

J. F. Wearin Jr

A

Study

in

Conservation

A STUDY IN CONSERVATION

MILLS COUNTY RURAL SCHOOLS
Grades 4 to 8

Unit I -- Soil Conservation

Unit II - Water Conservation

Compiled by

Amy Hammers
County Supt. of Schools
Glenwood, Iowa

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FOREWARD

On the coming of our forefathers to the county years ago, the verdant slopes of our prairies stretched out to them as a challenge, an untamed wilderness fraught with innumerable hazards, yes, yet ready to yield to them vast wealth.

They built their little homes in the sheltered wooded nooks near the streams. Here they felt secure, happy and content.

Summers and winters passed. The people prospered. More land was needed. Soon the virgin soil was upturned and trees were felled to make room for corn, rows and rows of corn.

"Deep and wide the wheels of progress have pass'd on. The silent Pioneer is gone." But to us he has left a grave responsibility, to guard and perpetuate, for the children of tomorrow, that rich heritage which is ours, the farm land of Mills County.

Our Purpose --

The outline is assembled with the hope that it will help teachers and pupils to have a better understanding of the problems of conservation in general, and in particular, "Our Own" the natural resources of Mills County.

Not even a long look can predict what the dividends of teaching conservation may be. They are not measureable. If right attitudes toward health, public property, flowers, animals and trees can be developed the experiment is well worth while.

CONSERVATION

The Earth's Surface --

Men of science have learned much about what the earth was like before man lived upon it. Beginning as a molten mass it gradually changed during a period of many thousands of years, until it became this gorgeous earth of ours, covered with living animals, growing flowers and trees.

As changes have occurred on the earth's surface, some plants and animals and peoples have disappeared. How has this affected man? What part has man had in the changing of his environment? Are there any of our plants and animals that exist on the earth today that are in danger of extinction?

Study page seven in your school text, Erbe's "History of Iowa." You will learn of the many changes that took place in the development of our soil.

Write a paragraph on the following topic:

"How the natural resources of Mills County were formed."

People, today, are attaching a new importance to the study of weather, climate, soil, drainage and other phases of their surroundings, particularly, those that have a bearing on man's well-being.

Write a paragraph on the topic:

"What changes have forced people to realize the necessity of the study of conservation?"

Mills County's Resources --

1. Soil
2. Water
3. Native Timber
4. Flowers and Shrubs
5. Minerals
6. Wild Life

VOCABULARY STUDY

As a reading readiness or preparatory measure to our entering on this new unit of work, we should make ourselves acquainted with the new words that we may expect to find in our study. In order to have the best possible understanding of the words in this list, let us consult the dictionary to find the meaning relative to Conservation.

accretion	extinction	sod
adhesive	gully	soil
conservation	humus	subsoil
contour	insert	surface
cropping	loam	terrace
cycle	molten	vapor
eradicate	pulverize	vegetative
erode	resource	verdant
erosion	rotation	
evaporate	slope	

SUGGESTED REFERENCE READING

Many of the books in your school library have material pertaining to some phase of conservation. Locate through the use of the index and table of contents the title and page of such articles, thus, making a bibliography of all available material. We have the following books which you will find helpful, in the circulating library.

Plants and Animals
Some Animal Neighbors
Our Earth and Its Life
Building America
Soil Elements in Farm Practice
Through the Year
Winter Comes and Goes
The Seasons Pass
The How and Why Club
How and Why Experiments
Tales and Travel
Science Stories, I, II, and III
Nature Activity Readers, I, II, and III
Pathways in Science, I to VI
Nature and Science Readers, I to VI

SOIL CONSERVATION

" 'Dirt Cheap!' This expletive is an expression of careless inaccuracy and far from true. Nothing is cheap that has taken years, yes, centuries to build. Nothing is cheap that leaves human poverty, vegetative death, and landscape starkness when it is gone.

Every child should know about soil and its importance to life. They should know its nature and origin. Scientists tell us that, 'Soil is the result of long passages of time during which temperature and climate exert their influence on the parent rock.' "

From "A Study" made by the
Minneapolis Schools.

I. Soil

1. What is soil?
 - a. Pulverized rock
 - b. Decayed vegetation
2. What is virgin soil?
 - a. Where found in our county, if any?
3. What is topsoil?
4. What is accretion soil?
5. How is soil formed?
 - a. Mechanical agents
 - (1) wind
 - (2) water
 - (3) changes of temperature
 - b. Chemical agents
 - (1) air
 - (2) water
 - c. Organic agents
 - (1) plants
 - (2) animals
6. Types of soil
 - a. glacial
 - b. lake
 - c. alluvial
 - d. wind-borne
 - e. volcanic
7. Size of soil particles
 - a. clay
 - b. loam
 - c. sand
 - d. gravel
8. Importance of humus
 - a. sources
 - (1) decayed leaves
 - (2) manure
 - (3) plowed under grass stubble
9. Fertilizers
 - a. Importance
 - b. Elements
 - (1) potassium
 - (2) calcium
 - (3) phosphorus
 - (4) nitrogen

10. Sources of fertilizers
 - a. domestic
 - b. commercial
11. Cultivation of soil
 - a. Importance of cultivation
 - (1) regulates distribution of moisture
 - (2) permits circulation of air
 - (3) eradicates weeds
 - b. Methods
 - (1) crop rotation
 - (2) strip cropping
 - (3) contour farming
 - (4) terracing
12. Mills County's Soil
 - a. What agents were employed in the development of our soil?
 - b. Color an outline map of Mills County to indicate where the different types of soil are found.
 - c. What are our chief sources of fertilizer?
 - d. What methods of farming are employed in your neighborhood?
13. Mills County's Soil Uses
 - a. Crops
 - (1) corn
 - (2) oats
 - (3) wheat
 - (4) barley
 - (5) soybeans
 - b. Pasture
 - (1) What kind of soil is required for good pasture?
 - (2) When does the grass in the pasture have a chance to grow?
 - (3) How early in the spring should cattle be put out to pasture?
 - (4) What makes pastures bare and weedy?
 - (5) Why do bare and weedy pastures erode more than those containing good sod?
 - (6) List some different kinds of grass used for pasture and hay.
 - c. Hay
 - (1) alfalfa
 - (2) brome grass
 - (3) clover
 - (4) sweet clover
 - (5) timothy
 - (6) sudan grass
 - d. Truck Farming
 - (1) peas
 - (2) sweet corn
 - (3) tomatoes
 - (4) melons
 - (5) berries
 - e. Orchards
 - (1) apple
 - (2) peach
 - (3) cherry

- f. Feed Lots
 - (1) Is the area of a feed lot large or small? Why?
 - (2) Is the ground trampled or not?
 - (3) What is the condition of the topsoil after the ground has been used as a feed lot for a period of years? Why?
- g. Parks and timber lands
 - (1) Recreation
 - (2) Reserves
- h. List other soil uses that you have observed.
- 14. Enemies of the land (plagues of our soil).
 - a. Leach
 - b. Depletion through cropping
 - c. Erosion
 - (1) gully
 - (2) sheet erosion
 - (3) wind

Write a theme on the topic:

"Methods of Erosion Control"

Some suggested methods are:

- a. rotation of crops
- b. planting of grass
- c. terracing
- d. strip cropping
- e. contour plowing
- f. check dams
- g. planting trees in gullies.

ACTIVITIES

1. Collect different kinds of soil and display them in glass jars.
2. Mixing soils

Let the pupils experiment with mixing their own soils, using clay as a base, adding sand, humus, fertilizers, etc. Test the productivity of each soil by planting beans or corn in each container. Water the seeds daily and keep them in a warm place. Do not disturb the soil. Watch the experiment closely. Keep a record of the results. Several attempts may be necessary before a good combination is found.
3. Comparison of soil fertility

Compare the fertility of soils by placing clay, loam, sand, and humus each in a separate container. Plant several beans in each of four containers, respectively. Label them thus (beans and clay) or (beans and sand), etc. Water the seeds daily. Keep them in a warm place. Make a report answering these questions:

 - a. In which container does the seed germinate first? last?

- b. Which soil holds the water longest?
- c. Which soil drains the quickest?
- d. In which container does the soil remain loose and porous?
- e. Which soil packs most tightly?
- f. Which soil proves itself to be the best for general agricultural purposes?
- g. Write descriptions of the above experiment showing the capacity of each soil to hold water and produce crops.

4. Does the kind of soil have anything to do with the way ground water comes up through it?

a. Materials.

- (1) 3 lamp chimneys.
- (2) Tin Pan 12" by 12" by 4"
- (3) Samples of sand, clay, loam.
- (4) Cheesecloth to cover the large ends of chimneys.
- (5) Adhesive tape.

b. Procedure

- (1) Cover large ends of lamp chimneys with cheesecloth and fasten securely with adhesive tape.
- (2) Put samples of soils in chimneys.
- (3) Stand up chimneys in tin pan.
- (4) Fill pan half full of water.
- (5) Observe to see rate and amount of water coming up in different soils.

5. Why does the water run off some soils more quickly than others? Experiment to show percolation of water through various soils, as one factor influencing run-off.

a. Materials.

- (1) 3 lamp chimneys.
- (2) Wooden frame to hold lamp chimneys.
- (3) Samples of sand, clay, loam.
- (4) Cheesecloth to cover small ends of chimneys.
- (5) Adhesive tape to hold cheesecloth to lamp chimneys.
- (6) 3 empty jars.

b. Procedure

- (1) Cover small ends of chimneys with cheesecloth and fasten securely with adhesive.
- (2) Fill each chimney half full of one kind of soil.
- (3) Place chimneys in wooden rack with covered ends down.
- (4) Place an empty jar under each chimney.
- (5) Pour one cup of water into each chimney.
- (6) Note length of time taken for water to pass through and the amount that passes through.

6. Write a theme on the topic:

"Gifts of the Soil."

7. Map out a "Nature Trail"

Your environment is different due to differences in localities. I would suggest, however, that you explore a road, where a high bank has been cut; find the topsoil, subsoil, and layers of mineral matter, if any. Not all road cuts expose all three layers.

Compare the texture of soil found in the road-bed with that of nearby field or woodland or both, if possible. Take some of the dirt of a freshly plowed field in your hands; note the color, texture, temperature, moistness and quality.

Visit a woods -- one that has not been used as pasture too extensively. Compare the firmness of wood soil with that of the road or field. Observe all the different flowers and birds along the way.

Let your trail lead you to a stream; here you will find a vast number of miniature land formations.

Draw a pictorial map or chart of your trail. Some suggested symbols to be used in making your maps are:



schoolhouse



tree



stumps



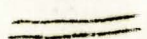
weeds



flowers



birds



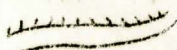
road



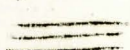
plowed fields



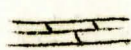
grass



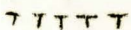
topsoil



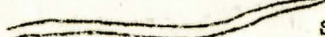
subsoil



mineral



telephone line



stream

(Be sure to include a legend with your map).

WATER CONSERVATION

II. Water

1. What is water?
2. Forms of water.
 - a. Liquid
 - b. Ice
 - c. Vapor
3. Explain the difference between hard and soft water.
4. What is mineral water?
5. What is meant by surface water?
6. What is meant by water level? water table?
7. What are clouds?
8. What is fog?
9. How does water get into the lakes and streams?
10. How does moisture get into the clouds?
11. What causes rainfall?
12. Explain a water cycle.

ACTIVITIES

1. Make a chart showing a water cycle.
2. List the uses of water.
3. An experiment to show how dew forms.

To show how dew forms and to show that the air contains water, place some ice or very cold water in a metal cup or glass. Beads of moisture will form on the outside of the receptacle since, when warm air strikes a cold surface, the water in the air condenses on the surface.
4. An experiment to show the different forms of water.

Place some ice (showing the solid state) in a glass and allow it to melt (showing the liquid state). Boil the water you now have to show the vapor state.
5. An experiment to show that water contains mineral.

Place some water in a shallow dish and allow it to evaporate. The formation found on the inside of the glass is composed of the solid minerals that do not evaporate. As a control, rain water can be placed in another shallow dish and allowed to evaporate. No minerals will remain.

6. How much water will a plant take from the soil?

a. Materials

- (1) 4 tin cans, holes punched in bottom.
- (2) soil, clump of grass, small plant.
- (3) 4 small tin bowls.
- (4) pasteboard to cover the bowls.
- (5) adhesive.
- (6) ruler.

b. Procedure

- (1) Put cup of water in each bowl.
- (2) Leave one can empty, fill one with soil, another with soil and clump of grass at top, fourth with soil and plant.
- (3) Place each can in pan of water.
- (4) Fit cardboard around can and out to edge of bowl. Fasten securely and make airtight with adhesive.
- (5) Make small opening in cardboard through which ruler can be inserted to measure water.
- (6) Observe to find where water lasts the longest.

7. An Experiment to show the retention of moisture and soil by a leafy or grassy covering.

Select a plot of ground located on a side hill or gentle slope. Use a sprinkling can and water to provide the rainfall. Let an equal amount of moisture fall with moderate force on both a bare plot of loose earth and on a like plot covered with a blanket of dead leaves or grasses.

a. Which plot of ground retains the most moisture?

b. Which plot lost a portion of its top-soil?

