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ABSTRACT

Suggesting that students in the intermediate grades can explore the world around them and practice valuable skills in spelling, reading, writing, communication, and language, this book presents cross-curricular units designed to integrate language-arts activities into the study of ecology and the environment. The units in the book reach diverse needs by working through emotional memory, deductive reasoning, and multiple intelligences. The book features ready-to-use theme-oriented units that integrate the language arts across the science and social science curricula. After an introduction, units in the book are: "Inside Mother Earth"; "Push and Stretch, My Earthworm Pets"; "Where Did the Rain Go?"; and "Runaway Land" (dealing with erosion problems). Appendixes describe how to create a learning center in the classroom, how to create bulletin boards and file folders, and how to create a book. (Contains a 49-item glossary and 10 teacher resources.) (RS)

ED 441 242

LANGUAGE ARTS AROUND THE WORLD

CROSS-CURRICULAR ACTIVITIES FOR GRADES 4–6

ECOLOGY AND THE ENVIRONMENT

- MY EARTHWORM PETS
- INSIDE MOTHER EARTH
- RUNAWAY LAND
- WHERE DOES THE RAIN GO?

ELIZABETH A. MCALLISTER
JCAN M. HILDEBRAND
JOANN H. ERICSON

ERIC
CLEARINGHOUSE ON READING, ENGLISH, AND COMMUNICATION

THE FAMILY LEARNING ASSOCIATION

CS 217 101

Language Arts Around the World

ECOLOGY AND THE ENVIRONMENT

by
Elizabeth McAllister
Joan M. Hildebrand,
Joann H. Ericson

ERIC Clearinghouse on Reading, English, and Communication

and

The Family Learning Association

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CONTENTS

Introduction

Cross-Curricular Theme Units

This book presents instructional units on themes typically taught in the elementary grades. Cross-curricular, multi-faceted learning is at the heart of these units.

Though the topics focus on science, math, social studies or literature, we use language arts skills consistently in each unit. Listening, speaking, reading, and writing activities show children that no matter what content they learn, they will increase their effectiveness through the communication skills that lead them through these units of study.

Encourage your students to discover through play and observation, then to share ideas and surprises with you or with other students. We remind you to integrate all of the language arts while students watch their guinea pig or follow the progress of a box turtle.

Writing should be a significant part of every unit. Take dictation from non-writing students, to show them how to act like a writer. Have students regularly write their own books, make picture books, and write the text that will help them share their knowledge.

Each unit in this series uses as many frames of mind or intelligences as possible. Howard Gardner (Multiple Intelligences, 1993) lists seven frames of mind and the activities that work with them:

- Literary: stories, poems, rhymes;
- Logical-mathematical: numbers, counting, graphing, logic;
- Bodily-kinesthetic: physical activity, games, acting-out;
- Visual/spatial: art, theatre, reading, writing, producing;
- Musical: songs, rhythm, listening, instruments;
- Interpersonal sociological connection to others: speaking, listening, sharing;
- Intrapersonal psychological connection with one's self: reflection, metacognition, feelings, and internal discourse.

Give your students a chance to express themselves across this range of intelligences by following the guidelines in each unit.

How to Use These Theme Units

This book offers you:

- Ready-to-use theme-oriented units that integrate the language arts across the science and social science curricula;
- Ways to connect the units meaningfully with a required curriculum;

- Unit goals that focus your day on enjoyable student-centered experiences;
- stimulating "grabbers" from children's literature, which will elicit child involvement;
- sample questions to pose about the readings;
- a wealth of resources that can lead you wherever your particular situation demands.

This book also gives you many choices for expanding each unit theme into a cross-curricular learning adventure. So you can readily:

- use the Appendices to create multimedia learning centers featuring a computer, audiotapes, library books, and an area for writing and artwork;
- find ways to build on children's prior knowledge, thus reinforcing their confidence for further explorations;
- develop more learning strategies from the springboard of these units.

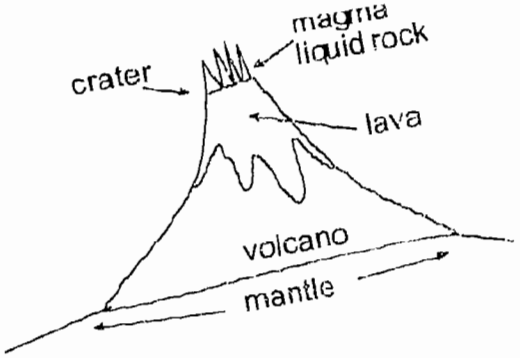
The units in each volume work well together for an extended exploration of the volume topic. Or you may use them separately and independently. In either case, you have the opportunity to expand your students' vocabulary, knowledge, and skill. Speaking of vocabulary, in Appendix C you will find a Glossary that defines our use of terms. Several other Appendices give you more detail on the activities cited in these lessons. After selecting an instructional unit and pulling together the necessary materials, we suggest the following procedure:

1. Read or paraphrase Part IV, the Introductory Narrative.
2. Ask your students to share their knowledge on the topic.
3. Read the book recommended in Part V. 2., to enrich the students' understanding of the theme.
4. From the options listed, select the activities that will best involve your students. You may want to ask the children to select the activities that suit them.
5. Toward the end of your study, you may choose any or all of the activity pages to reinforce the knowledge or skills that you are highlighting.

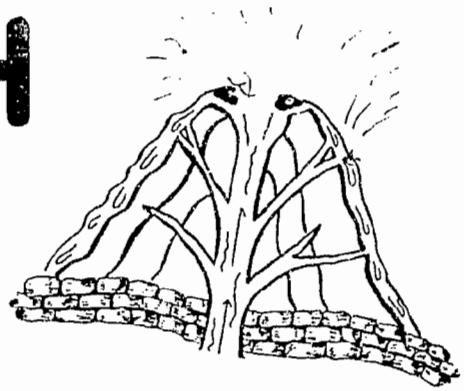
You may reproduce and distribute the Activity pages as you need them. You may also want to distribute the Introductory Narrative, so your students can read along or read it independently.

We suggest that you build learning centers with artifacts, books, games, activity sheets, illustrations, and other materials that expand and enhance the theme of each unit. You can find ideas for learning centers in the Appendix.

Creative minds will find numerous ways to turn these units into delightful and profitable learning experiences.



INSIDE MOTHER EARTH



I. Introduction

The violent eruptions of volcanoes both disturb and intrigue us. In the last few years, many devastating volcanoes have occurred in the United States and around the world. On television, children witness the destruction and life-changing results of these eruptions. They are curious and interested in learning about such happenings.

II. Targeted Ideas

- There are many types of volcanoes.
- All regions have volcanoes.
- Volcanoes form igneous rock.
- Erupting volcanoes have destroyed cities.
- Scientists can predict and chart volcanic activity.
- Humans cannot control active volcanoes.

III. Making Connections

Classes may simultaneously study other units of this volume that relate to land changes. Events less violent than volcanoes yet equally significant can bring natural geological shifts. For instance, Unit 4,"Runaway Land," describes the effects of erosion.

Unit 2 in Volume I. of this series, "Our Cities and Towns," shows how the settlement of towns and cities has depended on topography.

IV. The Unit Theme: An Introductory Narrative To Read To Students

WHAT IS THE EARTH?

The earth we live on is not like a solid ball. The earth's crust, or surface, feels solid beneath our feet because we can walk on it without falling through. Most of the crust has formed from several layers of different kinds of rock and soil. But the earth is really several layers deep below the rock crust.

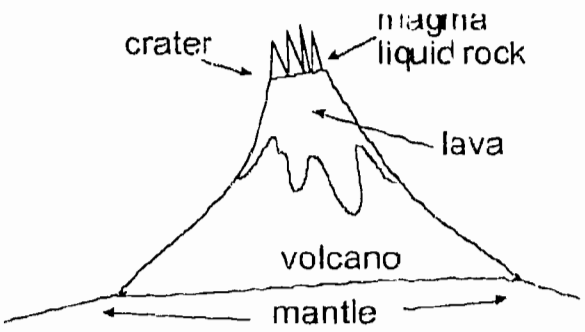
The top soil surface is the earth's crust. Just beneath the crust is another layer called the mantle. The mantle also consists of rock, but it is not hard. The mantle's rock is soft and thick like taffy, and it is very hot.

We call the very center of the earth the core. The outer core is red-hot, liquid metal. We call this melted rock the magma. The inner core is solid metal. The deeper we dig into the earth, the higher the temperature rises. Sometimes the temperature gets too hot, forcing the magma to rise to the earth's surface and escape. The escaping magma becomes an erupting volcano.

Imagine that the earth is an apple. Cut it open and start from the center. The center is the core. Next to the core, the pulp represents the mantle. The skin would represent the crust of the earth.

All About Volcanoes

A volcano is an opening in the earth's crust. When the eruptions begin, they come through the volcano's mouth. The hot melted rock is lava. It gushes up from the earth and runs down the sides of the mountain. After the lava cools, it becomes



new rock. This is how mountains get so tall. After a while, soil forms on the rock and grass, so trees and plants can grow.

Volcanoes begin with a crack, a weak spot in the earth's surface. The crack runs very deeply into the earth, about 20 to 40 miles deep. The crack reaches the melted

IV. The Unit Theme: An Introductory Narrative To Read To Students (cont.)

rock called magma. When the hot molten rock pushes through the crack to the earth's surface, it erupts and becomes lava. Some volcanoes throw out clouds of gas, steam, cinders, and volcanic ash into the air. The ash can travel many miles into the atmosphere, landing miles away from the volcanic crater.

The volcano cone is its mouth. We also call it a crater. It looks like the opening in a cup, with a smooth lip edge around the rim. The lava runs over the lip of the crater and down the sides of the mountain. Lava destroys everything in its path.

In Washington state a huge volcano erupted in May, 1980: Mt. St. Helens. Scientists say this eruption destroyed over 100 square miles of trees, along with wildlife living on the mountain. The land needs a very long time to restore itself and become usable by people.

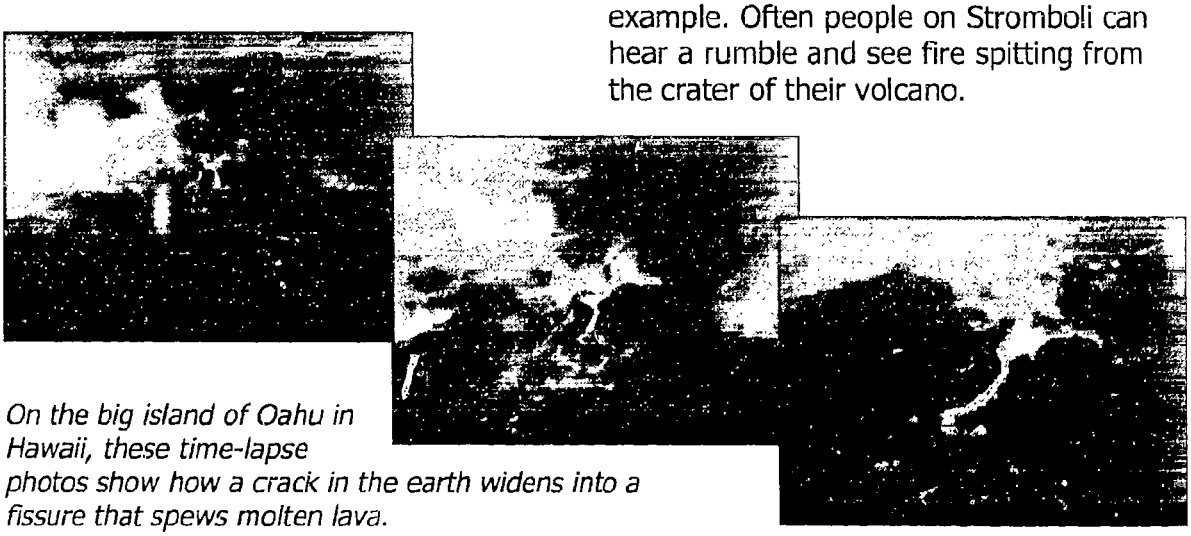
Kinds of Volcanoes

Volcanoes come in several varieties. Scientists categorize them by their status of eruptions. Extinct volcanoes no longer erupt, so we consider them dead. Mount Kilimanjaro, the highest mountain in Africa, is an extinct volcano.

If a volcano has not erupted for some time, but not long enough to be considered dead, we call it a dormant volcano. Dormant means that the volcano is sleeping, but can still erupt. Mount Fuji in Japan is such a dormant volcano.

If a volcano erupts occasionally, we call it an intermittent volcano. Seismologists, scientists who watch these volcanoes closely, expect them to erupt at some time. Mount Etna in Sicily is such an intermittent volcano.

Some volcanoes erupt regularly, so we call them active volcanoes. Stromboli, on an island of the same name in Italy, is an example. Often people on Stromboli can hear a rumble and see fire spitting from the crater of their volcano.



On the big island of Oahu in Hawaii, these time-lapse photos show how a crack in the earth widens into a fissure that spews molten lava.

V. How To Use The Theme: Procedures For Demonstrating Its Functions And Involving Children

1. Sample Questions To Pose About The Narrative

- What are some famous volcanoes?
- Where are they located?
- What are the effects of an erupting volcano?
- How can humans predict volcanic activity?
- Can we harness or control the power of a volcano?

2. Listening To Literature: A Sample Text And How To Use It

Dubois, William P. ***The Twenty-One Balloons***

A fantastic tale of truth and fiction. Relates the incredible adventures of Professor William Waterman Sherman, who in 1883 set off in a balloon across the Pacific Ocean and survived the volcanic eruption of Krakatoa. The Navy eventually rescued him in the Atlantic Ocean.

This classic book is excellent to read aloud to the class. Begin reading aloud an excerpt from Chapter 10 (pp. 159-160), starting with: *"I noticed the earth was moving with increasing violence...."*

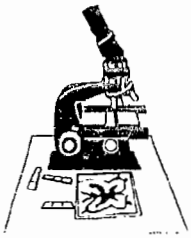
Berger, Melvin. ***Disastrous Volcanoes***

Discusses the formation, types, and locations of volcanoes, and describes the eruption of Paricutin, Vesuvius, Krakatoa, Mont Pelee, and Mount St. Helens. Read Chapter 6 aloud to the class, about the Krakatoa eruption in 1883. After the reading, discuss what happened at Mount St. Helens in Washington in 1980. Then read aloud Chapters 1 and 2.

OPTIONS FOR STUDENTS' RESPONSES:

- Take notes about the description of these volcanoes. Jot down descriptive adjectives. Then begin a vocabulary journal with these terms.
- Make a large chart to record similarities and differences found in each eruption.
- Read Chapter 8, about the eruption of Mount St. Helens, and develop a time-line of the approaching eruption.
- Write a skit about a volcano erupting. Pretend to be an eyewitness. Present the skit to another class and ask for their reactions.

3. Science Demonstrations



- Collect rock samples.
- Classify rocks from your area.
- Classify some rocks from volcanoes.
- Make a Volcano Fact Poster.
- Draw a cross-section of a volcano. Label the parts.
- Classify volcano types, and complete Activity #3.

4. Math Demonstrations

- Make a line-graph to record data about the height of famous volcanoes' eruptions.
- Make a bar graph to show data collected about the number of times that famous volcanoes have erupted.

5. More Books To Read

Asimov, Isaac. ***How Did We Find Out About Volcanoes?***

Discusses the features of a volcano, the causes of eruption, and the locations of active volcanoes.

Aylesworth, Thomas. ***The Mount St. Helens Disaster: What We've Learned***

Describes the famous event and close scientific monitoring concerned with recurrence, ecological impact, and weather changes.

Lauber, Patricia. Volcano. ***The Eruptions and Healing of Mount St. Helens***

An account of how and why Mount St. Helens erupted, the destruction it caused, and the return of life to that area.

Taylor, G. Jeffrey. ***Volcanoes in our Solar System***

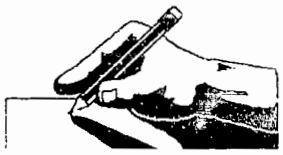
Explores the phenomenon of volcanism as it occurs throughout our solar system, on planets, asteroids, and the moon.

VI. Related Language Arts Activities

1. Listening and Discussion

- Look at the pictures of several volcanoes your teacher has displayed. Describe what you see, and tell what you already know about volcanoes. With the teacher's help, you can make a K-W-L Chart (What I **K**now, What I **W**ant to Know, and What I Learned) and keep it available for reference.
- Interview a Seismologist, having prepared questions in advance. Record the interview for later discussion.
- Listen to and discuss student stories about volcanoes.
- Listen to *The Twenty-One Balloons*, then share your impressions with the class.

2. Individual and Group Writing



- After hearing *The Twenty-One Balloons*, write an Eyewitness Report.
- Write a Volcano Fact Book.
- Write and illustrate a book about famous volcanoes.
- Write what you have learned about volcanoes, using the paragraph frames in Activities #4 and #5.
- Write a short report on a volcano. Use the Log Record Frames in Activity #4 to compare and contrast what you have learned.
- Write your responses to the readings, using the sequence and reaction frames in Activity #5.

3. Reading

- Read *The Magic School Bus Inside The Earth*. Pretend to be one of the classes in this story. Write a personal diary about what you did.
- Read *What is the Earth?* Complete the diagram in Activity #1.
- With a small group, read *Kinds of Volcanoes* to complete Activity #2.

VII. Related Extension Activities: Using Language Arts To Teach Social Science In Personal Or Small Group Work

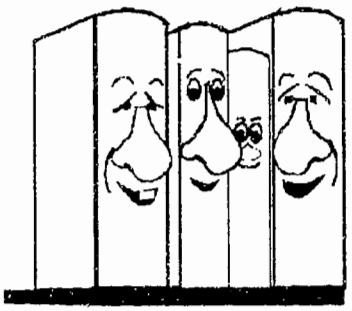
1. Individual and Team Projects

- Read for facts about famous volcanoes. Make a picture book about them. On the alternate page of each illustration, write Volcano Facts. Share the book with the class.
- Construct a volcano diorama. Show two sides to the story. One side will be a landscape before the eruption; the other side will show the landscape destruction after the eruption.
- Make a large mural about volcanoes. Choose one volcano to research. Use pictures in your sources for the mural.
- Research ancient civilizations in which volcanoes have been active.
- Your teacher can collect maps showing famous volcanoes. Locate them on the maps, then talk about their surroundings, and how people must live there.
- On a large piece of plywood, construct a model volcano from papier-maché. Place a small juice can in the lip of the volcano, to represent the crater. Place a small amount of dichromate crystals in the can. The teacher—only!— can drop a lit match into the can, to demonstrate a volcanic eruption. If you darken the classroom before the eruption, the effects will be more realistic.

2. Class Field Trips

- Visit a rock quarry.
- Visit a museum of natural history.
- Visit a science museum.
- Visit a rock museum.

VIII. Trade Books



Nonfiction

Asimov, Isaac. ***How Did We Find Out About Volcanoes?***
Aylesworth, Thomas G. and Virginia ***The Mount St. Helens Disaster***
Bawden, Juliet. ***The Art and Craft of Papier-Maché***
Berger, Melvin. ***Disastrous Volcanoes***
Branley, Franklyn M. ***Volcanoes***
Carson, James. ***Volcanoes***
Lambert, David. ***Earthquakes and Volcanoes***
Lampton, Christopher. ***Volcano***
Lauber, Patricia. ***Volcano: The Eruption and Healing of Mount St. Helens***
Marcus, Elizabeth. ***All About Mountains and Volcanoes***
Moxley, Susan. ***Play With Papier-Maché***
Poynter, Margaret. ***Volcanoes: The Fiery Mountains***
Rutland, Jonathan. ***The Violent Earth***
Selsam, Millicent E. ***Birth Of An Island***
Simon, Seymour. ***Volcanoes***
Taylor, Barbara ***Mountain and Volcanoes***
Taylor, G. Jeffrey. ***Volcanoes in Our Solar System***

Fiction

Cole, Joanna. ***The Magic School Bus: Inside The Earth***
Dubois, William P. ***The Twenty-One Balloons***
Hamilton, Sue L. ***Mount St. Helens: Volcanic Eruption***
Hayes, Joseph. ***Island On Fire: A True Saga***
Woodhouse, Martin. ***Moon Hill***

ACTIVITY 1

NAME _____

VOCABULARY: mantle, crust, magma, core, ash, crater, lava, cone

DIRECTIONS: Use the vocabulary words to answer these questions. Then label them on the diagram below.

1. What part of the Earth is soft and thick rock?

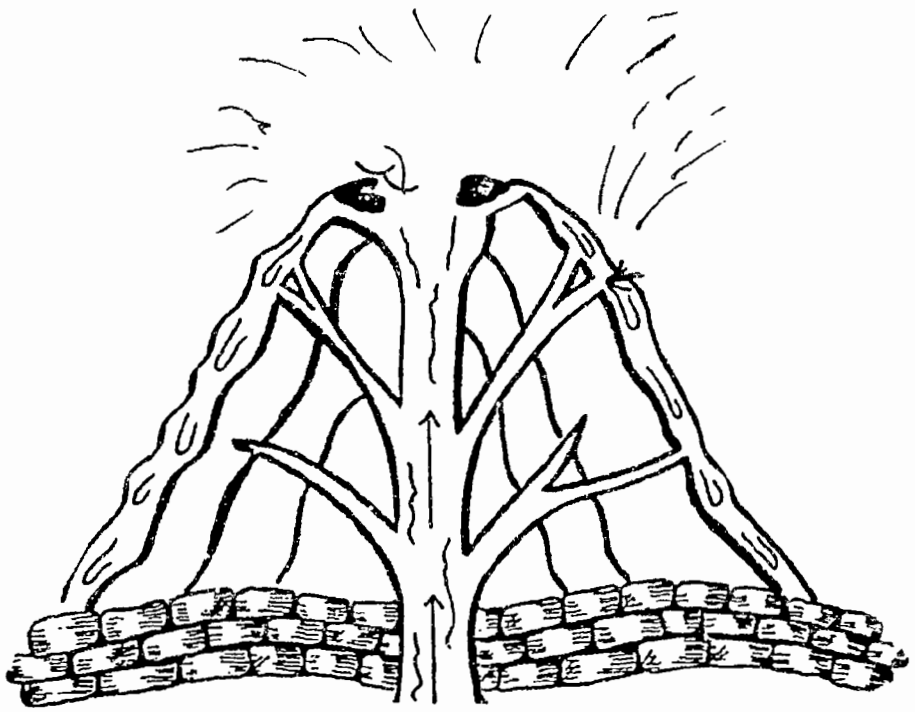
_____

2. What part of the Earth do we live on?

_____

3. What part of the Earth is deep inside and made of metal?

_____



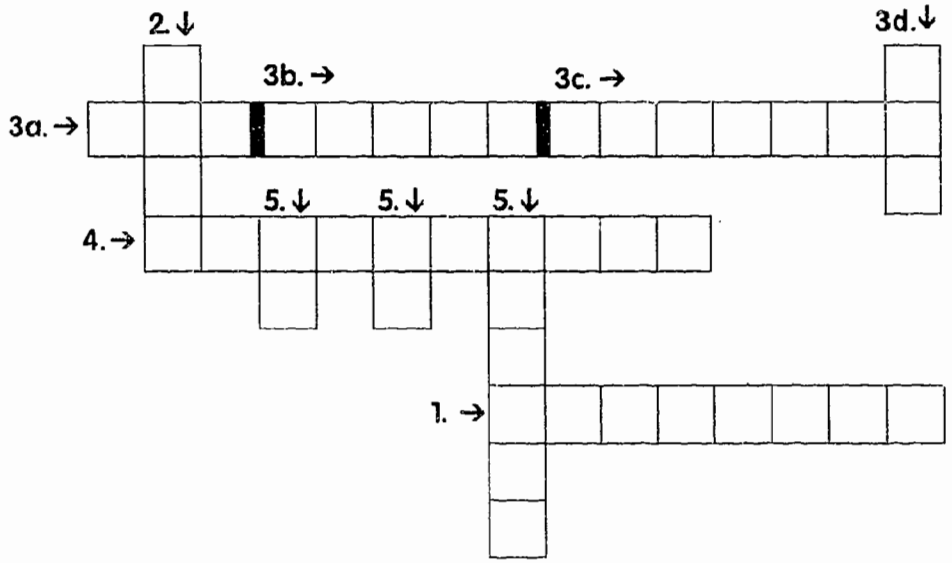
ACTIVITY 2

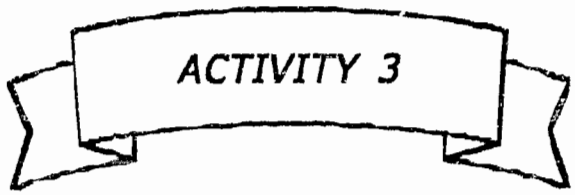
NAME _____

VOCABULARY: gas, steam, cinders, ash, atmosphere, Mt. St. Helens, eruption, lava

DIRECTIONS: Use the vocabulary words to complete the crossword puzzle.

1. The pressure is released in a volcanic _____.
2. _____ pours from the crater.
3. Some volcanoes throw out clouds of **a.**_____ , **b.**_____, **c.**_____, **d.**_____ .
4. The ash travels for miles in the _____ _____.
5. In 1980, _____erupted in Washington.





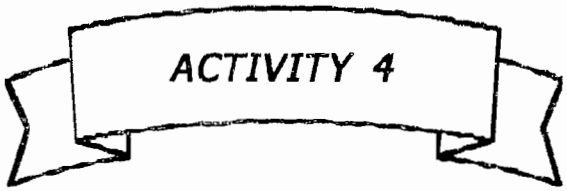
NAME _____

VOCABULARY: extinct, dormant, intermittent, active, Mount Etna, Stromboli, Mount Fuji, Mount Kilimanjaro

1. A dead volcano is called _____.
2. A sleeping volcano is called _____.
3. A volcano that erupts now and then is an _____ volcano.
4. Volcanoes that erupt regularly are _____ .

MATCH THE NAMES OF VOLCANOES TO THEIR TYPE.

FAMOUS VOLCANO	VOLCANO TYPE	LOCATION
Mount Etna	_____	_____
Stromboli	_____	_____
Mount Fuji	_____	_____
Mount Kilimanjaro	_____	_____



NAME _____

DIRECTIONS: Use the frames to respond to what you have learned about volcanoes.

CONTRAST FRAME

Volcanoes differ in type. Some are _____

while others _____

_____.

Another thing is _____

_____,

while_____.

COMPARISON FRAME

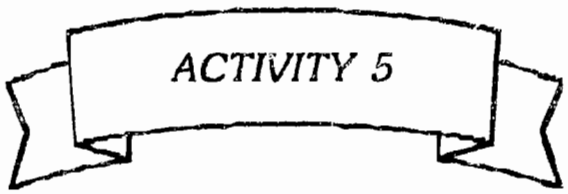
Although _____are _____ they are

_____in many ways. First, _____

_____.

Second, _____.

Finally, _____.



NAME _____

DIRECTIONS: Use vocabulary words to complete the reaction frames.

SEQUENCE FRAME

I learned some interesting facts about volcanoes. First, _____

_____

Next, _____

Then, _____

After, _____

_____

REACTION FRAME USING PRIOR KNOWLEDGE

Although I already knew that _____

_____, I

learned some new facts about volcanoes. For instance, I learned that

_____.

I also learned that _____.

What I wanted to learn even more about was _____

_____.

Suggestions For Teachers

Activity 1

Read the vocabulary terms with the class. Students should answer each question on the sheet, and label the parts of the volcano.

1. mantle; 2. crater; 3. lava; 4. ash

Activity 2

Students can use the vocabulary terms to complete each sentence and the cross-word puzzle.

1. eruption; 2. lava; 3. gas, steam, cinders, ash; 4. atmosphere; 5. Mt. St. Helens

Activity 3

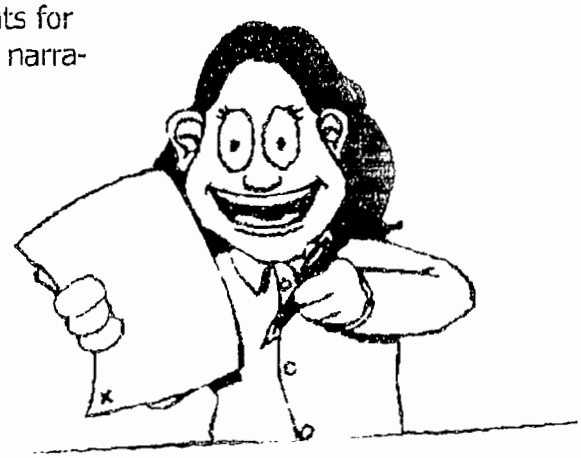
Students can use the vocabulary terms to complete each sentence.
After the discussion, help them to match the names of volcanoes to their type.

1. extinct; 2. dormant; 3. intermittent; 4. active

FAMOUS VOLCANO	VOLCANO TYPE	LOCATION
Mt. Kilimanjaro	extinct	Africa
Mt. Fuji	dormant	Japan
Mt. Etna	intermittent	Sicily
Stromboli	active	Italy

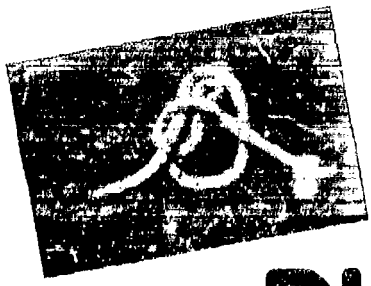
Activity 4

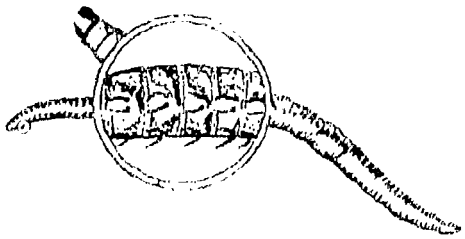
Pair students to discuss possible statements for each frame. Lead students to use the theme narrative for this activity.



Activity 5

Pair students to discuss possible facts for completing the frames. Again, lead them to use the information in the theme narrative.



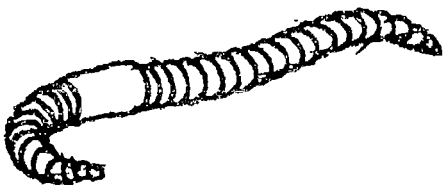


PUSH AND

STRETCH,

MY EARTHWORM

PETS



I. Introduction

The movement of a wiggly worm amazes and fascinates young children. They are also curious about worms' characteristics and features. And the usefulness of the earthworm may surprise them.

Begin by asking for previous knowledge. Record statements from students on a WEB.

II. Targeted Ideas

- Earthworms have no backbone.
- Earthworms are helpful in the garden.
- Earthworms live deep in the soil.
- Earthworms eat dead leaves and old roots.
- Earthworms will eat garbage.
- Earthworms have both common and individual characteristics.

III. Making Connections

"Runaway Land," Unit 4, fits logically with this unit. You may use it concurrently with this unit, as erosion compares well with the effects of earthworms. Just as they cause changes in soil composition, so does erosion cause changes in the land.

IV. The Unit Theme: An Introductory Narrative To Read To Students

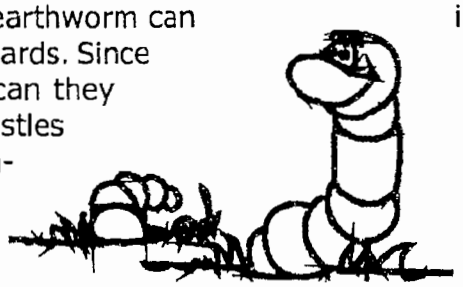
PUSH AND STRETCH

Did you know that earthworms can make good pets? Sure they can! I know because I have pet earthworms. One is named Push, and the other is named Stretch. Can you guess why I named them Push and Stretch?

Push and Stretch appeared in my backyard. They lived under the grass, deep in the earth, or soil. That's why we call them earthworms. Dad found Push and Stretch after a hard rain. When the soil is wet and soft, earthworms come to the surface. If it is cold, though, they stay deep in the ground.

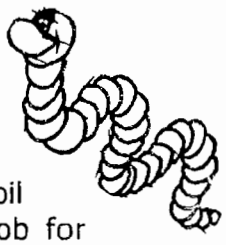
We can't see earthworms unless they are crawling across the dirt or grass. They burrow tunnels under the ground because they like dark, damp places. Some earthworms eat their way through the soil, making new tunnels all the time. Then again, some earthworms just stay in the same tunnels.

The squiggly, crawly, earthworm can move backwards and forwards. Since they have no feet, how can they do it? They have little bristles on their bodies, which contain slime. The slime oozes out of these bristles, helping the worm push and stretch easily through the soil. The worm takes in air through its wet skin.



Earthworms eat soft, dead leaves, dung, or old roots. They chew up this food along with some soil. The mixture passes through the earthworm's body, emerging as a new kind of soil that nourishes plants. So earthworms are very helpful in the garden. Farmers love to see them in their fields.

Earthworms are very busy creatures. They mix up layers of hard and soft soil. Air and water can get into the ground through their tunnels. They have everything they need right there. Their babies hatch from eggs and stay in the same soil area, doing a great job for gardens and farmers.



You can have earthworm pets in your home or classroom too. It's easy; here's how to do it. Dig up some soil, and the worms will appear. If the weather has been dry, water the spot, so the worms sense the moisture. Put them in a bucket with dirt to carry them inside.

You will need a glass aquarium or jar. Put a layer of good soil about one inch deep in the bottom. Then add a layer of sand on top. Next add a layer of sawdust that has not been treated with chemicals. Then add another layer of soil on top. Make sure the top and bottom layers are good, rich soil.

Place some small pieces of grass and rotten leaves on the top layer of soil, and your wormery is ready for guests. Add the worms that you collected, and cover the aquarium with dark paper or cloth, so no light can get in. Wait a week, and then see what has happened.

V. How To Use The Theme: Procedures For Demonstrating Its Functions And Involving Students

1. Sample Questions To Pose About The Narrative

- How do earthworms help people?
- Were do we find earthworms?
- Why do earthworms live in the soil?
- What do earthworms need tc survive?
- How do earthworms move?

2. Listening To Literature: A Sample Text And How To Use It

Bodecker, N.M. *Water Pennies and Other Poems*

A collection of poems about living creatures in nature. Use the poem, "The Earthworm" for this activity. Copy the poem on chart paper for the whole class to use.

OPTIONS FOR STUDENTS' RESPONSES

- Have the class read the whole poem as a chorus.
- Pair students to interpret specific statements:

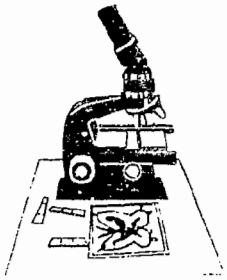
..."my friend of silent toil"

..."ate rank dirt to make sweet soil" *..."was good for me"*

Have students share their interpretations.

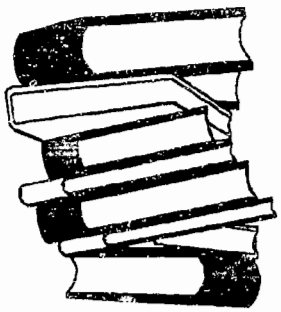
- Read Compost Critters to the class.
- Show the class live earthworms. Introduce the idea of creating a class wormery, to observe the life of the earthworm.
- Collect books listed in this unit. Divide the class into groups for independent/shared research. Give each group some books to read. Have them share the information by preparing a class report.

3. Science and Math Demonstrations



- Build a wormery. Add earthworms to the wormery.
- Observe the worms daily. Record your observations.
- Collect different kinds of soil. Compare them to the soil used in the wormery. Use a Venn diagram to show your comparisons.
- Carefully remove the worms for measurement. Log the growth of each worm over several weeks. See Activity #5. Prepare a report to share with the class.

4. More Books To Read



Coldrey, Jennifer. ***Discovering Worms***

Describes the physical and behavioral characteristics of a variety of worms.

Lavies, Bianca. ***Compost Critters***

Describes what happens in a compost pile and how creatures, from bacteria and mites to millipedes and earthworms, aid in the process of turning compost to humus.

McLaughlin, Molly. ***Earthworms, Dirt, and Rotten Leaves***

Examines the earthworm, especially its survival in its habitat. The book suggests experiments that introduce basic ecological concepts.

Hagan, Caroline. ***It's Easy to Have a Worm Visit You***

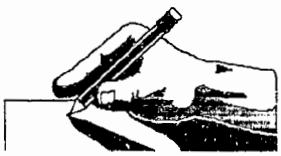
Describes the care, feeding, and observation of an earthworm kept briefly in a special home-made container.

VI. Related Language Arts Activities

1. Listening And Discussion

- Invite a farmer and an ecologist to speak to the class.
- Listen to peer stories and poems.
- Share Record Journals aloud.
- Interview a gardener.

2. Individual and Group Writing



- Keep a running journal of your observations of the wormery.
- After observing activity in the Wormery for a week, record and illustrate your data on the Activity #1 Response Sheet.
- Write and illustrate a fact book to share with the class.
- Create a class newsletter. Use Activity #4 for a pattern. Each group will have a different newsletter. Share each newsletter with the class and other classes.
- Write Record Journals about information found in your readings.
- Make a crossword puzzle, using the facts from your book. Have other classmates complete the puzzle.
- Write stories and poems about the earthworm.
- Write articles for a newspaper about the important work of the earthworm.

3. Reading

- Read books about earthworms.
- Read Interesting Facts About Worms (Activity #3). Write a Worm Gazing report. Describe their movement. Use the Paragraph Frame in Activity #3 to get you started.

VII. Related Extension Activities: Using Language Arts To Teach Social Science In Personal Or Small Group Work

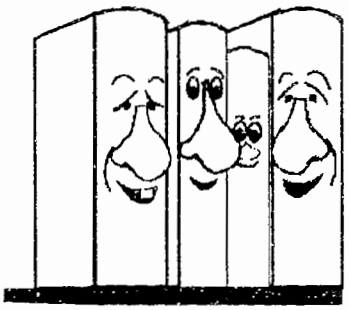
1. Individual and Team Projects

- Start a collection of garbage to create a compost pile.
- Use the compost to mulch around plants in the school yard.
- Create dioramas of earthworm habitats.
- Create earthworm mobiles.

2. Class Field Trips

- Visit a farm.
- Visit a nursery.
- If a college is near you, visit a Biology or Botany professor who teaches a course that studies worms.

VIII. Trade Books



Nonfiction

Appelhof, Mary. ***Worms Eat Our Garbage: Classroom Activities for a Better Environment***

Bodecker, N.M. ***Water Pennies and Other Poems***

Coldrey, Jennifer. ***Discovering Worms***

Earth Works Group. ***50 Simple Things Kids Can Do to Save the Earth***

Glaser, Linda. ***Wonderful Worms***

Henwood, Chris. ***Earthworms***

Hess, Lilo. ***The Amazing Earthworm***

Jennings, Terry. ***Earthworms***

Lavies, Bianca. ***Compost Critters***

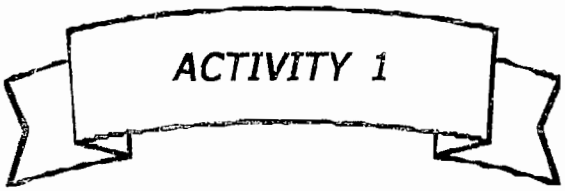
Lauber, Patricia. ***Earthworms, Underground Farmers***

Mc Laughlin, Molly. ***Earthworms, Dirt, and Rotten Leaves***

O'Hagan, Caroline. ***It's Easy To Have A Worm Visit You***

Ross, Michael. ***Wormology***

Simon, Seymour. ***Discovering What Earthworms Do***



NAME _____

MAKE A CLASSROOM WORMERY

1. Find a 5 gallon fish tank.
2. Put in a one-inch layer of good soil.
3. Cover the soil with a one-inch layer of sand.
4. Cover sand with a one-inch layer of UNTREATED sawdust.
5. Cover the sawdust with a one-inch layer of good soil.
6. Continue the layering (# 2-5) until the tank is nearly full. Soil must be on top.
7. Cover the top soil layer with grass and rotten leaves.
8. Add worms.
9. Cover the tank with dark paper or cloth. WAIT ONE WEEK.

Wormery Journal

Observe the wormery every day, recording what you see. How many worms can you find? How many tunnels have formed? Describe each worm. Do you see anything different about each one? Can you name them?

Wormery Data

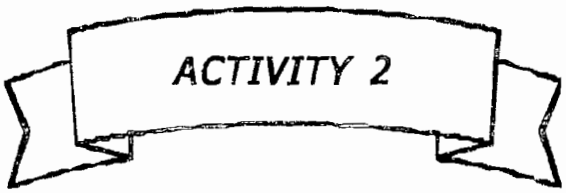
New Burrows

DATE	NUMBER	LENGTH (cm)

Draw a picture of the Wormery. Each day, add the new burrows to your drawing.

DIRECTIONS: After the first week, set up a schedule to check the wormery. Record the day, number of new burrows, and length of each burrow in centimeters.

Add to the Wormery Journal. On which day did the earthworms make more new burrows? How many worms can you see in the burrows? Can you watch them eat through the dirt?



NAME _____

FEED THE WORMS

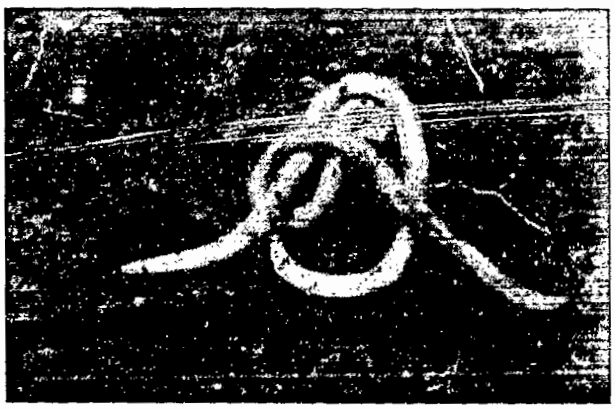
INTERESTING FACTS ABOUT WORMS:

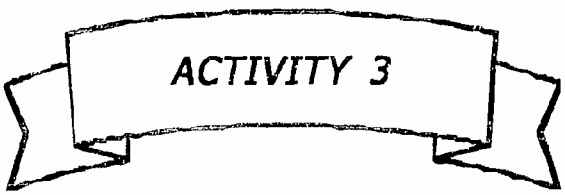
The quiet, busy little earthworm is one of Earth's best friends. It helps to make the best soil for growing grass, plants, or crops. That's because the earthworm will eat garbage and rotting plants or leaves.

You can make a COMPOST HEAP to feed the worms. A compost heap is a pile of rotting food, grass, or leaves. At home, pile the cut grass or fallen leaves in a corner of your yard. Soon that pile will turn into soil. If you put worms in the pile, it will become rich soil faster.

DIRECTIONS: Complete the Worm-Puzzle.

1. The _____ can make soil.
2. The earthworm will eat _____ and
3. _____ or
4. _____ .
5. This is a pile of rotting food.

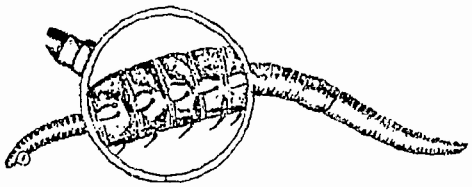




NAME _____

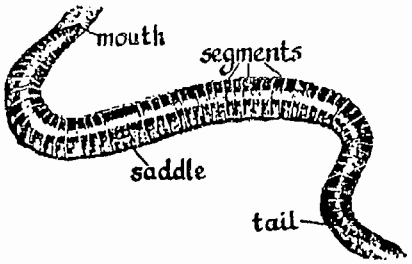
MORE FACTS ABOUT WORMS

The earthworm has no feet, but it can move backwards and forwards. Look at the diagram below. Note the little bristles on the underside of the body. These little bristles help the earthworm to move around by clinging to the soil.



The earthworm's body has many segments, or rings. It has no backbone. The body is pinkish-brown, covered with thin slimy skin, which is sensitive to touch and light. The worm breathes through the skin, so it must stay moist and out of direct heat or light.

The adult earthworm has a swollen band, or girdle, called the saddle. The saddle carries the eggs of new earthworms. From one to 20 eggs are deposited in tiny egg capsules, also called a cocoon. In about 14 to 21 days, baby earthworms hatch.



Worm Gazing

Remove a worm from the wormery. Carefully lay it on a piece of clear glass. Watch the worm for a while. How does it move? How many sets of bristles do you see? Record your observations. Describe its movement.

The earthworm moves like _____

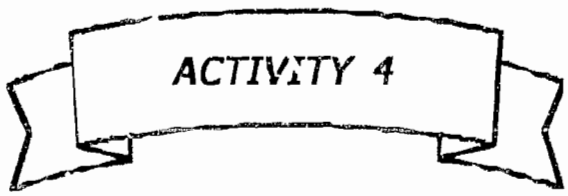
_____.

If a pencil touches it, it will _____

_____ like a _____.

The bristles _____

_____.



NAME _____

The Daily Worm

CREATURE FEATURE OF THE WEEK

Earthworms Capture Hearts and Fingernails of Entire Classroom

In a story as old as the hills and twice as earthy, _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

WORMERY OBSERVATION SUMMARY

_____

Monday

_____

Tuesday

_____

Wednesday

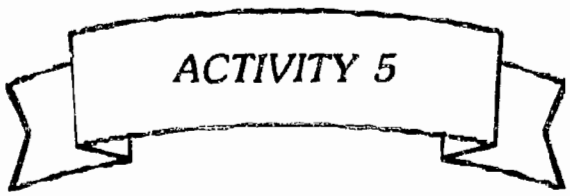
_____

Thursday

_____

Friday

_____



NAME _____

EARTHWORM ACCORDION BOOK

DIRECTIONS: Take a piece of paper 4" X 8." Fold into 2" strips like a fan. On each strip, write a fact about the earthworm. Decorate the front strip, illustrate the other strips. Share your Accordian Book with a friend.

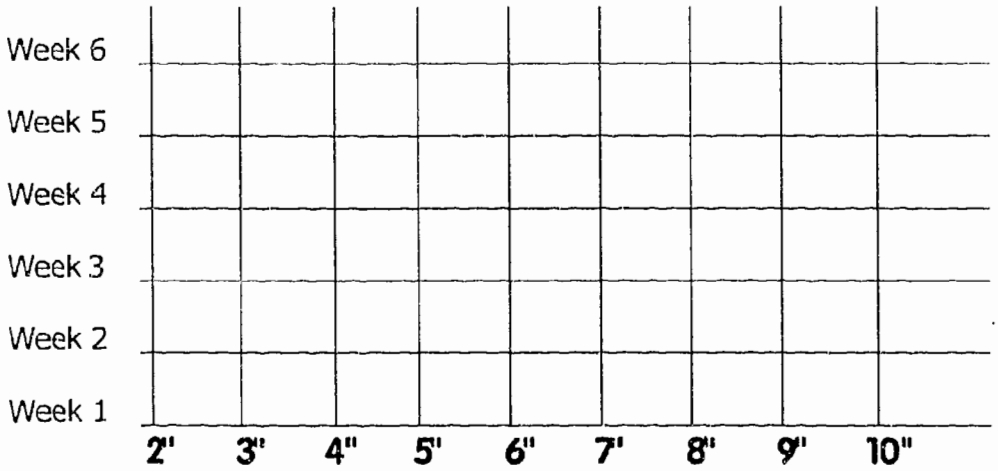
HOW MUCH DID THE EARTHWORMS GROW?

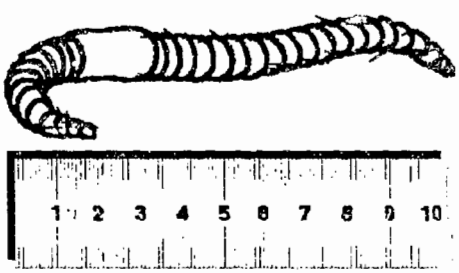
Carefully remove the earthworms onto a paper towel. Gently hold each earthworm straight, against a ruler's edge. Record the length of each earthworm. What was the average length of all of the earthworms?

_____

In a week, repeat the measurements and record the data. Repeat this procedure for several weeks. Record the growth averages on the graph below.

WORMY GROWTH





Suggestions For Teachers

Activity 1

Follow instructions for making a Wormery. Immediately expect students to write their first impressions in a journal. Let students share their journal entries with the class.

Each week, gather the students around the Wormery. Identify new burrows and new earthworms. Record them on the Activity 1 Response Sheet. Continue adding to this information weekly.

Activity 2

Read Interesting Facts About Worms with the class. Elicit a discussion about the information. Complete the Worm-Puzzle.

1. earthworm; 2. garbage; 3. plants; 4. leaves 5. compost heap

Activity 3

Place a worm on a piece of clear glass. Hold the glass above the children, so they can look at the worm's underside. Lead a discussion about how the worm moves by using the bristles. Have the students write a response in their journals.

After a class observation session, have students discuss what they learned and complete the expository frame.

Activity 4

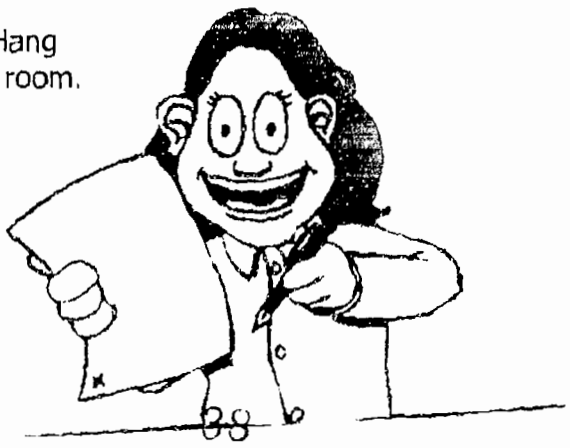
Have pairs of students write an earthworm article. After sharing them with the class, let the students select the one they want in the class newspaper.

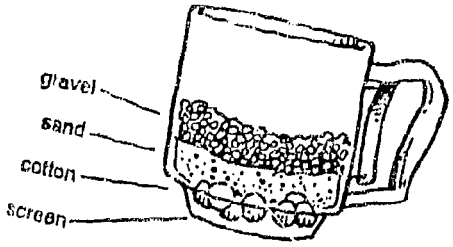
Each day, condense the students' observations. Help the class write a summary of these observations for the newspaper.

Activity 5

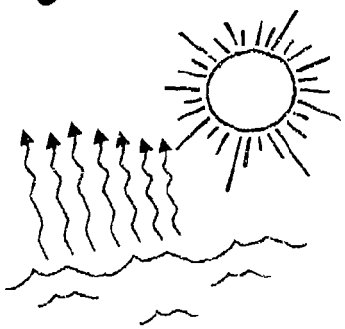
Help each child make an accordion book. Hang these accordion books on mobiles around the room.

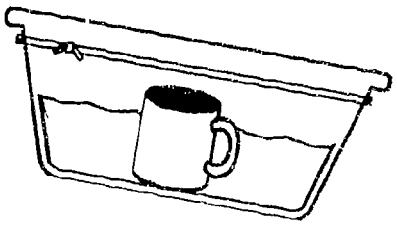
Divide into groups and have each group measure the worms from the wormery. Caution students to be very gentle and careful while handling the worms. Work with the class to figure worm length averages. Then plot the lengths on a class graph each week for six weeks. Lead interpretive discussions about the worms' growth.





WHERE DOES THE RAIN GO?

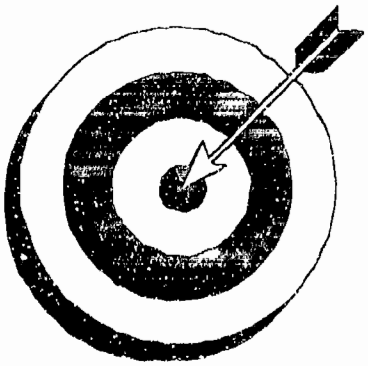




I. Introduction

Every child likes to play in and near water. There is something mysterious about a large body of water. Children are curious about what lives in the water. Use this curiosity to engage them in this unit about the water cycle.

II. Targeted Ideas



- The water cycle goes through many stages.
- The water cycle begins in oceans, lakes, and streams.
- The water cycle ends in the ocean.
- People must collect and clean water for their use.
- The water cycle carries nutrients to the soil.
- Towns and cities have water treatment plants.

III. Making Connections

Another unit suitable to use with this one is Unit 4, "Runaway Land." By learning how erosion can affect the water cycle, students will begin to appreciate the integrity of our ecosystems. Also related to the water cycle are some parts of Unit 2, "Push and Stretch, My Earthworm Pets." The readings, discussions and activities in that unit show the interdependence of soil and worm activity.

IV. The Unit Theme: An Introductory Narrative To Read To Students

RAIN IS IMPORTANT

The hard rain slashing against my bedroom window made me jump out of bed. Running to the window, I saw it had been raining a lot. The backyard was full of puddles, and the trees were blowing around like crazy men. I knew I would not be playing outside today.

Mother said it was a good time for me to understand the importance of that rain. Every living thing needs water to live. That means people and plants. The grass and trees would die if it did not rain. And the rivers and lakes would dry up. Then we would have no water to drink.

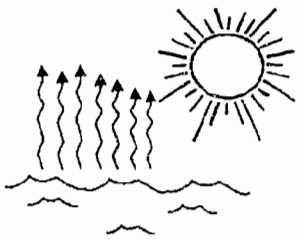
The rain has a busy trip after it falls. It does not just sit around in puddles and disappear into the soil. Did you know it must travel a long way?

High in the sky, winds in the atmosphere have carried tiny drops of water. Clouds fill up with the tiny drops of water, then they burst open on the land below. Then we get rain and puddles.

The soil soaks up the puddles, and the water travels around the rocks and under tree roots and plants. Eventually the water creates small brooks, which come together to form streams. Sometimes water overflows its banks, pushing branches, rocks, and soil along by its force. We call this action *erosion*.

As the water continues its travels, several streams dump into a large lake. The fields along the lake get nourishment and minerals from the water that descends from the mountains. Many animals and birds come to the water's edge to drink.

The reservoir stores drinking water, which flows from rivers and streams to cities and towns. Some of the water flows around the reservoir, overflows the edge of floodgates, and drops back again into the river. The river's journey ends in the ocean, completing its travels and mixing with salty tides and waves. Again, the water has arrived at its major source, the ocean.



When the hot sun shines down on the surfaces of oceans, lakes, and streams, some of the water slowly evaporates. It becomes a fine mist, which the wind carries back into the sky. There it is, forming water droplets in the clouds, which return to earth as rain.

So you see that rain plays a crucial role in our lives. Knowing this cycle, I don't feel so disappointed that rain prevents me from playing outside.

V. How To Use The Theme: Procedures For Demonstrating Its Functions And Involving Students

1. Sample Questions To Pose About The Narrative

- What happens to the rain?
- What is the source of our drinking water?
- What structure collects water?
- What would happen if something interrupted or changed the water cycle in some way?

2. Listening To Literature: A Sample Text And How To Use It

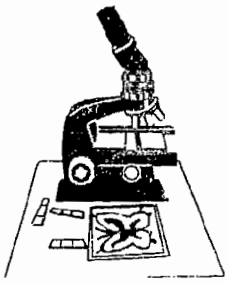
Cole, Joanna. *The Magic School Bus at The Waterworks*

When Ms. Frizzle, the strangest teacher in school, takes her class on a field trip to the waterworks, everyone ends up experiencing water purification from the inside.

OPTIONS FOR STUDENTS' RESPONSES

- Introduce the book by discussing its pictures. What interests students especially can determine the topics to study.
- Fill a clear glass pitcher with water. As the students watch, pour in bleach. They cannot see the bleach, for the water remains clear. But ask if it is clean. No, bleach is a poison.
- Take a trip with Ms. Frizzle's class. Read the book to the class as the students follow along. Stop to discuss important facts.
- Encourage students to keep a Water Journal as they gain new information. In the fewest words possible, they can record pertinent facts about the water cycle and the importance of water. This exercise starts them in note-taking.

3. Science Demonstrations



- Create a K W L Chart. Write what students Know about waterways in the K (know) column. Elicit questions about water sources that create waterways. In the W (want to know) column, list questions to be investigated. As you progress through the unit, add new information to the L (learned) column.
- Create a water cycle. Use Activity #1.
- Track a weather front on a map. Compare readings in several locations in your state.
- Create a mini-water treatment plant. See Activity #4.
- Create a class weather station.
- Engage in various weather experiments. Make a class book to record the results.
- Collect water samples around the neighborhood. Check the water for purity. Have recent rains affected your drinking water?

4. Math Demonstrations

- Measure humidity for several days.
- Graph humidity readings over several days.

5. More Books To Read

Cobb, Vicki. ***The Trip Of A Drip***

Traces the journey water makes to, from, and through our homes.

Locker, Thomas. ***Where The River Begins***

Two young boys and their grandfather go on a camping trip to find the source of the river that flows by their home.

Lyon, George Ella. ***Come A Tide***

A girl's tells about the Spring floods at her rural home.

Rand, Gloria. ***Prince William***

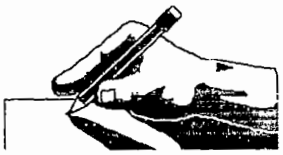
On Prince William Sound in Alaska, Denny rescues a baby seal hurt by an oil spill, and watches it recover at a nearby hospital.

VI. Related Language Arts Activities

1. Listening And Discussion

- Collect pictures of various waterways. Have students describe the scenes and their surrounding environments. List statements from the students regarding streams, rivers, ponds, lakes, bays, and oceans.
- Listen to weather reports on the radio.
- Interview a weather forecaster.
- Listen to peer reports and stories.

2. Individual and Group Writing



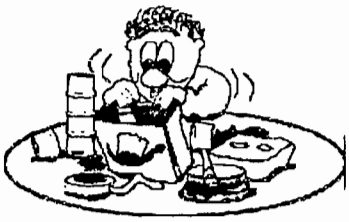
- Keep a weather journal about the water cycle, adding to these entries daily.
- Write a Reservoir Newsletter. See Activity #5.
- Write a Water ABC Book. Illustrate each page.
- Write weather reports suitable for reading over the radio, which you might tape and play back for the class.
- Write articles for the Reservoir Newsletter (Activity #5).

3. Reading

- Read about various types of weather.
- Read about clouds.
- Read The Magic School Bus at the Waterworks. Record the cycle used for drinking water. Use the vocabulary terms in Activity #3 in your journal entry.

VII. Related Extension Activities: Using Language Arts To Teach Social Science In Personal And Small Group Work

1. Individual and Team Projects

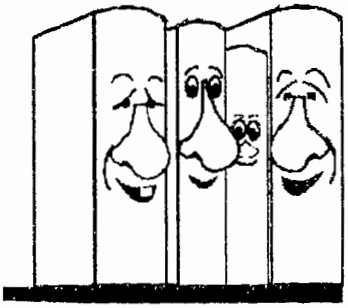


- Make a time-line to record serious weather patterns or storms in your state.
- Take a trip to a pond. Look for different plants around and in the water.
- Make a water cycle mural. Begin at the ocean, and include hills, flat lands, rivers, and ponds.

2. Class Field Trips

- Visit the Water Department in your town or city.
- Visit your local National Weather Bureau.
- Visit a TV channel that covers the weather.
- Visit a reservoir or dam.

VIII. Trade Books



Nonfiction

Cast, C. Vance. ***Where Does Water Come From?***
Cobb, Vicki. ***The Trip of a Drip***
Dickinson, Jane. ***Wonders of Water***
Dorros, Arthur. ***Follow The Water From Brook To Ocean***
Fowler, Allen. ***It Could Still Be Water***
Green, Ivah. ***Splash and Trickle***
Greene, Carol. ***Caring For Our Water***
Hoff, Mary and Rodgers, Mary M. ***Our endangered planet: Groundwater***
Locker, Thomas. ***Where The River Begins***
Lyon, George E. ***Come A Tide***
Mitgutsch, Ali. ***From Ice To Rain***
Schmid, Eleonore. ***The Water's Journey***
Seixas, Judith S. ***Water —What It Is, What Is Does***
Stwertka, Eve. ***Drip, Drop: Water's Journey***

Fiction

Asimov, Isaac. ***Henry Hudson***
Cole, Joanna. ***The magic School Bus at the waterworks***
Peters, Lisa. ***Good Morning, River!***
Rand, Gloria. ***Prince William***
Spar, Jerome. ***Willy, A Story Of Water***

ACTIVITY 1

NAME _____

DIRECTIONS:

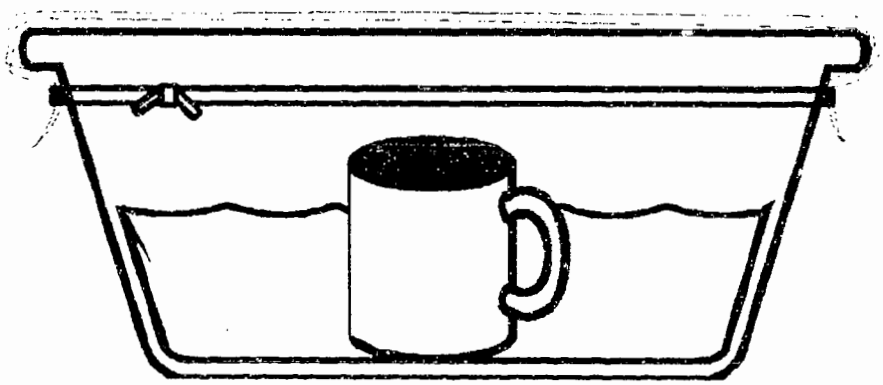
1. Use a large metal or plastic salad bowl.
2. Pour water into the bowl until it is about one-fourth full.
3. Carefully place a mug in the center of the bowl. Don't let water get inside the mug.
4. Cover the top of the bowl with clear plastic wrap that you have tied to the bowl's rim with string or a rubber band.
5. Carry the bowl outside, place it in the sun.
6. Let the bowl sit in the sun, watch to see what happens.

WHAT YOU WILL SEE:

The sun will heat the bowl, causing the water to evaporate. This water will rise as vapor, and condense on the plastic wrap. As more vapor collects on the plastic wrap, it will form droplets. The droplets will become rain. The rain will fall back into the water and into the mug.

INFORMATION:

The plastic wrap represents the atmosphere. The water is like a lake. The vapor represents forming clouds, which will rain after enough droplets have formed and cooled. This new rain will complete the final step in the water cycle.



ACTIVITY 2

NAME _____

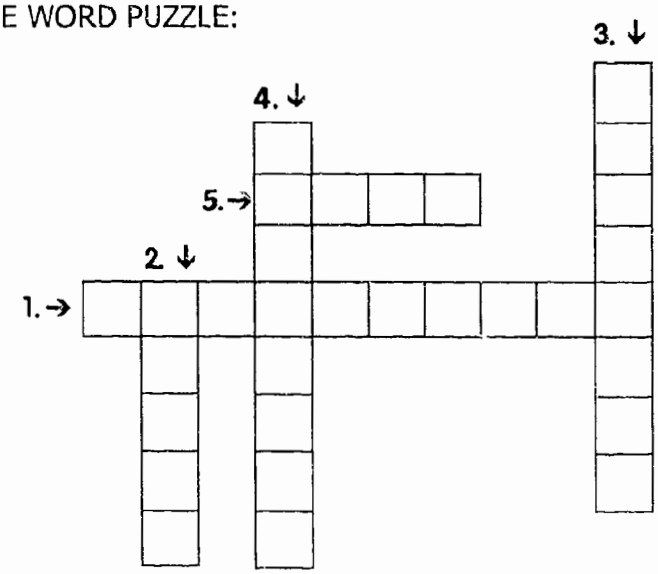
WATER CYCLE RESPONSE SHEET

VOCABULARY: evaporate, droplets, vapor, condense, rain

DIRECTIONS: Complete the information log below. Add this to your Learning Log.

1. When the sun warms the water, it starts to _____.
2. As the water lifts into the air, it takes the form of _____.
3. When the vapor cools, it begins to _____on the plastic wrap.
4. The condensed vapor becomes _____.
5. When the droplets cool, they turn into _____ , and fall back into the bowl and mug.

COMPLETE THE WORD PUZZLE:



ACTIVITY 3

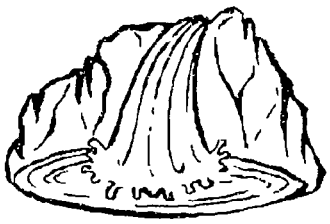
NAME _____

WATER FACT: The water cycle begins from the oceans of the world, and ends up in the oceans of the world.

DIRECTIONS:

1. Cut out the pictures below.
2. Arrange them in the order of the water cycle.
   Remember to begin and end with the ocean.
3. Below each picture, describe that part of the water cycle.

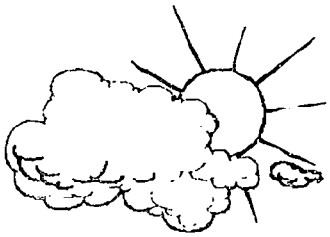
OCEANS



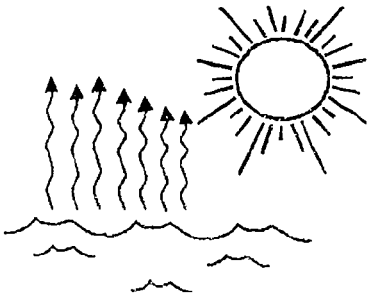
STREAMS

RAIN

RIVERS

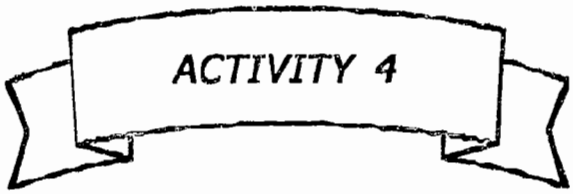


CLOUDS



WATER VAPOR

OCEANS



NAME _____

**WHAT ABOUT THE WATER THAT LANDS ON THE EARTH?
WHERE DOES IT GO? WHAT ABOUT OUR DRINKING WATER?**

FACT: After the rain settles on the ground, it begins to seep into the soil. Some of it runs off into rivers and streams that travel to the place where you live. At some point, there is a stream that runs into the reservoir. A reservoir holds the water that you use in your home. But the water is not clean enough to drink right from the reservoir. Many chemicals from insecticides and dirt are in the water. A treatment plant must purify the water, so is it safe to drink.

VOCABULARY: mixing basin, settling basin, gravel, sand, impurities, chlorine, fluoride

DIRECTIONS: Read *The Magic School Bus at the Waterworks*, by Joanna Cole. Make journal entries in a Learning Log. What are the steps that water goes through to become pure enough to drink? Include the vocabulary terms in your entries.

Learning Log - Purifying Water

Step One: _____

_____

Step Two: _____

_____

Step Three: _____

_____

Step Four: _____

_____

Step Five: _____

_____

Step Six: _____

_____

Step Seven: _____

_____

ACTIVITY 5

NAME _____

The Reservoir Newsletter

Letter To The Editor

DUMPING IN OUR WATERS?

Maybe some kids don't know what happens when their parents pour motor oil in the creek, but I do. _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Draw Your Own Cartoon

Water Treatment Plant Visit Flushes Out the Bad Guys

Whether you visit in person or read about it in a book, the process of cleaning up our water is a dirty job. _____

_____

_____

_____

_____

_____

_____

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_____

_____

Class Water Project: Adopt A Stream!

In a effort to clean up our local waterways, our class has adopted a stream. We will keep it clean by _____

_____

_____

_____

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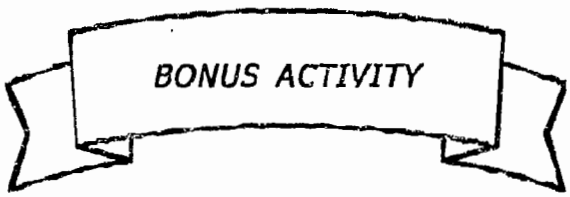


CREATE A MINI-WATER TREATMENT PLANT

DIRECTIONS:

1. Collect a wide-mouth glass jar and a flour sifter.

2. Place the sifter over the mouth of the jar.

3. Place a layer of cotton balls on the bottom, next to the screen of the sifter.

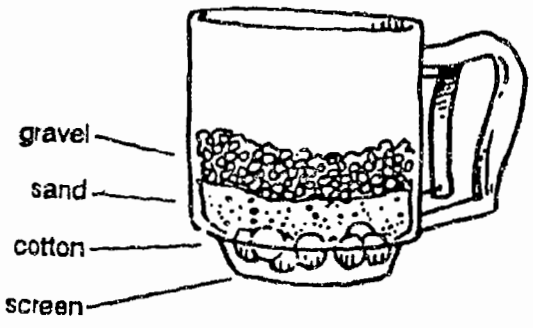
4. Add a one-inch layer of clean sand on top of the cotton.

5. Place a one-inch layer of clean gravel over the sand.

6. Slowly pour MUDDY WATER into the container.

JOURNAL ENTRY:

Discuss what you are observing. Describe your observations in a journal entry for the Learning Log. How can you explain what happened to the water? How did the water look when you poured it into the container? How did it look when it reached the jar?



Suggestions For Teachers

Activity 1 & 2

After using the exploration in Activity 1, address the vocabulary terms. Help students complete the sentences and the word puzzle.

1. evaporate
2. vapor
3. condense
4. droplets
5. rain

Activity 3

Discuss the names for each picture. After students cut out the pictures, they can lay them in order on their desks. Then paste and label each picture on construction paper.

1. oceans
2. water vapor
3. clouds
4. rain
5. streams
6. rivers
7. oceans

Have students share their statements about each part of the water cycle.

Activity 4

After reading *The Magic School Bus at the Waterworks* and the contextual facts, pose questions about this material. Have each student write journal entries as summaries about the information, using the vocabulary terms. Demonstrate how we clean water for personal use. Follow the directions to create a mini-water treatment plant. Elicit discussion to answer the questions for their journal entry record.

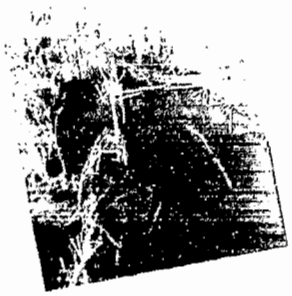
Activity 5

Discuss ways the class can get involved in keeping your town's or city's water clean. Have student pairs or groups write letters to the editor about dumping in the waterways. They might also take on an anti-pollution project.

They could expand this newsletter, to send it home to parents. They might in turn participate in a class project that you all share with the rest of the school.

RUNAWAY

LAND



I. Introduction

Take the class on a walk around the school-yard and neighborhood. Watch for evidence of erosion that heavy rains may have caused. Associate the soil damage with the term "erosion." Elicit observations from the students. Use the chart in Activity #3 as a pattern to record observations.

II. Targeted Ideas

Erosion has several causes.

- Erosion comes in several forms: water, wind, ice.
- We can prevent some types of erosion.
- Erosion results from the actions of natural forces.

III. Making Connections

During this study you may use the previous unit in this volume: *Where Does the Rain Go.* This unit is about the water cycle, and relates well to erosion. You may choose activities there that lend themselves to interchange between the units.

IV. The Unit Theme: An Introductory Narrative To Read To Students

EROSION CAUSES PROBLEMS

We had a big storm last night. It rained very hard, the wind blew like a hurricane, and the sky lit up with lightning. It was scary!

The next morning, when I went out in the backyard, I noticed some big gullies in the ground. Some of the yard had disappeared. I couldn't believe my eyes! Mother said it was caused by water erosion. That means that the water washed the dirt away, and left ruts and gullies across our yard.

Our teacher said erosion is a very big problem on our land. But water isn't the only cause. Wind can blow sand and dirt away too. When tornadoes come, they cause terrible damage and erosion.

Or wind blowing hard over a long time can actually cut away rocks and mountains. One of the biggest areas we can see is the Grand Canyon. Both wind and water wore away—eroded—the canyon over thousands and thousands of years.

Big waves and storms crash against the waterfront land of bays and oceans. That erosion has destroyed many beaches. When you are at the beach, watch the water carry sand back out into the ocean. Even without a storm, that kind of erosion happens every day and night.

During heavy rains and floods, rivers can cause erosion too. The fast-running flood waters carry off soil, rocks, and stones. Some of them get washed out to sea. And storms and floods can uproot trees. When they go, their big roots no longer hold the earth in place. Trees and grasses help to prevent erosion damage.

When earth is exposed, nothing keeps it down, so it washes or blows away. We need to save the soil from erosion, or it will disappear. When this happens plants lose the best topsoil that holds their nutrients. So we must protect our land, and not let it run away.

V. How To Use The Theme: Procedures For Demonstrating Its Functions And Involving Children

1. Sample Questions To Pose About The Narrative

- What kinds of erosion have you seen after a hard rain?
- What natural wonders resulted from erosion? (Carlsbad Caverns, Grand Canyon, Natural Bridge)
- How can you keep your yard from washing away?
- How do plants suffer from erosion?
- How can we minimize beach erosion?

2. Listening To Literature: A Sample Text And How To Use It

Mc Nulty, Faith. *Hurricane*

John and his family prepare for and experience a hurricane on the East Coast. They are very aware of possible damage that can be caused from winds, rain, and waves.

OPTIONS FOR STUDENTS' RESPONSES

- Read *Hurricane* to the class. Elicit statements from students about the kind of damage that a hurricane can cause. List students' ideas on the chalkboard.
- Divide the class into groups. Have each group brainstorm responses about:

  ...John's concern for his treehouse.
  ...necessary preparations.
  ...a list of needed safety precautions.
  ...a list of your favorite items that need protection.
  ...developing an emergency plan to leave the cabin.

- Write letters to describe a scary storm that you have experienced.
- Write a Hurricane Weather Alert Fact Book. On each page, describe a different fact. Illustrate the book. Make a cover for the book, and share it with another class.
- Use a map to track hurricanes or storms, as the TV weather report does.
- Research the effects of flooding. Dictate possible scenarios of a flood experience.
- Write a Diary of a Flood.

3. Science Demonstrations

- Create erosion in a clear plastic rectangular box:
  a. Partially fill the box with dirt. Tilt the box to one end, so the soil will be high on one side, and taper it down on the other. You are building a hill.
  b. Place the box on a high table in front of the class. Slowly pour water over the top of the hill. As students observe erosion, have them describe what is happening.
  c. Reshape the hill. Pour water over the hill very fast and hard. Ask what is different about the erosion this time.
  d. Replace the wet soil with dry soil. Use a fan to demonstrate wind erosion.
  e. Write students' observations on chart paper. Elicit statements about ways to prevent soil erosion from water or from wind.
- Experiment with different soils and rocks to investigate soil-management techniques.
- Plan a Science Fair about the problems of erosion and ways to save the land in your city or town.

4. Math Demonstrations

- Measure the rainfall over a period of time. Record the data in a bar graph.
- Measure the depth of a trench in the schoolyard. After a hard rain, measure the depth again. How much erosion occurred during that one heavy rain?

4. More Books To Read

Aylesworth, Thomas G. ***Storm Alert***

Examines weather conditions, including thunderstorms, hurricanes, and avalanches, which cause extensive damage and loss of life.

Dahlstedt, Marden. ***The Terrible Wave***

A first-person account of the Johnstown Flood of 1989. The terrible wave took nearly an hour to reach Johnstown, and less than a half-hour to destroy the whole city.

Gilson, Jamie. ***Hobie Hanson, Greatest Hero of the Mall***

While Hobie was baby sitting with Toby, the banks of the Hawk River broke through sandbags, flooding the town.

Mc Closkey, Robert. ***Time of Wonder***

Two children are spending a summer vacation on an island off the coast of Maine. A severe storm hits the island, causing beach erosion and other damage.

VI. Related Language Arts Activities

1. Listening and Discussion

- Display numerous pictures showing erosion from wind, water, floods, ice, and storms. Pair students to discuss what they observe. Take statements from each group. Brainstorm possible causes of erosion in each picture and possible remedies for it.
- View a film about caverns, discuss their relation to erosion.
- Present a radio or T.V. program about erosion.
- Interview a farmer and an environmentalist about the effects of erosion on the land.
- Present a skit about erosion.

2. Individual and Group Writing

- Make a class newspaper. Include pictures, stories, and interviews.
- Write Letters to the Editor at your local newspapers about your concern to save the land.
- Write a penpal in a different geographical area. Ask about the problems of erosion there.
- Write letters about your concerns to the U.S. Bureau of Land Management, the Department of Forestry, and the Soil Conservation Office.
- Write a Land Alert Report.

3. Reading

- Read books about erosion. Record the information there in a learning log.
- Take turns reading aloud parts of the bocks that your teacher has distributed to your small group. Everyone should feel free to ask questions about the reading.
- Read the theme narrative in Part IV. Discuss any ideas in it that interest you.

VII. Related Extension Activities: Using Language Arts To Teach Social Science In Personal Or Small Group Work

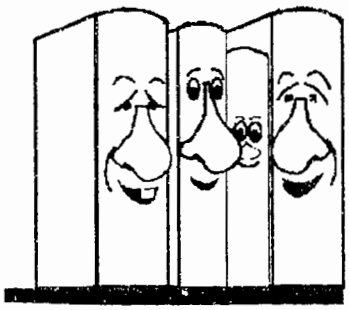
1. Individual and Team Projects

- Make posters that suggest ways to stop erosion.
- Make a diorama with several different types of soil. Label the soils, and write a fact sheet describing each type of soil. Specify which types erosion changes most quickly.
- Create a picture sequence about different types of erosion.
- Build a landscape, as in Activity #2.
- Make a large soil erosion mural. Begin with drawings of land and beach erosion. As you study other forms of erosion, add them to the mural.
- Go on a Neighborhood Erosion Hunt, as in Activity #3. Use the response sheet to record observations.

2. Class Field Trips

- Visit the Bureau of Land Management.
- Visit an excavation site.
- Visit a river following a storm.

VIII. Trade Books

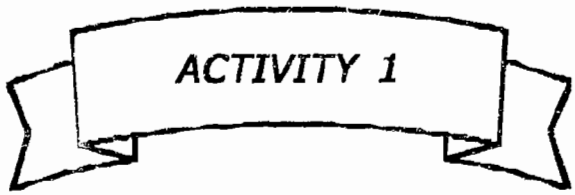


Nonfiction

Alth, Max. ***Disastrous Hurricanes and Tornadoes***
Aylesworth, Thomas G. ***Storm Alert***
Barrett, Norman S. ***Hurricanes and Tornadoes***
Branley, Franklyn. ***Tornado Alert***
Breiter, Herta S. ***Pollution***
Conlon, Laura. ***Floods***
Erickson, Jon. ***Violent Storms***
Goodman, Billy. ***A Kid's Guide To How To Save The Planet***
Lampton, Christopher. ***Tornado***
Stille, Darlene. ***Soil Erosion and Pollution***
Walker, Paul R. ***Head for the Hills: The Amazing True Story of the Johnstown flood***

Fiction

Dahlstedt, Marden. ***The Terrible Wave***
George, Jean Craighead ***One Day in the Prairie***
Gilson, Jamie. ***Hobie Hanson, Greatest Hero of the Mall***
McCloskey, Robert. ***Time of Wonder***
McNulty, Faith. ***Hurricane***
Murphy, Shirley R. ***Tattie's River Journey***
Nelson, Theresa. ***Devil Storm***
Ruckman, Ivy. ***Night of the Twisters***
Stone, George. ***Blizzard: A Novel***



NAME _____

SOIL FACTS:

Soil is not just dirt. Soil is a natural resource. Erosion is a serious environmental problem in many parts of the world and in the U.S. Water and wind carry soil away.

The top layer of soil is called *topsoil.* It is an important resource because it holds organic matter that is usually very fertile. Organic matter is a substance containing decayed plant and animal remains. This organic matter makes the soil very rich, or fertile, providing nutrients for plants, trees, and grasses to grow. Nature needs hundreds of years to build several inches of fertile topsoil. Erosion can remove it very quickly.

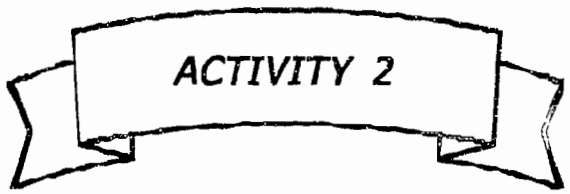
CONTENT SEARCH:

1. What causes erosion? _____

2. What do we mean by organic matter? _____

3. What do we mean by fertile soil? _____

4. Why is fertile soil important? What will happen if we lose fertile topsoil? _____



NAME _____

BUILD A LANDSCAPE:

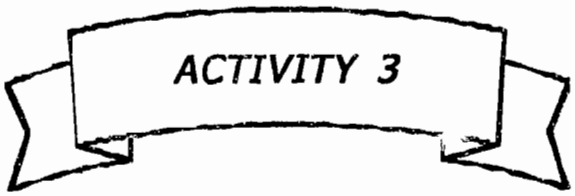
1. You will need two clear-plastic rectangular boxes. Do the first Science Demonstration experiment on page 51, if your class did not complete it as a group.

2. In the first box with the soil from the previous experiment, plant ryegrass seeds. In the other box, plant some small plants to represent trees. Water the grass seeds and plants until the grass seed comes up to cover the topsoil.

3. After the grass has covered the hill, try the erosion experiment again. What was the difference in the effect of water on the land that had trees and grass?

Log Record

SOIL Type of Soil	**EFFECT** Gentle Rain	**EFFECT** Hard Rain	**FINDINGS** Conclusions
Plain Soil			
Grass Soil			
Tree Soil			

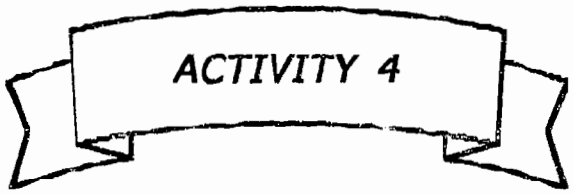


NAME _____

NEIGHBORHOOD EROSION HUNT

Take a neighborhood walk with the class. Look closely for signs of erosion. Take notes, and make drawings of what you find. Try to include many different sites to explore. Use the suggestions below.

Site Search	CONDITIONS	SOLUTIONS
building site		
house downspout		
back yards		
driveways		
empty lots		
canal or stream		
bay or lake		
beach		



NAME _____

LAND ALERT REPORT

Erosion Sites

Here are the Top Five sites we need to do something about:

1. _____
2. _____
3. _____
4. _____
5. _____

Concerned Citizens

The number of people who are concerned about possible land erosion is growing. Just this week, these caring individual added their support to the cause.

1. _____
2. _____
3. _____
4. _____
5. _____

Interview with Land Commissioner

In an effort to learn what is being done about the problem, an interview was conducted with the Land Commissioner. Here's the inside scoop: _____

_____
_____
_____
_____
_____

_____
_____
_____
_____
_____
_____

_____
_____
_____
_____
_____
_____

SOLUTIONS

Here are a few things you can do to help:

1. _____
2. _____
3. _____
4. _____
5. _____

Illustrations

Suggestions For Teachers

Activity 1

Read Soil Facts with the class. Discuss the terms in bold type. Students may search for content that answers questions such as:

1. What do wind and water do?
2. What do we call decayed things in soil?
3. What do we call the condition of rich, nutritious soil?

Activity 2

Follow the directions to build a landscape. Use the Log Record chart to record results of erosion after applying water to the landscape.

Activity 3

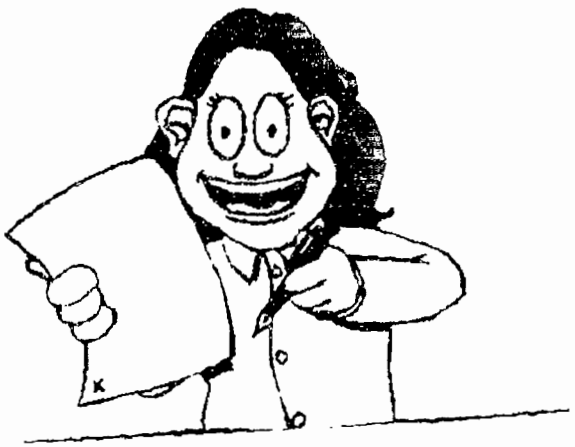
You might use this activity twice. Take two walks: one after a hard rain, and one on a dry day. Make comparisons of the findings from each site.

This project is good as a peer-buddy activity. Have students share their records and solutions for each observed problem.

Activity 4

Invite the local Land Commissioner to talk with the class. After the interview, involve the students in writing for a newspaper.

Findings from the erosion walk and talking with neighbors could offer more information for the Land Alert Report.



Appendices A — E

APPENDIX A

LEARNING CENTERS

You may set up many independent or peer activities in special learning areas of the classroom. Identify each center by subject or purpose. For instance, a Science Center will contain materials for students to engage in experiments or gathering content information. A Reading Center engages students in reading activities.

How to Use Learning Centers

Learning Centers need to provide easy access and directions, so your students can use them successfully. Recorded directions help students who are not yet fluent readers. You can color-code some activities for easy access. The Red Files may contain activities for the students who are visual learners. The Blue Files may contain activities for those who learn best by listening.

Many unit activities are ready-made for Learning Centers. You can put the Activity Pages and lists of other activities in file folders there. Students can do these projects at the Learning Centers, either individually or with a buddy.

Scheduling Learning Center Time

The teacher must plan Learning Center time. One effective schedule places students at Centers on a rotation basis. While some students are with you for instruction, conference time, or reading/writing assignments, others pursue theme activities at a Learning Center. Here's a sample schedule:

8:15-8:45	Attendance, daily plans, sharing	10:15-10:30	Storytelling or free reading
8:45-10:00	Reading groups; other students in Learning Centers, or engaged in writing activities	10:30-11:15	Math groups; other students in Learning Center, or engaged in writing activities
10:00-10-15	Morning break	11:15-11:45	Lunch

You can plan a similar breakdown for the afternoon schedule. Try to schedule a 45-minute slot just for Learning Centers. You can circulate among those in the Centers to do some on-the-spot teaching as questions arise.

Management and Quick-Fixes

You must train your students to use Learning Centers efficiently. Allow no more than four or five students at a center at one time. Make sure that each student understands directions for activities placed th Rotate jobs for each participant, so that the center can run itself. Jim may be the task m. ter on Monday; the materials gatherer, Tuesday; the "voice monitor" (keep voices low), Wednesday; and so on. It helps to write each name and job on a card that you place at each Center daily.

Assessment Profile

The most useful type of evaluation or assessment of student learning is the Student Portfolio. A portfolio is a collection of student products and samples of work over time.

Each unit contains activities that result in products. Some of these products are: learning logs, literature responses, student-generated stories, poems, skits, songs, graphs, charts, illustrations, mobiles, murals, or dioramas, just to name a few. Not all samples fit into a folder. Keep a description or checklist that evaluates such products in your students' portfolio folders.

When you want proof of specific learning, interview each student or use some activity pages as assessment items. For specific facts or knowledge you require, selected response pages represent factual information. Student records and journal entries also demonstrate new knowledge. If you use some unit pages to assess learning, include a self-checking folder for your students.

Learning Center Guidelines

Learning Centers can be a valuable complement to your regular instructional activities; they provide another alternative for students to practice, explore problems, and create. They also can help students to develop independence in managing their own learning.

Keep the following questions in mind as you begin to develop centers:

1. Does the Learning Center include a variety of materials which accommodate differences in learning styles?
2. Does it contain concrete, manipulative activities and paper/pencil activities? Is there a balance?
3. Does it contain some open-ended activities to encourage creative and original thinking?
4. Do the activities offer a variety of levels, to accommodate differences in ability? Are there activities at which all students can succeed? Are there challenging activities?
5. Are the activities self-checking and/or do the activities permit easy checking by you?
6. Does the student have a choice of activities to complete, or must the student do all the activities in the Center?

7. Does the Center include art, music, and literature?
8. Do the Center materials reflect diversity of gender, race, and language?
9. Are directions clearly stated and succinct?
10. Have you developed ways of keeping track of who has participated in the Center? Is the recordkeeping designed for the student to keep track of his/her progress in the Center?
11. Do the students have easy access to the materials?
12. Is the Center neatly constructed with appropriate printing/lettering?
13. Are the materials durable? Laminated? Have rounded edges?
14. Does the Center stimulate interest and further exploration?
15. Is there a unifying title or theme that appeals to students?

Setting Up a Center

Learning Centers will change with your content or theme. Before you begin a theme unit, decide which activities you will use; choose what to put in the Learning Centers accordingly. Put all materials in each Center that your students will need.

The most essential supplies for each Learning Center are listed on the blackline master on the next page.

Essential Supplies for Learning Centers

Listening/Music Center

1. Tape recorder
2. Taped stories, poems, and songs
3. Supply of blank tapes
4. Headsets
5. CD Players
6. CDs
7. TV/VCR
8. Videos
9. Camcorder

Reading/Viewing Center

1. Relevant Library books
2. Books on unit topics
3. Books made by students
4. Peer stories
5. Maps
6. Computer for reading files of work in progress, internet and e-mail, and non-print media.
7. CD-ROM drive and CDs (encyclopedia)
8. Internet browser and on-line connections
9. Printer
10. Film-strip Projector

Writing Center

1. Variety of papers: white, newsprint, scratch pads, legal pads, construction paper
2. Pens, pencils, crayons, felt-tip pens
3. Book-binding supplies
4. File Folders
5. Paper clips, stapler
6. Dictionary and Thesaurus
7. A list of idea starters
8. Expository and narrative writing samples
9. Pictures/Illustrations
10. Cartoon Samples
11. Sample newspapers
12. Paragraph frame patterns
13. Computer for works in progress
14. Printer

Art Center

1. Construction paper
2. Scissors
3. Scotch Tape
4. String
5. Pens
6. Pencils
7. Colored chalk
8. Crayons
9. Tagboard
10. Poster Board
11. Corrugated boxes
12. Mural/Bulletin Board paper
13. Paint
14. Easel
15. Clay
16. Brads

Math/Science Center

1. Scales
2. Yardstick, rulers, measuring tape
3. Containers, measuring cups, spoons, bowls
4. Thermometers
5. Blocks
6. Graph paper
7. Aquarium
8. Egg cartons
9. Picture books and magazines
10. Cuisenaire rods
11. Math manipulatives

LEARNING CENTER ACTIVITIES

MAKE

1. Peep box of scene
2. Movie of paper or story
3. Mural of story
4. Puppet show
5. Picture of scene
6. Scale model
7. Map showing locations of story events
8. Book jacket with summary inside
9. Picture books
10. Fact/Data books
11. Illustrated journal
12. Flannel board story
13. Pictures of characters

DO

1. Dramatize a part
2. Pantomime a part
3. Show something new
4. Round-table discussion
5. Continue a story
6. Radio program
7. Eyewitness report
8. Give news flashes
9. Chalk-talk: tell a story
10. Perform a skit
11. Book chat

TELL

1. Summary of story
2. Interesting facts learned
3. Something new learned
4. Problem and solution
5. Interesting words and expressions
6. Story board

WRITE

1. Summary of data
2. Semantic web of information
3. Story
4. Skit
5. Acrostic poem
6. Newspaper article
7. Letters to authorities
8. Story starters
9. Tall tale
10. True/False book
11. Legend
12. Story board narrative

Learning Center Checklist

Presentation:

- ❑ unifying theme/art work
- ❑ colorful, attractively designed
- ❑ neatly assembled

Contents:

- ❑ age-appropriate, stage-appropriate
- ❑ variety of materials
- ❑ activities at varying levels (easy to challenging)
- ❑ incorporate various disciplines
- ❑ concrete/manipulative and paper/pencil activities
- ❑ some open-ended activities
- ❑ stimulates creative thought/interest
- ❑ free from stereotypes
- ❑ incorporates diversity
- ❑ provides for choice

Organization:

- ❑ clearly-stated directions
- ❑ directions appropriate for age/stage
- ❑ recordkeeping form included
- ❑ self-checking activities
- ❑ accessible materials

Construction:

- ❑ durable materials
- ❑ laminated
- ❑ rounded edges
- ❑ appropriate printing/lettering
- ❑ appropriate containers for activities

APPENDIX B

HOW TO MAKE AND USE BULLETIN BOARDS AND FILE FOLDERS

With limited space in classrooms today, you must find inventive ways to keep your students active and interested. The following two ideas may help you plan for the activities in these units.

Bulletin Boards

If your classroom has only one bulletin board, you may want to think about other ways to provide interactive boards. Large portable bulletin boards will provide two sides for work, and you can move them around the room as dividers. You can fold flannelboards and store them when not in use. You can paint large cardboard boxes from kitchen appliance or television stores; the four sides are usable as bulletin boards. Sides of file cabinets, doors, and spaces under chalkboards can also serve as working bulletin-board spaces. You can use window blinds for attaching materials, but be aware of the safety factor. Children's clothing can get caught if the blind mechanism begins to wind up.

While it may be too costly to laminate all the materials for the board, you will want to laminate any materials you expect to use again. If you are concerned about thumb tacks, velcro strips are good for mounting materials. Pellum, the material used for sewing suit interfacing, works well on flannelboards, and is cheaper than flannel or felt. Although adhesive tape will put things on the bulletin boards, it tends to tear the material when you take it off the boards. While there are commercial materials to use with the bulletin boards, you can be inventive in finding ways to accomplish the tasks of mounting materials on bulletin boards.

File Folders

You can make file folders from many different types of folders. Office supply stores have different forms to adapt for your own purposes. For instance, regular heavy paper folded in half can be fastened on both sides to become an envelope for holding materials. Colored folders allow for color-coding materials into subjects.

Accordion-style folders allow for more materials in the pockets. The notebook folder has pockets on each side of the opened folder, or places to attach papers in fasteners, to allow for book writing. More expensive folders are transparent plastic; you can use them repeatedly for many different themes.

Parents who work in offices may give you used file folders they would normally discard. They may also be able to provide materials for the folders. If you tell parents your themes for the next few weeks, they may be willing to make folders for your class. Parents often think of creative activities that might not occur to you.

It is important to laminate file folders so they will last after frequent use from many children. You can laminate with clear shelf paper found in grocery stores. Practice on some old papers, so you can learn to cover without creating air bubbles.

With a box or small crate for storage, your students can use these activities at their own desks or at a small classroom table. With boxes placed in Learning Centers, students will not waste time waiting in line to choose a file folder.

SAMPLE BULLETIN-BOARD/FILE FOLDER DISPLAY

Bulletin Board

TOPIC: Mystery Magnet

TEACHER:

1. Make sets of pictures and word cards of items that a magnet will and won't attract.
2. Place velcro strips on each card.
3. Make pockets for picture cards and word cards.
4. Place velcro strips in columns on the bulletin board.

STUDENTS:

1. Draw a card from each of the pockets.
2. Put each card under the appropriate side of the bulletin board.

Alternate Activity:
Students can expand this activity by adding more pictures to the collection.

WORD CARDS AND PICTURES:

1. tack
2. clip
3. hook
4. hat
5. can
6. ball
7. nail
8. coin
9. sock
10. football
11. shoe

File Folder

You can put this same project in a file folder. Place the cards on the corners of an open file folder. Paste the envelope on the back of the file folder, with the instructions on the front.

APPENDIX C

GLOSSARY

Accordion book: A book made by folding paper into an even number of sections.

Acrostic poem: A poem in which the first letter of each line forms a word, e.g.

Cuddly and cute
Always happy to see me
Tabby is her name.

Baggie book: A book made from putting several ziplock plastic bags together. Use any size ziplock plastic bags; cut plain or lined paper to fit into the bag. To bind, place the closed ends of the bags together, staple, then bind with colored plastic tape. Students can change contents of the book by removing pages and inserting new ones.

Bar graph: A graph which uses squares (or bars) to represent data.

Big Book: An oversized version of a book written with especially large text and illustrations. Print and illustrations can be easily seen by groups of children.

Bingo: A game for large or small groups, consisting of cards divided into sections. Each section contains a picture or word related to the theme being studied. You can also use a deck of cards with corresponding pictures or words. Each player has a card; the caller, using the large deck, calls the name of the picture or word. Students cover the corresponding picture or word on their cards. Play continues until a student has covered a row, column, or diagonal.

Chalk-talk: A technique for sharing a story that involves illustrating on the chalkboard while telling the story.

Collage: An artistic arrangement of various materials into a picture or design.

Concentration: A game involving matching pairs of cards, similar to Memory; especially useful for developing visual discrimination, sight word recognition, or number facts. Students shuffle the Concentration deck and place the cards face down; students turn over two cards and try to match the cards; if they match the cards, they keep the pair and get another turn. The winner is the student with the most pairs.

Concept book: A book focusing on a single idea or concept. Examples: a concept book of colors, size, shapes, time, machines, apples, etc.

Concrete poem: A poem written in the shape of the object/idea being described.

Contrast poem: A poem which contains two parts that show different aspects of the same subject. Example:

The Weather
The sun bright and yellow/ Shines in the sky.
Rain pours down/ From darkened clouds.

Diorama: A three-dimensional, artistic reproduction often constructed in a container of some sort: for example, a shoe box representing an animal habitat.

Dominoes: A matching game; players match game pieces by placing them end to end.

Fact/Myth book: A book with a fact written on one page and a corresponding myth (untruth) on the facing page.

Fingerplay: A short poem incorporating hand motions.

Flannelboard: A board, usually rectangular, covered on one side with flannel or similar material.

Flip book: A book consisting of several pages which, when flipped through quickly, shows a sequence of actions.

Go Fish: A card game involving collecting "books" of matching cards. Students shuffle and deal seven cards to each player; the remaining cards are placed in a pile in the center. Students in turn ask the next player to "Give me all your _____," trying to make a book consisting of three cards. If students have the requested card, they give it to the other player. If they do not, they say "Go Fish". The player who must "Go Fish" selects a card from the center pile. Play continues until the winning player goes out first or has the most books.

Haiku poem: A Japanese form that addresses the seasons. Contains three lines of five, seven, and five syllables, a total of 17 syllables.

Interlocking puzzles: Puzzles whose pieces connect; especially helpful in developing visual discrimination, sight word recognition, and number facts.

K-W-L chart: A strategy to determine prior knowledge about a topic (What I Know); interest in the subject (What I Want to Know); and knowledge following instruction (What I Learned). At the beginning of a unit, the teacher records what the students already know about the topic, then asks what they want to know. The partially completed chart hangs in the classroom; at the end of the unit, the teacher records what students have learned.

Language Experience: Students participate in some kind of experience, either as a group or individually, and discuss the experience; then the student(s) dictate a story related to the experience. After hearing the story, students can do a variety of literacy activities with it: matching words in the story, illustrating words they recognize from the story, matching phrases, and so on.

Learning Log: A journal where students explore information they are studying.

Observation journal: A journal in which students record observed data.

Pictograph: A graph that uses pictures to display data.

Pocket chart: A large chart made of cardboard or plastic, which contains sections for cards or sentence strips.

Rebus recipe: A recipe which uses pictures instead of words.

Rebus story: A story which uses both pictures and words.

Rebus web: A brainstorming technique using pictures to represent ideas.

Semantic web: A brainstorming technique that uses words to represent ideas.

Sentence frame: Partial sentence used to prompt student writing, e.g., I like bears because _____. When I see _____, I feel _____.

Sequence strips: Strips of paper containing portions of a story; individual strips can be combined into a sequence.

Shape books: Books in the form of the topic being written about; e.g., books in the shape of animals, insects, fruits, vegetables.

Shared Reading Time: A time during the school day when the teacher reads to the students; as students become fluent readers, they can read to each other.

Shoebox sorter: A classification container. Partition a shoebox into sections according to the number of categories desired. Make corresponding cards for the theme being studied that students can sort into the shoebox.

Simon Says: A game of following directions. Caller gives directions; some begin with "Simon Says"; others do not. Students perform only those actions beginning with "Simon Says"; if they follow the directions that don't begin with "Simon Says", they are out of the game. To keep them involved, let the "out" students help you catch others who follow the direction without "Simon Says."

Single character cut-out: A child-size picture of a character from a story. It shows the body, but the face is cut out. Students hold the character cut-out in front of their faces while they retell or dramatize the story.

Storyboard: A retelling technique that uses pictures only; students illustrate portions of the story, then arrange the portions sequentially.

Tangrams: A set of seven varying shapes (five triangles, one square, and one parallelogram) are used to make many different forms.

Theme box: A container for props, costumes, and equipment pertaining to a specific topic or theme; useful for stimulating dramatic play.

Think-Pair-Share: Teacher pairs students to think about a concept and share their ideas.

Transparency story: Acetates (overhead transparencies) and erasable marking pens help students retell a story. Teacher writes the text from the story on the acetates; students draw a picture to accompany the text; then they sequence the illustrated portions and show them to the class with the overhead projector. As students become more fluent, they can write the text for illustrations drawn by the teacher.

Venn diagram: A graphic organizer consisting of two intersecting circles; used for comparing similarities and differences.

Web: A balloon drawn on the chalkboard that contains words, phrases, or images to be discussed and related.

Word bank: A collection of words for students to read. Write words on index cards and keep them in small containers (banks).

Word Wall: A designated wall in the classroom, where words are posted that interest students. May relate to the theme being studied; useful to help students with spelling as they compose their own stories.

APPENDIX D

How to Make a Book

1. Select the type of book: traditional, modern, accordion, baggie, hinged cover, shape, or pop-up.

2. Include these essential components:
   front cover
   title page
   dedication page (optional)
   story/content
   about the authors (optional)
   back cover

3. Attach book pages. The simplest way to attach pages is by stapling; however, there are other alternatives. Office supply stores offer a wide range of fasteners; you may find yarn, ribbon, string, or shoe laces at sewing stores. Pages may be glued to a backing of construction paper, then stapled together and covered. Pages may also be folded and glued back-to-back or stitched down the center. If your school has a bookbinding machine, you may attach the pages using spiral binders.

4. Attach cover. Choose materials that are durable or can be laminated. Possibilities are: tag board, mat board, cardboard, construction paper, cloth, wrapping paper, wallpaper (usually available free from paint/wallpaper stores), and contact paper. A variety of tapes for binding are also available: cellophane, masking, cloth, duct, or colored vinyl.

5. Helpful hints
   - Allow a margin on the left side of the paper before children start writing the story.
   - Cut cover pieces slightly larger than the writing paper; 1/4- to 1/2-inch is usually a good idea.
   - Sometimes you may wish to give a pre-assembled book to students; or you may want to give them individual sheets of paper. The latter is a good idea for children just beginning the process, since you want them to succeed in their story-writing endeavor.
   - It is easier if there is a straight edge on the side to be bound.

For additional ideas on making books, these resources might be helpful:

Evans, Joy and Jo E. Moore., *Making Big Books with Children*
Evans, Joy, et al., *Making Seasonal Big Books with Children*

APPENDIX E

TEACHER RESOURCES

Bittinger, Gayle, ed. *1001 Teaching Props: Simple Props to Make for Working with Young Children*

Boardman, Eunice. *Dimensions of Musical Thinking*

Johnson, Judi, ed. *The Educational Software Preview Guide*

Carle, E. *Animals, Animals*

Scholastic Books. *Poetry Place Anthology*

Neill, Shirley and George. *Only the Best: The Annual Guide to the Highest-Rated Educational Software: Preschool-Grade 12*

Prelutsky, Jack. *The New Kid on the Block*

Schiller, Pam and Thomas Moore. *Where is Thumbkin?: Over 500 Activities to Use with Songs You Already Know*

Silverstein, Shel. *Where the Sidewalk Ends*

Wilmes, L. and More, D. *Everyday Circle Times*

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