56 Environmental Education Activities You Can Do Today!

GRADES K-2

Science

Back to the Earth

Display food items such as a boiled egg, apple, peanut butter, bread, jelly, strip of bacon, etc. Pictures can be used. Ask students to identify the food items you have on display. As the students respond, ask them to tell what their favorite food is. From answers they give, let them trace two or three through their many forms back to the soil. Example:

apple -tree-seed-soil
peanut butter-store-factory-peanuts-plant-soil
jelly-store-factory-berries-plant-soil
orange juice-store-factory-oranges-tree-seed-soil

As a follow-up, provide each student with drawing paper and crayons. Ask them to draw a series of pictures showing each step of the cycle of a product from its soil origin to the consumer. Post representative products on bulletin board.

Snail Spell

Read Snail Spell by Joanne Ryder. Have the students fantasize "shrinking" to the size of an insect and write a descriptive paragraph, of their experience.

Flannel Beach Life

Cut out pictures of intertidal animals from calendars or a cheap field guide. Laminate pictures and use stick-on velcro to turn them into flannel board creatures. (You can also purchase a set of flannel patterns from the Seattle Aquarium). Use the flannel board to introduce the intertidal animals. If possible, have students act out the movements of each, for example, pretend to be anemones and wave arms as tentacles during high tide, cover up tight at low tide.

Garbage Gardens

Have students bring in an egg carton and empty halved egg shells from six eggs. Pierce the bottom of the egg shells and fill them with composted soil. Place the egg shells in the egg carton to keep upright. Plant various types of seeds in the egg shells. Make sure to label each student's egg carton with their names and the types of seeds they planted. Extend the learning by creating experiments dealing with the effects of natural environmental variations such as light and water as well as "artificial" variations including the application of household hazardous wastes found in the classroom (check out areas around your sink for these products). — TGP

Social Studies

Nautical Neighbors

If there is a marina area, take the class on a tour of it. Arrange a tour of a fishing boat, and have the skipper explain all the different equipment and the variety of jobs aboard the craft.

Seafood Survey

Many cultures depend heavily on food from the sea for their sustenance. Have students survey family members and friends about the types of seafood they like to eat. This can be graphed on the chalkboard as well. Follow up survey with a visit to a local fish market or grocery to look at varieties of fish and shell fish up close.

Getting Down to Basics

List all the items below on the chalkboard. Then ask students, one at a time, to erase something that could harm the environment.

Beds, foam cups, what, war, polio shots, oil, atom bomb, pine trees, friends, sneakers, car, hairspray, vegetables, television, plastics, hamburgers, gold, food coloring, love, lawnmower, oxygen, zippers, flowers, aspirin, rockets, ice cream, water, candy bar, computers, grass, chemical fertilizers, jets, school, mosquitoes, boom boxes.

Add to this list. Have students explain their reasoning. — KT

Mathematics

Whale Milk Math

A newborn blue whale gains 200 lbs per day (9 lbs. per hour) by drinking up to 50 gallons of milk each day. In one day, a blue whale calf would drink the amount of milk in 800 school-sized milk cartons! Have students rinse and save milk cartons each day. Count the new ones daily and add the total to the previous day's total until you reach 800.

How Many Legs?

Post pictures of an octopus, a seastar, a crab, and a gull. Review as a class the number of legs each animal has, and discuss the ways each animal's legs help it to survive. Next challenge students with addition problems, such as: How many legs would there be if we had added the legs of the octopus and the gull? The seastar and the crab?

Geometric Shapes in Nature

Geometric shapes can be found in twigs, rocks, leaves, insects, and feathers. Look for cubes, cylinders, pyramids, cones, ovals, spheres, spirals, etc. have students put specimens in like piles. *Variation:* Human-made shapes. Triangles, squares, dcircles, rectangles, etc., can be found at school in sidewalks, buildings, clothing.

Language Arts

What Do You See?

Students view several pictures of beach/ocean wildlife, then choose one to study. After examining closely, each student writes a description of his/her animal. Later, teacher reads written description and class guesses which animal picture it was based on.

World Music

You and your students can listen to, discuss, learn the lyrics and sing along with international artists of world music. Johnny Clegg and Savuka, Raffi, Peter Gabriel, Midnight Oil, Sting (song composed in the video, Spaceship Earth), Julian Lennon ("Salt Water Tear") and Paul Simon ("Boy in the

Bubble") are only a few. Kid's Eye View of the Environment, presented by Michael Mish, is a delightful audio cassette with clever lyrics and catchy melodies that will make everyone want to sing and dance. — TPE

Finding Adjectives

Give each child a small piece of paper with one or more adjectives that describe something in nature (e.g., smooth, slimy, triangular, expanded, cool, soft and green, round and gooey). Have students explore a natural area to find items that meet these descriptions. Let students take turns sharing what they found. —JOD

Fine Arts

Be a Tree

Have students identify characteristics of trees. Visit trees in a back yard, in an orchard, in a park, or in the school year.

Have the students do tree dramatizations, using their arms as the branches and their legs as the trunk. How does the tree look during a storm? How does a fruit tree look in the spring? How does a young tree look in comparison with an old tree? What would happen to change the tree in different kinds of weather or during the different seasons?

After feeling what it might be like to be a tree, have the students paint pictures of them. — EGO

Make a Refracting Telescope

Use two small convext lenses, a toilet paper tube, cardboard, rubber cember, and paper.

1. Find the focal length of one of the lenses.
2. Cut a lens-size hole in the cardboard
3. Glue the lens over the hole.
4. Trace around the toilet paper tube with a pencil over the spot in the cardboard where the lens is located.
5. Cut on this line, and glue the cardboard-mounted lens in the end of the tube.
6. Wrap a sheet of paper around the tube.
7. Tape it in place.
8. Mount the other lens in the end of the paper tube.
9. Slide the tubes back and forth.

Natural Balance

Collect natural materials, or have students collect them. Suspend them with string under a crossbar of two sticks. Driftwood, acorns, and pine cones are among materials that are effectively used. Hang these in the classroom to brighten the scenery.

Illustration by Paul Hansen

Will You Teach Science Better If You Have Done Science?

By Jim Martin
CLEARING Associate Editor

What if science teachers did science before they began teaching? Might a teaching model like this be possible to employ? Instructive to explore? There have been initiatives which followed up on this possibility. Their results were encouraging, but never replaced learning about science in publishers' materials via college teacher education courses, which are simpler and less expensive to do when they are textbook-centered. The fruits of this choice have been a large fraction of K-12 graduates who haven't achieved their potential.

What do students have to say about the way they are taught? Might some insights emerge from their comments? There is very little record of K-12 education from students' own personal view point. Do they know whether their educations are worthwhile? A few people have looked into this, and have found that, when asked, students feel that classroom time is well spent when students treat the teacher with respect, behave the way their teachers want them to, stay busy and don't waste time, learn a lot almost every day, and learn to correct their mistakes. Perhaps they have an intuitive understanding of an environment conducive to learning. The National Board for Professional Teaching Standards teacher certification program finds that students do well in school when their teachers are committed to them and their learning, know the subjects they teach and how to teach those subjects to students, are responsible for managing and monitoring student learning, think systematically about their practice, learn from experience, and are members of learning communities. Two complimentary views of what underlies effective education.

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Teaching Science *(continued)*

Taken together, these findings indicate that students know when they are taught well, and present the foundation of a clear plan for teacher pre- and in-service education. What if students who didn't achieve their potential knew about the National Board's standards, and insisted on assessing their teachers and curricula with them? Would their science courses have begun to encourage them to achieve their potential? Would this have improved science teaching in their schools?

My experience tells me that doing science is important for science teachers. The need for science experience is a need that environmental educators have the capacity to respond to. The environments they work in abound with the kind of work pre- and in-service educators can do: mitigation, restoration, assessment, etc. They all contain the kernels of science inquiries to do. Working in collaboration with environmental educators, agency staff, and teacher education faculty and staff, pre- and in-service teachers could gain hands-on experience on the ground that they could get in no other way. My own experiences tell me that what emerges from this kind of collaborative work is science teachers involved and invested in the content that they teach, and empowered as teachers unencumbered by bureaucratic pressures outside their classroom doors; the experience necessary to change teachers' views of science, a paradigm shift, that moves their locus of control for teaching science to within themselves, and away from the political winds that blow through schools. A key piece of the puzzle, this respite gives them a chance to develop effective science curricula.

What is it about doing science in environments outside the school that makes it so effective? I'd say that the reasons are many. An obvious one is that doing science in a familiar setting is less intimidating than doing it in a lab, which is much less familiar than, say, a quiet streambank. Another is that our brain learned to learn in the world outdoors. So learning science in a natural environment means learning in the brain's inductive-constructivist way of learning. I've learned that,

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K-12 ENVIRONMENTAL EDUCATION ACTIVITIES

GRADES 3-5

Science

Evaluating Growth

Growing plants in crowded and uncrowded situations will show the effects of overpopulation. Fill milk cartons about three-fourths full of soil. Plant several cartons with seeds — some with two or three seeds, several cartons with a small handful and several cartons with a large handful. Varying the amounts of seed in the different cartons creates different conditions under which the plants will grow. After the seeds have become seedlings, measure and record their heights on a piece of paper and draw a line graph on graph paper to represent each group of seedlings. Evaluate the plants' growth periods in terms of the number of plants under the different conditions. —CTE

Living in the Schoolyard

Teacher begins activity by drawing an outline of the classroom on the blackboard. Develop a key to one side of the outline to be used to represent the plants, animals and special features which exist in the classroom. "Let's see if we can make a map of all the living things in our classroom. Does anyone see a plant? Skippy, will you come up and mark the plants on our map for us?

Then provide a map of the schoolyard for groups of students (or for individual students depending on skills at map making). Take children outside and let them map all the living things that they see. Remind them that they have to look hard to see some of the things that are there.

After students have completed their maps, gather them together for discussion about the roles of the living things they found.

Forest Community

Discuss as a group the items a city has and make a list. Suggestions include people, factories, subways, cemetery, apartments, treffic, plumbing, stores, garbage collectors, streets, etc.

Divide the group into smaller ones of 3 to 4 each. Send each group out in a forest or wooded area and have them try and identify the natural item that corresponds to the ones on the list. —ECO

Social Studies

Pick a Package, Any Package

Visit a supermarket and find the following products: cereal, laundry soap, milk, fruit juice, vegetables, soup, cake mixes, spices, candy, and toothpaste. In what different kinds of packages can they be bought? Are they available in the bulk food section? Why are products available in so many different packages? Which packages have the least amount of throw-away packaging? Which packages cost the least for each product? Which one does your family usually buy? Back in class, make a wall chart. Can some of the packages be reduced or avoided, reused or recycled? Circle in green all the reusable items, in yellow all the recyclable items, and in red all the disposables. -NTW

Non-Pointing the Finger

Take a walking tour of the neighborhood. List possible examples of non-point source pollution, both natural and human-caused. Back in the classroom, compile a class list to see how many sources were pin- "pointed." Use magazine or newspaper pictures to make an informational display of possible sources of non-point water pollution. — FSS

Water, Water Everywhere...NOT!

Point out that last year water was rationed in parts of California. It was shut off altogether in parts of Rhode Island when a leaking gas station tank polluted it. Our carelessness can hurt the water supply. Also, it is important not to waste water if we want to be sure of having enough for our needs. Have students name some ways each of us can help protect our water supply. (Ideas include using less water, not running water needlessly, not littering near bodies of water. Also some environmentalists suggest eating less meat to save water. A vegetarian diet requires much less water in its production than is used in the raising of cattle, for example.) —KT

Mathematics

Milk Carton Madness

In an attempt to determine how much potential space milk cartons take up in a landfill, students measure and calculate the volume of one milk carton. Students also determine the volume of their classroom. Using the milk carton volume figures, have the students determine how many cartons it would take to fill up their classroom. Then determine how many milk cartons are generated by the entire school in one day. Determine how long it would take to fill up

their classroom. Extend these computations to a volume the size of the school. Follow this by discussing the importance of diversion of materials from the landfill and by exploring the feasibility of milk carton recycling at your school. — TGP

Shoot the Moon

Knowing that the moon returns to a given position every 29 1/2 days, have students figure out the dates that will have full moons for the coming calendar year. From this they can make their own calendars and check up on themselves. —JOD

Language Arts

Get Your Story Straight!

Invent or find a story that conveys an environmental message you wish to have your students think about. Divide the story into individual events that have ideas or words that allow the student to sequence them in a particular order.

As a group, or individually, have the students read the passages. Have the students number the passages so that the story can be read in the correct order.

Read the story aloud in the correct sequential order.

Use discussion and questioning to strengthen the story's message. —IEEIC

Wet Words

How important is water to our society? Just think how many different words we have to express it. Have students brainstorm words that mean water or a form of water (e.g., splash, drip, etc.) while the teacher lists them on a large sheet of butcher paper. Can your class reach one hundred? Save the list and use it later for creative writing activities.

Fine Arts

Wetlands Animal Masks

Students can create paper mache masks of their favorite wetlands creatures. Creative dramatics can be developed by students using their masks to play a role in a wetlands drama.

Students will need old newspapers, wallpaper paste or liquid starch, water, tempera or acrylic paint, round balloons, and scissors.

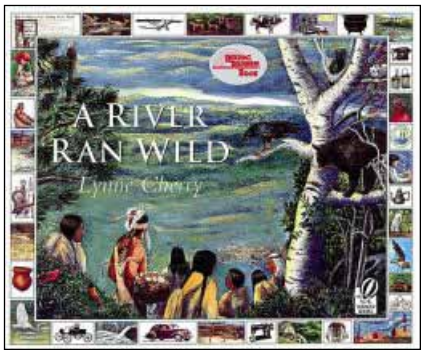
Choose a wetlands animal. Tear the newspaper into narrow strips. Blow up the balloon. Mix the wallpaper paste. Use one part wallpaper paste and 10 parts water or straight liquid starch.

Dip the strips of newspaper into the wallpaper and water mixture. Lay the paper

Metaphors for Change: Interpreting Human Changes in Your Watershed

Background information:

Metaphor is a powerful tool for learning in which we can connect old thoughts together in new ways. As environmental educators, we're trying to get our students to understand how they can use their knowledge to find meaningful connections with their environment. This language arts activity focuses on helping students find new ways to see themselves a stewards of the environment, whil also giving them an introduction into watersheds.



Materials:

- One copy of A River Ran Wild by Lynne Cherry
- Large butcher paper or lots of chalkboard space
- Writing materials (pencils and paper)

Knowing your students:

1. Have each student write a list of words that he/she thinks describes the word "healthy."
2. Keep these lists to compare with the end product of this exercise.

Activity:

1. Together as a class, create a class list of words that describe "healthy."
2. Tell students that you're going to read them a story that may bring up some different ideas about health.
3. Read A River Ran Wild by Lynne Cherry.
4. Tell students you're going to switch topics on them, but you promise to bring them back to this idea.
5. Ask students to tell you what it would feel like to be a train. List all of their ideas. Carry it further by asking what it would feel lie to be pulling a heavy load, or to suddenly have to slam on the brakes. Really concentrate on getting students to become the train with their words.
6. When you've got a long list of words about trains, ask students to describe what it would feel like to be ice cream. How would it feel if you were just being made into ice cream? When someone bought you at a store? When someone scooped you into a bowl? Continue until another long list of descriptive words is formed.
7. Look at all the words on the board that describe trains and ice cream. Put two opposite words together (such as Creamy Steel). Put as many opposites together as you can and list them on the board or butcher paper.
8. Pick an opposite which could be used to describe the Nashua River Watershed in A River Ran Wild.
9. Write a description of your own watershed using one of the opposite combinations you listed.
10. Share the descriptive paragraphs and discuss how they reflect the health of your watershed.

Reflection:

Take several minutes to discuss how this activity helped students view their watershed in a different way. How did therir conception of health change? What are some of the ways humans change their watershed (maybe without knowing it)?

Teaching Science *(continued)*

when teachers begin by doing science in a natural environment, they develop reasons to go into the lab, and labs become familiar places. What if we tried that? What would happen if environmental educators, agencies and organizations, and schools of education gathered together to explore the idea of a collaboration to provide pre- and in-service hands-on science education for teachers? There are all kinds of possibilities in collaborations like this.

If you're a teacher, think back to your pre-service classes. Did you learn about a thing in class, then go out to experience it? How closely did what you experienced resemble the picture you had in your head back in the class? What if you had done the work first, then returned to the class to learn the underlying conceptual structure? Imagine a pair of pre-service teachers working together with an environmental educator, a restoration specialist from the City's Bureau of Environmental Services, and a teacher with her students, to restore a reach of a stream flowing through a residential area near a school. Imagine further that the pre-service teachers are charged that day to identify and describe the characteristics of effective work groups. This in addition to doing the scheduled work of the morning.

The next day, back in the School of Education, all of the members of the class relate their experiences and report the characteristics of effective work groups that they had observed. Might discussion and negotiation of meaning elicit a clear concept of effective work groups, and posit connections between that and other elements of human learning? How might experiences like this influence these pre-service teachers when they do their one-year teaching internship? Would they affect the quality of their students' educations when these interns begin full-time teaching? How would this look if a full-time teacher worked with the group from time-to-time as a mentor? If the full-time teacher would be the supervising teacher when the interns did their year in her classroom? This may never happen, but you can organize your own experiences to make this kind of experience one that you achieve yourself. All of the pieces of the puzzle are out

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K-12 ENVIRONMENTAL EDUCATION ACTIVITIES

over the balloon. Apply two layers to what will be the front of your mask. Let it dry completely.

Repeat procedure, building up the areas that will be noses, beaks, ears, etc. Let it dry completely.

Repeat the procedure, applying one last coat of paper over the entire mask. Let it dry completely.

Put the mask over your face. Feel where your eyes are. Have a friend mark the eye gently with a crayon or marker. Remove the mask and cut eyeholes. Put the mask over your face and check the eyeholes; remove it and make any corrections.

Cut a mouth hole.

Paint the mask and let it dry.

Water Drop Necklaces

Give each student a sheet of paper onto which a large water drop has already been drawn on both sides. On one side of the paper, printed inside the water drop are the words, "I'M TOXIC, DON'T FLUSH ME." On the reverse side of the paper, inside the water drop are written the words, "WATER IS PRECIOUS, AS PRECIOUS AS..." Instruct students to draw one or several toxic items that should not be flushed down the toilet (e.g., paint, oil, chemicals) inside the water drop on the "toxic" side of the paper. On the other side instruct them to draw pictures of one or more persons or items that are precious to them (e.g., grandma, grandpa, a pet, a bicycle).

Once the drawings are completed, have the students cut out the water drop, then punch a hold near the top of the drop using a paper punch and finally thread a string of yarn through the hole to create a necklace. The necklace has a positive "precious" side and a negative "toxic" side depicted by the students' drawings. — CON

Torn Paper Art

To help the students understand the fibrous make up of paper, tear a scrap of paper and hold one of the torn edges up to the light. Along that edge will appear a slight fuzz. Here and there tiny strands will project separately, like fine hairs. These strands are cellulose fibers.

Discuss with the children all the different materials from which fibers can be harvested to make paper. Show them fibers from a small piece of cloth to illustrate the point.

Using scraps of construction paper, tear and glue different colors to represent the forest and creatures who depend on the forest for survival. Display these pictures throughout the school to heighten awareness of the need to conserve and protect natural resources. - CON

GRADES 6-8

Science

Rainforest Pyramid

Use artistic talents to create blocks symbolizing rainforest creatures. Build a pyramid, putting the prey species such as insects at the bottom - building up until the top predators like the jaguar and harpy eagle are at the top. Show what happens when prey species are taken away - such as if insects are killed by pesticides, or small rodents are killed as pests. The same activity can be done for temperate forests of the Northwest as well, or any other particular ecosystem. —RC

Adopt a Part of Nature

Adopt part of a stream, creek, river, lake or ocean. Clean up the beaches or shores and spend time there as a class enjoying these special places.

Shorebird Safari

After introducing the class to common shorebirds and the field marks used to identify them, take your class to a beach. Shorebirds are visible year round, especially as the tide goes out. Students should try to identify special adaptations the birds have and predict the type of food they are seeking.

Social Studies

How Did They Do It?

Have students investigate the lifestyles of Native Americans on the prairie or along the coasts or in your local area. How were their needs met by these different environments?

Nature's Tool Box

Pass out to individuals or small groups of students an assortment of simple tools: paper clips, sewing needle, letter opener, hair brush, straight pin, comb, and so on. Have students examine the tools carefully and decide what kinds of natural objects could be used or modified to make them. After students hike through an outdoor setting and collect materials, have them use the materials to make specific tools. —EGO

Travel Log

Design a travel log to show the travelling you do for two weeks. Include the date, where you went, how you travelled, who went with

you, how long it took and how many kilometres you travelled round trip. After two weeks, add up how many trips you took by car, transit, bicycle, foot, taxi or other modes. How many kilometres did you travel all together? Which transportation mode is the fastest? The cheapest? Which is you preferred transportation mode for each type of trip? Why?

Now analyze your information and make suggestions as to how you could have reduced the number of trips you made. How many times could you have used transportation other than a car? Compare your results with those of your friends. —LCA

Mathematics

Calculating Growth Rates

In 1990 the U.S. population was 248.71 million, in 1980 it was 226.54 million. If you need to determine the annual growth rate and doubline time from this information, use the following equation:

growth rate = (100÷number of years) x In (pop. 1990 ÷ pop. 1980)

To calculate natural log (In), you will need a calculator with an "In" key, which are available for under $20. The following is the series of keystrokes required to work out this example:

KEY	DISPLAY READS
ON	0
248.71	248.71
divided by	248.71
226.54	226.54
=	1.0978635
In	0.0933660
x	0.0933660
100	100
divided by	9.336603
10	10
=	0.933660

Because of the uncertainty in the data, we will round this number up to 0.934. You now know that population in the U.S. increased between 1980 and 1990 at an average annual growth rate of 0.934 percent per year. Using the equation to determine doubling times (70 divided by the rate of growth), you can also figure out that the U.S. population at that continued growth rate will double in approximately 74 years. We cannot however, assume that the rate of growth will remain constant. The Immigration Law of 1990 for example, which increased immigration rates by 40%, will proportionately raise the U.S. population growth rate and thereby decrease the time it takes for our country to double its population. -CCN

Each-One-Teach-One I See Change!

Background information:
This lesson is designed to be a student-centered introduction to observing the changes in your watershed. It is best one outdoors, but you may also bring materials indoors for the activity if an outdoor option is not available. I suggest scoping out a trail or section of open land near your school before you take students out to observe. It will be important for you to know where to find examples of geologic, climatic, and human changes in the area where you take your students I also suggest bringing several volunteers to assist with students.

Knowing your learners:
Prior Knowledge Assessment.

Materials needed:
1 large piece of butcher paper
Markers

Procedure:
1. Hang up the paper where students can see it and you can record what they say.
2. Ask students to think about the word CHANGE and to tell each other one thing that they think shows change.
3. Listen to ideas and record them on the paper.
4. Ask students to describe how nature changes, how people change, etc., to bring out more ideas.
5. Once you've written several examples of change, ask students to look at what you've written and to see if any of the changes are similar to one another.
6. Discuss the similarities.
7. Point out that the students have listed examples of GEOLOGIC CHANGE, CLIATIC CHANGE and HUMAN CHANGE.
8. Explain that the class is going to take a walk to look at these three types of changes.
9. Use this chart you have created as a base reference for what your students knew about change at the beginning of this lesson.

Student Preparation:
Describe how an Each-one-teach-one line works by demonstrating with stones or markers:
1. Students will be in a line with partners. The line will stay at one end of the trail with volunteers while the first two students go with the teacher up the trail.

(X=students and volunteers, T=Teacher)

XXXXX X T Trail
XXXXX X →

2. The first pair of students will find an example of a geologic, climatic, or human change and learn a fact about it. (Example: "This dirt used to be a rock. It went through a geologic change called erosion and now it is broken down into dirt.")
3. A second pair of students leaves the line about 1 minute later and joins the first pair to hear what they have to teach.

XXXX XX T Trail
XXXX XX →

4. After the second pair of students has learned the fact, they go with the teacher further up the trail to find another example of change.

XXXX X XT Trail
XXXX X →

3. The third pair leaves the line to listen to the first pair, and then to go with the teacher to a third site of change.
4. The process continues until everyone has left the origianl line and then the first pair, which is now at the end of the line of students spread out on the trail, proceeds up to the second pair to learn from them. They all four go together up to the third pair, and so on until everyon e has heard what everyone else had to teach.

Back in the Classroom:
1. Have students sit with their partner they were with on the trail and give each partner a sticky-note pad.
2. Write one example of change on each sticky-note. Try to remember as many as you saw, or heard about on the trail.
3. Categorize the sticky-notes into geologic, climatic and huan change categories.
4. have each group share their sticky-notes and discuss any discrepancies.
5.Make three large charts on butcher paper to list the types of geologic, climatic and human changes you learned about. Compare this new chart to your first chart and discuss how much you've learned.

Graph the Tide

Purchase a tide table wherever fishing supplies are sold. Enlarge and photocopy each month's chart on a separate page. Make enough copies so that each student will have one month to chart on graph paper. Post the papers in a line along the wall to see the rise and fall of the tide for the year. Teacher may want to designate a place on the paper for the base point (0.0).

Language Arts

Opposites Attract

Here is a thought-provoking idea: Collect photographs, illustrations and/or paintings from magazines — some that graphically portray a healthy, balanced environment and others that depict a damaged, unhealthy Earth. Hang these on opposite walls in the classroom to stimulate discussion and inspire writing. How does each set of images make students feel? Encourage them to think about how the healthy can be changed into the damaged and how they can help to change the damaged back into the healthy. As students learn about environmental problems and the solutions, they may go to the appropriate sides of the room to record their thoughts and ideas in two separate notebooks. For example, if a student is studying about an extinct animal, that student may record his/her concerns in a notebook located next to the unhealthy Earth artwork. If he/she knows of possible solutions and actions that can be done to help, they may be recorded on the other side of the room next to the healthy Earth artwork. Eventually, your class will have two useful notebooks filled with concerns and solutions to many environmental problems. Prioritize these and use your computer to record the top ten items that can be posted in the room for reference and distributed to family members. - TPE

What's the Idea?

Encourage students to be on the lookout for environmental articles in their magazine. Once they begin coming in, select one and duplicate as many as needed.

Distribute copies to students.

Instruct the students to read the selection very carefully. On a clean sheet of paper, or index card, they are to write the following:

- the main idea
- the problem
- a solution
- their personal opinion
- a summary (approximately eight sentences)

On the back they are to compose and write three quality questions with answers regarding the selection; one true-false, one multiple choice, and one fill-in-the-blank.

Collect papers and compose a comprehension quiz to distribute the next day, or perhaps create a game with which to exercise learned facts. — IEEIC

Expectations

Students can write a paper that expresses their feelings about going to outdoor schooll. By knowing their anxieties, fears, and excitement, you may be able to better understand their individual needs. It is always fun for students to reread their own papers upon returning home. —JOD

Fine Arts

Touch of Color

While visiting a wooded area, pass out paper to the class and have each student, using natural materials (soil, berries, flowers, leaves, moss), draw a picture of the forest setting. Give the class an opportunity to display their work and describe their feelings about the surroundings. Encourage the students to discuss what materials were used to add color. —EGO

GRADES 9-12

Science

What Eats?

For one game, divide the group into teams, with no more than 10 persons on a team. How write a column of numbers one to 10 in three widely separated places in the room. Each team has a pice of chalk or marking device.

At a signal, the first person on each team dashes to the column of numbers and writes the name of a plant or an animal opposite the number "1". Then he dashes back and gives the marker to the second person on his team. This person goes to the column and writes the name of something that eats what is written in number "1". The marker is then passed to the third person, and so on down the line.

If a player writest down an incorrect name, it can be erased only by the next player, who loses his turn to write a name. Winners are determined by the most correct food-chain connections identified by a group.

Once a group has developed some skill at playing, try limiting the habitat to that of the forest, a brook, a marsh, a pond, the ocean, or some biome or community.

Symbiosis

Working with a partner, students research symbiotic relationships amongst intertidal and ocean organisms and choose one to report on. One example would be the anemone and the clownfish.

Human-created Habitats

Assign one water-dwelling animal to each student or team. Students then must design (on paper) an artificial habitat which would suite the living requirements of the animal. To do so, they must investigate and establish the characteristics of the animal's natural habitat, including food, water, shelter, space, climate, etc. This assignment could be followed by creating models of artificial habitats.

Social Studies

Environmental Impact

Create a large mural on butcher paper of a natural area complete with wildlife, trees, mountains, rivers, etc. but no human development. After completing the mural, brainstorm a list of things that would happen if a much needed energy source (e.g., coal, oil, uranium, water) was discovered in that area. Draw pictures of these activities and facilities and place them in appropriate places on the mural. Discuss the positive and negative impacts the "new development" will have on the environment and wildlife, and create a list of these effects. Now, re-develop the energy source and see if you can come up with ways that the development can have less impact on the environment and still get the energy needed, at an affordable cost.

Move Over!

To begin this activity, tell your class they are going to try an experiment dealing with classroom arrangements. Don't mention the idea of overpopulation or limited resources. These concepts will surface as the outcome of the activity.

Select an area of the classroom to be used in this overpopulation experiment. an area approximately 10'x10' should be marked with masking tape on the floor and two desks should be placed inside the area. Also provide a "Resources Box" with 4 pencils, 2 pens, 6 sheets of paper and 1 pair of scissors.

Select two volunteers to work in the square. They should take with them only the books they will need. One half hour later, select two more students to work in the square and add their desks to the other two. (Make sure to remove all "resource" from the desks first).

Continue to add students to the area in shorter intervals of time similar to the way population grows rapidly. When the area can no longer hold additional desks, add students and have them share desks. Make sure the tasks the children are involved in will require the use of resources in the "Resources Box."

When the limited resources and overcrowded conditions lead to bedlam, bring the class together for discussion. How is this like the real world? What "resources" are in short supply? —LLC

Environmental Careers

Plan an Environmental Careers Day. Research various careers associated with the environment and invite people in to speak about their jobs. Try to get a variety of speakers to reflect the diversity of careers and educational requirements. Prepare an outline for the speakers to they will address the questions you are most interested in.

Both Sides Now

A forest management specialist, touring a watershed area, notes that in one part of the forest many diseased trees have fallen and are covering the ground. This is a serious fire hazard for the forest. The specialist recommends logging this area and replanting with young, healthy seedlings. A concerned citizen's group protests the logging, saying that clearcutting the area will erode the soil, which will make our drinking water unclean.

Your group has been asked to list the pros and cons of logging that area of the watershed. Consider the environmental, economic and social arguments. Can you find a compromise to the problem? How do personal opinions affect your decision? —FSS

Litter Lifelines

Students collect litter in an outdoor setting — school parking lot, playground, camp, or business district. Then each student selects a piece of trash - soda can, chewing gum wrapper, potato chip bag —and makes a life line of the litter, from the origin of its natural materials to its present state. — TGP

Mathematics

Differential Absorption

Types of soils differ in the amount of water they can hold. Collect a standard amount of each of five or six soil types. Place each soil sample in a sieve held above a container. Pour a measured amount of water onto the soil and measure how much is collected after 30 seconds, one minute, 10 minutes. The amount of water the soil can

Teaching Science *(continued)*

there; they're just not seen as elements of a functional whole. We have to learn to open our minds to recognize the relationships between what seem obviously disparate elements in a confusing world.

We're not going to have this handed to us. But you can hand it to yourself. Find an environmental educator who is doing a restoration. Work with her. Then get your students on board. You'll be outside your comfort zone. That's okay. Keep your focus on what you want your students to learn, and make sure that part works. Look for workshops and institutes that provide valuable experience. In one summer institute, a teacher who had never ventured outside the classroom experienced her first encounter with the real world. By the end of the institute, she knew how to find a wetland, figure out its parameters, and design a project for her students. She had done science, and moved it into a perspective that removed its anxiety, made it eminently teachable. So she looked up an environmental educator she had met during the institute who suggested a wetland restoration project along a city-sponsored trail. The environmental educator agreed to help her plan, meet City bureau of environmental services staff, provide a training for her students, and point her toward a private granting organization which funded just this sort of project. She did the project, and continued on this path.

Let me step away from science for a moment and tell about plays my 7th graders performed when I first began teaching below college level. If I hadn't done drama, I'd never have just hung two sheets from the ceiling light fixtures along the length of the room and said, "The side toward the windows is the audience, the side toward the blackboard is the stage. What shall we do?" My locus of control would have been too far away from me to even think of doing that. Luckily, I'd done plays for years. We picked a play, edited it, gave it. Then students, in groups, asked to write and do plays for the lower grades. And did them. I'd have been scared to death if I hadn't acted, directed, constructed, written programs, made props, etc. I'd have simply followed a published play with directions. To the letter. And thought I was teaching drama. And I'd certainly not let them go off to the lower grades on their own. They're seventh graders; get real.

Once you do science, it is not as intimidating as you first perceive it to be. Like me if I'd never done drama. Or, for all of us, the first time off the diving board, hitting a softball, etc. Now, you are focusing on particulars, so experience no unfocused anxieties about vague worries. We're all good at that; once we focus on particulars, we begin to nail them down and work toward mastery. Get the start, so you know what you want to understand and do, then look around for resources like courses, workshops, knowledgeable people. Experience doing the work, then take control of your curriculum.

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hold is total added, minus that which drained out at the bottom.

From the data obtained, determine which of the soils can hold the most or the least water. On what properties of the soil does this depend? Which soils would erode most easily? Which would be best for plant growth? —ECO

Food Chain Figuring

Use the following information to create math problems. A medium-sized whale needs four hundred billion diatoms to sustain it for a few hours! The whale eats a ton of herring, about 5,000 of them. Each herring may have about 6,500 small crustaceans in its stomach, and each crustacean may contain 130,000 diatoms...

Language Arts

Operation: Water

Invite the participants to imagine that they have landed on Earth from another planet. The planet they come from only has minerals and air. They had received word that a substance had been found on Earth that could move or hold its shape. They are here to see if the report is true and discover for themselves what this "water" is like. They are equipped with finely tuned instruments for sound, feel, sight, smell, and taste. They are to split into two search parties, one going to the pond area, one to the stream. They have 15 minute to gather sounds, smells, signs of animal and plant life, observe water clarity, etc. The groups then discuss and compare the two water sightings and make speculations about the role of water on this green planet. Have students write an essay on their exploration of this strange planet and the miracle substance "water." —JOD

Forest Essay

Have students write an imaginary story using one of the following titles: a) The Life of a Pencil; b)An Autobiography of a Tree from Seed to Lumber.

Legends of the Sea

Many cultures have legends about the way the ocean and its life forms were created. Read some of these to the class, then encourage them to create their own legends about how somethings came to be. It would be helpful to have some pictures of marine life forms for the students to view. Some ideas: How the Eel Became Electric; Why Octopi Have Only Eight Arms; Before Whales could Swim; How the Hermit Crab Lost His Shell.

Fine Arts

Mother Earth

Students begin by brainstorming a list of all the ways they are dependent on the Earth. From that list should come some ideas for presenting that information to others. They may decide to have teams of students work on representing different items on the list. They may want to expres their relationship to the land written in story format, in poetry, verbally on tape, through photographs, drawings, paintings, or soft sculpture. They should come up with a theme uch as Native American philosophy, or a celebration of life-giving qualities of the Earth, or getting involved with conservation, and work from there. Ask for volunteers to write letters to local organizations requesting space to set up their display for others to view.

Encourage your students to express their feelings about our responsibility to live in harmony with the land. Is it our responsibility? Can the actions of one person make a difference? What kinds of actions does living in harmony with the Earth require? —LLC

Environmental Art

Visit a natural history museum. Or, have students look through books with photographs of paintings depicting the environment. They may analyze, discuss, compare, contrast art works and give critiques. Pupils may be inspired to write poems or stories about ideas generated from the special works and they may then create their own works of art.

Sources of activities:

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