shrivelled the pistil raises its three-toothed rake to scoop off the pollen from any insect. This fertilizes the three seeds.

How are the sepals fastened together?

How many are there? How is the spur made. What is it?

Taste of the tip. What do you find?

2. How do the upper petals differ from the lower ones? Where do the lines point? Examine the sepals. What do you find? Of what use are they?

3. Select a blossom and watch it. How many stamens? Where are they? When do they lift? Why do you think? How do the anthers open? Where is the pistil? What is its top called? Where is the stigma? How many anthers open today? Where were they yesterday? What happens to the anthers when there is no more pollen?

4. How many parts to the pistil today? What will it do with its two-tined rake?

5. Where is the seed pod? How do you account for the fact that the flowers extended beyond the leaves, but the seeds are beneath? How does it climb?

Draw a nasturtium leaf. Why is it like a shield? Put one under water. How does it look?

Press flowers and leaves.

Find how nasturtium seeds are used for food.

Gather nasturtium seeds.

Gather a bouquet and arrange according to color.

Compose a story telling how you think the nasturtium got its spur.

Material:

Nasturtium

Flower

Leaf

Plant

Seed

Magnifying glass

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 620-623.

Children's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 620-623.

GRADE V

Unit-Fourteen-----Tree-----Parts of a Tree

Leisure-time interests and activities.

- A. Specific Objective: To know the parts of a tree.
- B. Organization of activities and subject matter of this unit.
1. Observe a tree on a walk or on school grounds. These words have been given to look up their meaning: Head, crown, bole, trunk, branches, limbs, twigs, spray, roots, bark, leaf, petivle, sap.

Where is the crown of the tree? Walk to the various directions until you stand under the tip of the farthest twig. Mark it. Measure the distance from these points to the tree. How large is the head or crown?

What is a branch? How many large branches has this tree? What is the spray? The branches are divisions of the trunk or bole. Measure the bole of this tree at its largest part. Higher up. Where are the roots? If a tree that has been blown over can be found it can be observed that the roots are as great as the crown. What is the work of the roots? What do these roots sometimes do to water systems? What do we call the smallest roots? They are really the mouths of the tree. What use is made of tree roots by man?

What is the use of the trunk or bole?

What is the use of the branches?

What are the parts of the trunk?

Of what use is the bark? What is the next coat called? Of what use is the cambrium layer? Where is the sapwood? What

do we call the center of the tree? What is its use? How can you tell the age of a tree? The age of a limb? Where are the leaves? Why are they spread out?

What are the parts of the leaf? What is the business of the petiole or stem and veins in a leaf?

What are the enemies of trees?

What are the uses of trees?

1. Draw a tree. Locate crown, spray, branch, trunk.
2. Draw a leaf. Locate petiole, blade, veins.
3. Read about some famous trees - "Willage Blacksmith".
4. Sing about trees.
5. Tell the value of trees to the environment.
6. Explain the use of tree surgery.

Write a story of your life playing you are a tree.

Material:

Trees

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 726-816.

TREES IN KANSAS, Kansas State Board of Agriculture, Topeka, Kansas, 1928, Vol. XLVII, No. 186-A.

WORLD BOOK, Roach Fowler and Company.

Stebbins, Fannie A., "Nature Study Through Experiment", American Childhood, March 1931.

Children's Reference:

TREES IN KANSAS, Kansas State Board of Agriculture, Topeka, Kansas, Vol. XLVII, No. 186-A.

Nichols, M. Louise, SCIENCE FOR GIRLS AND BOYS, J. B. Lippincott and Company, pp. 49; pp. 328.

Edwin Lincoln, TREES, STARS, AND BIRDS, World Book Company, The Graber Company, London, pp. 404; p. 30-31.

GRADE V

Unit-Fifteen----Gardening----A School Fair

Leisure-time interests and activities.

- A. Specific Objective: To have a school fair.
- B. Organization of activities and subject matter of this unit.
1. Some Friday afternoon before frost have a fair. Arrange the vegetables grown in our gardens. Arrange the vegetables and flowers as attractively as possible at school. Invite parents and neighbors.
 2. Have the exhibit uniform.

Vegetables

Carefully wash all root vegetables and tie the same number in a bunch. Have the same number of potatoes, melons, tomatoes, peppers, cucumbers, in a group.

Melons, cabbage, pumpkins, cauliflower, and squash should have only one displayed.

Beans may be on vines, in pods, or shelled.

Three ears of corn tied together.

Some complete plant gone to seed - as radish.

Labelled boxes or bottles should contain seeds we have gathered for next year.

Small bouquets of flowers nicely arranged.

Home Work--any thing that the girls have canned.

Pictures or drawings to show what has been done to make the yard at home more attractive.

Marking--Child's name - and grade on each separate exhibit.

Dramatize a vegetable health play.

Sing vegetable song.

Make vegetable or flower costumes for the dramatization.

Dance a vegetable dance.

Tell vegetable and flower stories.

Suggested Activities:

A broadcast from vegetableland.

Have a child tell the particular value of his vegetable.

A pet show could be held later in the season.

GRADE V

Unit-Sixteen----Rocks and Soil-----Limestone

Leisure-time interests and activities.

- A. Specific Objective: To know the how limestone has been made.
- B. Organization activities and subject matter of this unit.
 1. A trip may be made to observe rocks in the locality. Rocks may be brought into school.

Wherever we find limestone, we know that it was once the bottom of the sea. Limestone is being constantly made in all of the oceans. Some limestone is pinkish having been made from pink coral, some is yellow, and some is white like the limestone in Morris County. Limestone is not only the coral skeletons but it is the bones of many large animals that lived on the earth ages ago. Perhaps we have here a piece of the bone of the Mammoth largest elephant that we know anything about. Perhaps it is the bone of the denosauris, a large reptile that lived so long ago. Where do we see pictures of denosauris? How many saw the Sinclair Exhibit at the World's Fair in Chicago? Limestone sweetens the soil. Often when soil is sour, we spread lime. It is used much for buildings. What buildings do you know that are made of limestone? Morris County Court House and Last Chance Store Building. Bridges are often made of limestone. The great pyramids of Egypt are made of limestone. Where are they? Why do we not make roads of it? It will slowly dissolve in water especially if there is some acid in the water. In some limestone countries, there are great caves

where the water has eaten out the rock. Why is the water in limestone countries always hard? The streams are usually clear. Springs in a limestone country are likely to have impure water because they do not filter through sand. Chalk is made of limestone. It is the shells of very small sea animals.

Marble is limestone that has been formed inside the earth under pressure and heat. We can see crystals in marble and the grains are much larger. Marble is many colors. In California, marble of twenty different colors has been found. In ancient times as well as today, beautiful statues were carved of marble. When marble or limestone is heated very hot, it crumbles into lime and gas - carbonic acid gas - the same that is used at soda-water fountains.

Make some quicklime.

Visit a place where limestone may be seen in layers.

Boil some water to see if it contains lime.

Collect native rocks.

Visit a place where tombstones are made

Materials:

Limestone

Chalk

Coral

Marble

Granite

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 836-837.

Russell, E. J., LESSONS ON SOIL, Cambridge at the University Press, 1912, pp. 131.

Children's Reference:

Wright, Julia McNail, SEASIDE AND WAYSIDE, D. C. Heath and Company, 1895, pp. 24-38.

Troeger, John W., "Limestone" in Harold's Rambles II, D. Appleton and Company, N. Y., 1898, pp. 80-81.

GRADE V

Unit-Seventeen----Sky and Weather----Shooting Stars
Leisure-time interests and activities.

- A. Specific Objective: To know what a shooting star is.
- B. Organization of activities and subject matter of this unit.
1. Name the things which we may see in the sky. What are shooting stars?

When we see a star going across the sky with a long tail after it, we say a star is shooting or falling. Astronomers say no real star ever fell. What we call a falling star is a piece of matter out of which the world and comets are made. It is dull and dark but in moving at a mad rate around the sun it is burned up by friction as it passes through our air. Large masses of matter do not burn up as they pass through the earth's hundred or more miles of atmosphere. These reach our earth and are called meteorites. Several meteorites have been found in Morris County. They look like bits of stone and several may be held in one hand. There are larger ones, however. In Yale Museum, there is one weighing 1635 pounds. It is estimated that our world meets seven million of these shooting stars every twenty-four hours.

Flocks of these stars are gathered together. In July and August, we come close to these wandering bands and we have showers of stars.

Recite a star poem.

Tell a star story.

Read star legends.

Read about stars and comets.

Find out about Haley's Comet.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 908-909.

Children's Reference:

Milton, G. E., THE BOOK OF STARS, Adam and Charles Black, London, Chapter 9.

June, Caroline Silver, FIFTY FAMOUS SKY STORIES, Albert Whitman Company, Chicago, 1925, pp. 126.

GRADE V

Unit-Eighteen-----Sky and Weather----Clouds

Leisure-time interest and activities.

- A. Specific Objective: To know the nature and formation of clouds.
- B. Organization of activities and subject matter of this unit.
1. This unit should be developed by experiment.
 1. Put the same amount of water in two pans. Put one on the stove or radiator. Put the other on the desk. What becomes of the water in each?
 2. Dampen your handkerchief. Spread it on the grass.
 3. When do clothes dry more rapidly on a windy day or still day? On a cold day than a warm day?
 4. Where is the steam on the teakettle? When does the teakettle boil dry sooner? Why?
 5. Where does the water go? When we have a damp day where does the water come from?
 6. Why does our breath show on a cold day?
 7. Why does the water pitcher gather drops of water on a warm day?
 8. Why do windows sweat?
 9. How does it come we can see clouds? Why are clouds colored?
 10. Why is the bottom of some clouds so level? We call these clouds cumulus clouds. Water vapor is everywhere in the air but cannot be seen. It is moving along with air currents. When it reaches cold, it becomes a cloud. If there is enough

vapor, we have rain.

11. Why is there fog on mountain tops?

12. When do we have dew? Why is there no dew on a windy night?
Where does the dew come from?

13. If it turns cold after dew forms, what happens? What is hoar frost?

14. Which part of the stream freezes first?

15. Why does ice break bottles?

16. Of what use is ice breaking things?

17. How does it work?

18. When does winter wheat kill? Why?

19. What colors do you see in rain drops or drops of water?

20. Where can you see these same colors greatly magnified?

When do we see a rainbow?

Write up the experiments and answers to the questions.

Get pictures of the various kinds of clouds.

Make a cloud poem.

Study of the formation of mist.

Study of the formation of fog.

Make the rain cycle.

Compose a cloud poem.

TEACHER'S REFERENCE:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 850-856.

Children's Reference:

Howliston, Mary H., "The Vapor Family" in CAT-TAILS AND OTHER TALES, A. Flanagan Company, Chicago.

THE WORLD BOOK, Vol. 14, The Grolier Society, London, pp. 5087.

Ibid., Vol. pp. 2921-2928.

GRADE V

Unit-Nineteen-----Stars-----Big Dipper

Leisure-time interests and activities.

- A. Specific Objective: To know the Big Dipper and how it got its name.
- B. Organization of activities and subject matter of this unit.
1. There are pictures in the sky made of stars. Which of them do you know?
 2. Can you find the Big Dipper?
 3. What is another name for it?
 4. What seems to divide the earth from the sky?
 5. How did star stories come to be written?

Story:

Seven bright stars and one dim star form the Big Dipper. These stars may be connected with lines, so that we seem to see a big dipper with a bent handle. Four large stars form the bowl and four smaller stars form the handle. The dim star appears at the bend of the handle. Some folks say, it is a man riding a horse. October is a good time to study the Dipper. It is low in the northern sky, with its handle turned up to the left.

Other names for the Big Dipper are the Great Bear and Ursa Major. This old bear strides across the sky all night long. Years ago shepherds in Greece who tended their flocks all night while they grazed, watched the stars. They made up stories about them to pass away the time. The Big Dipper was always in plain view. One story says that the bear is

really a beautiful woman named Callista. These people believed that there were gods who could turn people into animals or animals into people. Jupiter, the highest god, thought Callisto very beautiful. Juno, his wife, became angry and would have destroyed Callisto. Jupiter changed her into a bear so no one would know her. For fear hunters or dogs might harm her, he placed her out of harm up in the sky. Her little son would have been very lonely without his mother and she would have been very unhappy without him, so he was turned into a little bear and wanders about with her.

The four stars are the body of the Great Bear, and the four stars make the tail. Other stars form the head and feet.

They are dim and are not present above the horizon at all times of the year. Where the earth and sky seem to meet is called the horizon. There is more sky below. The stars making the Great Bear's head and feet are in the sky but not in our part of it.

Different countries give the Great Bear different names.

English people call it the Plow and Charles's Wain or Wagon.

The bowl of the Dipper is the wagon box and the handle is the tongue. French people call it the Sauce-pan.

Test

Choose the correct answer.

1. It is called the Dipper because _____.
2. It is made up of _____.
3. In October the handle _____.
4. The Dipper is _____.

5. The handle of the Big Dipper is _____.
6. The body of the Great Bear _____.
7. Shepherds told these stories _____.
8. The horizon is _____.
9. The head and feet _____.
10. Different countries call the Big Dipper _____.

Answers

1. are not always in our sky.
2. eight stars.
3. the Great Bear different names.
4. toward the left.
5. the Bear's tail.
6. where the earth and sky seem to meet.
7. four bright stars.
8. to pass the time.
9. looks like a big dipper.
10. Charles's Wain and Sauce-pan.

Teacher's Reference:

Martin, Martha Evans, THE FRIENDLY STARS, Harper Brothers,
N. Y., 1907, pp. 188-189.

THE WORLD BOOK, Vol. 9, Roach and Fowler, 1925, pp. 5528-5529.

Children's Reference:

Ibid.

GRADE VI

Unit-One-----Birds-----Starling

Leisure-time interests and activities.

A. Specific Objective: To know the history and life habits of the starling.

B. Organization of activities and subject matter of this unit.

Read about the Starling. Find out from the Agricultural College at Manhattan, Kansas, about the starling.

The starling is a bird having metallic green and purple feathers with many buffy or white spots. He is not as large as the red-winged blackbird. By measurement, he is eight and one-half inches long. These birds were introduced into New York from Europe some years ago. Like the English sparrow, he has acquired a bad reputation. It, too, lives about the streets and in crevices of tall buildings. It lays four to six pale-blue eggs. It has been steadily moving across country and has reached Kansas. They are very quarrelsome, even discouraging and overcoming the English sparrow. It is feared that they will drive away desirable song birds. We should be on the alert to discourage their taking up residence with us.

Seek information about the starling.

Draw a starling.

Write a theme telling why the starling is an undesirable bird.

Teacher's Reference:

Reed, Chester A., BIRD GUIDE, Doubleday, Page and Company,

Garden City, N. Y., p. 61.

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, pp. 5532.

Children's Reference:

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, pp. 5532.

Horsfall, Carra E., "Lean Days in Birdland" in NATURE MAGAZINE, January '28, pp. 33-37.

GRADE VI

Unit-Two-----Birds-----Red-Wing Blackbird

Leisure-time interests and activities.

- A. Specific Objective: To know the history and life habits of the red-wing blackbird.
- B. Organization of the activities and subject matter of this unit.
1. The bird should be studied by the pupil in the field. It is often difficult to tell whether it is a cowbird or a blackbird that we see. However when we see the bright red-wing cap, we are sure it is a blackbird. The males come some three weeks ahead of their mates. It is no unusual sight to see a band of these gay fellows together. The female is a very dingy looking black. White and buff are sprinkled through her feathers. Since she does most of the nest building, this is a very good thing for her. She walks like a blackbird with her strut. The nesting begins in May. Grasses, weed stalks, and fine grass are the materials used. The nest is built among the reeds, or on the ground. She likes to fasten the rim of it to a limb. The young are like the mother. When the males are a year old, the red wing caps are grown. They are fond of following the farmer as he plows. Worms and caterpillars are greatly enjoyed but canker worms are a special delicacy. It is estimated that in four months, these birds destroy sixteen thousand two hundred million larvae. Caterpillars, tent caterpillars, and other hairy larvae are choice foods. Weevils, click beetles, grass-

hoppers, ants, flies, and bugs are on their menus. In some places they eat much grain. In the South, they are called rice birds and they destroy rice fields. In the West, they harm grain fields. Laws protect them because they do far more good than harm.

How can you tell a red-winged blackbird? What are his colors?

1. How does he fly? What especial use does he make of his tail?

2. What is his song? How does he perform while singing?

3. When does he appear? Who accompanies him? Where has he been? Describe the female red-winged blackbird. How can you tell she is a blackbird? Why is she so dull colored?

4. When and where do they nest? Of what is it made? Describe the eggs.

5. Describe the young. Why are they dull?

6. Where does the red-wing forage for food? What is his food? Where is he a mischief maker? Why should laws be passed to protect him?

7. When do they go away? How do they go? Where do they stop for food on their way out of the country?

8. Of what use are they to man?

Draw a red-winged blackbird pair.

Write a dramatization between a farmer and a red-winged blackbird in the fall in which you convince the farmer that he owes you the grain you eat on your trip to the South.

Tell how the mother blackbird builds the nest.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock

Publishing Company, Ithaca, N. Y., pp. 122-126.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 141-143.

CLASSROOM TEACHER, Vol. 9, The Classroom Teacher, Inc., Chicago, 1927, pp. 251-256.

THE WORLD BOOK, Vol. 2, Roach and Fowler, Chicago, pp. 757-

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., pp. 18-21, Book 5.

THE WORLD BOOK, Vol. 2, Roach and Fowler, Chicago, pp. 757.

Brown, Abbie Farwell, THE CURIOUS BOOK OF BIRDS, Houghton, Mifflin Company, Boston, 1903, pp. 114-126.

GRADE VI

Unit-Three-----Mammals-----Coyote

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits of the coyote.
- B. Organization of activities and subject matter of this unit.

Read about the coyote in stories such as "The Coyote" by Bret Harte, and the "Law of the Pack" in the Second Jungle Book.

1. Where does the coyote live?
2. What is their food?
3. How do they get their prey?
4. How do they hunt?
5. What is their call?
6. Description of young and den.
7. What are its enemies?
8. How does it escape hunters and traps?
9. What is its effect upon the country?
10. Describe a coyote hunt.

Write a composition covering the foregoing questions.

Get a picture of a coyote for note book.

Gather pictures of animals that belong to this family.

Material:

Books

Stories

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 255-256.

Children's Reference:

Seton, Ernest Thompson, "Lobo" in WILD ANIMALS I HAVE KNOWN, Scribner's Sons, N. Y., 1900, pp. 1-29.

A. Seton, Ernest Thompson, "Tito" in LIVES OF THE HUNTED, Charles Scribner's Sons, N. Y., 1899, pp. 265-351.

GRADE VI

Unit-Four-----Mammals-----The Muskrat

Leisure-time interests and activities.

A. Specific Objective: To know the habits of the muskrat.

B. Organization of activities and subject matter of this unit.

The muskrat may be visited at home. His tracks may be observed in the snow. His lodge may be observed in the water. One may be harmlessly trapped by a "figure Four" trap.

1. Where will we look for the muskrat? We will take a trip to see him at home, at the water's edge. Measure his tracks. How long are they? How wide are they? What is the distance between the two hind feet tracks? What is the distance between several tracks? How can we tell by his tracks whether he was running or jumping? What do the tracks tell about the size of his feet? What can you tell about his tail by the tracks?
2. What animal does the muskrat make you think about?
3. What is his color?
4. With what is he covered?
5. For what are his teeth particularly useful?
6. How does the length of his tail compare with the length of his body?
7. How do you know that he is a swimmer?
8. Describe his fur.
9. What name has muskrat when we buy it in a new coat?
10. How does his fur fit him for living in the water?
11. How does he swim?

12. How long can he stay under the water?
13. What is his food?
14. How does it prepare its food?
15. When does it eat? Where?
16. Describe its home.
17. What are its enemies?
18. How does he protect himself?
19. How does he warn others of danger?
20. When does he have the greatest danger?
21. How does it get its name?
22. To what family does it belong?
23. When are the young muskrats born? How many in a litter?
24. Is he a friend or enemy?
25. What relatives of his do you know?

Write a letter to a friend telling him about the muskrat.

Be sure you leave out nothing important about him.

Teacher's Reference:

FARMERS' BULLETIN, No. 396, United States Department of Agriculture, Washington, D. C.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 218-223.

Children's Reference:

THE WORLD BOOK, Vol. 7, Roach and Fowler, Chicago, pp. 4036-4037.

Rogers, Julia Ellen, WILD ANIMALS EVERY CHILD SHOULD KNOW, Doubleday, Page and Company, N. Y., 1913, pp. 260-264.

GRADE VI

Unit-Five-----Mammals-----Mole

Leisure-time interests and activities.

- A. Specific Objective: To know the history and life habits of the mole.
- B. Organization of activities and subject matter of this unit.
1. Catch a mole.
 2. The mole has a very queer appearance. It is especially adapted to living underground. Its soft gray fur protects it from sharp eyes. Its strong claws and body and its pointed nose all make for good digging. The eyelids are grown together. Perhaps the mole can tell daylight and dark. The ears are poorly developed but the mole seems to hear by means of vibrations. According to his size a mole is very strong. He makes a tunnel that shows above the ground. The dirt from deeper rooms is pushed to the top and makes mole hills. For the nest we must look a foot underground. Here we find a bed made of dry leaves and soft grass. It has its young in the spring and works the year round. It feeds upon earthworms and cutworms. It plows its tunnel under roots in garden and lawn and has a bad reputation with the farmer and townsman as well. He is, however, a good friend to the farmer.
- Describe a mole, size, shape, color.
- Describe his feet, eyes, ears, nose, mouth, and tail.
- How does he make his burrow?

Describe the nest.

How many young are there?

How are they fed?

What is the food of the mole?

Of what use is the mole?

Decide whether or not he should be killed.

Tell how to trap moles.

Compare the gopher and the mole.

Teacher's Reference:

THE CLASSROOM TEACHER, Vol. 9, The Classroom Teacher, Inc.,
Chicago, 1927, pp. 256-257.

THE WORLD BOOK, Vol. 6, Roach and Fowler, Chicago, pp. 3877.

Children's Reference:

Schwartz, Julia Augusta, WILDERNESS BABIES, Little, Brown
and Company, Boston, 1905, pp. 205-214.

GRADE VI

Unit-Six-----Mammals-----Badger

Leisure-time interests and activities.

A. Specific Objective: To know the life habits of the badger.

B. Organization of activities and subject matter of this unit.

1. In a trip, we come across large holes six or eight inches in diameter. We decide they are badger holes.

2. We will read about the badger. If possible, we will study him first-hand. Occasionally they are caught in traps.

3. Were the mole and the badger to run a race in digging, it would probably be a tie. The badger's strong claws and muscles are well suited to rapid digging even when the soil is quite hard. The fore feet tear away the earth and the hind ones throw it out of the hole.

The badger is a dingy gray above and yellowish white below. The white stripe extending from the tip of its nose to its shoulders suggest the skunk to us. Short legs carry its heavy body. Its tail is short. Its outer hair is long and coarse but the fur next its body is thick. Its home is a large burrow six or more inches across.

It is known to have three to five little ones early in the spring. Very little is known about their family life.

They hunt at night usually.

They defend themselves with their sharp teeth and strong jaws. It can best any animal of its size. It is also provided with strong smelling scent glands and can flatten out like a lump of mud.

In years gone by, badger hunting with hounds was a favorite sport. Due to this the badger has disappeared from many regions. There is danger that he may become extinct.

Gophers, mice, ground squirrels, pocket gophers, and other burrowing animals are their food. They hibernate in winter. Legs of cattle and horses are sometimes broken when stepping into the badger holes.

Read about badgers.

Decide whether or not they are of use to man.

Write a theme on "Why the Badger Is Disappearing".

Get pictures of the badger for Nature Note Book.

Materials:

Books

Pictures

Badger

Teacher's Reference:

THE CLASSROOM TEACHER, Vol. IX, The Classroom Teacher, Inc., Chicago, 1927, pp. 268-270.

THE WORLD BOOK, Vol. 1, Roach and Fowler, Chicago, pp. 540.

Children's Reference:

THE WORLD BOOK, Vol. 1, Roach and Fowler, Chicago, p. 540.

GRADE VI

Unit-Seven-----Milk

Leisure-time interests and activities.

- A. Specific Objective: To know the processes involved in getting pure milk.
- B. Organization of activities and subject matter of this unit.
1. Prepare for visit. Secure bulletings issued by the United States Department of Agriculture on various phases of dairy sanitation, on the health and care of milk cows, upon the milking of cows, on the cleansing of milk, on the uses of the milk separator, on cooking milk, on bottling of milk, the temperature maintained, the using of milk while in transit, and care, and uses of milk in the home.
 2. Construct an outline of information to secure through observing and by asking questions.

Where does the milk come from?

How does it reach the creamery?

How is it weighed?

Why is it weighed?

How is it tested?

How is it Pasteurized? Why?

What is "whole" milk?

How is it separated?

How is the cream cared for?

How is the milk cared for?

How are bottles cleaned?

Why are all bottles scalded?

Uses of butter milk.

Uses of powdered milk.

Butter making.

How made.

Temperature.

How much per day?

Value.

Where is it shipped?

Other milk products.

Other interesting information.

3. Write a letter getting permission of the manager to visit and the time most convenient.

4. Children tend strictly to business at hand. Note books open, pencil to take down observations and questions answered.

5. At school, organize notes in relation to information in hand from bulletins and other sources. When differences arise between the pupils observations and answers, and reading done, the opportunity to solve problems is present.

6. Determine standards of milk production, transportation, and care by the dairymen.

7. Next study will be concerned with the use of milk in the home. Care of milk in the home, refrigeration, and uses.

8. Finally, the standards of milk production, transportation, and its care in the dairy and the home should be clearly formulated, and then conclusions should be drawn by comparing the standards with the actual accomplishments of

the creamery.

9. Test. Completion involving the observations and answers of the creamery men, reading, standards, and conclusions.

Materials:

United States Department of Agriculture Bulletins

Dairy

Ink spot on cotton for removal by sour milk

Note books

Teacher's Reference:

Shortt, P. J., "Below the Cream Line" in TWENTY-SEVENTH BIENNIAL REPORT, Kansas State Board of Agriculture, 1929-30, pp. 219-224.

Kinsley, Dr. A. T., "The Veterinarian and Human Health" in TWENTY-SEVENTH BIENNIAL REPORT, Kansas State Board of Agriculture, pp. 155-157.

GRADE VI

Unit-Eight-----Fish-----Sunfish

Leisure-time interests and activities.

- A. Specific Objective: To know the history and life habits of the sunfish.
- B. Organization of activities and subject matter of this unit.
1. Get a sunfish. Put him in the aquarium while we observe him. The sunfish is called pumpkin seed and tobacco box because of its shape.
 2. The sunfish seem always hungry. They are willing to try anything. We have no more beautiful fish than the bluish, pinkish, whitish sunfish. There are thirty varieties and they are true Americans, being found only in the United States. They have plump flattened bodies brilliantly colored. They are from four to eight inches long and seldom weigh a pound. Their stiff fins are well covered with scales. The black flap over the gill cover, is edged with orange or bright red. The sunfish scoops out a sort of a nest in the bottom of the stream. The female comes and lays her eggs and leaves them for the male to watch. He is on constant guard until the young ones hatch. Then he considers his duty done. Those who have caught sunfish tell about it.
 3. Where are the sunfish found?
Describe the sunfish's body.
Why is it called a pumpkin seed?
Tell about the dorsal fin. How many spines? How many soft rays? How many fins has the fish? Describe each.

Describe its eye.

Describe its mouth.

Describe its nest. How are the eggs fastened down?

What does the sunfish eat? He should be in an aquarium by himself.

Write a story of a fishing trip in which the sunfish is described.

Get pictures of sunfish.

Draw sunfish and locate and name fins.

Material:

Fish

Aquarium

Fish food

Teachers' Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., p. 171-176.

THE CLASSROOM TEACHER, Vol. 9, The Classroom Teacher, Inc., Chicago, 1927, pp. 337-338.

Dyche, L. L. PONDS, POND FISH AND POND FISH CULTURE, Bulletin No. 1, State Department of Fish and Game, Kansas, 1914, pp. 114-118.

Children's Reference:

THE BOOK OF KNOWLEDGE, The Grolier Society, N. Y., Vol. 16, pp. 5780-5788. Ibid., Vol. 15, pp. 5630-5632.

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, p. 5629.

GRADE VI

Unit-Nine-----Snakes-----Milk Snake

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits of the snake.
- B. Organization of activities and subject matter of this unit.
 - 1. Get a milk snake. Put it in a glass covered box and observe. Observe him in the field.

This is a creature that has had untrue things told about it. It is said to have milked cows. Now this snake if it could be made drink milk could not hold more than two teaspoonfuls of milk and it could not milk a cow. It is about its business when found in barns and milk houses. It is looking for food - rats and mice. It squeezes its food to death.

It is a pale gray snake covered with many brown or dark gray blotches. It is three feet long. It is sometimes called the spotted adder, but it is a king snake and not an adder. During July and August the mother snake finds some rubbish, loose soil, or decaying matter and lays from seven to twenty eggs. These oval eggs have a soft white leathery covering. In two months the eight inch snakelings are hatched. Their blotches are reddish. The snake is not poisonous. Sometimes it will bite but the bite is not serious.

- 1. How does it get its name?
- 2. Where do we find it?
- 3. Examine its mouth to find out if it could milk a cow.
- 4. Try to have it drink milk.
- 5. What is its food?

6. How does it kill its food?
7. What do the eggs look like?
8. Where are they laid?
9. How big are the young snakes when hatched?
10. How can you tell the young snake?
11. Of what use are the color and spots of the milk snake?
12. How does a snake shed its skin?
13. What does the shed skin look like?
14. Write composition telling why you think the milk snake should be encouraged to stay around the farm.
15. Talk on superstitions about snakes.

Materials:

Milk snake

Glass

Box

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 204-205.

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, pp. 5419-5420.

Children's Reference:

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, pp. 5419-5420.

THE LINCOLN LIBRARY OF ESSENTIAL INFORMATION, The Frontier Press Company, Buffalo, pp. 1059-1060.

Wright, Julia McNair, SEASIDE AND WAYSIDE, No. 4, D. C. Heath and Company, Boston, 1892, pp. 272-280.

GRADE VI

Unit-Ten-----Insects-----Housefly

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits and control of the fly.
- B. Organization of activities and subject matter of this unit.
1. Catch some flies. Observe. Give out these questions and let the children find the answers by observation. Man has been at war a long time with fly bandits. Since science has discovered for us that it is not what this thief takes but what he leaves that causes trouble. Armed with thousands of eyes, a sort of nose that can smell things far off, a powerful mouth, files to rasp, to cause juices to flow, feet that can cling to ceilings, legs that bear strong bristles, and wings that can carry him swiftly, he is indeed a hard one to fight. Man has gone into the business of fly killing in order that the fly and its filth may not kill him. Describe its eyes. Notice the dot between the two large eyes. This dot is three tiny eyes.
1. What is the antennae or nose like?
 2. How many wings has the fly?
 3. What are the two white objects just behind the wings?
 4. Describe the wings. Where do they grow?
 5. How many legs has he?
 6. Where are they?
 7. What do we call the part of the fly where the legs and wings are attached?

8. How many parts are there to the fly's leg?
9. To the foot?
10. Upon what does the fly walk?
11. How does he eat?
12. What is the flies doing when you feel him?
13. Where does he keep his tongue when not in use?
14. How does he clean himself?
15. What diseases does a fly carry?
16. What is the fly at first?
17. Where are the eggs laid?
18. Upon what do the maggots feed?
19. How long does the fly grow after it comes out of the pupa?
20. How long does it take the eggs to hatch?
21. The maggots to become pupa?
22. The pupa to become flies?
23. Where do flies winter?
24. How many generations of flies can there be in a season?

Figure out how many flies wintered in your kitchen last winter, if one fly "stayed over." In May, she laid 100 eggs. All hatched. Fifty were mother flies that laid 100 eggs and all hatched with 50 mother flies and for five generations. How many flies would that be?

Make "Swat the Fly" posters.

Write a composition on the housefly, why we should swat it, and how to fight it.

Material:

Flies

Teacher's Reference:

BULLETINS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE,
Washington, D. C.

THE WORLD BOOK, Vol. 4, Roach and Fowler, Chicago, pp. 2231-
2235.

Children's Reference:

THE WORLD BOOK, Vol. 4, Roach and Fowler, Chicago, pp. 2231-
2235.

BULLETINS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE,
Washington, D. C.

GRADE VI

Unit-Eleven-----Weeds-----Sunflower

Leisure-time interests and activities.

A. Specific Objective: To know the life history of the sunflower.

B. Organization of activities and subject matter of this unit.

1. Observe a sunflower growing. The sunflower is one of our most interesting plants. Here we have a whole village of florets or little flowers living under one green shingled roof. There are a half a hundred species of this flower in the United States. European countries grow it for its seed which is used for chicken and cattle feed. Good lands yield thirty or fifty bushels per acre. Coffee substitute is made of them. Olive oil substitute and oil for lubricating are pressed out of the rich seeds while yellow dye is made of the blossoms. Some people like roasted sunflower seeds. It is sometimes called the "Eagle of the Flowers" because it is one of our largest flowers. Large flowers may be grown by cutting off all the flowers but one.

Bring in plant complete.

Somethings we want to know?

1. Why is it called the Sunflower?
2. What color is it? What is it sometimes called?
3. What the sunflower really is. (A group of smaller flowers.)
4. How is it fastened to the stem?
5. Why is it yellow?
6. How it smells?
7. What is the shape of the leaf?

8. How do they feel?
9. How are the veins arranged? Why?
10. How are the leaves arranged on the stalk?
11. Why are they so large?
12. Why can they not stand cold weather?
13. How does the stalk feel? Why is it so?
14. How the stalk grows. (Fast or slowly). Why?
15. The shape and color of the seeds.
16. How the seeds are scattered?
17. What is the value of the seeds?
18. What is the yield per acre?
19. How large flowers may be grown?
20. The number of species of sunflowers.
21. Which state claims it as its flower? Why?

Summary:

1. Draw and color the sunflower.
2. Read how the first sunflower came to be.
3. Gather sunflower seeds to hang out for birds in the winter.
4. Compose a sunflower acrostic.

Teacher's Reference:

Craig, John Bradford, NATURE STUDY, Book I, McIndoo Publishing Company, 1921, p. 43-45, 147.

THE WORLD BOOK, Vol. 9, Roach and Fowler, Kansas City, Mo., p. 5629-5630.

WILD FLOWERS IN KANSAS, Kansas State Board of Agriculture, Topeka, Kansas, Vol. 51, No. 204-B, pp. 128 and 254.

Children's Reference:

Cooke, Flora J., NATURE MYTHS AND STORIES, A. Flanagan and Company, Chicago, 1926, p. 159.

WILD FLOWERS IN KANSAS, Kansas State Board of Agriculture, Topeka, Kansas, Vol. 51, No. 204-B, pp. 138-254.

GRADE VI

Unit-Twelve---Wild Plants-----Blue Stem Grass

Leisure-time interests and activities.

A. Specific Objective: To know what the life habits of blue stem grass are.

B. Organization of activities and subject matter of this unit.

1. Get some big blue stem and little blue stem grasses.

There are some five million acres of pasture land in eastern Kansas where big and little blue stem grasses form the greater part of the grass. Morris County is almost in the central part of this region. Due to improper grazing and being plowed up for wheat fields much of the grass is gone. Big blue stem is found along the slopes and little blue stem, which can endure drouth, is found on the uplands and ridges. No where else in the United States is the blue stem so rich in food value as in Kansas. Farther west the grass becomes tough and stringy. Blue stem, like the Indian, is a vanishing race. Unless the farmer learn@s to treat his blue stem pastures sensibly one of the greatest forage crops will be completely gone.

What does the blue stem look like?

When should cattle be turned into the blue stem pastures?

Why not before?

How high is blue stem before it makes good pasturage? What is the effect of mowing blue stem? What systems of grazing have been tried? Of what value is burning a pasture? When does burning help control weeds? What are the weeds which

bother blue stem?

List the places where big blue stem may be found?

Describe your pasture and tell upon which blue stem your cattle graze.

If blue stem puts on three hundred pounds per critter this summer, how much meat will your pasture grow for you?

Read the haymarket prices in the newspaper.

Materials:

Big blue stem.

Little blue stem.

Teacher's Reference and Children's Reference:

Aldous, A. E., "Blue Stem Pastures" TWENTY-EIGHTH BIENNIAL REPORT OF THE STATE BOARD OF AGRICULTURE, Kansas, Vol. 33, pp. 184-191.

LINCOLN LIBRARY OF ESSENTIAL INFORMATION, The Frontier Press Company, Buffalo, N. Y., pp. 1091.

GRADE VI

Unit-Thirteen-----Plants-----Seeds

Leisure-time interests and activities.

A. Specific Objective: To know that the seed is the purpose of the plant.

B. Organization of activities and subject matter of this unit.

Gather seeds.

1. Make a seed frame.

Take a piece of wall board, then board, or heavy card board. Cut to desired size. Cut at regular intervals the size of a nickel, smooth round holes. Decide upon which seed is to be contained in a hole. Label neatly underneath. Cover snugly with a piece of glass held in place by passepartout. Confine with another piece of glass held snugly in place by passepartout. If not a tight fit, the seeds will work out of their compartment.

2. Put seeds in small labelled phials.

3. Keep seeds in labelled boxes.

4. Make seed chart. Stick on with glue.

5. Note the shape of seeds, the color, the texture, hardness, softness.

6. How to choose good corn seed.

How seeds can be tested.

1. Put several layers of blotting paper that will absorb moisture in a wide mouthed jar. Put some seeds that have soaked in water over night. Cover jar with loose covering to keep paper moist.

2. Fill large glass jar with water. Tie a thin cloth over the top. On this place the seeds. Keep sufficiently full of water to keep cloth moist. Cover seeds loosely with damp paper.

3. Place earth in a shallow box and over the earth put thin cloth. Keep earth and cloth saturated with moisture. Cover with moist paper. Keep moist while sprouting.

4. Soak some corn and beans for a day or so.

Put sand in a plate. Moisten for seed sprouting.

Make rag doll tester.

Write the answers to these questions after observation.

1. What are the parts of the seed? (Germ - stored nourishment-covering).

2. Which is the germ?

3. Why is the seed so large?

4. Why is the covering tough?

5. What does the covering look like?

6. How is the corn different from the bean?

7. What does a seed need to grow? (Light, heat, moisture.)

8. Of what value are seeds?

9. Name those used for food.

Plant seeds we have gathered in school garden or home.

Seedless varieties of plants.

Put pea seeds in a thin glass bottle. Tie a bit of muslin securely over mouth and invert in a bucket of water. In from 2 to 4 hours bottle will burst.

Test seeds.

Gather and list seeds according to the way they travel.

Materials:

Seeds

Passepartout

Glass

Blotting paper

Jars

Cloth

Box of earth

Bottle

Plate

Sand

Teacher's Reference:

Zahnley, J. W., "Home Testing for Seed Germination" in Kansas STATE BOARD OF AGRICULTURE, TWENTY-EIGHTH BIENNIAL REPORT, PP. 195-198.

Children's Reference:

LINCOLN LIBRARY OF ESSENTIAL INFORMATION, The Frontier Press Company, Buffalo, N. Y., pp. 1112-1113.

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, pp. 5290-5294.

GRADE VI

Unit-Fourteen-----Wild Plants-----Lichens

Leisure-time interests and activities.

- A. Specific Objective: To know the life history of the lichen.
- B. Organization of activities and subject matter of this unit.
1. Take a field trip to observe lichens. Bring in some lichen covered stones.

In the beginning, the earth was solid rock. The first plants had to grow on rocks. These plants are called lichens. These come gradually over an entire rock. They can stand dryness. This we know by observing a rock after a rain, when it has become green again. These plants have acid in their roots that eat into the rock itself. They may be found on trees and fence posts. After the lichens have covered the rocks, the seeds of other plants find food in the soil which the lichens help make. Then the lichens are driven away.

2. How do lichens look under the magnifying glass?
3. How do they pry off the outside of rocks?

Put a lichen covered rock in water. What happens?

Fill the blanks:

1. Once the earth was _____ rock.
2. _____ were the first _____ to grow on rocks.
3. Lichens have roots that make an _____ which eats rock away.
4. Lichens are _____ makers.
5. They can do without _____ a long time.
6. After a _____ the lichens on the rocks freshen up.
7. In the soil which the lichens have helped make other _____

their seeds.

8. The lichens are _____ out.

Materials:

Rocks

Wood

Lichens

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 843-844.

THE CLASSROOM TEACHER, Vol. 9, The Classroom Teacher, Inc., Chicago, 1927, pp. 470-471.

LINCOLN LIBRARY OF ESSENTIAL INFORMATION, The Frontier Press, Buffalo, N. Y., p. 1097.

Children's Reference:

THE WORLD BOOK, Vol. 6, Roach and Fowler, Chicago, p. 3406.

GRADE VI

Unit-Fifteen-----Tame Plants-----Iris

Leisure-time interests and activities.

A. Specific Objective: To know the history and life processes of the iris.

B. Organization of activities and subject matter of this unit.

1. Bring in some iris. Watch the bees at work at home.

The iris is sometimes called fleur-de-lis which means "Flower of Louis". Some eight hundred years ago, Louis VII of France chose this flower as the emblem of his house. It has a sword for a leaf and a lily for a flower. It was called iris by the Greeks in honor of the goddess of the rainbow. It is still the national flower of France. The root of the blue flag is used in making iridin - a drug.

How is the flower marked to show the bee where the honey is?

Where is the honey well? Which part of the flower guards the door?

Where is the anther? How does the bee gather pollen?

How are the styles of the iris arranged? How does the iris manage to keep the bee from leaving the pollen from her own anther?

Describe the petals of the iris.

For what, do you think, are the lines on the petals?

What insects visit the iris?

How do the buds unfold?

How do the leaves join the stem?

Describe the seed, pod of the iris.

How many kinds of iris have you see?

Draw an iris.

Read poems that tell about the iris.

Material:

Iris

Leaves

Bud

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 626-629.

THE CLASSROOM TEACHER, Vol. 9, pp. 510.

THE LINCOLN LIBRARY OF ESSENTIAL INFORMATION, The Frontier Press Company, Buffalo, N. Y., 1928.

Children's Reference:

THE WORLD BOOK, Vol. 5, Roach and Fowler, Chicago, pp. 3054-3055.

GRADE VI

Unit-Sixteen-----Trees----Budding An Apple Tree

Leisure-time interests and activities.

- A. Specific Objective: To know how to bud an apple tree.
- B. Organization of activities and subject matter of this unit.
1. Preparation of a class for a lesson in budding. Secure bulletins issued by the United States Department of Agriculture, from the State Department at Topeka, from the Agricultural College of Manhattan, and Stark's Nursery Catalog. Read the different ways in which trees may be budded.
 2. Decide upon the variety of tree wished to be grown.
 3. Practice making T slits, loosening the bark, choosing buds, making shield buds, and inserting into the T incision on the stock the shield buds.
 4. Make arrangements to secure a seedling apple tree a year and a half old.
 5. After reading and discussion, a student gives the directions and demonstrates each step emphasizing the fact that the experiment can not be complete until the bud has grown. Write up the steps of budding an apple tree.

Material:

A bud stick

A sharp dull point knife (Budding knife)

A stock stick

Yarn, raffia, or string

Seedling

Teacher's Reference:

THE APPLE AND HOW TO GROW IT, United States Department of Agriculture, Farmers' Bulletin, 113.

THE WORLD BOOK, Vol. 1, Roach and Fowler, Chicago, pp. 295-300.

Children's Reference:

THE WORLD BOOK, Vol. 1, Roach and Fowler, Chicago, pp. 295-300.

Bryant, William Cullen, "The Planting of the Apple Tree" in THE POETRY BOOK 6, Rand McNally and Company, Chicago.

GRADE VI

Unit-Seventeen-----Trees-----The Apple

- A. Leisure-time interests and activities.
- A. Specific Objective: To know the processes involved in producing, marketing, and care of apples.
- B. Organization of the activities and subject matter of this unit.
1. Preparation of the class for visiting the Sharp orchard. Get "The Apple and How to Grow It" Farmers' Bulletin 113, United States Department of Agriculture and any other bulletins that the United States Department of Agriculture may publish.
 2. Before the orchard is visited, they should construct an outline of information to secure by observation, and by asking questions.
 3. Make arrangements with Mr. James Sharp to visit the orchard.
 4. Questions for apple orchard visit.
 1. What is the first thing considered in making an apple orchard?
 2. How is the soil improved?
 3. Why is a sloping piece of land best?
 4. How large is the Sharp orchard?
 5. How old is it?
 6. How many trees does it contain?
 7. How are the trees arranged?
 8. Why are they arranged in rows?
 9. How far apart are the rows?

10. How far apart are the trees?
11. Why are they put so far apart?
12. What kinds of apples are grown?
13. Which tree produces the most fruit?
14. How are the trees made bear larger apples?
15. When a tree dies how is it replaced?
16. Where do the trees come from?
17. How are the blossoms fertilized? What are the enemies of the apple? How are they controlled?
18. What is the average yield per tree?
19. How are the apples picked?
20. How are they prepared for market?
21. Where are the markets?
22. How are the apples stored?
23. What is done with the apples not fit for sale?
24. What is a box of apples worth?
25. How many boxes is an average yield?
26. What is the value of the orchard?

5. Have no foolishness. Pupils have note books open, and take notes on their questions answered and on their observations.

6. On their return to school, the children should organize their notes in relation to information previously gained. This presents an opportunity to make decisions.

7. The study provides information concerning budding, grafting, locating an orchard, soils, use of fertilizer, preparation of land for planting, planting, varieties, culture,

gathering, packing, and marketing value, and use.

8. The next will be the care of apples at home and the use.

9. The information of apple production should be applied to what we have read and observed. Compare with Mr. Sharp's results. Decide whether or not apple growing is profitable in much of Morris County.

Find out the value of the nation's apple crop this year.

Read stories of apples.

Read "Planting the Apple Tree", Trees in Prose and Poetry, pp. 43-59.

Eat an apple for lunch.

Tell how you enjoy apples best.

Teacher's Reference:

The Apple and How to Grow It, Farmers' Bulletin 113, United States Department of Agriculture, Bulletin Revised by American Pomological Soc. and Division of Pomology, United States Department of Agriculture.

Children's Reference:

Op. cit.

GRADE VI

Unit-Eighteen-----Trees-----Conservation

Leisure-time interests and activities.

A. Specific Objective: To know the real contribution of trees to the environment.

B. Organization of activities and subject matter of this unit.

1. Why do we need trees? Secure pamphlets from the United States Department of Agriculture, Bureau of Biological Survey, Washington, D. C., and read about forests.

Name all of the things which we use which are made entirely or partly of wood.

What are the common trees of our neighborhood?

What is the purpose of a windbreak?

Of what value are decaying leaves?

How do trees prevent floods?

How do trees conserve soil?

What are the products of trees other than lumber?

How do trees serve birds and animals?

How do the trees give us pleasure?

What damage do campers do to trees yearly?

What is a forest ranger? What does he do?

Where are there great forest regions?

What are the enemies of trees?

How are trees protected?

At one time there were over a hundred times as many trees in the United States as there are now. Man in his great greed has removed one of the best friends. Tree roots hold

the soil together and keep it from washing away. Floods are caused by the rapid melting of snow. The fallen leaves hold the moisture and snow melts less rapidly in regions where there are trees. Trees afford a home for birds and provide food for animals. They give us shade and provide places for picnics and pleasure. Campers are often careless and yearly thousands of acres of trees are destroyed. The government in its forest reserves has employed men to look after forests. One of their big jobs is to be on the lookout for forest fires.

Write a composition on "The Prevention of Forest Fires".

Read Joyce Kilmer's "Trees".

List the products of trees.

4. Fill the blanks:

1. Trees are one of man's best _____.
2. Trees may prevent _____.
3. Trees protect _____ and _____ against storms.
4. Trees furnish a _____ for birds.
5. Trees furnish _____ for animals.
6. Trees keep soil from _____.
7. Man uses _____ for many purposes.
8. We must save our _____.
9. Trees give us _____ by affording a place to picnic and camp.
10. Careless _____ destroy thousands of trees yearly.
11. The estimated yearly loss by forest fire is _____.

Teacher's Reference:

The CLASSROOM TEACHER, Vol. 8, The Classroom Teacher, Inc., Chicago, 1927, pp. 186-193.

Keeler, Harriet L., OUR NATIVE TREES, Charles Scribner's Sons, N. Y., pp. 425.

Children's Reference:

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, pp. 5870-5872.

Moseley, Edwin Lincoln, TREES, STARS, AND BIRDS, World Book Company, Yonkers-on-Hudson, N. Y., pp. 1-155.

Rogers, Julia E., THE TREE BOOK, Doubleday Page and Company, Garden City, N. Y., pp. 571.

Stone, Gertrude L., TREES IN PROSE AND POETRY, Ginn and Company, Boston, 1902, pp. 184.

Weed, Clarence M., OUR TREES: HOW TO KNOW THEM, J. B. Lippincott Company, Philadelphia, 1918, p. 295.

GRADE VI

Unit-Nineteen-----Trees-----Sycamore

Leisure-time interests and activities.

- A. Specific Objective: To observe the life history of the sycamore tree.
- B. Organization of activities and subject matter of this unit.
 - 1. Visit a sycamore.

The sycamore is the largest of our hardwood trees. Sometimes it grows to the height of 150 feet or more. The trunk is sometimes 10 feet in diameter. It requires much moisture. It is usually found along creek banks or in rich bottom country. It is unusual because of the way it sheds its bark every year. When the shedding has taken place the trees appear painted.

It grows from seeds and cuttings. The seeds are gathered together around a hardy woody core and are known as sycamore buttons or balls. The wood is reddish brown. It is capable of a high polish. It is not very strong wood. It is used for making tobacco boxes, woodwork for the inside of houses, furniture, and butchers' blocks. Its leaves are broad, pointed leaves, suggesting the leaf of the wild grape. Where will we find the sycamore? Why? How tall does it grow? How large around is it? What is peculiar about it? How may it be grown? What is its seed like? Of what use is the sycamore?

Draw a sycamore tree.

Gather some bark, leaves, and seeds.

Read about the sycamore tree.

Material:

Sycamore tree

Bark

Leaves

Seeds

Teacher's Reference:

Scott, Charles A., "Kansas Trees and Their Uses", Kansas State Board of Agriculture, TREES IN KANSAS, Vol. 47, No. 186-A, pp. 89-90.

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, pp. 5666.

Rogers, Julia Ellen, TREE GUIDE, Doubleday, Page and Company, Garden City.

Children's Reference:

Scott, Charles A., "Kansas Trees and Their Uses", KANSAS STATE BOARD OF AGRICULTURE, TREES IN KANSAS, Vol. 47, No. 186-A, pp. 89-90.

GRADE VI

Unit-Twenty-----Gardening-----Beautifying the Home
Leisure-time interests and activities.

- A. Specific Objective: To know ways in which we can make the home beautiful.
- B. Organization of activities and subject matter of this unit.
1. Visit a home that we consider beautiful. Tell why we think it is beautiful. The Finney home across the road from District No. 1 is an interesting example.

When the country was first settled, no one painted his house. Neither log houses nor sod houses could be painted. But they grew vines to cover up the dullness. Today man paints his house to make it beautiful and to preserve it. Beauty makes us happy. The surroundings of the home should be beautiful, too. The two things which make for beauty, no matter how simple or grand the home, are cleanliness and neatness. We should know what beauty is and try to work to this standard. A beautiful home is neat and clean inside and out.

A Chinese proverb says, "Show me your front dooryard and I will tell you what you would have the world think you are; but show me your back dooryard and I will tell you what you really are".

What are some of the things which make for beauty in a yard?

Why do we paint our houses?

What are some of the things around the home that make it look untidy?

What may we do to make our homes beautiful?

How do you make a window box?

What flowers do you put in it? Why?

Why do railroad depots have window boxes and plant flowers about?

The College at Manhattan will landscape farm homes if requested.

What are some of the things we may do without cost to keep the home beautiful? (Plant flowers - make window boxes - keep the yard neat - keep the house inside and outside clean, etc.)

Make a home booklet.

1. The first Kansas homes.
2. Pictures of different types of homes.
3. The homes of people of other lands.
4. Some modern homes.
5. My ideal home.

Teacher's Reference:

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., pp. 192-195.
 Stadel, Mrs. Walter, "Look to Your Dooryard", KANSAS STATE BOARD OF AGRICULTURE, TWENTY-EIGHTH BIENNIAL REPORT, Topeka, Kansas, pp. 103-108.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, McIndoo Publishing Company, Kansas City, Mo., Book 5, pp. 149-155.

Stadel, Mrs. Walter, "Look to Your Dooryard" in KANSAS STATE BOARD OF AGRICULTURE, TWENTY-EIGHTH BIENNIAL REPORT, Topeka, Kansas, pp. 103-108.

GRADE VI

Unit-Twenty-One-----Rocks and Soil----Salt

Leisure-time interests and activities.

A. Specific Objective: To know the ways in which salt is obtained.

B. Organization of activities and subject matter of this unit.

1. Ask the children to bring two teaspoonfuls of salt, a cup and saucer. Take five teaspoonfuls of water and mix with the two teaspoonfuls of salt, stirring until dissolved.

Pour over a paper in the saucer. Put in a dry place. Put in a warm place. Put where there is a draft. Which dries up first? A string may be put in the solution and the crystals may be lifted out.

2. What becomes of the salt poured into the water? How can you tell when the water will take no more salt? We call this a saturated solution.

3. What becomes of the water? From which saucer did the water go first? In which did crystals form largest?

4. What is the shape of a salt crystal?

5. What makes small crystals?

6. Of what value is salt to us?

7. Where do we get dairy and table salt? What is ice-cream salt?

What is rock salt?

Of what use are salt licks? Where are they used?

Where are salt mines found?

Why are lakes salt? Where are there salt lakes?

What animals on the farm eat salt?

How do we feed them salt?

How much does a block of salt cost?

How is salt made into blocks?

Where is the salt which you use mined?

Where is oldest salt works in United States?

We have all tried to eat food which had no salt or which had not enough salt. Salt is necessary to health. Even cattle become ill who do not have salt. Salt is mined as rock or water containing much salt is evaporated. Indians got salt from springs. The salt works at Syracuse, New York are once well known to the Indians. At Ithaca, New York, the salt deposits are 2000 feet below the ground. Water is forced to the layers and pumped out again. It is evaporated. For hundreds of years, salt has been mined from the mines of Poland. These are the largest mines in the world. In some countries salt is worth its weight in gold. In Italy the poor suffer because of the tax on salt.

Materials:

Salt

Water

Cup

Saucer

Paper

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 827-828.

THE WORLD BOOK, Vol. 8, Roach Fowler and Company, Chicago,
pp. 5175-5177.

Children's Reference:

"Salt Production in Kansas" in KANSAS STATE BOARD OF AGRICULTURE, TWENTY-SEVENTH BIENNIAL REPORT, Vol. XXXII, 1929-30, p. 300.

Fairbanks, Harold W., STORIES OF ROCKS AND MINERALS, Educational Publishing Company, N. Y., 1903, pp. 204-211.

Loomis, Frederic Brewster, FIELD BOOK OF COMMON ROCKS AND MINERALS, G. P. Putnam's Sons, N. Y., 1929, pp. 163-164.

GRADE VI

Unit-Twenty-two-----Stars-----The Sun

Leisure-time interests and activities.

- A. Specific Objective: To know what a star is.
- B. Organization of the activities and subject matter of this unit.

1. Review the stars we have studied.

The sun is a medium size star and stars are suns. Those little stars are really immense suns like ours. Many of them are many times larger than our sun but because they are so far away they look small. Stars are classified according to their brightness. Stars shine by their own light.

The moon and planets shine by reflected light from the sun. Stars seem to twinkle because of the atmosphere or air through which we see them. Stars rise and set because the earth is turning on its axis. We are moving at the rate of 800 miles an hour.

The sun is the center of a solar system. The earth is one of the planets revolving about the sun.

The sun has all of the elements that we find on earth. However, they are all gases. It is so hot there that even iron is a gas. We could not travel on the sun because there is only gas to walk on.

The heat of the sun is greater than the hottest fires on earth. We know that there has been a sun a long time because we find remains of animals and plants that lived here a hundred million years gone by. These had to have light

and heat so the sun has been shining a long, long time. The sun weighs 330,000 times as much as the earth and is 108 times as large. The earth is a small dot compared to the sun. Some of the sun spots that we read about in newspapers would be large enough to cover our entire earth. Just what the effect of the sun spots upon our earth is we do not know. Scientists believe they effect our weather and radio. Were we on the sun, we would weigh twenty-seven and two-thirds times as much as we do. An object weighing an ounce on earth would weigh almost a pound and three-quarters.

2. How much would each of you weigh?

3. Make a shadow stick.

Put a nail or peg two or three inches high in a board. Place in a south window for the south light. With chalk, outline the length of the shadow at 9 o'clock, recess, noon, recess, and 4 o'clock. A month later mark the distance again and so on repeating monthly to note the movement of the sun.

4. A tree may be used. Measure the shadow and record every day for a month. When is the longest shadow?

Write a story of an imaginary visit to the sun. How long would it take you to travel there going 90 miles an hour if the distance is 93,000,000 miles?

Materials:

Paper

Wood

Peg or nail

Apple

Mustard seed

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 905-907.

THE CLASSROOM TEACHER, Vol. 8, The Classroom Teacher, Inc., Chicago, pp. 207-210.

LINCOLN LIBRARY OF ESSENTIAL INFORMATION, The Frontier Press Company, Buffalo, N. Y., 1928.

Children's Reference:

Wright, Julia McNair, SEA SIDE AND WAY SIDE, D. C. Heath and Company, Boston, 1892, pp. 64-71.

Baikie, Rev. James, PEEPS AT THE HEAVENS, Adam and Charles Black, 1911, pp. 11-26.

GRADE VI

Unit-Twenty-three-----Sky-----Planets

Leisure-time interests and activities.

- A. Specific Objective: To know what a planet is, the names and comparative sizes of the planets.
- B. Organization of activities and subject matter of this unit.
1. Observe the stars. Some twinkle and some do not. Why? Stars twinkle but planets do not. The stars have their own light. Planets have reflected light. There are eight planets that revolve about our sun. They are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. The smallest of all is Mercury. It is nearest the sun hence it must be very warm there. Mercury keeps the same side toward the sun.
- Venus is a little smaller than the earth and is our nearest neighbor. Scientists believe it is most like the earth because it has atmosphere.
- Mars is only half the size of the earth. The earth is nine times as large as Mars. A year in Mars is twenty-three months long. It has two small moons.
- Jupiter is the giant of our system. It is 317 larger than the earth. Its day is ten hours long. It has nine moons all of different size.
- Saturn has three rings. Its day is eleven hours long and it takes thirty of our years for it to go around the sun. It has nine moons.
- Uranus is a large planet and has four moons.

Neptune is the farthest away of all known planets. It takes it one hundred and sixty-five years to go around the sun.

Fill the blanks:

1. The largest planet is _____.
2. The planet nearest the sun is _____.
3. _____ is thought to be most like the earth.
4. Mars has _____ small moons.
5. _____ has rings.
6. A year is _____ of our years on Neptune.

Material:

Books

Poems

Magazine articles.

Teacher's Reference:

THE CLASSROOM TEACHER, Vol. 8, The Classroom Teacher, Inc., Chicago, pp. 288-293.

Holden, Edward S., STORIES OF THE GREAT ASTRONOMERS, D. Appleton and Company, N. Y., 1912, Chapter 4.

Children's Reference:

Proctor, Mary, GIANT SUN, Silver, Burdette and Company, N.Y., 1906, pp. 82-150.

Gibson, Charles R., THE STARS AND THEIR MYSTERIES, Seeley, Service and Company, Limited, 1916, Chapter 9.

GRADE VII

Unit#One-----Birds-----Pigeon

Leisure-time interests and activities.

- A. Specific Objective: To know the habits of the pigeon.
- B. Organization of the activities and subject matter of this unit.
 - 1. Bring a pigeon to school for observation.

Read "Arnaux" in Animal Heroes to Children.

Pigeons are mentioned in literature as far back as three thousand years. All domestic pigeons are descendants of the wild Rock pigeon of Europe and Asia. The pigeon was first used as a carrier. Pigeons are family birds. They are fond of each other and unhappy when absent from each other. Man took advantage of this characteristic. During the Crusades and other wars, a knight took along several pigeons. He wrote a message and tied it to the wing of a pigeon which flew directly home to his family. To-day airplanes, telegraph, and telephone wires have put the carrier pigeon among the things of history. Pigeon fanciers still breed carrier pigeons for races. Records tell of one flight of a thousand miles being made in a few hours over two days.

The pigeon is the only bird that can drink like a horse or cow. He has a peculiar ducking movement of the head which makes it appear as though the head and tail are some how connected with the feet. This is the reason the the pigeon appears to change color.

The language of the pigeon is more difficult to understand than that of the hen.

The nest is not particularly well made. Grass and twigs are carelessly put together. Into this nest the mother lays a pair of eggs. In sixteen days the young pigeon or squab is hatched. From seven to twelve broods are raised a year. The homing male pigeon sits on the eggs from ten o'clock in the morning until four in the afternoon then the female takes up the task. A very devoted family is this pigeon family. In the crops of both parents pigeon milk is secreted. This the parent pumps into crop of the squab. Milk feeding continues for five days when the young pigeon goes on a seed diet. This seed is softened in the crops of the parents and is pumped into the crop of the young.

Many enemies seek the pigeon. Rats, mice, hawks, snakes, and boys are constant fears to the pigeon whose only escape is flying. He is pursued by lice, also. Many people derive considerable revenue from squab raising which is considered quite a delicacy.

A trip to the home of some one who raises pigeons will be the best way to study the pigeon.

Observe his appearance. Color of top of head, eyes, beak, breast, wings, back, tail, feet, and claws.

What is their food? They are the only salt eating birds.

How does he drink?

How does he walk?

How does he fly? How does this differ from the flight of a crow or hawk?

Describe the nest and the manner of hatching.

What are the health essentials of a pigeon?

What are the breeds of pigeons?

Describe them.

Describe the building of a pigeon house.

Describe the training of carrier pigeons.

Retell the story of "Arnaux".

Materials:

Pigeons

Books

Pictures

Stories

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N.Y., pp. 45-48.

SQUAB RAISING, Bulletin of United States Department of Agriculture.

Children's Reference:

THE WORLD BOOK, Vol. 8, Roach and Fowler, Chicago, pp. 4670-4671.

Mukerji, Dhan Gopal, GAY NECK, THE STORY OF A PIGEON, E.P. Dutton and Company, N. Y., 1927, pp. 197.

Seton, Ernest Thompson, ANIMAL HEROES, Charles Scribner's Sons, N. Y., 1905, pp. 73-107.

GRADE VII

Unit-Two-----Mammals-----The Horse

Leisure-time interests and activities.

- A. Specific Objective: To know the history and life habits of the horse.
- B. Organization of activities and subject matter of this unit.
1. Read a story of horses. Get pictures of wild horses of America.

A million years ago had you been out in the Rocky Mountains, you would have seen a strange little animal scarcely bigger than a dog. His foot track would have said to you, "Four toes on the front foot. Three toes on the back foot." Had you met this little fellow and observed, you would have seen four toes and a splint of the fifth on the front foot; three toes and a splint of a fourth on the back foot. The days were warm, the soil was moist and these toes helped the creature from mireing down. Had you called him, you would have said, "Come, Mahippus". Then as time went on and his toes became one large middle two and two small side toes, you would have called, "Come, Orahippus". Change continued and the middle toe grew large and long while the side toes were much higher up. Now you called, "Come, Mesahippus." Finally the side toes were no longer seen and only a long flat toe was seen, you called, "Come, Horse".

These dog like horses trotted to South America so the rocks tell us. We even find him loping over into Asia and present when the early man and he roamed the earth together untamed.

Here we find the wild man eating the flesh of the tiny horse. There are still wild horses in Asia and even in our own country. Our horses are descendants of wild horses brought over by Coronado some years ago when he was hunting for gold. There are wild Shetland ponies in Scotland, and Africa has the wild stupid horse which we call the zebra.

The children may tell of their own horses or some interesting horse they have seen.

These questions may be given the children for observation at home:

1. How do the horse's legs compare with his height?
2. What need have wild horses of long legs?
3. Upon what does the horse walk?
4. What is his toe nail?
5. Upon what kind of soil is the horse's foot best fitted for walking?
6. Which part of the horse's front foot corresponds to our hand, wrist, elbow, shoulder?
7. What part of his back leg corresponds to our hip, knee, heel?
8. Where are his ears?
9. How do they move?
10. Of what value is this to the horse?
11. What can you tell by a horse's ears?
12. Where are the horse's eyes?
13. What advantage was this to the wild horse? What colors are his eyes?

14. What can you tell about a horse by his eyes?
15. Describe the mouth and nose.
16. How many and where are his teeth?
17. How can you tell a horse's age by his teeth?
18. Which eats grass closer, the horse or the cow?
19. How can you tell whether or not a horse has been well kept?
20. How can you tell the difference between a range horse and a work horse?
21. How does he use his fetlock and tail?
22. How do a colt and calf differ in the way of feeding? Why?
23. How does a horse lie down?
24. How does a horse walk?
25. Describe the gaits of a horse.
26. How do we measure a horse's height?
27. How does a horse fight?
28. How should a horse be trained?
29. How do you treat a horse when he shies? Why does he shy?
30. What is the food of the horse?
31. How should a horse be treated in winter?
32. Of what use are check reins?
33. What are diseases to which a horse is liable?
34. How does he often get pneumonia?
35. How do you feed dusty hay?
36. How do you help keep a horse clean?
37. How many breeds of horses do you know?
38. What is the use of each?

Materials:

Horse

Pictures

Books

Bulletins

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1927, pp. 286-294.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY, McIndoo Publishing Company, Kansas City, Mo., 1920, pp. 67-71.

THE WORLD BOOK, Vol. 5, pp. 2838-2842.

KANSAS STATE BULLETIN OF AGRICULTURE, TWENTY-SEVENTH BIENNIAL REPORT, Topeka, Kansas, pp. 278.

Children's Reference:

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GRADE VII

Unit-Three---Invertebrate Animals-----Crayfish

Leisure-time interests and activities.

A. Specific Objective: To know the life habits of the crayfish.

B. Organization of the activities and subject matter of this unit.

1. Get a crayfish for the aquarium. A wide mouthed jar will do. Put the creature in clear water first so that its mouth, legs, and swimmer, etc. Give it clean sand so that the water will not become riled.

The crayfish is well prepared to get about, to protect itself, and get its food. The big pincers on the front legs are indeed frightening. Each leg is particularly armed, even to the last one which ends in a hook. These little claws are really jaw-feet and are called maxillapeda. Just behind are two more pairs of jaw-feet. To keep up with these three sets of jaw-feet, there are three pairs of sideworking jaws. Fastened to two pairs of these jaws are two pairs of thread like flappers that fan water over the gills.

Summing up we see there are three pairs of jaw-feet, one pair of great nippers, and four pairs of walking feet.

His head and chest or thorax are fastened together and are called the cephalathorax. It is covered with shell called carapan, the name given to the upper turtle shell.

It is easy to see where the head joins the thorax.

Its eyes are fastened to a stalk. In this way he can see

in any direction. These are many eyes put together. They are called compound eyes.

The long antennae are large at the base and taper. Each consists of many segments. Antennules are also aiding the antennae in making discoveries.

There are six parts to the body and a flaring tail. These segments enable the insect to curl its softer body part under the carapace for safety.

The tail can be folded up, curled beneath, or opened up.

Each swimmerets distinguish the male from the female. Upon her four paddles she lays her eggs, fastening them with water proof glue. They cling to the mother until they are able to care for themselves.

The crayfish breathes through gills.

Pools and quiet waters are their homes. In winter, they bury themselves in the mud.

It grows by splitting its skeleton. The complete shell may be often found.

If an organ is lost it can grow a new one. Sometimes in tight places they throw a leg away.

The nest is made in sand.

1. Why is the crayfish hard to pick up?
2. Describe its front legs. How many legs has it? What is the use of each set?
3. What is the use of the first three pairs of feet?
4. What does its mouth look like?
5. How do its jaws move? What is the business of the thread

- like organs that wave back and forth in and out the mouth?
6. What is the cephalathorax?
 7. Where is the carapax?
 8. Describe the eyes. Of what advantage is this?
 9. What is the use of the antennules? Of the antennae?
 10. How many parts to the abdomen?
 11. Describe the tail.
 12. How does the crayfish swim?
 13. Of what use are swimmerets?
 14. How does the crayfish breathe?
 15. What is their food? They are scavengers of the streams.
 16. Where do you find crayfish?
 17. How do they scurry to safety?
 18. Where do they pass the winter?
 19. What happens if the crayfish loses a leg?
 20. How does it grow?
 21. Watch it make its den. How does it do it?
 22. How can you tell the male from the female? Of what use are crayfish?
 23. Write a description of a crayfish.
 24. Draw its mouth - feet.
 25. Tell about preparing craw-dads for market.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 466-471.

WORLD BOOK, Vol. 9, Roach and Fowler, Kansas City, Mo., pp. 1625-1626.

Craig, John Bradford, A TEACHER'S MANUAL OF NATURE STUDY,
McIndoo Publishing Company, Kansas City, Mo., pp. 152-153.

Children's Reference:

Craig, John Bradford, NATURE STUDY FOR BOYS AND GIRLS, BOOK
5, McIndoo Publishing Company, Kansas City, Mo., pp. 43-47.

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WORLD BOOK, Vol. 3, Roach and Fowler, Chicago, pp. 1625-1626.

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N.Y., 1905, pp. 169-177; 178-186.

GRADE VII

Unit-Four-----Animals-----Snail

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits of the snail.
- B. Organization of the activities and subject matter of this unit.

1. Make a snailery. A glass jar, some moss, soil, and a little dish of water are the necessary equipment. Fasten cheese-cloth over the top. Keep the moss moist.

The snail is one of the most interesting of insects. No other animal has ever used the strange way of getting about, as has the snail. He carries his house about with him, so that, unlike human tramps, he always has a place to stay. No other animal has such enormous feet - or foot as this case happens to be. The whole underside of the body is foot. The flanges along each side are prepared with some substance which enables the snail to stick and yet travel at will. His eyes are of the "press the button" type. Upon the ends of the horns are the eyes. These may be withdrawn or extended at will. He is also armed with feelers which are capable of being moved the same way. They are fond of the dark.

Feed him lettuce, cabbage, apple, or soft fruit. Watch him eat. For shame! The snail does not use a tooth brush we see as he exposes his dirty teeth when slobbering over his meal. His round tongue aids the yellow teeth on his upper jaws and the meal is on.

The snail breathes through a pore which may be seen opening and shutting on the right side where the snail and its shell join. The snail's lung received the air and passes it out very much as man does.

Touch the snail and observe what it does. No common enemy would be attracted by a hard shell. When dry weather comes, he shuts the entrance with some mucus.

When hunting he uses first one eye and then another. He can see around the corner. He can travel upside down or down side up, that is, he can walk on the floor or the ceiling. The snail is two animals in one, or has both sexes in one animal.

His skin reminds us of an alligator's, rough, divided, and pebbled. He leaves a shining, trail wherever he walks.

The transparent eggs as large as peas are covered by a soft shell. They are held together by mucus and laid under rocks or decaying leaves. The infant snail has only one spiral. Age adds spirals.

Their food is watery leaves, and soft vegetable matter. In the winter, they bury themselves in vegetable mold or beneath stones or logs. They build as many as three storm doors for winter leaving a tiny air hole.

There are several varieties of snails. The house snail makes an enjoyable pet. Many people eat snails. In Italy and France, there are snailfarms. Were you to read one of their papers you would read the snail market.

By observation answer these questions.

In what places do you find snails? Why?

Describe the snail's appearance.

Describe its foot. How does it walk? What makes the track?

Describe the snail's eyes. Of what advantage are these eyes?

Of what use are the feelers? Touch them. What happens?

How does the snail protect itself? How many spirals in a full grown shell? How does it grow? How can you tell the young?

How does the snail breathe?

How does the snail prepare for winter? How does it prepare for drought?

How does a snail eat? What does it eat? Describe the tongue.

Describe a snail's egg. Where are they laid? How does the shell grow? What shows how they grow?

What are the kinds of snails which we have here?

Of what use are snails?

Where are they procured?

Draw a snail.

Write a description of the snail and its habits.

Materials:

Snails

Shells

Jar

Lettuce, cabbage, fish food, apple, green beans.

Teacher's Reference:

THE WORLD BOOK, Vol. 9, Roach and Fowler, Chicago, pp. 5418-5419.

LINCOLN LIBRARY OF ESSENTIAL INFORMATION, The Frontier Press
Company, Buffalo, N. Y., pp. 1059.

Children's Reference:

Ibid.

THE BOOK OF KNOWLEDGE, Vol. 19, Roach Fowler and Company,
Chicago, pp. 6889-6890.

Ibid., Vol. 14, p. 5085.

Ibid., Vol. 2, p. 457.

Miller, Olive Thorne, LITTLE FOLKS IN FUR AND FEATHERS, n.p.,
pp. 238-241.

GRADE VII

Unit-Five-----Insects-----The Earthworm

Leisure-time interests and activities.

- A. Specific Objectives: To know the life habits of the earthworm.
- B. Organization of the activities and subject matter of this unit.

1. Observe the earthworm out-of-doors. Observe the earthworm in the terrarium. After a rain is a good time to see the worm in the daytime. Why?

Long before man began to dip up the earth for his grain and plants, a more lowly farmer was busy digging up the earth for food. Like the early farmer he too had simple tools. He plowed, harrowed, fertilized, and irrigated his land. This farmer plowed from underneath the ground. Some seven or eight feet, sometimes, depending upon the moisture he plowed. Usually twelve or eighteen inches under favorable circumstances found him in his field. His plow was his stout little gizzard aided by grains of sand or gravel. In the morning, we can see these plowings in little piles around a hole. These we call "castings". They are really the sub-soil brought up by the earthworm. In his stomach, he has the power of adding lime to the soil as it passes through. It drags dead leaves, flowers, and grass under ground to make its nest. Bones, insect bodies, twigs, shells, and seeds are covered by the castings. Holes are bored to carry off the surplus water. In these holes often are clever drain

pipes of grass stalks. Plants are made to grow more luxuriantly by the thorough loosening which these plowmen give the soil around their roots.

It is estimated in some countries that there are 50,000 earthworms to the acre and that the top soil passes through their bodies at the rate of eighteen tons a year.

Much of the beauty of our scenery is due to the work of the earthworm in tending the soil. Rocks and stumps have become objects of beauty by the tilling of the soil by these landscapers. What does he use? A tiny proboscis, a peculiar pharynx, a sort of tail, a gizzard, and glands which are capable of secreting lime.

It does not walk by scales but by bristles called setae. They are found all on the underside of the creature; except the first three and the last segments bear them. It is because of these that the robin has such a hard time trying to drag the worm out backwards. There are two sets of muscles that aid the worm in crawling. The most inner muscles run round ways of the body and the outer ones lengthwise.

The clitellum, a thick whitish rings, is absent in the young earthworm. Around this clitellum, the egg band is formed. It works forward and is thrown off over the head of the worm as a boy sheds his shirt. Before leaving the head, the ring snaps together making a sack the size of a grain of wheat. This yellowish brown ball of eggs is stored away under manure piles or stones in May.

What the worm lacks in not being able to hear or see it makes up in being able to smell and feel.

The burrow extends straight down some foot or two before winding about and ending in a chamber where the worms spend the winter together. The upper part is plastered with a thin layer of dark colored earth which has passed through the worm's body.

How quickly can a worm bury itself in loose earth? In hard soil?

The burrow openings are stuffed with leaves drawn in by the top. They begin with the smallest part first.

The soil must be moist as the worm breathes through his skin. They work mostly at night. Why? But after a rain they may be seen in daylight. Why?

Their food is earth, leaves, raw meat, earthworms, leaves, and fat.

No other animal has done more for mankind in general than has the earthworm.

It really deserves a better fate than to go to a painful death on a fish hook.

With these questions, observe the earthworm.

1. Describe the earthworm.
2. How does it move about?
3. How does its way of locomotion differ from that of the caterpillar or snake?
4. How do its muscles work?
5. Measure a worm walking and one not walking.

6. How can you tell a young earthworm?
7. Describe the earthworm's ears?
8. Its eyes?
9. Its nose?
10. What sense is most thoroughly developed?
11. How is the burrow of an earthworm made?
12. Describe it.
13. Where does it make its home?
14. When does the earthworm work?
15. Where does it spend the day?
16. Why is it hard for a robin to pull a worm out of its hole?
17. What is its food?
18. How does it eat?
19. Where shall we look for the eggs?
20. What are its enemies?
21. How do you regard the earthworm?

You are an earthworm. A boy wants to use you for fish bait.

What argument would you put up to save yourself.

Measure a yard of soil. Remove castings. Next morning rake up castings and weigh.

Materials:

Earthworms

Terrarium

Castings

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 462-465.

THE CLASSROOM TEACHER, The Classroom Teacher, Inc., Chicago,
pp. 349-351.

Children's Reference:

Schwartz, Julia Augusta, WONDERFUL LITTLE LIVES, Little, Brown
and Company, Boston, 1909, pp. 24-45.

Rogers, Julia Ellen, EARTH AND SKY EVERY CHILD SHOULD KNOW,
Doubleday Page and Company, 1910, pp. 63-67.

Troeger, J. W., SCIENCE BOOK (Intermediate), Geo. Sherwood
and Company, Chicago, 1894, pp. 40-46.

GRADE VII

Unit-Six-----Wild Plants-----Greendragon

Leisure-time interests and activities.

- A. Specific Objective: To know the life habits of the greendragon.
- B. Organization of the activities and subject matter of this unit.

Read about Jack-in-the-pulpit.

Some may be growing in the neighborhood. A cousin of "Jack" grows quite profusely in Morris County. He is called "Greendragon".

Another cousin of the Greendragon is the beautiful calla lily which we find in greenhouses and in our homes.

The greendragon is found on moist shady banks. It has a fleshy root stalk called a corm. The Indians called it the Indian's turnip. Taste it. To us they taste "bitey."

The wide flap which looks like a lily on the dragon is called a spathe. It is really a tent leaf to protect the flower group which grows around the tall center. The leaf divides into from seven to eleven leaflets.

The plants bear both pollen bearing blossoms and pistillate blossoms on the same stem. The pollen bearing flowers being above the pistillate blossoms which make the berries.

When the blossom appears in the spring it looks like a pointed peg.

Beetles and small flies are carriers of pollen for this plant. It has been accused of being a flytrap. The leaves wither

away and leave the bright red berries to attract the birds in the fall.

Young plants are produced by seed and by corms sent out from the parent corm.

Make a trip to see a greendragon. A single plant may be dug up and transplanted in the school yard.

Where does the greendragon grow?

When does it bloom? How does it look when first coming up?

How does the spathe or pulpit look when it first unrolls?

Draw the leaves of the greendragon. Where are the veins?

What does a one leaf plant tell you?

Where are the blossoms? What is the spadix? Which of the blossoms have pollen? What will the others produce?

How is the plant fertilized?

When do the seeds ripen? How do they look?

Describe the root. What is it called?

How does it taste? What is its use?

How did the Indians use the roots?

How does the greendragon multiply?

Compare with the calla lily or the Jack-in-the-pulpit.

Write a theme describing the greendragon, telling how you think it got its name.

Draw the greendragon.

Material:

Greendragon

Calla lily (if possible)

Jack-in-the-pulpit

Teacher's Reference:

THE CLASSROOM TEACHER, Vol. 9, The Classroom Teacher, Inc., Chicago, pp. 494-495.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 512-514.

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Blanchan, Neltje, WILD FLOWERS, Nelson, Doubleday, Inc., 1926, pp. 5-8.

Mathews, F. Schuyler, FIELD BOOK OF AMERICAN WILD FLOWERS, G. R. Putnam and Sons, N. Y., 1912, pp. 10-12.

Peterson, Maude Gridly, HOW TO KNOW WILD FRUITS, The Mac-Millan Company, N. Y., 1910, pp. 8.

GRADE VII

Unit-Seven-----Wild Plants-----Fungi

Leisure-time interests and activities.

- A. Specific Objective: To know the fungi which may be used as food.
- B. Organization of the activities and subject matter of this unit.
1. On a trip observe the fungi. Gather some and bring to school.

Toadstools are some fungi that grow every where. These are plants which have no green parts so can not manufacture their own food through sunlight, air, and chlorophyl. Since they live and grow we know they must have food. There are two varieties, of these colorless plants, those who live upon the food other plants manufacture for themselves and those who live on dead vegetation. The first are parasites -or robbers. The second are saprophytes or scavengers. Fungi are of much benefit to the world. Dead wood and decaying vegetation are eaten up by the fungi. The dead material by action of these plants passes off as gas and the rest becomes humus. Some of these fungi are used as food. Only those, however, who know them well should attempt to use them for food.

Puffballs grow very large. Some times they appear to smoke when pressed. The "smoke" is spores which the wind carries away. They grow from threads which botanists call mycelium.

What does the puffball look like?

What is its color inside and outside?

Where does it grow?

How did it grow?

How large does the puffball grow?

What color is the inside of the puffball when ripe?

What is the smoke? What is its use?

The large puffball is used for food. If white and solid to the center it is very good and may be prepared like mushrooms. Beware of the small ones.

Read about mushrooms and other fungi.

Make a collection of the various fungi.

Write a theme on "Fungi as Food".

Materials:

Fungi

Puffballs

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 706-720.

THE CLASSROOM TEACHER, Vol. 5, pp. 432-433.

THE WORLD BOOK, Vol. 4, pp. 2349-2350.

Children's Reference:

THE BOOK OF KNOWLEDGE, Vol. 10, The Grolier, N. Y., pp. 3723.

Ibid., Vol. 1, pp. 332-333.

Ibid., Vol. 4, pp. 1356.

Ibid., Vol. 13, pp. 4826.

Ibid., Vol. 5, pp. 1757-1762.

GRADE VII

Unit-Eight-----Gardening-----Corn

Leisure time interests and activities.

- A. Specific Objective: To know the life habits of corn.
- B. Organization of activities and subject matter of this unit.

1. Begin the study with the planting in the spring.

Nothing that man has ever discovered equals the richness of the treasure of corn. No one knows where the first corn grew. On the tablelands of Mexico, a plant grows which is perhaps the first species. When the early settlers came to America, the Indians had grown corn so long that they thought they had always had it. It is believed that the colonists could not have stayed here had it not been for corn. The tree tops were chopped off to let in the sun, a stick plowed up the soil and the corn grew providing the necessary food. Every grain is a kernel of gold.

Testing seed corn.

From the seeds which were gathered and labelled in the fall, plant a five grains of each in sand. Label.

Make a seed corn tester of cloth.

Preparing the field for corn.

How is the soil prepared?

When is it prepared?

How is the seed planted?

How long for the seed to germinate?

Give these questions to be filled out in note books in the summer.

How does the corn look when it comes up? How do the leaves look? When does the stalk appear?

When do the tassels appear? Describe the tassels. Where are the anthers? Where do they discharge their pollen?

The silk is the pistil attached to the ovule. Notice the tip of the silk.

How is the corn blossom fertilized?

How do we get different varieties of corn?

What kind of weather is best for growing corn?

Describe the stalk. Where are the nodes or joints? How many are there? What is their use?

Where are the leaves on the stem? How is this arrangement of benefit to the stem?

How is the stalk protected by harm from the accumulation of rain between it and the leaf?

Describe the leaf. Why are its edges ruffled? Of what value to the plant are these leaves which bend easily but do not break?

Describe the roots. What is the use of the brace-roots?

Describe them.

How is the corn plant fitted to withstand the wind?

The Ear:

Where are the ears on the stalk? How is the stalk arranged for the holding of the ears?

How are the ears arranged in relation to the leaves?

Compare the leaf and the husk. Of what use is the husk?

What do you think the husk really is? How does the inner

husk differ from the outer husk? How does this protect the growing grains?

Where is the silk? How is it fastened? What is it? What part of the flower is the silk? The kernel?

How many grains on an ear? How many rows? How many kernels in a row? Notice the kernels at either end. How do they differ? Which would grow the stronger corn?

How are the kernels arranged on the cob?

Draw a cross section of the cob showing the kernels.

Why do not all the kernels develop equally on the cob?

Describe a perfect ear for seed-corn.

Experiments to try.

Tie two strings on a corn stalk as soon as it appears above the ground, one above and one below the joint. Tie two strings the same distance apart on the stem of a weed growing with the corn. Be sure the distance between the strings on both plants is exactly the same. A month later, measure the distance between the strings. What do you find?

Measure the distance between nodes on a marked corn plant.

Two weeks later measure again.

What do you find? What is the importance of corn? What was the corn yield of Morris County in last Agricultural Report? What was the value of last year's world's corn crop?

Corn Book

1. Legends or stories about corn.
2. Uses and commercial articles from corn.

3. Where corn is grown and its importance.
4. The plant:
 - Root
 - Stalk and leaves
 - Flowers (a) staminate or tassel; (b) pistillate or ear.
 - Fruit and what constitutes a good ear of corn.
5. Corn judging.
6. Gathering seed.
7. Storing seed corn.
8. Testing.
9. Planting, soil, seed-bed, methods.
10. Harvesting - silo - fodder- husking.

Materials:

Note book

Corn

Sand

Box

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 660-666.

Publications of the United States Department of Agriculture, United States Government Printing Office, Washington, D.C.

Note: Miscellaneous Publication, No. 60, contains a list of all available publications of United States Department of Agriculture. It may be had for the asking.

Children's Reference:

Publications of the United States Department of Agriculture,

Washington, D. C.

Sargent, Frederick Leroy, CORN PLANTS, Houghton, Mifflin Company, Boston, 1900, pp. 106.

Sandford, Albert H., THE STORY OF AGRICULTURE, D. C. Heath and Company, 1916, Chapter 1.

GRADE VII

Unit-Nine-----Rocks and Soils-----Fertilizer

Leisure-time interests and activities.

- A. Specific Objective: To know the common ways of fertilizing.
- B. Organization of activities and subject matter of this unit.

Observe a corn field that has not made a good growth because the soil has grown corn too long.

Arrange six flower pots with the same kind of soil. To one add well-rotted manure--to another quicklime--to another sodium nitrate (chicken manure)--to another add wood ashes--and to the fifth add superphosphate--leave the sixth as it is. Plant oats in each. Watch results. How could this be used in determining what soil is needed for growing oats? There are certain substances that come from the soil that are necessary to all plant growth. Some of the important ones that cost much to supply are nitrogen, phosphorus, and potash. These may be obtained from barnyard manure. Its value depends upon the type of crop grown. Find out from father how much a ton of cow manure is worth to the farm. What is the best way to handle and get the most good out of it?

In some places legumes or the clovers are grown. These have particular nodes on the roots which form the food of bacteria which have the power of making nitrogen. These do not grow well in a sour soil so lime is added to promote growth. The plowing under of these plants enriches the soil. What is this method of fertilization called? Where is it

used? (Sharp's apple orchard.)

Leaves, straw stacks, and slop are other methods of securing fertilizer. None of these should be burned.

Packing houses manufacture fertilizer as a by product of the meat packing industry.

What is the most common fertilizer?

Get several samples of commercial fertilizer. Note the contents.

What vegetables will potash grow well?

Of what use is lime?

Of what is humus made?

What soil grows corn well?

List fertilizers:

Fresh manure (horse - sheep - cow - goat - chicken)

Corn stover

Oak straw

Wheat straw

Clover hay

Slop

Cowpea

Alfalfa

Dried blood

Sodium nitrate (chicken manure)

Raw bone meal

Steamed bone

Acidulate bone

Raw rock phosphate

Wood ashes

Corn cobs

Bones

Tankage

Bat guano

Where in Kansas is fertilizer manufactured?

Visit Sharp apple orchard and observe use of fertilization.

Tell how to properly care for barnyard fertilizer.

How should barnyard manure be spread?

Materials:

Samples of commercial fertilizer.

Teacher's Reference:

Hopkins, Cyril G.;, SOIL FERTILITY AND PERMANENT AGRICULTURE,
Ginn and Company, Boston, 1910, pp. 653.

Burd, John S., COMMERCIAL FERTILIZERS, COLLEGE OF AGRICULTURE,
Experiment Station, Berkeley, California, Bulletin, No. 240.

Ware Brothers Company, THE AMERICAN FERTILIZER HANDBOOK,
Ware Brothers Company, Philadelphia, 1919.

TAME PASTURES IN KANSAS, Bulletin 253, Kansas State Agric-
ultural College, Manhattan, Jan. 31, pp. 29-31.

Manufacturers in Kansas:

Joseph Baunn, Kansas City, Kansas.

Fowler Packing Company, Kansas City.

Morris Packing Company, Kansas City.

Standard Rendering Company, Kansas City.

Swift and Company, Kansas City.

Wilson and Company, Kansas City.

GRADE VII

Unit-Ten-----Weeds-----Weed control in pastures
Leisure-time interests and activities.

- A. Specific Objective: To know how to control weeds in pastures.
- B. Organization of activities and subject matter of this unit.
1. Bring in samples of brush and weeds from pastures.

In much of the bluestem region, weeds and brush greatly reduce the grass yield. Buckbrush which spreads by seeds and runners is doing much to kill off the grass. Fortunately these perennial weeds and brush have a period when they may be more easily fought. The plants store food to supply growth until the leaves are grown sufficiently in numbers to supply enough food. When the reserve is low is the time to act.

The cheapest method known is mowing. Where the region is too rocky burning may be used. In small areas herbicides may be used. One common herbicide is sodium chlorate.

Where old stands of sumac have grown too large to cut with a mower going over them with a heavy dray in winter when they are frozen will break them down. The broken branches may be burned in the spring.

Buckbrush may be most effectively injured about May 15. It usually takes three annual cuttings to kill it.

Sumac should be cut about June 15 for three years.

Ragweed, August 15 and two years.

Burning weeds has little effect unless done after April 20.

What are the common weeds of the pastures? What are the common brush?

How may they be controlled?

Which is the cheapest way?

When is the time to control buckbrush? Sumac? Ragweed? Why?

What are some reasons why pastures become over run with these pests?

Which is cheaper to hire a man to mow the weeds or to buy hay?

Make a weed and brush chart.

Write a theme on the care of pastures.

Materials:

Buckbrush

Sumac

Ironweed

Ragweed

Burdock

Milkweed

Teacher's Reference:

Aldous, A. E., "Bluestem Pastures" in KANSAS STATE BOARD OF AGRICULTURE, TWENTY-EIGHTH BIENNIAL REPORT, Topeka, 1931-32, pp. 184-191.

Children's Reference:

Aldous, A. E., "Bluestem Pastures" in KANSAS STATE BOARD OF AGRICULTURE, TWENTY-EIGHTH BIENNIAL REPORT, Topeka, 1931-32, pp. 184-191.

Farmers' Bulletins.

Department Bulletins.

Department Circulars.

Miscellaneous Publications.

Leaflets.

Yearbook Separates, all publications of weed control issued by United States Department of Agriculture, Washington, D.C.

GRADE VII

Unit-Eleven-----Sky and Weather-----Winds

Leisure-time activities and interests.

- A. Specific Objective: To know what causes wind.
- B. Organization of the activities and subject matter of this unit.

Make a ventilation box.

Take a chalk box. Make a lid out of glass. Bore two holes in one side of the box. Put a lamp chimney over each hole. Put a short piece of lighted candle under one hole. Light some moistened paper. Put it first over one chimney and then the other. Over which one does the smoke rise? Over which one does the air descend? What causes this? Let the box represent the earth's surface. The candle is the heated part of the earth. Trace the smoke through the box. How does this compare with the wind? Hold the paper over the stove or radiator.

Air does not conduct heat well. This is a very great help to all animals. Our clothing as well as feathers and furs keep in small pockets of air which do not quickly conduct heat from warm bodies. Our houses have an air space between the walls. Ice-boxes and refrigerators have air spaces.

Air does not allow heat to pass so it is a nonconductor. Heat passing from one particle to another is said to be conduction. Conduction is one way of heating. Heated air is lighter so is transmitted. When it rises colder air rushes in to take its place. This causes a circulation and the

room heats. This is the way winds are caused. This is called convection. The heated particles move about and carry the heat with them. The earth is not heated the same all over. It is warmer in Africa than at the North Pole. The warm air rises because it is pushed up by the heavier air moving in. There is a difference in air pressure over heated areas and cold areas.

Winds and weather are thought of together. Five hundred years before Christ, the Greeks built a temple to the Winds. It was called "The Temple of the Winds". Its eight sides faced the eight winds. A figure on each side represented the kind of wind that direction brought.

The cold north wind known as Boreas was represented by the figure of an old man wrapped in a heavy mantle, wearing high boots and blowing a weathered horn. A cross looking man rattling slingstones on a shield represented the northeast wind. It brought hail, cold, snow, and sleet.

A beautiful youth having flowers and fruit in his tucked-up cape was the east wind, the bringer of good growing weather for plants.

The warm south wind was Natos. He is emptying a jar of rain over the earth.

A ship is being driven by Lips, the southwest wind. He was the sailors wind.

The gentle west wind, Zephros, was a youth wearing little clothing, but scattering flowers as he goes.

The northwest wind, a dry wind, is represented by a man

holding a vessel of charcoal.

The heat received from the sun makes the weather and winds. If there were only land or only water and all received the same amount of heat all the time, there would be no winds, no clouds, and no rain. Gravity would make all still. The earth has land and water. Land heats up quickly and radiates heat. Water heats up slowly. Air over land is warmer in summer and cooler over water. In winter, it is quite reversed. Currents in the ocean carry heat from the equatorial regions to the poles, and from the poles to the equator so there is a constant difference between land and water.

The path of the earth about the sun is not round but is an ellipse, causes an unequal distribution of heat. The equator is always warmer than the poles, and the heat of summer is greater than the heat of winter. These differences in temperature cause a difference in pressure over different parts of the earth's surface.

What is the effect of a cold wind blowing into warm regions? What is the result of a warm wind blowing into a colder region? What decides largely the kind of weather? What is the effect of a gentle breeze on temperature? What conditions make a gentle breeze? What conditions make a high wind? How is the wind measured? What is the work of the wind? Why does the smoke rise through the chimney instead of passing out through the front of the stove? Why is the upper part of the house usually warmer than the lower floors?

The Book of Knowledge, Volume 4, page 1391, gives directions

for constructing a simple anemometer.

Make a wind chart for a month. Keep weekly summary.

Date

Hour

Temperature

Direction of wind

Sky

Dew or Frost

Rain or Snow

Remarks

Weekly summary

Write a theme on the work of the wind in this district.

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 857-886.

THE CLASSROOM TEACHER, Vol. 8, The Classroom Teacher, Inc., Chicago, 1927, pp. 181-184.

THE WORLD BOOK, Vol. 10, Roach and Fowler, Chicago, pp. 6309-6311.

Children's Reference:

THE BOOK OF KNOWLEDGE, Vol. 11, The Grolier Soc., N. Y., p. 4113. Ibid., Vol. 4, p. 1391. Ibid., Vol. 8, pp. 2666-2668.

THE WORLD BOOK, Vol. 10, Roach and Fowler, Chicago, pp. 6309-6310.

GRADE VII

Unit-Twelve-----Stars-----Orion

Leisure-time interests and activities.

A. Specific Objective: To know the constellation, Orion.

B. Organization of the activities and subject matter of this unit.

1. Place a diagram of Orion on the board. Have the children observe at night.

Orion is one of the most beautiful of the constellations.

It consists of twelve stars which the ancients thought looked like a giant wearing a bright belt and sword. Betelgeuse (bet-el-gerz) a large reddish star was a club on his shoulder while Regil was the spur at his heel. He stalks across the sky with his club raised ready to hit the bull whose red eye is Aldebran (al-deb-a-ran). Regil, the spur star is in a direct line with the Pole star. It is too far away to measure. Betelgeuse is a young star. It is made of gas much thinner than our air.

It is more than a million times larger than the earth. Its diameter is 215,000,000 miles. It is one hundred and sixty light years away now and going farther away all the time.

What is a light year?

How far away is Betelgeuse?

How can Orion be located by the Pole star?

How many stars in Orion's belt? How many in the sword?

Where is Betelgeuse? How large is it?

How can we tell that it is a young star?

Where is Rigel? What color is it? What does this tell you about its age?

Which star of the group rises first? Which last?

Draw a dotted line connecting the four stars of Orion. Draw the giant.

Write the name of the star in the club and the star which makes the spur.

What have the stars done for man?

Material:

Star map

Stories of stars.

Teacher's Reference:

Comstock, Ada Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y.

THE WORLD BOOK, Vol. 7, Roach and Fowler, Chicago, pp. 4413.

Children's Reference:

Proctor, Mary, STORIES OF STARLAND, Potter and Putnam Company, 1898, pp. 186.

Porter, Jermain Gildersleeve, THE STARS IN SONG AND LEGEND, Ginn and Company, Boston, 1901, pp. 189.

Pratt, STORYLAND OF STARS, Education Pub. Company, Boston, 189, n. p.

GRADE VIII

Unit-One-----Rocks and Soils

Leisure-time interests and activities.

- A. Specific Objective: To know that the earth is very old.
- B. Organization of the activities and subject matter of this unit.
 1. Read about life found in fossils.
 2. Read about the fern age.
 3. Read about early man.
 4. Read about extinct animals.
 5. Collect rocks of the neighborhood which contain fossils.
How old was the oldest person you ever knew? How do you know that the earth is older than he?
 6. What other proofs do we have that the earth is old?
 7. Roll a pebble about in the hand.
 8. How long will it take to roll it to the size of these grains of sand? We know that there are great masses of rocks, thousands of feet thick, and reaching hundreds of miles, made up of just such pebbles.
 9. Examine a handful of sand. There are thousands and thousands of feet of sandstones over the earth's surface. How is sand on mountain sides accounted for?
 10. Notice this limestone ledge. In some countries these layers are a thousand feet deep. How were these limestone beds formed? These bodies formed not faster, perhaps, than one hundredth of an inch in a year. How long has it taken to form

this ledge? Measure the thickness. At the end of one or two hundred million years, the layers were made. At this rate find out how old this piece of limestone is. (Specimen.)

11. How are valleys made? In old countries like Europe, it has been estimated that valleys deepen at about the rate of two feet in one hundred years. How can we find the age of the Neosho Valley?

12. How high are Niagara Falls? These falls have moved from the town of Lewistown near Lake Ontario. (Find it.) At the rate of four feet in one hundred years, how old is Niagara Falls? It is quite a young thing.

13. What do the fossil plants and animals tell us about the earth? The catacombs in Egypt have shown to us mummied plants and animals that are four thousand years old. The species of these that we find on earth today have changed very little.

14. About how long has man lived upon the earth according to records?

15. Write four hundred million in figures.

16. How many feet in a mile? Estimate a mile or measure it. Call the oldest man on earth one hundred years old. Step off one long step. This is the age of the old man. The line, 5280 feet long represents one-half million years. It would take a line 1000 miles to represent the age of the earth.

17. What are some of the forces that have been and are still at work changing the inside and outside of the earth?

18. What is one of the most important evidences that we have of the earth's age? Name some of these animals and plants.

We may, also find the history in layers of rock on the land. The rocks have been formed at different periods of the earth's development. The rocks are a ragged old book, but if we knew how to read them, the story is plain.

19. Look for evidences of the earth's age.

20. Write a theme on "The Dinosauria, Extinct Kansas Reptile".

Material:

Books

Rocks

Pictures

Fossils

Teacher's Reference:

Clodd, Edward, THE STORY OF CREATION, Longmans Green and Company, Chicago, 1909, pp. 29-64.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., 1920, pp. 835-837.

Children's Reference:

Shaler, N. S., A FIRST BOOK IN GEOLOGY, D. C. Heath and Company, Boston, 1895, pp. 203-231.

THE WORLD BOOK, Vol. 3, Roach and Fowler, Chicago, pp. 1901-1906.

Verril, Alpheus Hyatt, THE BOY COLLECTORS HANDBOOK, Robert M. McBride and Company, N. Y., 1912, Chapter 3.

Mix, Jennie Irene, MIGHTY ANIMALS, American Book Company, N.Y., 1912, pp. 144.

GRADE VIII

Unit-Two-----Mammals-----Beef

Leisure-time interests and activities.

A. Specific Objective: To know how man is fed.

B. Organization of the activities and subject matter of this unit.

1. Secure bulletins issued by the United States Department of Agriculture on the various phases of beef cattle, breeds of beef cattle, judging, beef cattle, the beef calf, its growth and development, beef on the farm, slaughtering, cutting, and curing, feeding cattle for beef, beef production on the farm, costs and methods of fattening beef cattle in the Corn Belt, our beef supply,

2. When man domesticated wild animals, he was no longer a savage. As he went from place to place, he took his cattle with him. First, man wished to be relieved of bearing loads, so his animals bore the burden. Food became scarce and he ate his faithful burden bearer. Perhaps some hot day man's throat became dry and he turned again to his faithful beast and drank the milk. Later as religion came into his life, man offered his most precious treasure to his god, this sacrifice also being the same burden bearing beast.

To this day in countries of the Old World as well as in certain parts of the United States, oxen still carry packs and draw loads. In pioneering, cattle have done much to further the work of man. Patient and willing they have done work which a nervous horse could never do.

In China today, cows are the plow "horses".

Man has bred his cattle with two purposes in mind: one for milk, and one for beef. Among our beef animals, we find Hereford, Galloway, Short-horn, and Aberdeen-Angus. The Hereford, Short-horn and Aberdeen-Angus are common breeds of the farms of the country.

All of the breeds of cattle have come from the wild cattle of Europe and Asia. Our wild cattle were the buffalo.

The best breeds of cattle have been developed in the British Isles and northern Europe.

What are the characteristics of a good beef animal? Describe the ears, horns, eyes, ears, nose, and mouth. What is peculiar about the nose? Describe her hair.

How does the cow walk? How many toes has she? Which is better adapted for mud walking, the cow or the horse? What are the dew-claws? What parts of the cow's leg correspond with man's elbow, wrist, knee, and ankle? How many forms of locomotion has a cow?

What is the use of the cow's tail? In what other ways does the cow rid itself of flies? How did buffalo defend themselves against flies?

What is the language of the cow? How does the bull express anger? What are the ways in which a calf uses its voice? How is a herd of cattle managed? How is this leadership attained? In what way does a cow show intelligence? How do cattle play?

When do cattle feed? When do they chew the cud? How does a cow lie down or get up?

How do cattle defend themselves? For what purposes were cattle first domesticated? For what do we raise cattle today?

Give brief descriptions of the different brands of cattle with which you are familiar.

What are the points of a good beef cow? What is their food? Why? Which part of the United States produces the most beef cattle?

What is a balanced ration? How is it figured? Of what value is a balanced ration?

What provision should be made for wintering beef cattle?

Why and where is dehorning of cattle practiced? When and how should a calf be dehorned?

For what are cattle used in other parts of the world?

How many industries are dependent upon cattle?

Visit Manning and Miller's Ranch at Sylvan Grove, Kansas.

Describe a thoroughbred Hereford bull.

Describe a thoroughbred Hereford cow.

Estimate the value of the herd when given the value of the thoroughbred animals that may be seen.

Why does the raising of "scrub" cattle not pay?

Consult the World Almanac and compare the beef industry in value now and five years ago. Ten years ago. How do you account for the difference? What is a diet for successful beef growth.

Read the stock market reports.

How do stockmen know when to sell their cattle?

Material:

Cattle

Bulletins

Books

Stories

Songs

Teacher's Reference:

FARMERS' BULLETINS, United States Department of Agriculture, Washington, D. C.

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 295-302.

Children's Reference:

FARMERS' BULLETINS, United States Department of Agriculture, Washington, D. C.

THE WORLD BOOK, Vol. 2, Roach and Fowler, Chicago, pp. 658, 1925.

Carpenter, Frank George, HOW THE WORLD IS FED, American Book Company, N. Y., 1907, pp. 362.

GRADE VIII

Unit-Three-----Clams

Leisure-time interests and activities.

- A. Specific Objective: To know the habits of the clams.
- B. Organization of the activities and subject matter of this unit.
1. Read about clams. Observe clams. They may be kept in the aquarium.

The mussel or clam is a bivalve while the snail is a uni-valve. It lives in the mud and ooze at the bottom of ponds and streams. Like the snail, it walks with one foot. Its food is obtained from a stream of water which is drawn into the body. The male is longer and lighter in color than the female. At first the eggs are cared for in the gills of the female. When this period of development is passed the eggs are thrust out and attach themselves to the body of some fish. The little clam is the size of a very small pin head. If the fish is the right kind of food, the little clam rides about with it for a few weeks. Later it drops from the fish and finishes its development. Two years later it has reached the size of two or three inches and is full grown. Clams are particular about their food. One species likes suckers, another bass, another pike. Most clams are valuable for button making and grow on the gar, pike, an undesirable fish being useless and a canabal of useful fish.

Describe the clam.

Where is it found?

What are its habits?

How is it spread?

What is its value?

Write a theme on "Pearl Button Making".

Find out how baroque pearls are made.

Materials:

Mussel

Shells

Buttons

Oyster shell for chickens

Teacher's Reference:

THE CLASSROOM TEACHER, Vol. 5, The Classroom Teacher, Inc.,
Chicago, pp. 467-469.

THE BOOK OF KNOWLEDGE, Vol. 19, The Grolier Soc., N. Y.,
pp. 6888.

Children's Reference:

THE WORLD BOOK, Vol. 3, Roach and Fowler, Chicago, pp. 1405-
1406.

LINCOLN LIBRARY OF ESSENTIAL INFORMATION, The Frontier Press
Company, Buffalo, N. Y., p. 1018.

Barrett, Charles, "The Great Barrier Reef and Its Isles" in
NATIONAL GEOGRAPHIC MAGAZINE, Sept. 1930, pp. 355-384.

GRADE VIII

Unit-Four-----Reptiles-----Rattlesnake

Leisure-time interests and activities.

- A. Specific Objective: To gain knowledge by taking nature walks.
- B. Organization of activities and subject matter of this unit.
1. Identification is about all the study we need of this snake.

Read about rattlesnake. How does he differ in looks from a bullsnake?

The rattlesnake is distinguished most easily by the rattles on his tail. These begin to appear after the first shedding of the skin. The first year is called a "button". Every year after a rattle appears. His age can be told by the rattles. He reaches the length of six feet. The head is distinct from the body and the top is covered with scales. The tail of the adult is black. The diamond-back rattler's tail is crossed with dark brown or black. These snakes rarely attack man unless they are bothered or surprised. They feed upon mice, ground-squirrels, moles, birds, and other small warm-blooded animals. They have like born young in large numbers. He has a bad reputation but he is not without his good points.

Write a description of the rattlesnake.

Tell what to do in a case of being bitten by a rattlesnake.

Tell of the Hopi Indian Snake Dance.

Tell of a battle between a king snake and a rattlesnake.

Uses of rattlesnake. (Skin - oil - cure for epilepsy).

Material:

Books

Pictures

Teacher's Reference:

THE CLASSROOM TEACHER, Vol. 9, The Classroom Teacher, Inc.,
Chicago, pp. 429-430.

GRADE VIII

Unit-Five-----Snakes-----Copperhead

Leisure-time interests and activities.

- A. Specific Objective: To know the characteristics of the copperhead.
- B. Organization of activities and subject matter of this unit.
1. An ability to recognize the copperhead when he is met is the aim of this unit. A closer acquaintance may be had with one which is dead.

What does the copperhead look like?

The copperhead is a thick-bodied snake two and one-half feet long. One seventh of it is tail. His coppery color makes both young and old easy to identify. He has fifteen cross bands that look like hour glasses. The head is distinct from the body and is copper red. The underpart of the body is whitish with large dark spots. There are twenty-three ridged rows of scales. Their food may be frogs, birds, mice, and rats. They are not usually looking for trouble. They bear live young.

Describe the copperhead.

Read about the copperhead.

Tell of the treatment for snake bite.

Material:

Pictures.

Books.

Teacher's Reference:

THE CLASSROOM TEACHER, Vol. 9, The Classroom Teacher, Inc.,

Chicago, p. 428.

Children's Reference:

Wood, Carolyn D., ANIMALS, Ginn and Company, Boston, pp. 134-139.

GRADE VIII

Unit-Six-----Centipede

Leisure-time interests and activities.

- A. Specific Objective: To learn the life history and habits of the centipede.
- B. Organization of the activities and subject matter of this unit.

1. Get government bulletins from United States government on insects. Read about household pests.

Often we find crawling about in the house the "thousand leg" of two varieties - one flat with many long legs and one round with many legs. The centipede has one pair of legs for every segment and have a flat body. The milliped has a round body and two legs from each segment.

The centipede's frail legs break off easily but are soon grown again.

Centipedes feed upon clothes, moths, bedbugs, and roaches. Its bite is poisonous. It is a fierce looking creature and does not invite a very close acquaintance.

The milliped is not such a fierce looking fellow and he is perfectly harmless. Its food is waste vegetable material. It is really a scavenger.

Centipedes grow larger in the South and are very troublesome to man.

Both the milliped and centipede protect themselves by their appearance.

Capture a centipede and a milliped and put in glasses. Ob-

serve under the magnifying glass.
 Read about the southern centipede.
 How can centipedes be controlled?

Material:

Glasses

B. Magnifying glass

Bulletins

Books

Teacher's Reference:

FARMERS' BULLETIN, No. 627 F, United States Department of
 Agriculture, Washington, D. C.

Other FARMERS' BULLETINS, United States Department of Agric-
 ulture, Washington, D. C.

Hungerford, H. B., "Insect Pests About the House" in TWENTY-
 FOURTH BIENNIAL REPORT OF KANSAS STATE BOARD OF AGRICULTURE,
 pp. 10-11.

THE CLASSROOM TEACHER, Vol. 5, The Classroom Teacher, Inc.,
 Chicago, pp. 471-472.

Children's Reference:

FARMERS' BULLETINS, United States Department of Agriculture,
 Washington, D. C.

GRADE VIII

Unit-Seven-----Spiders

Leisure-time interests and activities.

A. Specific Objective: To learn the life history and habits of the spider.

B. Organization of the activities and subject matter of this unit.

1. Observe a spider in his web. Catch a spider and put in a glass for observation. Put some clean fine sand in the bottom. Feed it flies.

2. Spiders are not true insects. Insects have three parts, head, thorax, abdomen, and six legs, while a spider has two parts, the cephalothorax which is joined to the abdomen by a narrow thread. It has eight legs.

When the body of the spider has grown until its skin will hold it no longer, pop goes the skin! In a short time the new soft skin is as hard as the old one.

The spider has no equal as a bridge builder. No civil engineer ever built more wonderful suspension bridges than does this fellow of the fields and woods. He is skilled, too, in aeronautics. Long before man took a flight in a balloon, spiders were skilled operators. Their aeroplanes have never yet been equalled by man.

The spider is of tremendous use to man since they destroy millions of insects which are pests. Flies, grasshoppers, mosquitoes, and bugs are their diet.

The spider spends much time weaving curtains which loom up

in the kitchen, and the corner in the form of cobwebs. How is it made?

The web serves as a home, as a nest for eggs, and as a means of getting food. Not all spiders spend their lives spinning. The jumping spider is of this type. The spinning is done by means of little finger like glands called spinnerets located in the abdomen. Where was the spinning organ of the caterpillar? Webs are of various shapes. One, the funnel spider, has a tube for its web in which it hides. Some make parachutes and are blown about by the wind. The one most seen in the house makes a triangular bag. A common one seen out-of-doors makes a wheel.

As soon as the web announces a captive, the spider hurries down. At the front of the head is the mouth. It is guarded by two mandibles, each of which ends in a sharp claw bearing a poison gland at the tip. Its prey is killed by a thrust of these mandibles.

The spider does not mind going without food for sometime. He will have a feast when he does eat. He sucks the blood of his victim dry and throws the shell, wings, and legs away. No doubt the four pairs of eyes which face a victim loom up with great terribleness.

When the male spider comes a wooing, the female spider if she happens to be in an ill mood he will make a good meal instead of a good husband. The young of some varieties make food for others in the same family as the cocoon. The mother is a fairly good care taker of her young. Some

envelope the eggs in a little silken bag which protects them well. Some spiders, the wolf spider in particular, drag the egg sack about with them. There are those that keep turning the egg sack in the sun. Some spider mothers' life is lived as soon as the young are hatched. The egg sacks are opened in different ways. When one mother feels the young moving, she opens the case and lets them out. Mothers of some species carry the young about on her back.

All spiders secrete a little poison when they bite, however, very few are of a serious nature.

The spider hibernates for the winter.

Bring in spider egg sacks. Open one and count the eggs.

Observe others and note the spiderlings that come out.

Where have you found spider webs?

How was it protected?

How is the egg sack protected? Describe the sack. What color are the eggs? When do the young hatch?

How does the spider spin its web?

When the site is chosen, the spider when it has reached some height, raises its abdomen and spins out a thread which is carried by the wind. When ever the line touches an object it sticks. The spider draws up the line until tight and then he does a tight rope walking stunt, all the time doubling the line to strengthen it. From this line for a support, it fastens other lines. With a line fastened to a point, he walks to another point making a line as he walks. A hind

leg keeps the line from clinging to objects over which he walks. When the proper point is reached, he pulls the line tight and continues. To make the first radius, he drops from the bridge to some point below spinning as it goes. When he climbs back up to the center, fastens the radius and drops again, continuing until sufficient radii have been constructed. Next it begins at the center and spins a spiral. The lines in this are wider than the final lines. With the spiral to hold the radii firm, the spider goes to the outer edge and begins to build the final spiral, all the while cutting away with his mouth the scaffolding of the first spiral. Under a microscope the second spiral is beautifully decorated with tiny drops of adhesive fluid.

Why doesn't the spider get caught in his own web? The radii are made of inelastic, not adhesive silk. It is upon these that the spider walks.

How does the spider build his web?

Why doesn't he get caught in his own web?

Catching its prey.

The spider always keeps one sharp claw on the web and this with his four pairs of eyes enables him to know when dinner is to be served. He is not long in deciding about the size of the victim - if too large he is not hungry, but if the situation is satisfactory he darts out and quickly rolls the struggling insects over and over wrapping it in the sticky web. Finally the cocoon-looking body is hung up on the web, or if it is meal time, the spider scuttles up to his dining-

room in the center of the web or in his private den at the side and the meal is prepared.

How does a spider treat its prey?

All spiders do not make webs but depend upon coloring to help capture its food.

The common crab-spider always takes on the color of the flower where it expects to find a victim. They are unafraid and will attack insects several times their size. If needed, this spider can spin a web to drop to safety. He usually walks sideways or backs off.

Describe the crab-spider? The shape of the body, the legs, markings of the body.

What is its food?

How does it capture its prey?

Fill blanks:

1. The crab-spider looks like a _____.
2. It is found where there are _____.
3. They catch their prey by _____ for it.
4. They take on the _____ of the flower where they are watching.
5. The legs are arranged so that it can walk _____ or _____ better than forward.
6. In case of danger it can drop to safety by a _____.
7. They are very _____ often attacking insects several times their _____.
8. It does not _____ a _____ but lives in cracks or on plants.
9. In winter it _____ in some protected place.
10. Its food is _____ which feed upon _____ of the flowers.

Materials;

Spiders

Webs

Eggs

Egg sacks

Glass

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 475-488.

Ewing, Henry E., "A Field With the Spider" in THE NATIONAL GEOGRAPHIC MAGAZINE, August 1933, pp. 163-211.

Patterson, Alice Jean, THE SPINNER FAMILY, A. C. McClurg, Chicago, 1903, pp. 159.

Children's Reference:

Craigin, Belle S., OUR INSECT FRIENDS AND FOES, G. P. Putnam's Sons, N. Y., 1904, pp. 310-333.

Patterson, Alice Jean, THE SPINNER FAMILY, A. C. McClurg and Company, Chicago, 1903, pp. 159.

GRADE VIII

Unit-Eight-----Mushrooms-----Morels

Leisure time interests and activities.

A. Specific Objective: To know the mushroom.

B. Organization of the activities and subject matter of this unit.

1. Read about the mushroom in Farmers' Bulletins, Department Bulletins, and Yearbook Separates published by the United States Department of Agriculture, United States Government Printing Office.

The mushroom is a fungi. It has no provision made for the manufacture of its own food, hence it must live on food provided some other way. It is a saprophyte, a fungi that lives on dead vegetation. Many mushrooms make very delicious food. Every year people are killed by eating what they thought were the right kind. One can never be too careful. One small button may kill.

Mushrooms that have scales can not be eaten. Those that have the base of the stem in a sac can not be eaten. Sometimes this sac is hidden below the surface. See the whole stem. The button stages all look alike so do not use them. Those that have milky juices can not be eaten unless the juices are reddish in color.

Those with shiny, thin, or brightly colored caps, and those with whitish or clay-colored spores should not be eaten.

No mushroom or puffball should be eaten after its meat has begun to turn brown or has become filled with fly larvae.

No matter where we find the mushroom, what its color is, or

what its shape it has been planted by spores.

The morel is shaped like a cob or cone with a deep-celled network. Their color is cream white. The stems are thick and swollen. As the morel grows older, it turns brownish. Some stems are smooth while others are wrinkled. While none of the morel family are poisonous, after it turns brownish, it should not be eaten.

It is possible to get specimens in several of Morris County's districts. They may be found in orchards, fence corners, and where there are decaying logs, leaves, or vegetation.

What is a morel?

How are they distinguished?

What is their value?

Have a morel hunt.

Material:

Farmers' Bulletins

Mushrooms

Magnifying glass

Teacher's Reference:

Farmers' Bulletins, United States Department of Agriculture, Washington, D. C.

Comstock, Anna Bostford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 706-720.

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GRADE VIII

Unit-Nine-----Wild Plants-----Mold

Leisuretime interests and activities.

- A. Specific Objective: To know the habits of the muskrat.
- B. Organization of activities and subject matter of this unit.

1. Put some bread in moist dark place. A jar with the lid. Observe what happens. Bring some mold which forms on the top of canned fruit.

When the house is swept no matter how carefully, rays of moving particles are struggling toward the sunlight. We say it is dust. That is not all. There are all sorts of germs, all looking for a place to land. Among these are mold spores. Very small white balls they appear, so small that a pin head appears large beside them. When one of these tiny balls, breaks open thousands of spores are set free to look for a place to grow. Most any food will do if put in the right conditions - a damp dark place. The spore itself is a tiny body which enlarges, bursts open, and sends out a thread. These branch and grow larger and send out more threads which appear to be roots. They are called mycelium. The tip ends of the threads spread out over the bread and form little balls. These are made of protoplasm. Each has a wall and becomes a spore. When ripe, they are black or other colors. Blue mold bears its spores in groups of chains. They look like tassels and do not grow within sacs. It is often seen on cheese.

Bread mold is one of the most common molds. It is one of

the largest molds. It is made up of white threads which cross over and under making a beautiful fringy web, well dotted with spores. When ripe the spores each turn black. When many are ripened the bread looks black. Sunlight and dryness are not favorable to mold.

2. Put some moistened bread under a glass. Put it in a warm place. Run the hand across the desk and lightly touch the bread. Take the same amount of bread and put it in a dry sunny place. Observe.

Put some sauce in a dish. Put a little dust over it. Put in a warm dark place. Put some sauce in a dish and do not allow dust to enter. Cover well. Put by the dusty sauce. Observe. A microscope would lend much to the observation. A magnifying glass will help.

4. Which produces mold first? How does it look at first. How does it smell?

Where did the mold not do well?

How can you tell whether more than one kind of mold appears? If there are pink purple or yellow patches, they are bacteria and not mold. What is the difference between bacteria and mold? The decay of teeth shows one effect of bacteria on man.

When does odor appear?

When do molds grow best?

Where does mold come from?

What harm does it do? How should we prevent mold? What is the effect of mold on food?

List the places where you have seen mold growing.

Describe mold.

Draw a picture of mold as it looks under the glass.

What are the uses of mold?

Materials:

Glasses

Saucers

Bread

Fruit juice or sauce

Magnifying glass

Teacher's Reference:

Comstock, Anna Botsford, HANDBOOK OF NATURE STUDY, Comstock Publishing Company, Ithaca, N. Y., pp. 722-725.

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GRADE VIII

Unit-Ten-----Trees-----Pruning

Leisure^atime interests and activities.

A. Specific Objective: To know how to prune a tree.

B. Organization of activities and subject matter of this unit.

Should we wish to have a tree be dwarfed, we will cut off the roots so that it will not get so much food. To make the tree spread out, prune the top which forces the food into the branches left and makes them grow more vigorous. To prune for fruit, prune the tips of the buds of the twigs, which forces the food into the side buds and fruit. To make the branches more sturdy, prune out a few to let in the sunlight. The limb should be sawed off smoothly where it joins a larger limb. Do not leave a stump. Paint the wound to prevent fungi to enter and cause decay.

Fill the blanks:

1. To prune the _____ of a tree makes it a dwarf.
2. To prune the _____ of a tree makes it spread.
3. To prune the _____ of a tree makes the other branches grow more vigorous.
4. To prune the buds at the tip of the _____ makes the leaves and fruit grow more.
5. To prune the _____ lets in more sunshine.
6. The _____ should be pruned off smoothly where it joins another limb.
7. It should be _____ to keep fungi and spores out.
8. The _____ is an American wild apple.

9. Other plants and shrubs may be _____ the same way.
10. The top of a plant is pinched out to make it _____.
- Practice pruning a bush on the school grounds.

Materials:

Bulletins

Sharp knife

Trees

Teacher's Reference:

FARMERS' BULLETIN, No. 181 F, United States Department of
Agriculture, Washington, D. C.

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GRADE VIII

Unit-Eleven-----Tame Plants-----Smut in Corn

Leisure-time interests and activities.

- A. Specific Objective: To gain knowledge by taking nature walks.
- B. Organization of the activities and subject matter of this unit.

1. Preparation of the class for studying smut in corn. Secure bulletins issued by the United States Department of Agriculture on the various forms of smut present in cereal grains.

2. Plants bearing smut may be brought into the room or it may be studied in a nearby corn field. Since there are as many varieties of smut as there are grains it will be well to have a sample of as many as possible for observation.

3. An outline for observation should be constructed.

What is its appearance?

Where is it found on the plant?

How does it appear under the magnifying glass?

What is each individual part?

What is its purpose on the plant?

Ways in which it is spread.

How does the wheat smut differ from the corn smut in:

a. time of seeding.

b. manner of seeding.

How does the oat smut differ from the wheat and corn smut in:

a. time of seeding.

b. manner of seeding - cost.

What are the life habits of the corn smut?

To what in man does corn smut correspond?

How does smut affect the corn yield?

How does it affect cattle?

What is the treatment for wheat smut? Barley and oats? For corn?

What is the cost of corn smut?

4. What has been read and what has been observed should be compared. The problem of proper control of corn smut is one to be solved, but one which has a solution. It should stimulate some further seeking as to how.

5. In your father's cornfield, estimate how much corn smut is present by finding the number of plants affected in one row. Estimate the cost of your smut crop.

Materials:

Corn stalk affected in various places of smut attack.

Smut of various other grains.

Teacher's and Children's References:

FARMERS' BULLETIN 939, United States Department of Agriculture, Washington, D. C.

FARMERS' BULLETIN No. 69, United States Department of Agriculture, Washington, D. C.

FARMERS' BULLETIN 507, United States Department of Agriculture, Washington, D. C.

GRADE VIII

Unit-Twelve-----Gardening-----Landscaping

Leisure-time interests and activities.

- A. Specific Objective: To know how to make otherwise unattractive situations pleasant.
- B. Organization of activities and subject matter of this unit.
1. Collect pictures of the different types of homes showing the grounds. Read about famous homes. Mount Vernon, Ashland, The Hermitage, Monticella, Arlington. If possible visit the nicest home of the neighborhood. What makes the home attractive? Where are the trees? Where are the shrubs? Where are the gardens? Where is the lawn? The proper arrangement of vegetation about a home is another way of making a picture. An artist represents things on his canvas but one who makes a home uses the real things.
 2. What things do we want to consider in choosing plants for our yard? The harmony of plants, the contrast of certain plants as well as the rotation of flowers and foliage during the season are important items of selections of plants. Vines are grown near walls, the fence, or trellis. What are some that are beautiful? There are shrubs which grow best in certain positions. Which grow well on a north exposure? Which are good for feeding birds? Paths should have small shrubs. Sweet peas and nasturtiums are particularly good. What should we bear in mind in planting vines and shrubs?

Hardy vines and shrubs that require little care and attention are most satisfactory.

3. Take a picture of the house and grounds, add the dimensions of the grounds and send to the Agricultural College at Manhattan, Kansas for the proper arrangement.

4. Draw a plan of your home grounds to scale. Select from nursery catalogs the plants and shrubs which you desire. According to information as to culture, arrange on the plan drawn.

Material:

Books

Nursery catalogs

Pictures

Teacher's Reference:

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Robinson, L. Eugene, DOMESTIC ARCHITECTURE, The MacMillan Company, 1921, Chapters 17-18.

GRADE VIII

Unit-Thirteen-----Weather-----Magnet

Leisure-time interests and activities.

- A. Specific Objective: To know what a magnet is.
- B. Organization of activities and subject matter of this unit.
1. Hold each pole of a magnet over cloth, paper, wood, copper, nickel, silver, gold ring, pins, needles, tacks, nails. What do you infer?
 2. Rub a large needle with one end of a magnet. Try it on small needles. What do you infer?
 3. Spread iron filings over a smooth sheet of paper. Put a bar or horseshoe magnet on them. What do you infer?
 4. Bring the two north poles of the magnets together. What happens? Bring the two south poles of the magnets together. What happens? What do you infer?
 5. Place sheets of paper or glass over horse and bar magnets. Sprinkle iron filings over each. What happens? What do you infer?
 6. Rub a fountain pen briskly with a woolen cloth. Bring it near some scraps of thin paper. What happens? What do you infer?
 7. Rub a glass rod with silk. Bring it near scraps of paper. What happens? What do you infer?
- Read about magnets and electricity.
- What was the lodestone? We call it magnetite. Where is it found?
- Bar and horseshoe magnets have the same power as lodestone.

What has experiment No. 1 proved to us? Give the four things we have found out about the magnet.

1. Magnets attract only iron or steel.
2. The attraction is greatest at the ends and lessens toward the center.
3. A magnet's power extends somewhat beyond its surface.
4. Small objects after being in touch with a magnet are themselves magnets for a time.

Each end of the magnet is called a pole. They are marked N and S. What happens to the filings when a magnet is laid upon them? This arrangement is called a magnetic field. What would happen if the magnet could be broken into the tiniest of bits? How long a string can you hold of iron filings on the magnet? Each little bit is in itself a magnet and these tiny magnets hold together and make the string. What do the rows of iron filings show? This is called lines of force.

What kind of material does a magnet attract? Suspend a larger magnet by a string. Suspend a small magnet by a string. What happens when the two north poles touch? What happens when a north and a south pole touch? What do you infer?

Write the law of magnetic attraction.

What was the first compass like?

Why does the needle always point north? The needle of the compass is a small magnet in the field of the large earth magnet. What happened when the north pole of the small magnet touched the south pole of the large magnet?

Because unlike poles attract each other, one end of the needle always points to north pole of the earth. The N on the magnet means what? The S on the magnet means what?

Of what value to man was the discovery of the magnet?

Why on cold mornings as you comb your hair does the hair stick to the comb? As you draw the comb away, what happens?

Rub a fountain pen with flannel. Try it on scraps of paper.

What do you infer? Rub a glass rod with silk. Try it on scraps of paper. What do you infer?

What did the magnet pick up? Try picking up scraps of paper with each end of the rod? With the middle? What do you infer?

How are the rod and the magnet alike? Why didn't the rod pick up the paper before it was rubbed? A charge of electricity causes the rod to pick up the paper. What causes the electricity?

Suspend an electrified comb near a rod rubbed with silk.

What happens as the glass rod nears the rubber comb? Rub another comb and hold it near the rod? What happens? What do you infer?

A man named DuFay performed an experiment similar to this and decided there must be two kinds of electricity. Because he produced one by rubbing a piece of gum or resin, he called it "resinous" electricity. Because the other he got from glass he called it "vitreous". Benjamin Franklin called "vitreous" positive and "resinous" negative electricity. We call it so today. From our experiments, what is

the law of electricity?

What do we call a transfer of electricity from one object to another?

Where have you seen discharges of electricity? What is thunder?

Write the answers to these questions:

1. What kind of things does a magnet attract?
2. Tell how to magnetize a knife blade.
3. Write the law of magnets.
4. What effect has heat on a magnet?
5. How can the pole of a magnet be determined?
6. Of what use are magnets?
7. What does hard rubber rubbed with wool do?
8. What is the effect of rubbing a glass rod with silk?
9. What does rubbing rods produce?
10. What do we mean by an electric discharge?
11. What causes a flash of lightning?
12. What causes thunder?

Materials:

Comb or hard rubber material

Glass rod

Silk cloth

Wool cloth

Paper

Iron filings

Nickel

Copper

Silver

Gold ring

Pin

Needle

Tacks

Nails

Needles

String

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Charles E. Merrill Company, Chicago, 1915, Chapter 10.

THE WORLD BOOK, Vol. 6, Roach and Fowler, Chicago, pp. 3594-
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cott Company, Chicago, 1924, Chapter 28.

GRADE VIII

Unit-Fourteen-----Stars-----Light

Leisure-time interests and activities.

- A. Specific Objective: To know what light is.
- B. Organization of the activities and subject matter of this unit.
1. Light a candle and allow it to burn for a few minutes. Blow it out and quickly relight it without touching the wick. Explain what happens.
 2. In a dark room, light a candle and hold in front of it the following: mirror, piece of tin or aluminum pan, shingle or piece of wood, piece of glass, piece of white paper, a piece of black paper. In how many can you see the image of the candle? Which are they? Why? Arrange the names of the objects according to the order in which you think they reflect light best.
 3. Hold an open book perpendicular to a mirror. How do the letters look? How far behind the mirror do the letters appear?
 4. Write your name on a piece of paper before a mirror. How did you write it? What is a mirror image?
 5. Hold a magnifying glass directly in the path of the sun. Hold a piece of paper under the glass. Move the paper back and forth from the glass. What do you see on the paper? Where did the paper seem to be?
1. Light a candle. What is the first thing to do? Why does the match light? This physical law illustrated is friction produces heat. Where have you seen heat caused by friction?

Why does the match burn? A chemical process called combustion is taking place. Why does the wick light? When the wick lights what changes takes place in the candle? A solid can be changed to a liquid by heating.

Hold a white saucer over the flame. What do you notice? What is this black substance? This is carbon. All the time the candle is burning, the carbon is present. Why did we not notice it until the cold saucer was held over it? Look at the head of the match. What do we find here? When the match was blown out, what color was the head? Carbon when burning is a bright yellow. Any substance that is so hot that it glows and gives out light is said to be incandescent. Why makes the light?

Notice the flame. What colors do you see? What is the blue part? Put a hollow tube through the blue part and a lighted match at the other end. What makes the blaze come to the end of the tube? What effect has heat on gas? The heat is changing the melted wax to gas. The gas rises and burns.

Why doesn't the carbon burn in the blue flame?

If the saucer is held over the blue flame it will burn off. What happens to the candle the longer it burns? Of what use is the wick? The melted wax turns gas. It is burning gas that makes the flame. How does the oil get to the flame? We call this process of liquids rising in spaces of small diameter capillarity. Flame is burning gas or vapor.

What methods are in use now to make light? What kind of kerosene lamp gives the best light? What other methods of

have we? What burns in the mantle burner? In the electric light? Objects that can give a light are called luminous and those which do not are called non-luminous.

Hold your cat in front of the mirror. What does it do? Why? Why can we see ourselves in the mirror? We call this sending back of the rays of light from the shining surface reflection. Where does the book seem to be in front of the mirror? The image appears to be as far back of the glass as the image is in front. We call this the law of reflection which is: The angle of reflection is equal to the angle of incidence.

How do you throw a ball so that it will return? What does it do if thrown obliquely?

This is the way light from the mirror acts. Those rays reaching vertically come back vertically and we see the image as it is, while those reaching it obliquely come in the opposite direction.

Look at yourself in a spoon. Why?

What things in nature reflect light? Where do they get their light? What is daylight? It is called diffused light? What is the effect of dust and clouds upon light? Why can we see through glass? Air, gas, and water let most of the rays of light pass. They are said to transmit light or are transparent. Why can not we see through paper, window shades, or jello? These allow some rays to pass but not all. They are called translucent. Name some translucent materials. When no rays go through, we say it is opaque. Name some

opaque things in the room. Why are shadows cool?

What becomes of the light which falls upon unpolished wood? Upon dark colors? Of what use to us is the fact that colors absorb or do not absorb light? Why do people wear black at funerals?

How can a room receiving little sunlight be made light? How can we improve the quality of light given off by a lamp? By an electric light?

1. Write the experiment which shows what flame is.
2. Explain why the flame gives light.
3. Explain why we can not see in the dark.
4. Tell how to make a dark room appear light.
5. Read about Thomas Edison.

Teacher's Reference:

Pease, Clara A., A FIRST YEAR COURSE IN GENERAL SCIENCE, Charles E. Merrill, Company, N.Y., 1915, Chapter 10.

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GRADE VIII

Unit-Fifteen-----Stars-----Solar System

Leisure-time interests and activities.

- A. Specific Objective: To know what the solar system is.
- B. Organization of activities and subject matter of this unit.

The sun is the center of our solar system. All of the planets revolve around it. The sun gives us light, heat, and energy. Stars twinkle because they are so much farther away than the sun. The stars are really suns. Smoke a piece of glass and look at the sun. How does it appear to you? Read about the sun in the encyclopedia, THE WORLD BOOK, or THE BOOK OF KNOWLEDGE.

2. Planets. There are nine members of the solar system. Each is called a planet. These give out no light and no heat but shine by reflected light. The earth is one of these planets. To form an idea of the arrangement of planets in reference to the sun, we will make a chart.

Take a piece of beaver board or other stiff paper and drive a nail in the center from the underside upon which to fasten a short piece of candle to represent the sun. Keeping the candle as the center draw nine circles keeping each succeeding circle one inch from the other. These are the orbits on the paths in which these planets travel about the sun. These are really ellipses but on account of the small space, we will let these represent the sizes and relative distances from the sun.

On the circle nearest the sun, fasten a ball of clay one eighth

inch in diameter. This is Mercury, the planet nearest the sun. It goes around the sun in 88 days. How long will its year be?

On the circle, put an arrow pointing opposite to the direction the hands of the clock travel to indicate the direction of the planets travel. Put "M" on it.

Venus is one-fourth of an inch in diameter. (How does it compare in size with Mercury?) Place it on the second circle. It revolves around the sun in 225 days. How long is its year? Put "V" on the ball.

The earth is about the size of Venus. Put it on the third circle. How long does it take to make a revolution around the sun?

Make a ball one-half the size of the earth which represents Mars. This planet travels around the sun in 687 days. How long is its year? How does it compare with the earth's year? With Venus? With Mars?

A bit of white chalk may be put on the top to indicate ice and snow which it is thought to have.

The planet Jupiter is ten times as large as the one for the earth. How large will it be? It travels around the sun in 4332 $\frac{1}{2}$ days. How many of our years is that? Put "J" on the ball.

Saturn is nearly as large as Jupiter. Cut a circle from paste board the shape of a doughnut with an opening the size of the ball. Fit it around the ball to represent the rings of Saturn. This planet requires 29 years, 168 days to re-

inch in diameter. This is Mercury, the planet nearest the sun. It goes around the sun in 88 days. How long will its year be?

On the circle, put an arrow pointing opposite to the direction the hands of the clock travel to indicate the direction of the planets travel. Put "M" on it.

Venus is one-fourth of an inch in diameter. (How does it compare in size with Mercury?) Place it on the second circle. It revolves around the sun in 225 days. How long is its year? Put "V" on the ball.

The earth is about the size of Venus. Put it on the third circle. How long does it take to make a revolution around the sun?

Make a ball one-half the size of the earth which represents Mars. This planet travels around the sun in 687 days. How long is its year? How does it compare with the earth's year? With Venus? With Mars?

A bit of white chalk may be put on the top to indicate ice and snow which it is thought to have.

The planet Jupiter is ten times as large as the one for the earth. How large will it be? It travels around the sun in $4332\frac{1}{2}$ days. How many of our years is that? Put "J" on the ball.

Saturn is nearly as large as Jupiter. Cut a circle from paste board the shape of a doughnut with an opening the size of the ball. Fit it around the ball to represent the rings of Saturn. This planet requires 29 years, 168 days to re-

volve around the sun. How many days is this? Put "S" on the ball.

Uranus is four times as large as the earth. It requires 84 years and 5 days to make a trip around the sun. How many days? Put "U" on the ball.

Neptune is a trifle larger than Uranus. It travels around the sun in 188 years and 88 days.

The youngest planet in point of discovery in our solar system is Pluta. It is not quite the size of the earth. Two hundred and fifty years are required for its journey about the sun.

The Moon. The moon revolves around the earth. Draw a ring one-half inch in diameter around the ball labelled earth for the moon's orbit. On this circle put a ball one-half the size of the one representing the earth. This moon shines by reflected light from the sun and travels the opposite direction of the clock hands around the earth once every $27\frac{1}{4}$ days.

Material:

Clay

Board

Small nails

Colors (if desired to use instead of initials.)

The above plan of representation may be used with paper for medium instead of clay. These may be pasted on the circles.

Teacher's Reference:

Given in the unit before.

Children's Reference:

Given in the unit before.

GRADE VIII

Unit-Sixteen-----Stars-----Light

Leisure-time interests and activities.

- A. Specific Objective: To know some star bodies.
- B. Organization of the activities and subject matter of this unit.
1. The study of the constellations and stars.
 - a. Through questions from children and through stories of readily seen star groups.
 - b. What are constellations? How were they named?
 - c. Study constellations around the North star first as they are always in our sky. Make a chart locating those we know.
 - d. Locate some constellations of the season. Find myths about them.
 - e. The constellations change. These may be studied each lesson.

2. What are the constellations?

A star is a body of the sky which gives off heat, light, and energy. Years ago shepherds watching their flocks saw figures in the sky which reminded them of objects on earth. We can see them, too.

A map of constellations. Cut the largest possible circle out of heavy black paper a foot square to represent the night sky. Small gilt stars may be used to locate the constellations. Paste a star in the middle of the circle to represent the North Star. It is immediately over the north pole of the earth. All of the stars seem to revolve about it.

Near the edge of the circle and to the right of the North Star paste a star. A little to the left place another star. These two stars form the "pointers" in the constellation called "Big Dipper" and are almost in a line with the North Star. Complete the figure known as the Big Dipper. This constellation is the best known and is used as a guide for finding others. To the left of the Big Dipper and south of the North Star place six stars to form the Little Dipper as shown.

To the left and slightly below the Pointers in the Big Dipper place a star for the Dragon's Tail. Place other stars to complete the figure as shown. The shepherds thought this resembled a dragon.

Above and to the left of the North Star near the edge of the circle, place five stars to form a figure which looks like W. This is Cassiopea's Chair. Cassiopea was a legendary queen.

Below Cassiopea's Chair and to the left is another group of five stars. It represents Cepheus, the husband of Cassiopea.

Because these five constellations appear to revolve around the North Star once in twenty-four hours as the earth turns, they are called circum-polars. They never set. With this diagram as the sky map, try to locate these bodies at night. Each season, new constellations appear and others disappear in the sky as the earth proceeds on its journey around the sun. THE NATURE MAGAZINE, 1214 Sixteenth Street, Washington,

., contains in each issue a map showing the constella-
s to be seen that month.

a star party some night to observe the stars.

al:

k paper

stars

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Berkeley, Calif.....	Nature Study.....	1931...	K-6
Cleveland, Ohio.....	Elementary Science.....	1926-7...	K-6
Denver, Colo.....	Science-Course of Study.....	1927...	1-6
	Monograph #21		
Detroit, Mich.....	Course in Nature Study.....	1927...	1-2
Kansas.....	Course of Study for Elementary Schools.....	1932---	1-8
Kern County, Calif..	Manual of Elementary Science...	1930...	1-8
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Grand Rapids, Mich..	Course in Elementary Science...	1931...	1-6
Minneapolis, Minn..	Outline for Elementary. Science.....	1927-8...	1-2
Missouri.....	Course of Study for Elementary Schools.....	1931...	1-8
New York City.....	Tentative Course of Study in (Horace Mann School) Elementary Science.....	1927...	1-6
Pittsburg, Kansas...	Nature Study.....	1930-1...	2-6
Pittsburgh, Penn....	Course of Study in Nature Study and Elementary Science...	1928...	K-6
Portland, Oregon....	Tentative Course in Nature Study.....	1928...	1-7
San Francisco, Cal..	Elementary Science-Curriculum Bulletin 2.....	1929...	4-6
Bloomington, Ill....	Study of Nature.....	1923...	1-6
Chicago, Ill.....	The Course in Nature-Study and Elementary Science (University Elementary School).....	1924...	1-6

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APPENDIX A

Flora and Fauna of Morris County, Kansas

- a. Domestic
 - Chicken
 - Duck
 - Goose
 - Guinea
 - Turkey
 - Pigeon
 - b. Year around birds
 - Cardinal
 - Chickadee
 - Crow
 - English sparrow
 - Owl
 - Woodpecker
 - Quail
 - c. Spring birds
 - Blackbird
 - Bluebird
 - Blue Jay
 - Bunting
 - Bobolink
 - Catbird
 - Cowbird
 - Goldfinch
 - Hummingbird
 - Kingbird
 - Martin
 - Meadowlark
 - Mockingbird
 - Nighthawk
 - Oriole
 - Phoebe
 - Poor-will
 - Robin
 - Sapsucker
 - Sparrow
 - Starling
 - Swallow
 - Swift
 - Woodpecker (Redheaded)
 - Woodpecker (Downy)
 - Wren
 - d. Game birds
 - Duck
 - Geese
 - Mudhen
 - Quail
2. Mammals
- Badger

Bat
 Beaver
 Cat
 Cow
 Coyote
 Dog
 Goat
 Gopher
 Ground Squirrel
 Horse
 Mole
 Mouse
 Mink
 Muskrat
 Otter
 Opossum
 Panther
 Pig
 Rabbit
 Raccoon
 Rat
 Sheep
 Skunk
 Squirrel (red, black, gray)
 Weasel
 Woodchuck

3. Amphibians

Frogs (green, tree, bull)
 Toads

4. Fish

Black Bass
 Cat (spoonbill, blue, yellow, mud)
 Crappie
 Eel
 Gar
 Pickerel
 Sucker
 Sunfish

5. Reptiles

Lizard (Shink, six-striped, swift)
 Snakes
 Black
 Blue Racer
 Bull
 Copperhead (poisonous)
 Garter
 Grass
 King
 Spreading adder
 Water

6. Insects

Ant
 Acadia
 Cricket
 Bee (honey, bumble, solitary, sweat)
 Beetle
 Butterfly
 Bottfly
 Caterpillar
 Cow-fly
 Flea
 Gnat
 Grasshopper
 Grub worm
 Horse fly
 Hornet
 House fly
 Katydid
 Moth
 Mosquito
 Wasp

5. Spider

6. Centipede

7. Crayfish

8. Clam

9. Snail

10. Wild Plants

Aster
 Blazing Star
 Bittersweet
 Black-eyed-Susan
 Buckeye
 Camassia
 Cardinal Flower
 Daisy
 Dogtooth Violet
 Dragon Arum
 Dutchmen's Breeches
 Evening Primrose
 False Garlic
 Gentian
 Golden Rods
 Ground Plum
 May Apple
 Oxalis
 Phlox
 Pond Lilies
 Poppy Mallow
 Prickly Pear
 Red Bud

Snow on the Mountain
 Solomon's Seal (true and false)
 Spiderwort
 Star Grass
 Verbena
 Violets
 Wapoo
 Wild Indigo (Rattle Box)
 Wild Onion
 Wild Petunia
 Wild Roses
 Wild Blue Sage
 Yucca

2. Tame Plants
 Various

3. Weeds

Barnyard Grass
 Bindweed
 Bladder Ketmia (Flower of an Hour)
 Bouncing Betty
 Burdock
 Cheat
 Chicory
 Cockle Bur
 Daisy
 Dandelion
 Docks
 Dadder
 Devil's Claws
 Ironweed
 Milkweed
 Mustein
 Nightshades
 Plantains
 Poison Ivy
 Pokeberry
 Ragweed
 Sandburs
 Snow on the Mountain
 Stick Tight
 Toadflax
 Thistles
 Wild Lettuce
 Wild Morning Glory
 Wire Grass

4. Trees

Arbor Vitae
 Ash
 Basswood
 Birch

Black Locust
 Black Pine
 Black Walnut
 Box Elder
 Buckeye
 Catalpa
 Cherry
 Cottonwood
 Hackberry
 Hickory
 Honey Locust
 Mulberry
 Oak
 Papaw
 Red Bud
 Red Cedar
 Red Elm
 Red Haw
 Scotch Pine
 Silver Maple
 Sycamore
 Tree of Heaven
 White Elm
 Wild Plum
 Willow

14. Gardening

- a. School gardens
- b. Home gardens
- c. Dish gardens
- d. Eggshell gardens
- e. Rock gardens

15. Rocks and Soil

Limestone
 Niggerheads
 Flint

Soils:

- a. Clay
- b. Sand
- c. Humus
- d. Lime

16. Sky and Weather

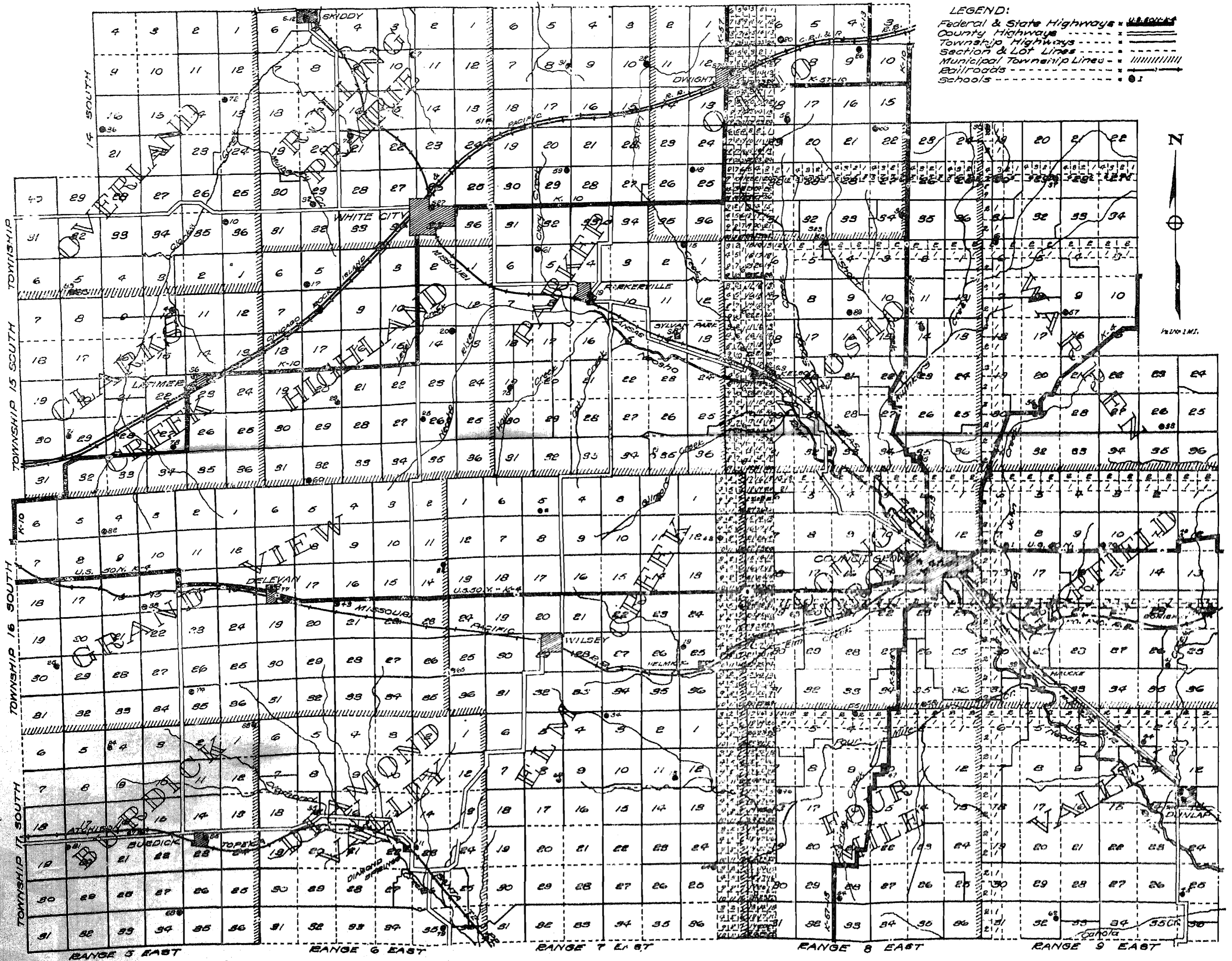
- a. Sun
- b. Moon
- c. Big Dipper
- d. Little Dipper
- e. Orion

Weather:

- a. Wind
- b. Clouds

- c. Temperature
- d. Water forms (rain, sleet, hail, snow, dew, fog, frost, ice.)
- e. Condensation
- f. Evaporation
- g. Seasons (Cause and preparation for each)
- h. Floods
- i. Erosion
- j. Signs (Weather Bureaus)
- k. Maps

MORRIS COUNTY KANSAS



SUPPLEMENT

The purpose of this study has been to gain experience through field trips. Before trips are taken, the children should be prepared for the observations in prospect. On their return to the school, observations should be checked and organized, and conclusions should be drawn.

Some of the units or parts of units may be too difficult or too simple. They should not be slavishly followed but adapted to the needs, interests, and learning abilities of the pupils.

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