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ABSTRACT

Each of the six instructional units deals with one aspect of conservation: forests, water, rangeland, minerals (petroleum), and soil. The area of the elementary school curriculum with which each correlates is indicated. Lists of general and specific objectives are followed by suggested teaching procedures, including ideas for introducing the topic, questions to ask, demonstrations to perform, and evaluation methods. Where appropriate, reference to books, pamphlets, charts, films, and filmstrips for teacher reference or class use are provided. Specific examples given are concerned with Texas situations. (AL)

An Instructional Unit

How Nature Distributes Seeds On The Range

Primary Grades

Correlate with Science

How Nature Distributes Seeds

I. Area of Conservation involved: Range Conservation

II. Topic: How Nature Distributes Seeds

III. Objectives

A. General Objectives

1. To develop an understanding that conservation is the wise use of our natural resources

2. To develop an understanding of man's dependence upon natural resources

3. To develop an understanding that all living things are interrelated and interdependent

4. To develop an understanding that the effectiveness of our conservation program depends on the attitude of our citizens

B. Specific Objectives

1. To develop a knowledge of range improvement methods

2. To develop a knowledge of what is meant by range conditions

3. To develop a knowledge of nature's way of distributing seeds

4. To develop an understanding of the relationship between conservation of soil, water, and range

5. To develop an understanding of the economic value of ranges

IV. Introduction

A. Motivation

1. Bulletin board and other displays

2. Arrange information center

B. Questions designed to determine what students already know about range vegetation

1. Have you ever seen a pasture or woodland in the spring?

2. What made it look so pretty and green?

3. Do you suppose someone planted those wildflowers, grasses, and trees so that we could enjoy them?

4. What do plants need to grow and be healthy?

5. How do new plants get started in an area?

C. Thought-provoking questions

1. What do you think our community and surrounding communities would look like if the only plants we had were those planted and cared for by people?

2. Have you seen large areas of bare ground where no plants were growing? What was happening to the soil?

3. Where can you find seeds?

4. What plants were here when Columbus discovered America?

D. Films, Filmstrips, Slides, etc

1. "Wonders of Plant Growth", Churchill-Wexler Film Production - Film

2. "From Seeds to Plants", Gateway Production - Film

3. "Seeds Grow Into Plants", Coronet Instructional Films - Film

4. "Finding Out How Plants Grow", Society for Visual Education - Filmstrip

5. "Let's learn About Seeds", McGraw-Hill Book Co. - Filmstrip

6. "How Seeds are Scattered", Young America Films - Film

7. "Seeds Travel", Jam Handy Organization - Filmstrip

E. Demonstrations and Laboratory Experiences

1. Show that seeds need water. Use two sponges. Place one in a dish which has no water. Sprinkle grass seed or birdseed on each sponge. Keep one sponge watered and the other dry. Watch what happens. Which one becomes a little seed garden?

2. Show that seeds need room to grow and be healthy. Plant a dozen lima beans in a small flower pot. In another pot the same size, plant only 3 or 4. Watch to see what happens when they come up and begin to grow. In the pot where so many seeds were planted, is there room for the plants to be healthy and grow well? What would happen if all the seeds a plant produces fell at the spot where the plant is growing?

3. To show how seeds are carried by water. Pour water into a trough or ditch in which seeds have been placed. What happens to the seed?

4. To show that seeds falling in unfavorable places will not survive. Place some seeds on a stone or brick which is kept moist, others on a dry stone, and others in a tumbler of water. Note that these seeds do not develop. Plant some in dry sand or clay. To check on this experiment, drop some seed in a long box of dry soil and water one end only to show that only those seeds falling in favorable places will develop

5. Use a magnifying glass to see the little hooks and spines on seeds (beggar's lice, etc.) which cling to animals and clothing

6. Get an old bird's nest and water it for several days. Note the plants that sprout

V. Body of the Unit

A. Procedure

1. Place colorful pictures of wildflowers and animals on the bulletin board and/or develop information center. Have as many books about plants, seeds, and animals common to the community as possible on display

2. Ask the questions designed to find out what the students know about range vegetation

3. Present the thought-provoking questions

4. Originate activity program

5. Class discussion

6. Use audio-visual materials

7. Presentation of pupil demonstrations and laboratory experiences

8. Make use of excursion method

a. Take a walk over the school grounds, a park, or a field. See how weeds and grasses have value in many places. Look to see where they are actually helping to hold the soil. Ask the children to consider what would happen if they were removed. Discuss the advisability of making a plan to care for a spot before removing the weeds or grasses

b. Take an excursion around your neighborhood. Find seeds that travel in different ways. Collect enough to make a display for the classroom

9. Evaluative effectiveness of unit

B. Content

1. Most plants have their seeds planted by some natural means and grow without being cared for by people

2. Many seeds cannot grow well in one place

3. Seeds are moved about in many ways

4. They may grow far away from the parent plant

5. Soil, water, sunshine, and warmth are needed by plants for growing

6. How seeds are scattered

   a. Seeds that sail in the wind because they have thin wings

      (1) Box Elder
      (2) Elm
      (3) Maple
      (4) Pine
      (5) Wafer Ash
      (6) White Ash
      (7) Linden (basswood)

   b. Seeds that sail in the wind because they have parachutes or plumes

      (1) Aster
      (2) Cattail
      (3) Clematis
      (4) Cottonwood
      (5) Dandelion
      (6) Goldenrod
      (7) Milkweed
      (8) Sycamore
      (9) Thistle

   c. Tumbleweed is rolled by the wind

   d. Seeds that have barbs and are carried by animals

      (1) Bur marigold (beggar's lice or sticktight)
      (2) Cocklebur
      (3) Devil's Claw
      (4) Grassbur
      (5) Sandbur
      (6) Spanish Needle

   e. Seeds that travel on the water

      (1) Coconuts
      (2) Seeds dropped by plants growing near the water

   f. Seeds eaten by animals or hidden by animals for future use

      (1) Acorns
      (2) Berries
      (3) Cherries

(4) Nuts
(5) Small Fruits

g. Seeds that are scattered by explosion

(1) Garse
(2) Jewelweed
(3) Touch-Me-Not
(4) Violet
(5) Witch Hazel

7. Animals which help scatter seeds so that new plants are able to grow depend upon these plants for their food

8. Plants help protect the soil from erosion

9. Plants provide beauty for us to enjoy

10. Plants provide homes and protection for animals

11. Most plants return nutrition to the soil in their life cycle

12. Some plants are considered pests because they are not edible by animals, do not restore nutrition to the soil, or crowd out more desirable plants

13. It is not always easy for plants to live and grow. They have many enemies which kill them or keep them from growing

a. Harmful Insects

b. Drought

c. Floods

d. Disease

e. Others

14. If we are careless, we can be enemies of plants, too

a. Picking too many wildflowers so that not enough seeds are left to make new plants

b. Disobeying game laws

c. Carelessness with camp fires

d. Overgrazing

e. Others

15. Let us decide that as we grow up we will help keep our country green

16. Let us learn and practice the Conservation Pledge

17. Significance of range conservation

    a. Ranges can be conserved

    b. We depend upon ranges for food for our wildlife

    c. Range conservation is an individual responsibility

    d. Range conservation is the obligation of one generation to the next

18. Study of local range conservation practices

    a. Local needs

    b. Effectiveness of local practices

    c. Needed Improvements

C. Activities

1. Field trips

2. Laboratory experiences and demonstrations

3. Pupil reports

4. Preparation of exhibits

D. Continuity through the grades

This unit is related to the study of life science. Life science is taught in the elementary grade. It is also taught in junior high school. Other units in range and wildlife conservation are proposed for the junior high school as well as for the senior high school

VI. Evaluative procedure

A. Paper and pencil test

Questions should be constructed so as to determine whether the general and specific objectives have been reached

B. Class discussion in which children are motivated to answer oral questions

C. Composition exercise with these suggested topics:

1. "Why Wild Plants are Important"

2. "How Nature Scatters Seeds"

3. "How Animals are Important to Plants"

4. "How Plants are Important to Animals"

5. "How to Keep Our Country Green"

6. "My Job in Conservation"

7. "Why Conservation is Important to Everyone"

D. Physical check to see if available resource materials were adequately used

1. Do you have materials that were not used?

2. What additional materials were needed?

V. Bibliography

A. Printed Materials

1. Baker, Arthur O., Grace C. Maddux, and Helen B. Warrin, In Your Neighborhood, Rand McNally and Company, 1955. (Book)

2. Blough, Glen O., and Marjorie Campbell, Making and Using Classroom Science Materials in the Elementary School, The Dryden Press, Inc., 1955. (Book)

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4. Buck, Margaret Waring, In Woods and Field, Abingdon Press, 1950. (Book)

5. Comstock, Anna Botsford, Handbook of Nature Study, Comstock Publishing Associates, 1939. (Book)

6. Craig, Gerald S., Science for the Elementary-School Teacher, Ginn and Company, 1958. (Book)

7. Craig, Gerald S., and Etheleen Daniel, Science Around You, Ginn and Company, 1958. (Book)

8. Dickenson, Alice, The First Book of Plants, Franklin Watts, Inc., 1944. (Book)

9. Disney, Walt, Nature's Half Acre, Golden Press, 1958. (Book)

10. Doane, Pelagie, A Book of Nature, Oxford University Press, 1952. (Book)

11. Dowling, Thomas I., Kenneth Freeman, Nan Lacy, and James S. Tippett, The New Seeing Why, The John C. Winston Company, 1957. (Book)

12. Foster, Willene K., and Pearl Queree, Seeds Are Wonderful Melmont Publishers, Inc., 1960. (Book)

13. Frasier, George Willard. Helen Dolman MacCracken, and Donald Gilmore Decker, Seeing New Things, The L. W. Singer Company, 1959. (Book)

14. Garden Club of America, "The World Around You", The Conservation Committee, 598 Madison Avenue, New York 22, New York. (Educational Packet)

15. Gates, Richard, True Book of Conservation, Childrens Press, 1959. (Book)

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18. Kane, Henry B., The Tale of a Meadow, Alfred A. Knopf, Inc., 1959. (Book)

19. Minor, O. Irene S., The True Book of Plants We Krow, Children's Press, 1953. (Book)

20. National Geographis Society, The Book of Wild Flowers, 1933. (Book)

21. Palmer, Ephraim L., Field Book of Natural History, McGraw-Hill Book Company, Inc., 1949. (Book)

22. Parker, Bertha M., Saving Our Wildlife, Row, Peterson, and Company, 1944. (Book)

23. Partridge, James, Natural Science Through the Seasons, The Macmillan Company, 1955. (Book)

24. Paull, Grace, Come to the Country, Abelard-Schuman, Limited, 1956. (Book)

25. Podendorf, Illa, True Book of Weeds and Wild Flowers, Children's Press, 1955. (Book)

26. Schneider, Herman and Nina, Science for Here and Now, D. C. Heath and Company, 1961. (Book)

27. Selsam, Millicent, Play with Plants, William Morrow and Company, Inc., 1949. (Book)

28. Selsam, Millicent, Play With Seeds, William R. Morrow and Company, Inc., 1957. (Book)

29. Shuttlesworth, Dorothy F., Exploring Nature with Your Child, Garden City Books, 1952. (Book)

30. Smith, F. C., The First Book of Conservation, Franklin Watts, Inc., 1944. (Book)

31. Spenser, Edwin Rollin, Just Weeds, Scribner's and Sons, 1957. (Book)

32. Thorn, Samuel A., and Irene Harbeck, Let's Look Around, Benefic Press, 1957. (Book)

33. Watson, Jane Werner, Wonders of Nature, Simon and Schuster, Inc., 1958. (Book)

34. Webber, Irma E., Travelers All, William R. Scott, Inc., 1944. (Book)

35. Zim, Herbert S., Plants, Harcourt, Brace and Co., Inc., 1947. (Book)

B.

1. Churchill-Wexler Film Productions, "Wonder of Plant Life" (Film 11 min. Color)

2. Coronet Instructional Films, "Seeds Grow Into Plants" (Film 11 min. Color)

3. Gateway Productions, "From Seeds to Plants" (Film 10 min. Color)

4. Jam Handy Organization, "Seeds Travel" (Filmstrip)

5. McGraw-Hill Book Company, "How Plants Live and Grow"

6. McGraw-Hill Book Company, "Let's Learn About Seeds"

7. Society for Visual Education, "Conservation for Beginners" (6 Filmstrips)

8. Society for Visual Education, "Finding Out How Plants Grow" (Filmstrip)

9. United World Films, "How Seeds Germinate" (Film 6 min. b/w)

10. Young America Films, "How Seeds Are Scattered" (Film 11 min. b/w)

CONSERVATION PLEDGE

I give my pledge as an American to save and faithfully to defend from waste the natural resources of my country--its soil and minerals, its forests, waters and wildlife.

An Instructional Unit

Wildlife and Conservation

Primary Level

Correlate with Social Studies and Science

Wildlife and Conservation

I. Area: Wildlife and Conservation

II. Topic: Wildlife Is Valuable To Man

III. Objectives:

A. General Objectives

1. To develop an understanding of the meaning of the term "natural resources"

2. To develop an understanding that conservation means the wise use of our resources

3. To develop an understanding that the effectiveness of our conservation program depends on the attitude of our citizens

4. To develop an understanding that some natural resources are renewable and some are not

B. Specific Objectives

1. To develop an understanding that all wildlife must have ample food, cover, protection from enemies, and a place to raise its young

2. To develop an appreciation for the aesthetic, sport, and recreational values of wildlife

3. To develop an understanding of what is meant by the term wildlife

4. To develop an understanding of the economic importance of wildlife

5. To develop an understanding of the simple facts about the most important species and their daily needs

6. To develop an understanding of the factors which help maintain a proper balance of wildlife

IV. Introduction to the topic

A. Questions relative to what children already know about the topic

1. What is meant by the term wildlife?

2. Name some kinds of wildlife found in Texas

3. Name some kinds of wildlife found in your county

4. How is wildlife protected?

5. What kind of wildlife do we have near our community?

B. Thought provoking questions

1. Who should enjoy wildlife and want to protect it?

2. How do men and animals depend on each other?

3. Can you name some animals that are harmful and some that are helpful?

4. Where do the wild mammals and birds live?

C. Charts

1. Let children make a chart or freehand posters showing various types of wildlife

2. Make posters depicting animal homes

3. Make a list of some enemies of wildlife

V. Body of the Unit

A. Procedure

1. Bulletin board displays

a. Different pictures of animals

b. How man is using wildlife

2. Show films--introduce them and discuss them afterwards

3. Present and discuss specific problems related to wildlife

4. Activities

5. Evaluation

B. Content

1. Define wildlife: Wildlife might be defined broadly as consisting of all forms of living things other than man and his domesticated animals

2. The values of wildlife

a. Provides recreation

b. Used for food

c. Adds to the beauty of nature

d. Brings business to communities

3. Plants and animals help each other

a. Animals eat plants

b. Animals live where they can find food

c. Animals live where they can find protection

d. Animals help scatter plant seeds

4. Enemies of wildlife

a. Foxes, owls, and snakes eat rabbits

b. Dogs and man hunt rabbits and foxes

c. Birds are killed by cats and man

5. How wildlife is hindered by man

a. Man hunts animals for food and clothes

b. Homes of the wildlife may be destroyed when forests are cut

c. Enemies of the wildlife, such as dogs and cats, are sometimes aided by man

d. Man sometimes kills rare animals

6. How man helps wildlife

a. By protecting forests

b. By protecting water resources

c. By obeying laws protecting wildlife

(1) On game refuges

(2) Hunting restrictions

7. Major forms of wildlife in Texas

a. Game birds

b. Game mammals

c. Food and game fishes

8. Common examples of wildlife in Texas

a. Cardinal

(1) A woods bird - uses overgrown fence rows, brush patches, low thick shrubs, and small trees for its home

(2) The cardinal eats hackberries, mistletoe, wild haws, and many other fruit and berries

(3) The cardinals are famous singers

b. Wild turkey

(1) Ground dwelling bird

(2) Color - generally black with a coppery bronze iridescence on the neck and breast, and the head varies from red to purplish blue

(3) Food - seed bearing plants of a wide range such as berries and fruits. grasshopers are a favorite food

(4) Uses - this bird furnishes sport, recreation, and food to man. wild turkeys help control grasshoppers and this results in the protection of crops

c. Jackrabbit

(1) Lives in the open prairies

(2) It depends for food on grass and other plants, such as mesquite, hackberry, prickly pear, and a wide variety of forbs and grains

(3) Uses - it provides a food supply for hungry predatory birds and mammals which would otherwise attack and destroy the farmers' poultry and other domestic animals. it furnishes sport for dog owners

d. White-Tailed deer

(1) Lives in deep woods, swamps of river bottoms, live oak thickets, brushy canyons, or on Spanish oak-covered hills

(2) It feeds on acorns, pecans, western hackberry, and various kinds of grasses and seasonal forbs

(3) Uses: its most important use is furnishing sport, recreation and food for sportsmen

e. Raccoon

(1) Lives near wooded areas around ponds and along streams in almost every county in Texas

(2) Food - its favorite foods are crayfish, fish, grasshoppers, fruits, berries, and sweet corn

(3) Uses: the raccoon is one of the six important fur animals in Texas. raccoon skins are used to make a variety of fur garments. hunting raccoons at night with dogs is a favorite sport in many parts of the State

f. Mockingbird

(1) It lives in the rural areas of the farmsteads and the wilds of the ranch country. it is also seen about city streets and dooryards

(2) For food, it eats grasshoppers, caterpillars, berries, and kinds of wild fruit

(3) Uses: its song has marked it as the south's most famous singer. it has been adopted as the State Bird of Texas

C. Activities

1. Excursion - observe forms of wildlife and where they live

2. Introduce film (Common Animals of the Woods), show it, and then discuss it

3. Use posters

a. Animals and their homes

b. How animals are helpful

c. Animals in your community

4. List new oral vocabulary words:

Natural resource

Conservation

Nature

Environment

5. Draw freehand pictures of kinds of wildlife

6. Make riddles about wildlife animals:

I am about the size of a small dog

I am dark gray and brown body color

I like to wash my food before I eat it

What am I

7. Make a bird house

D. Continuity through the grades

This unit is related to social studies. Its primary purpose is to help children understand that we need to care for and protect our wildlife. It can be correlated with science, reading, and other subjects through the elementary grades

VI. Evaluation

A. Review questions in the introduction

B. Physical check to see if available resources were adequately used

a. Do you have materials that were not used?

b. What additional materials do you need?

VII. Bibliography

A. Books

Beauchamp, Wilbur. How Do We Know. Scotts, Foresman and Company. 1956

B. Bulletins

Making Land Produce Useful Wildlife. Farmers' Bulletin No. 2035 Washington, D. C.: U.S. Department of Agriculture

C. Pictures of Animals - Texas Parks and Wildlife Department, Austin

D. Filmstrips

Animals Help Us

Animal Homes

Textbook Film Dept.,
McGraw-Hill Book Co.,
330 West 42nd Street,
New York 36, New York

E. Films

Common Animals of the Woods - 1979

Life Along the Waterways - C 5216

Educational Motion Pictures
University of Texas
Visual Instruction Bureau
Austin, Texas

An Instructional Unit

Why We Need Water

Primary Level

Correlate With Science and Geography

Why We Need Water

I. Area of Conservation Involved: Water Conservation

II. Topic: Why We Need Water

III. Objectives

A. General objectives

1. To understand the meaning of the term "natural resource"

2. To understand that conservation is the wise use of our natural resources

3. To understand man's dependence upon natural resources

4. To understand that all living things need water

B. Specific objectives

1. To understand that all living things are dependent upon water for their very existence

2. To understand some of the uses of water

3. To understand what happens to rain after it falls to the earth

4. To develop a knowledge of our sources of water

5. To understand how rainfall and water effect our community

IV. Introduction

A. Introduction of terms

resource	rainfall	evaporate
moisture	well	pump
river	lake	stream
creek	dam	pond
brook	drain	irrigation
wet	sprout	dry
recreation	waste	soil
erosion	reservoir	transpiration
discharge	aquifer	infiltration
run-off	pollution	percolation

B. Motivation

1. Discuss vacation activities and experiences that will bring up the subject of water, e.g., a visit to a dam, lake, or river or activities such as swimming, boating, or fishing

2. Bulletin board dispaly

a. Different uses of water

3. Demonstrations

a. Place an equal amount of water in several open containers on a window ledge or table. Observe them for several days. What happens to the water? Cover one dish with a film of oil. Saturate another with salt

b. Place an equal amount of water in two fruit jars that are the same size. Put a lid on one jar. Leave the other open. Stand them side by side for several days and compare water level

c. Wet a piece of cloth and hang it out to dry. Discuss what happens to the water

C. Questions designed to determine what students already know about water

1. How do you use water?

2. Where does our water come from?

3. What is a well?

4. What is evaporation?

5. What is irrigation?

D. Thought-provoking questions

1. Where does water come from?

2. Where does water go when it rains?

3. Do all animals need water?

4. Do all plants need water?

5. How is rain useful?

6. How does water get into the water pipes?

7. What is a dam and what is it used for?

8. Why is some natural water unfit for use?

V. Body of Unit

A. Procedure

1. Bulletin board display

2. Ask questions to find out what children already know

3. Ask thought-provoking questions

4. Show films

5. Present content

6. Class discussion

7. Demonstrations

8. Make scrapbook

9. Review questions
   a. Questions designed to find out what children already know
   b. Thought-provoking questions

10. Evaluative procedures

B. Content

1. Water -- a resource
   a. Next to air water is our most important resource for survival. You can live longer without food than you can without water

2. Uses of water
   a. Homes
      (1) To drink, bathe, wash clothes, cook, for gardens and lawns
   b. Farmers and Ranchers
      (1) Water for animals
      (2) Water for grass
      (3) Irrigation for crops
   c. Industries
      (1) Water is industry's most important raw material
   d. Recreation
      (1) Swimming
      (2) Boating
      (3) Fishing
   e. Transportation by water
      (1) Important to many communities
   f. Generation of electrical energy

3. All living things must have water to live
   a. People
   b. Animals
   c. Plants

4. Where water goes when it falls to the earth?
   a. Goes into the ground
   b. Evaporates
   c. Runs into creeks, streams, and rivers
      (1) Small dams on creeks and streams
      (2) Larger dams on rivers
      (3) Some water goes into the ocean
   d. Transpires

5. Where do we get the water we use?
   a. Wells
   b. Rivers
   c. Lakes

6. Some ways water is wasted
   a. Leaky faucets and leaky pipes
   b. Wasting water at home through misuse
   c. Farmers waste water through misuse, e.g., poor design of stock tanks, and poor irrigation practices
   d. Through pollution

7. How rainfall effects our community
   a. Not enough rainfall
      (1) Rivers and lakes become low or dry up
      (2) Water level in wells drop
      (3) Grass on range becomes scarce. Livestock and wildlife may not have enough food or water
      (4) Farmers crops fail because of lack of water

C. Activities

1. Prove that seeds need water to sprout. Plant seeds in two containers, one with dry soil and the other in wet soil

2. Prove that plants need water to live. Place plants in two containers. Give one plenty of water and the other very little to start with and then quit giving it any. Let children observe

3. Collect pictures and make scrapbook showing as many uses of water as you can

4. Plan field trip to farm and some industry to show how they use water

5. Have some person who drills wells come talk to the children

6. Construct dam site on a sand table. The general view will be that of a canyon river with the dam built between papier mache mountains. The dam and all surrounding buildings will be made from tag board. Water will be represented by mirrors, the edges of which will be covered by sand and mache mountains. The mirror at the back of the dam will be raised to show water elevation
   The materials needed for this are the following:
   a. Sand
   b. Tagboard or cardboard
   c. Two oblong mirrors
   d. Materials for papier mache
      (1) Newspaper
      (2) Paper towels
      (3) Wheat paste and water

VI. Evaluative procedures

A. Oral response to questions

B. Has this unit been of value in stimulating general interest?

C. Has it stimulated natural curiosity about the importance of water, so that children will want to learn more in later grades?

D. Did the children better understand water as a natural resource at the conclusion of the study?

VII. Bibliography

Books

Bennett; Elements of Soil Conservation, McGraw Hill Book Co., New York, New York, 1955

Huberty and Flock; Natural Resources, McGraw Hill Book Co., New York, New York, 1959

Renner; Conservation of National Resources, John Wiley and Sons, New York, New York, 1942

Shirley; Conserving Natural Resources, McGraw Hill Book Co., New York, New York, 1959

Films

Adventures of Junior Raindrop, U.S.D.A., S.C.S., First National Bank Building, Temple

Water, 11 min., sound, b & w, U.S.D.A., S.C.S., First National Bank Building, Temple

Bulletins

U.S.D.I.; A Primer on Water, U.S. Dept. of Interior Geological Survey, U.S. Government Printing Office Washington

U.S.D.I.; A Primer on Ground Water, U.S. Department of Interior Geological Survey, U.S. Printing Office, Washington

U.S.D.A.; Water for Farm and City, December, 1960, PA-411, U.S. Government Printing Office, Washington

U.S.D.A.; Recreation in Small Watershed Projects, February, 1964, PA-610, U.S. Government Printing Office, Washington

U.S.D.A.; Agricultural Land Resources, Agriculture Information Bul. No. 263, Washington

T.E.A.; How Can We Meet Our Water Needs?, Austin

The publications below are available from the Texas Water Commission, Austin. At the present time there are insufficient copies to make a distribution to all schools. Copies will be furnished on request as long as they last

The 25th Biennial Report of the Texas Water Commission

The 26th Biennial Report of the Texas Water Commission

Circular No. 64-03, "Publications of the Texas Water Commission as of December 31, 1964"

Bulletin 6404, "Conservation Storage Reservoirs in Texas, Some Aspects and Chronology of Surface-Water Resources Development"

Bulletin 6403, "Fifty Years of Water Development in Texas"

Bulletin 6408, "Dams and Reservoirs in Texas - Historical and Descriptive Information"

Circular 63-03, "The Development of the Science of Hydrology"

A Plan for Meeting the 1980 Water Requirements of Texas"

AN INSTRUCTIONAL UNIT

THE IMPORTANCE OF SOIL

AND

HOW IT CAN BE LOST

Upper Primary or Lower Intermediate Level

Correlate with Science or Geography

I. Area of Conservation Involved: Soil Conservation

II. Topic: The Importance of Soil And How It Can Be Lost

III. Objectives

A. General objectives:

1. To understand the meaning of resource
2. To understand man's dependence upon resources
3. To understand that some natural resources are renewable and some are not
4. To understand that man's survival depends upon the conservation of our resources
5. To understand that conservation means the wise use of our resources
6. To understand that conservation may provide more resources for more people for a longer period of time

B. Specific objectives:

1. To understand that soil produces a large portion of the things essential to man's survival
2. To understand that soil is a major source of all wealth
3. To understand that soil and water produce most of man's livelihood
4. To understand that soil resources can be damaged or destroyed through unwise conservation practices
5. To understand that soil (may be) a renewable resource
6. To understand that man profits most when he understands and complies with natural laws

IV. Introduction

A. Motivation

1. Take a walk around the school campus observing the soil, and have a discussion on soil characteristics. (If possible show the children some type of erosion)
2. Discuss plant life
3. Bring soils of various types to school

B. Questions designed to determine what students already know about soil

1. Where do plants live?
2. Does soil ever wash or blow away?
3. What are some things we get from soil?
4. How many things in this room came from the soil?
5. Are there different kinds of soil?
6. What do plants need besides soil to grow?

C. Thought provoking questions

1. Why do some areas of the school ground have grass while others do not?
2. Why does the soil wash or blow away more in some places than in others?
3. How can we keep the soil from washing or blowing away?
4. Why is there nothing growing on the steep sides of a gully?
5. What are some things we get directly from the soil?
6. What are some things we get indirectly from the soil?

D. Films

1. The Golden Secret, S.C.S., 7 min., sound, color, First National Bank Building, Temple, Texas

V. Body of Unit

A. Procedure

1. Observe soils around the school
2. Discuss plants growing in the area
3. Ask questions to find out what children already know
4. Ask thought provoking questions
5. Show film
6. Present content
7. Carry on class discussion
8. Perform demonstrations
9. Present oral reports
10. Review questions
    a. Questions designed to find out what children already know
    b. Thought provoking questions
11. Evaluate procedures

B. Content

1. Extent and damage of erosion
    a. It is estimated that erosion has already ruined for probable cultivation one-fifth of the tillable land in this country
2. Need for conservation
    a. Our population increases while our good land decreases
    b. We must conserve what land we have left
3. Rainfall and erosion
    a. Extent of erosion is determined by:
        (1) How fast rain falls
        (2) How much rain falls

(3) The slope of the land
(4) The plant cover on the land
(5) The kind and condition of the soil

4. Effect of slope on erosion
   a. Steepness affects erosion
   b. Length and shape of slope affects erosion
   c. In general the greater the slope the greater the amount of erosion

5. Effect of plant cover on erosion
   a. A good cover of vegetation on the soil is the best protection against erosion
   b. The denser the vegetation the better

6. Terraces to control erosion
   a. A terrace is usually a low ridge of soil or a channel erected across sloping fields for the purpose of holding water
   b. Terraces slow the water down, thus allowing more time for water to soak deeply into the soil

7. Farming on the contour
   a. Rows or furrows are made with the contour of the land. This slows the water down and increases the water intake in the soil

8. Use of land according to its capabilities
   a. Not all land is suitable for cultivation
   b. Rangeland should not be overgrazed

9. Living in harmony with nature

C. Activities

1. Obtain two wooden boxes about one foot square and three or four inches deep. In one box place only soil. In the other box place soil that has grass growing on it. Fix both boxes so that when tilted, water running to the end will funnel out in one place. Tilt both boxes and sprinkle water in the boxes. Catch water running off in two fruit jars. Observe that water running off the plain soil is muddy while the water from the soil with grass on it is almost clear

2. Tilt the box with only soil at different angles. Sprinkle soil at the different angles showing the children that the steeper the slope the more the soil washes away

3. Make small ridges in the soil and sprinkle. Show children how the water is slowed down

4. Dig up a piece of sod six inches square and weigh it. then wash all the soil off the roots and weigh again. Observe how much soil was held by the roots

5. Study the root system of kinds of grass on or near the school yard by digging up clumps of the different grasses

6. Build a model farm or exhibit showing the effects of soil erosion, deforestation, over-grazing, and other poor farming methods

7. Invite a man from the Soil Conservation Service to come to talk to class

VI. Evaluative procedures

A. Oral response to questions

B. Has this unit been of value in stimulating general interest?

C. Has it stimulated natural curiosity about the importance of soil, so that children will want to learn more in later grades?

D. Do pupils realize:
1. How dependent we are upon soil?
2. Why soil should be taken care of?
3. How soil is lost?

E. Did the children better understand soil as a natural resource at the conclusion of the study?

VII. Bibliography

A. Books

1. Bennett; Elements of Soil Conservation, McGraw Hill Book Co., New York, New York, 1955
2. Donahue; Our Soils and Their Management, The Interstate Printers and Publishers Inc., Danville, Illinois, 1961
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4. Renner; Conservation of National Resources, John Wiley and Sons, New York, New York, 1942
5. Our Land is Our Life, State Supt., Columbus, South Carolina

B. Bulletins

1. U.S.D.A., Soil Conservation at Home, S.C.S., Agr. Inf. Bul. No. 244, Washington
2. U.S.D.A., Dust Storms, Leaflet No. 260, Washington
3. U.S.D.A., Know Your Soil, S.C.S., Agr. Inf. Bul. No. 267, Washington

4. U.S.D.A., How to Control a Gully, Farmers Bul. No. 2171, Washington
5. U.S.D.A., Conquest of the Land Through 7,000 Years, Agr. Inf. Bul. No. 99, Washington
6. U.S.D.A., Soil Erosion, Agr. Inf. Bul. No. 260, Washington
7. U.S.D.A., Agricultural Land Resources, Agr. Inf. Bul. No. 263, Washington

C. Films

1. The Golden Secret, U.S.D., S.C.S., 7 min., sound, color, First National Bank Building, Temple, Texas
2. Food and Soil, U.S.D.A., S.C.S., 10 min., sound, color, P. O. Box 417, Temple, Texas

An Instructional Unit

The Importance Of Trees

Intermediate Level

Correlate With Geography

The Importance Of Trees

I. Area of Conservation Involved: Forests

II. Topic: The Importance Of Trees

III. Objectives

A. General Objectives

1. To develop an understanding of man's dependence upon trees, one of our important natural resources

2. To develop an understanding that forest conservation means the wise use of our forest resources

3. To develop an understanding that good forest conservation practices may provide more natural resources for more people for a longer period of time

4. To develop an understanding that forest conservation practices exemplify man living in harmony with nature

5. To develop an understanding that the effectiveness of our forest conservation program depends on the attitude of our citizens

6. To develop an understanding that all living things are interrelated and interdependent

B. Specific Objectives

1. To develop an appreciation of the aesthetic value of trees and forests

2. To develop a knowledge of the many products we get from trees and the many other economic values of forests

3. To develop an appreciation of the need to protect forests

4. To develop an understanding of what constitutes wise and efficient use of our forests

5. To develop an understanding of the inter-relationships of forests to soil, water, wildlife, and people

6. To understand how a tree grows, matures, and reproduces

7. To understand the part the individual citizen plays in protecting the forests

IV. Introduction

A. Interesting bulletin boards and displays

B. Questions related to what children know about trees

1. What is our state tree?

2. What trees grow in our neighborhood?

3. What are the direct benefits of trees in terms of the products they give to man? What products from the tree can be found in the classroom?

4. In what ways do trees benefit man socially?

5. What are the three major parts of a tree?

6. What are some enemies of trees?

7. How are trees damaged?

C. Thought-provoking Questions

1. What would we do without wood or wood products in the home (as paper in cereal boxes; newspaper; chairs; tables; etc. etc.)

2. What would our world be like without trees?

3. Can man be considered an enemy of trees?

D. Charts

1. What We Get From Trees

2. How A Tree Grows

3. How Fire Damages Trees

E. Books, Brochures, Bulletins, Pamphlets, Films

Books

Edwards, Paul Grey and James W. Sherman. Nature Activity Readers Boston: Little, Brown and Co

Hylander, C. L. New York: Macmillan Co., 1942-43
Out of Doors in Autumn
Out of Doors in Spring
Out of Doors in Winter
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Parker, Bertha Morris. Basic Science Education Series. Evanston, Ill.: Row, Peterson and Co
Fire, 1941
Leaves, 1949
Trees, 1941

Brochures, Bulletins, Pamphlets, Films

Forests and Forest Industries, American Forest Products Industries, Inc., 1816 North Street, N. W., Washington, D. C., 1958-59

Bibliography of Forest Industry Education Materials, American Paper and Pulp Association, 122 East 42nd Street, New York

Audubon Nature Bulleting Series, National Audubon Society, New York

Cutting Woodlands; Forest Fires, the South's Great Enemy; How Paper Comes from Trees; Using Our Tree Crop Wisely; Where Does Our Timber Go?; Southern Pulpwood Conservation Association, 1224 Peachtree Street, N. E., Atlanta 5, Georgia

Forestry Principles for Elementary Schools (Bul. 43); Pupil Activities in Forestry and Related Conservation (Bul. 39); Trees and Poets See Them (Cir. 32); Texas Forest Service, College Station

Products of American Forests; Teaching Conservation in the Elementary Schools, United States Dept. of Agriculture, United States Forest Service, Washington

Forest Trees of Texas - How To Know Them (Bul. 20), Texas Forest Service, College Station (41¢)

Films

Days of a Tree; Little Smoky; The Forest Grows; The Forest Produces, Encyclopedia Britannica Films, Inc., 1125 Central Avenue, Wilmette, Illinois

F. Demonstration

1. Arrange for demonstration by a resource person from the Texas Forest Service

V. Body of the Unit

A. Procedure

1. Eye-catching bulletin board and display

2. Questions designed to find out what student knows about the subject

3. Thought-provoking questions

4. Presentation of Content

a. Class discussion led by teacher
b. Demonstration led by resource person

5. Activity Program

6. Evaluative Procedure

B. Content

1. How Trees Grow

2. Kinds of Trees

a. Trees in the neighborhood
b. State tree
c. Other important trees in Texas

3. Value of Trees

a. Food
b. Wildlife habitat
c. Lumber and wood fiber products
d. Wind and water erosion control
e. Stream pollution prevention
g. Recreation
h. Aesthetic values

4. Enemies of Trees

a. Fire
b. Insects
c. Disease
d. Other

5. How We Can Protect Our Trees

1. Make diorama of trees in the different seasons

2. Make leaf Pictures

3. Write stories

   a. "Kinds of Trees"
   b. How Trees Help Us
   c. Enemies of Trees

4. Make short field trip

5. Plant tree on schoolyard for Arbor Day

VI. Evaluative Procedure

A. Oral questions and discussion to determine whether or not the objectives have been reached

B. Written stories

VII. Bibliography

Books

Weaver, Howard E. and Anderson, D. A. Manual of Southern Forestry, Danville, Ill. The Interstate Printers and Publishers, 1954. 368 pp

Elliott, Charles N. and M. D. Mobley. Southern Forestry Atlanta: Turner E. Smith and Co., 1938. 494 pp

Sellars, David K., William M. Longnecker, and Mamie Eppler Nature's Wonderland. Dallas: The Southern Publishing Co., 1938. P. 97-101

Bulletins and Pamphlets

American Forest Products Industries, Inc., 1816 North Street, N. W., Washington
It's a Tree Country
The Forest Adventure of Mark Edwards

California Association for Outdoor Education, Sacramento, Calif.
Teaching Conservation and Natural Science in the Outdoors

Texas Forest Service, College Station
Forest Resources of East Texas
Pecan and Other Trees of Texas
Texas Forestry Laws

United States Dept. of Agriculture, Forest Service, Washington
Edible Fruits of Forest Trees
Enemies of the Forests
Making Paper from Trees
Why Leaves Change Their Color
Wildlife Habitat
Wood-The Material of a Thousand Uses

AN INSTRUCTIONAL UNIT

TEXAS MINERALS
(Petroleum)

Intermediate Level

Correlate with Social Studies or Science

I. Area of Conservation involved: Minerals (Specifically Petroleum)

II. Topic: Man's Dependence Upon Mineral Resources

III. Objectives:

A. General

1. To develop an understanding of the meaning of a mineral resource.
2. To create an awareness that some resources are renewable and some are non-renewable.
3. To encourage curiosity as a beginning to scientific research.
4. To develop the understanding that mineral conservation involves wise use and sound management by man.

B. Specific

1. To enable the student to gain a more thorough knowledge of minerals, their importance and location, in Texas.
2. To develop the understanding that the use of mineral resources has changed and is changing.
3. To stress the importance of the individual's responsibility in the conservation of petroleum.
4. To increase the student's knowledge of the importance and usefulness of oil in everyday life.
5. To stress that conservation of oil and gas as a non-renewable resource depends on sound recovery practices.
6. To create an awareness of the many many minerals consumed daily by each individual.

IV. Introduction of Unit:

A. Motivation

1. Pulletin board displays consisting of charts or maps to show location of resource in state and/or nation or world.
2. Bulletin board displays consisting of pictures or drawings to describe the exploration, production, transportation and manufacturing necessary before oil can be used by man.
3. Show films such as:
   Conserving a Heritage
   Man on the Land
   Non-Stop to Everywhere
4. Demonstration or lecture by resource person from oil industry.
5. Class discussion.
6. Some questions to stimulate student thinking:
   a. What are the most important sources of energy in Texas?
   b. How is the school building heated?
   c. What are minerals? What is petroleum?
   d. Are minerals renewable or non-renewable? Why?
   e. List the things around you that are made entirely or in part from minerals. Petroleum.
   f. Of what is oil made?
   g. How many times today have you used a product made from petroleum?

V. Body of the Unit

A. Procedure

1. Developing the material

a. Set aside a corner for a classroom display of a mineral and rock collection. Include samples of petroleum.

b. Display charts on bulletin board.

c. Have an information center and display pictures, magazines, pamphlets and specimens of some common minerals such as oil, salt, sulphur.

d. Build a model oil derrick.

e. Let students submit written questions that they would like to have answered about the resource.

f. Present questions listed above.

g. Use audio-visual aids.

h. Have a resource speaker.

B. Content

1. Vocabulary (terms peculiar to the industry)

roustabout	petro-chemicals
roughneck	seismograph
dog house	gusher
pumper	pumping station
driller	derrickman
dry hole	cat-cracker
duster	kelly
wildcat	pig
sitting on a well	mud
christmas tree	casing
pumping jack	tank farm

2. Occupations closely related to the petroleum industry

geologists	seismogists
engineers	stenographers
geophysists	chemists
salesmen	

3. Products, by areas, derived from this resource

natural gas	lubricating oils and greases
napthas	coke
white oils	refined oils (such as jet fuel, gasoline, kerosine)
petrolatum	
residual fuel	asphalt
carbon black	waxes

C. Activities

1. By thorough examination of maps notice the relation between mineral and petroleum deposits to population.

2. Map the major oil production areas in Texas.

3. Invite one or more resource people to speak to the class.

4. Make a list of equipment needed to drill an oil well.

5. Examples of student reports to be written or presented orally to the class:

"How Oil is Found"
"History of Early Oil Booms in Texas"
"Spindletop"
"How Oil Travels Through Rock"
"Building a Pipeline"
"Conservation of Petroleum"

D. Continuity through the grades

This unit is related to the study of petroleum (minerals section) which is taught on the elementary, junior and senior high school levels. At each level the study becomes more specialized.

VI. Evaluative Procedures

A. Class discussion in which students are motivated to answer oral questions.

B. Paper and pencil test. (The questions should be constructed so as to determine whether the general and specific objectives have been reached.)

C. Physical check to see if available resource materials were adequately used.

1. Does the teacher have materials that were not used?

2. What materials are needed as replacements or additionals?

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Adventures in Petroleum Science. Dallas: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center, n.d.

Burton, Mary Jane. The Story of Oil. New York: American Petroleum Institute, 1271 Avenue of the Americas, n.d.

Clark, James A., and Michel T. Halbouty. Spindletop. New York: Random House, 1952.

Conservation in the Texas Petroleum Industry. Dallas, Texas: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center, n.d.

History of Texas Oil. Dallas: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center, n.d.

Schackne, Stewart, and N. D'Arcy Drake. Oil for the World. Second revised edition. New York: Harper and Brothers, 1960.

Suggestions for Teaching Conservation. Austin, Texas: Texas Education Agency, 1955.

Wonders from Oil. New York: Committee on Public Affairs of the American Petroleum Institute, n.d.

Maps and Charts

Science in the Search for Oil. Dallas: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center.

World Map. Dallas: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center, n.d.

Transportation Since 1775. Dallas: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center.

Texas Oil and Gas Fields Map. Dallas: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center.

Texas Oil Pictures. Dallas: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center, n.d.

Films

Barrel Number One, 16mm, sound, black and white, 29 minutes.

Conserving a Heritage, 16mm, color, 16½ minutes.

Man on the Land, 16mm, sound, color, 16 minutes.

The above films can be obtained from: Oil Information Committee of Texas Mid-Continent Oil and Gas Association, 2920 Southland Center, Dallas, Texas. (Free on Loan)

The Birth of an Oilfield, 16mm, color, 30 minutes.

The Fossil Story, 16mm, sound, color, 19 minutes.

The above films can be obtained from: The Shell Oil Company, 450 North Meridian Street, Indianapolis, Indiana. (Free on Loan)