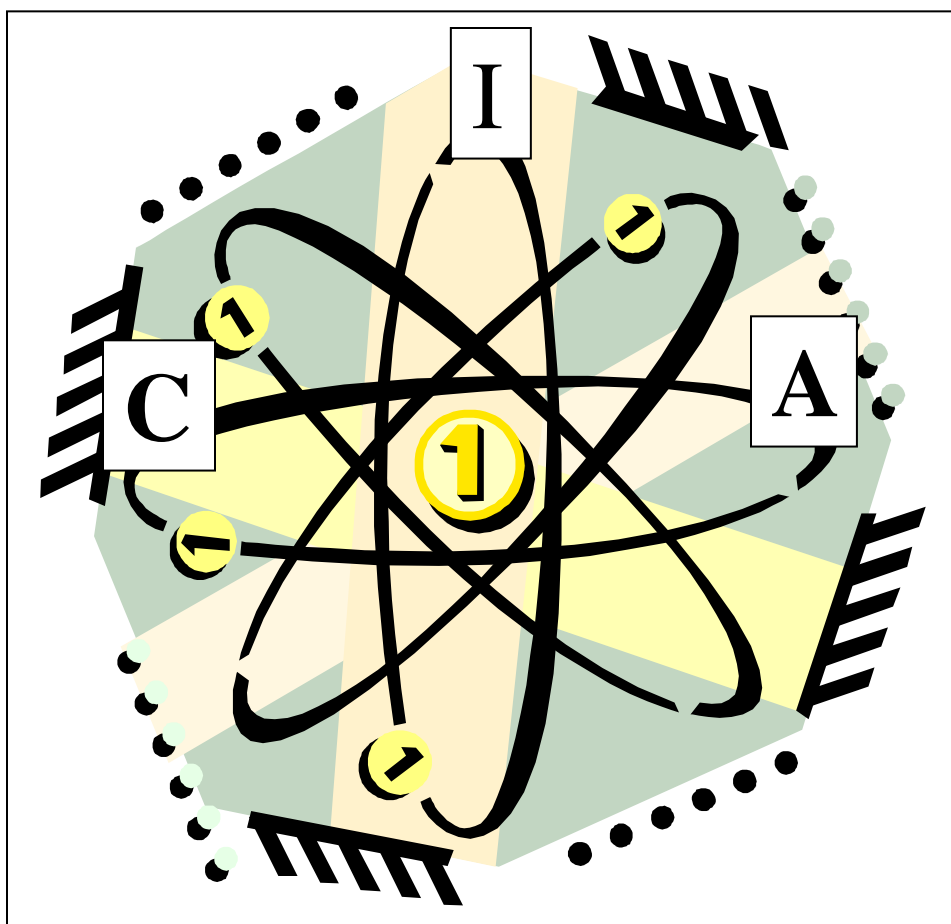


Curriculum, Instruction, Assessment (CIA) Alignment

Science, Grade 2 Unit 6: Save the Earth

Task Analysis and Hands-on Investigations



**Ronald Blocker, Superintendent
Orange County Public Schools
Orlando, Florida**

2003-2004



Subject Area: Science
Strand G: How Living Things Interact with Their Environment
Grade: 2

Benchmarks

SC.D.2.1.1: The student understands that people influence the quality of life of those around them.

SC.G.2.1.1: The student knows that if living things do not get food, water, shelter, and space, they will die.

SC.G.2.1.2: The student knows that the activities of humans affect plants and animals in many ways.

TASK ANALYSIS	
The student...	
SAVE THE EARTH	
•	recognizes that humans are an integral part of the ecosystem.
•	classifies and justifies changes humans make in the environment as positive or negative.
•	identifies resources as things we get from the living and nonliving environment.
•	recognizes and explains why some resources are limited.
•	investigates the air in the environment.
•	recycles materials that can be used again, sometimes in different forms.
•	creates a plan for being more personally responsible about caring for the earth.

CLEANING WATER

BENCHMARK AND TASKS

SC.D.2.1.1 The student understands that people influence the quality of life of those around them.

- The student recognizes and explains why some resources are limited.
- The student creates a plan for being more personally responsible about caring for the earth.

KEY QUESTION

Can we clean dirty water?



BACKGROUND INFORMATION

Because water is used and reused, waste materials, bacteria, and viruses must first be eliminated before the water returns to the environment. The increased amount of waste and the greater demand for water have reduced the capacity of rivers, streams, and lakes to purify themselves. The creation of new products leads to the need for more advanced water treatment and pollution control technology.

Before our population and industry grew to their present sizes, the sheer volume of clean water in streams was able to dilute the small volume of waste. Today, bacteria would quickly rob our water of dissolved oxygen, which would result in the loss of drinking water and the death of fish and other animals.

The function of a waste water treatment system is to speed up the natural process by which water purifies itself. The process of water purification usually takes three stages. The first phase removes solids. The second phase employs biological methods to remove biodegradable materials. The final stage disinfects water and makes the water ready for drinking.

MATERIALS

Teacher

coffee grounds
pebbles or marbles
raisins
broken toothpicks
water
Save Our Planet by Diane MacEachern

Per group

Available tools for cleaning wastewater:
clear, plastic cups
hand held flour sieves
4" by 4" square screens
spoons
sorting sieves (if available)
coffee filters
magnifiers (1 per student)
student science journals
newspaper
microscope

TEACHING TIPS

1. To make wastewater:
Fill plastic cups until they are $\frac{1}{2}$ full of water and then add the coffee grounds, marbles, raisins, and small broken toothpicks. Create one cup of “wastewater” for every group.
2. An optional chart is available at the end of this activity for each group to use for organizing and planning. Students will need guidance to complete the chart.

ENGAGE

Using a globe or map, show how water covers approximately $\frac{3}{4}$ of our planet. Explain that because of the salt content in our oceans and the pollution of clean water around the globe, much of our available water is undrinkable. Because we cannot live without drinking water, it is important that we understand the importance of keeping our water clean.

Say, *Each group will be given a cup of ‘dirty’ water. Another way of describing this water would be to call it **wastewater**. Each group is challenged to use the materials available to clean the water.*

This wastewater will not harm you, but should be treated like real wastewater and considered unsafe for drinking.

EXPLORE

1. Organize the students in groups of three or four.
2. Have students cover their work area with newspaper.
3. Give each group a cup of wastewater.
4. Allow the groups time to use the magnifiers to observe the wastewater. Students will record their observations in their science journals.
5. Show the students the tools each group may select from to help clean the water.
6. Groups will need to create a plan for cleaning the water. Discuss some possible methods, using the tools. The plan should include:
 - assigned tasks for every member of the group,
 - the tools to be used,
 - a plan for using the tools (sequence of events).
7. Have one helper from each group collect the needed tools.
8. The groups should follow their plans to clean the water.

EXPLAIN

Each group will explain their plan and share their results.

Ask:

Was the wastewater completely changed back to clean water?

If not, what remains to be cleaned?

What tools worked the best?

What materials were easiest to remove from the wastewater?

What are some ways that people pollute water?

Could we clean our wastewater at home?

Why is it important to think about how we use water?

If you removed most of the waste from the water, but could still not drink it, how could you still use the water?

EXTEND/APPLY

1. Collect a sample of water from a local pond and some tap water. Observe the differences between the two samples, using a hand lens and a microscope.
2. *Save Our Planet* has many, excellent tips for saving our water and keeping it clean.

EXTENSIONS

1. Organize a field trip to visit our local wastewater treatment plant.
2. Invite a representative from a local bottled water company to explain the difference between bottled and tap water.

WasteWater to Clean Water

Write the steps of your plan in order from beginning to end and number the steps.

Steps of our plan:

Student Scientist	Task	Tools Needed

CATCHING AIR

BENCHMARKS AND TASKS

SC.D.2.1.1 The student understands that people influence the quality of life of those around them.

SC.G.2.1.2 The student knows that the activities of humans affect plants and animals in many ways.

- The student investigates the air in the environment.
- The student classifies and justifies changes humans make in the environment as positive or negative.

KEY QUESTION

What do we find in the air around our school?



BACKGROUND INFORMATION

The students will collect matter from the air around the school. A special sticky frame, an air collector, will collect evidence of many different types of matter (e.g., insects, pollen, lint, dust, hair, parts of plants).

Particulate matter (second graders would refer to as dirt) is made up of tiny particles of solid matter and/or droplets of liquid. It is produced by a variety of natural (pollen, dust) and man-made (smoke, lint) sources. Particulate matter is a necessary part of the water cycle. It is what the moisture (evaporated water) clings to when condensation takes place, thus forming a cloud. Particulate matter can also consist of matter that is considered a pollutant. Most of these pollutants are invisible unless large amounts concentrate in areas, like large cities, and result in smog. Some of these particles are harmful to our lungs, make things dirty, and coat plants so that it is difficult for them to grow.

It is important for the teacher to point out that not all particulate matter is considered harmful. Some, such as plant parts, dust, and insects are simply part of the natural world.

MATERIALS

Teacher

graph or chart paper
safety goggles
1 prepared *Air Collector*
candle
matches
The World That Jack Built by Ruth Brown
The Lorax by Dr. Seuss

Per pair of students

Air Collector frames
contact paper to cover frame opening
scissors
hole punch
string
wooden dowel, ruler, or pencil

Per student

science journal
hand lens
pencil

TEACHING TIPS

The teacher may choose to make the air collectors or have students construct them with teacher direction.

1. To build an *Air Collector* frame:
 - Duplicate the blackline master using heavy cardstock. Each rectangle will be a frame.
 - Cut out the center.
 - Cut out a piece of clear contact paper a little smaller than the outer edge of the frame.
 - Remove the protective covering from the sticky side of the contact paper.
 - Lay the contact paper down, sticky side up on the table and place the cardboard frame onto the sticky paper.
 - To protect the sticky side until it will be used, replace the protective covering.
 - Using packing tape or staples, attach a wooden dowel, ruler, or pencil to the bottom center of the frame if the collector is to be staked in the ground. If the air collector is to be suspended, punch a hole in the middle of the top of the frame and place a string in the hole so it can be tied and suspended from a tree, pole, etc.
2. Find places around your campus that will work well for the collectors.
3. Put some collectors out ahead of time in order to be familiar with what might be found.
4. Keep all materials gathered, charts, and journals for assessment.

ENGAGE

Read *The Lorax* and/or *The World That Jack Built* to the class and discuss how humans effect the environment in positive and negative ways. Lead the class in a discussion about air pollution. Discuss causes of air pollution produced by gas burning engines (e.g., cars, jets, some lawn mowers, machinery with gas burning engines) and by smoke producing sources (e.g., furnaces, fireplaces, factories, coal burning power plants).

Create a chart of things the students think may be bad for them to breathe. Discuss how for many people, some of the things listed may not cause any problems. However, some people may be allergic to dust or pollen or some of the other items on their list. Share with the students that allergic reactions may include sneezing, watery eyes, or shortness of breath. Discuss what sources around the school may be producing things which may produce problems for some people.

EXPLORE

1. Show students what smoke from a burning candle looks like when “caught” using the *Air Collector*. Light a candle using a long wick and ask the students to observe smoke rising from the flame. Ask them where they think the smoke goes once it reaches the air. (It seems to disappear, but it really is still there, mixed in with the other air.)
2. Discuss what they think smoke would look like, using a hand lens or microscope, if they could capture it
3. Blow out the candle and hold an *Air Collector* above the candle until the candle stops smoking.

4. Pass the *Air Collector* around for the students to observe. Encourage the use of hand lenses.
5. Discuss what they have observed.
6. Ask students to name other things that give off smoke (e.g., campfires, fireplaces, factories).
7. Ask a student to gather up some dust from the floor or under the doormat and blow it gently into the air while the teacher holds the *Air Collector* nearby, positioned to catch some of the particles (teacher should wear safety goggles).
8. Again, pass the *Air Collector* around to observe.
9. Discuss the observations and ask the students how dirt can get into the air we breathe (e.g., cars driving by, wind blowing, children playing on the playground).

Collecting Air Activity

1. Tell the students that they are going to become scientists and gather information about what's in the air around the school. Show them an *Air Collector*.
2. Explain that the sticky side will gather evidence of some of the things found in the air around the school.
3. Create teams of two students and give each team an *Air Collector* and ask them to decide where they will place their *Air Collectors*.
4. Take students outside and have them place their catchers in appropriate, safe areas (not around driveways, dumpsters, etc.). Do not place in areas that will interfere with other classes learning (not in the windows of other classes, on walkways, etc.).
5. Direct the students to place the collectors and record the location of their *Air Collector* frame.
6. With the class, make a graph using labels that indicate the area of all of the *Air Collectors*.
7. Leave the *Air Collectors* out for two or three days. Check the frames and discuss their observations each day.
8. Have the students bring in their *Air Collectors*, use a hand lens to observe, and record what they see in their science journals.
9. Ask students to try to determine what the matter is and where it came from. Include this information through pictures or words in the journals.
10. Have teams compare their frames and information with other groups.

EXPLAIN

Make a bar graph with the *Air Collectors* labeling the x-axis *heavy, medium, light*. Sort the *Air Collectors* into heavy, medium, and light according to the amount of matter collected. Place them above the three labels on the x-axis.

Ask the following questions:

- Where did the class collect the most evidence of matter?
- Where did the class collect the least amount of evidence?
- What do you think the matter particles are?
- Do all of the particles look the same? Explain.
- Where do you think the particles came from?
- What type of matter did we collect the most of around our school?
- Would you consider this air pollution? Explain.

- Is there something that could be done to reduce any of the air pollution?
- Does air pollution cause any problems for anyone?
- Is there evidence of matter in our air that is bad? Explain.
- Why is it important to have clean air?

EXTEND/APPLY

1. Make additional *Air Collectors* and send one home with each student. Students are to set the Air Collector up at a location at home and observe for three days. They will need to keep observations in their science journals during this time. After three days the *Air Collectors* are brought back to class and the data they collected is compared with what was found at school.
2. Make additional *Air Collectors* and set them up with the class in the school parking lots. Ask an adult to start a car (with the students back) and place the *Air Collector* near the car exhaust. Gather the other *Air Collectors* after two days and compare the materials found with the materials collected directly from the car exhaust. Use hand lenses or microscopes to look at these collectors and discuss what comes from cars.

EXTENSIONS

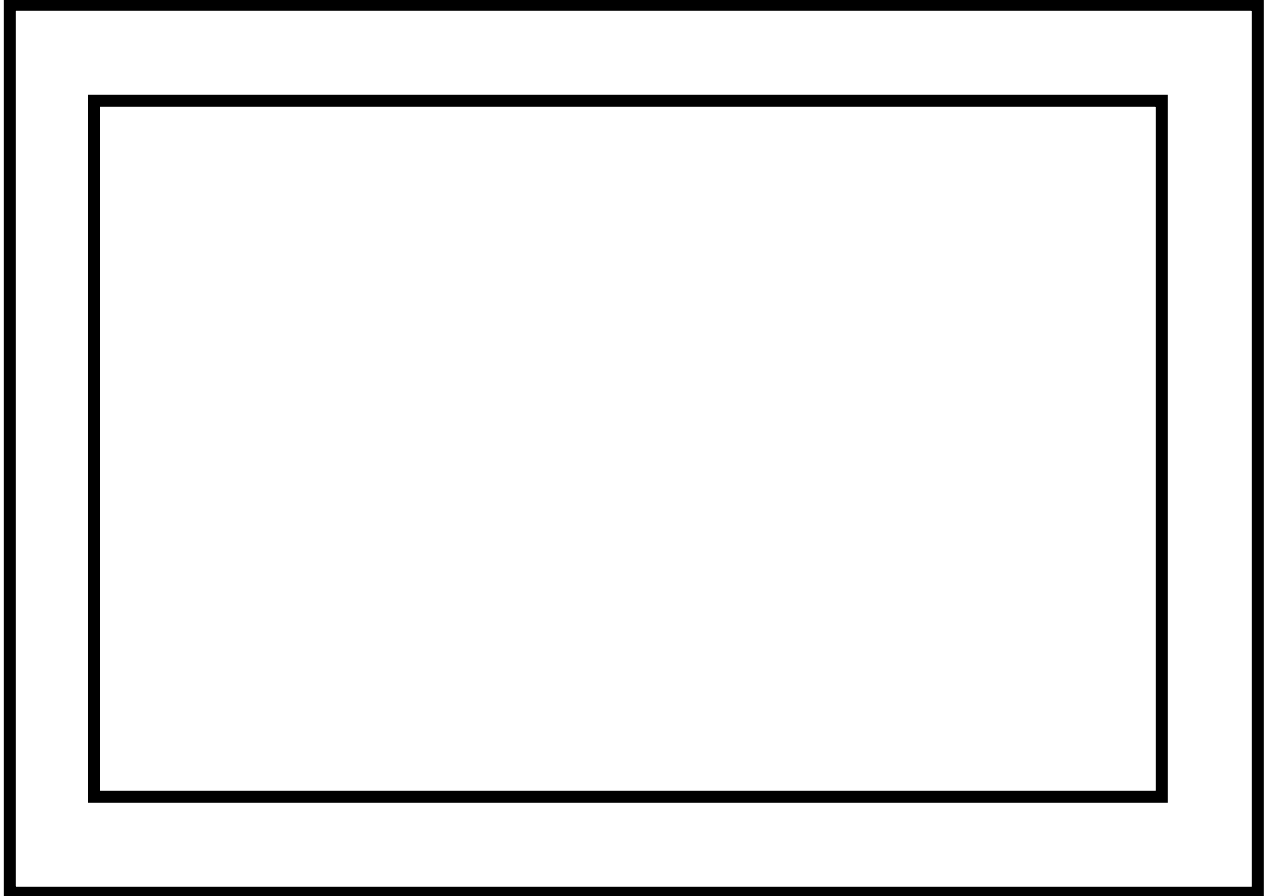
1. Discuss the fact that the matter particles in the air also contribute to what we smell. Send each student home with a plastic bag (such as those used to cover the morning paper, or those found in the produce department of the grocery store) and a twist tie. Challenge the students to capture an odor from dinner. They will need to “scoop” air from near where cooking is taking place and twist the bag shut. Bring the bags back to class and ask students to guess what a classmate had for dinner.
2. Create a T-chart and categorize common odors (or locations of odors on campus) as pleasant or unpleasant. Use Air Collectors to capture matter from these areas. Discuss what is found.

ASSESSMENT

Teacher assessment through observation should include the following criteria:

- Tasks have been completed by the student.
- Level of detail and specificity in descriptions found in the student journal entries show growth and understanding.
- Students demonstrate understanding through successful completion of the activities and in class discussions.
- Student answers to questions should show evidence of conceptual knowledge.
- Students use appropriate vocabulary.
- Data collection and organization of data was effective.
- Use of science tools enhanced their learning.
- Science safety rules were observed.

Air Collector frame



COMPOST GARDENS



BENCHMARKS AND TASKS

SC.D.2.1.1 The student understands that people influence the quality of life of those around them.

SC.G.2.1.2 The student knows that the activities of humans affect plants and animals in many ways.

- The student identifies resources as things we get from the living and nonliving environment.
- The student classifies and justifies changes humans make in the environment as positive and negative.
- The student recognizes and explains why some resources are limited.
- The student recycles materials that can be used again, sometimes in different forms.
- The student creates a plan for being more personally responsible about caring for the earth.

KEY QUESTION

How can we make organic waste into a useful product?

BACKGROUND INFORMATION

The decomposition of waste creates new and useful soils. Soil consists of a mixture of mineral particles (sand, silt, and clay), air, water, and organic matter known as humus. The humus component is usually brown or black in color and comes from decomposing plant and animal matter. It holds water that keeps the soil moist and provides many of the nutrients that plants need to grow.

Composting is an effective way to turn organic waste into useful humus. A composting system must provide moisture and air for the organisms that are critical to the decomposition process, since these organisms require this to live. Vegetable wastes, coffee grounds, sawdust, hair, fingernail clippings, and well-soaked newspapers are a few of the materials considered effective composting materials. Meats, animal fats, and bones are best left out because they attract animals.

Did You Know:

- Every year we throw away 24 million tons of leaves and grass.
- Leaves alone account for 75% of the solid waste in the fall.
- The average American family produces more than 1,200 pounds of organic garbage every year.
- About 70% of the garbage Americans create is compostable, including yard waste, food waste, wood, and paper.

MATERIALS

Teacher

Optional:

4' x 4' outside area
plastic wading pool,
plastic pails with lids,
string

Per group

digging tools (e.g., plastic spoons, craft sticks, trowel)
newspaper or tray
hand lenses

water hose or watering can
vegetable waste, leaves, hair, used coffee grounds, sawdust, newspapers, paper cups, napkins, and other materials for composting
50 Simple Things You Can Do to Save The Earth by the Earth Works Group
Worms Eat My Garbage by M. Appelhoff

science journal
disposable plastic gloves
soil sample
index card
zip-lock baggie
nail

TEACHING TIPS

Before creating a compost garden, obtain your administrator's approval.

1. Create a compost "garden" in **one** of the following three ways:
 - Clear an outside area approximately 4 feet by 4 feet and use string to create a grid of one foot by one foot squares.
 - Fill a wading pool $\frac{1}{2}$ full of soil and use string over the top to create a grid of one foot by one foot squares.
 - Use one liter pails and fill each pail about halfway with soil.
2. Composted materials will be added to each "garden".

ENGAGE

1. Give each group a sample of soil taken from outside the classroom that contains organic matter (e.g., composting leaves, wood). Place the sample on trays or newspaper and use a hand lens to observe the matter.
2. Ask:
What kinds of things do you see in the soil?
Do leaves, wood, or other materials appear to be changing?
Why do you think change is occurring?
3. Tell the students that we sometimes call what they are observing rotting.
Ask:
What is rotting?
Can you give examples of things that appear to be rotting?
Another word for rotting is decomposing.
4. As a class, create a list of things that the students think might decompose quickly and a list of things they believe would take a long time to decompose. Discuss.

EXPLORE

1. Tell students that they are now going to learn more about decomposition.
2. In teams of four (or whatever is best for the class), students will choose from the potential composting materials to be placed into the soil. Make sure that a variety of materials are selected.
3. The materials will be placed in one of the grids within the compost "garden", **or** each group will be given a bucket and place their material on top of the soil in the bucket.
4. Place approximately four inches of soil over the composting materials, thus creating a sandwich of soil, decaying matter, and soil.
5. Each grid, or bucket, should be identified with the following information: group members, composting materials placed in the soil, and the date. Write the information on

an index card placed in a zip-lock baggie and secure it to the “garden” with a nail through the baggie and into the soil.

6. Each grid should be watered thoroughly (for approximately two minutes).
7. Students should water the grids daily.
8. After two weeks, begin digging into the compost gardens and record any changes observed in the composting materials. Repeat this activity weekly.

EXPLAIN

1. Ask the following:
What can we learn from the observations you have made?
Are all of the materials composting equally?
Are there things we can do to make our materials decompose more quickly? Explain.
What things can you think of that would not compost well?
2. Read to the class some ideas from *50 Simple Things You Can Do to Save The Earth* or *Worms Eat My Garbage*.
3. Make a class list of ways that we can compost more effectively.

EXTEND/APPLY

1. Go on a “trash walk” and collect pieces of trash that were man-made. Place the materials in bags.
2. In the classroom classify each material as things that will compost easily and things that will not. Tell students that these things are sometimes called “*biodegradable*” (those that rot) and “*non-biodegradable*” (those that do not rot). It may help to share that only once-living (organic) materials or things made from once-living materials are *biodegradable*.
3. Use a T-Chart to create biodegradable/non-biodegradable lists. Discuss the results.
4. Introduce some of the *non-biodegradable* materials to the compost gardens (e.g., plastic wrapping, styrofoam cups, plastic utensils).
5. Have students bring in empty boxes, containers, or packages of a variety of materials found at home and look for information which might tell if the materials are *biodegradable* or *non-biodegradable*.

EXTENSIONS

1. Encourage students to develop a program for recycling non-biodegradable materials at school and at home.
2. Challenge the students to have a “garbageless” lunch time. The goal is to have no non-recyclable material remaining after the entire class has eaten lunch. Paper bags or lunch boxes are used for transporting lunch to school, organic waste is composted, and only packaging material that can be recycled is used and properly recycled (including cans and empty bottles). Have the class show the results of this “garbageless” challenge on the board.
3. Take a class field trip to the county landfill. The landfill has an area where composting takes place and can give students a more global perspective on our responsibility to our environment. The Orange County Landfill provides a compost area for home gardeners to take composted soil home to their gardens. This composted material would be a great addition to a school garden.

ASSESSMENT

Teacher assessment through observation should include the following criteria:

- The T-Charts show that students are able to distinguish between substances that are biodegradable and those that are not.
- Students demonstrate understanding through successful completion of the activities and in class discussions.
- Student answers to questions should show evidence of conceptual knowledge and a greater sensitivity to issues concerning waste management.
- Acquired vocabulary should appropriately demonstrate understanding.
- Data collection and organization of data were effective.
- Use of science tools enhanced their learning.
- Science safety rules were observed.

CROWDED OUT

BENCHMARKS AND TASKS

SC.D.2.1.1 The student understands that people influence the quality of life of those around them.

SC.G.2.1.1 The student knows that if living things do not get food, water, shelter, and space, they will die.

SC.G.2.1.2 The student knows that the activities of humans affect plants and animals in many ways.

- The student recognizes that humans are an integral part of the ecosystem.
- The student classifies and justifies changes humans make in the environment as positive and negative.
- The student identifies resources as things we get from the living and nonliving environment.
- The student recognizes and explains why some resources are limited.



KEY QUESTION

Why do some animal species become extinct?

BACKGROUND INFORMATION

Throughout the earth's history, many animal species (groups of animals that look alike and can reproduce with each other) have become *extinct* (died out and disappeared). Reasons are not always clear, but most experts think that species disappear when something happens to destroy the balance of nature in the animal's environment.

Today, animals and plants that face possible extinction are classified as endangered, threatened, or rare. Scientists consider any species of animal that will probably disappear within 20 years – unless humans make a special effort to protect it – an *endangered animal*.

Threatened species are animals that are likely to become endangered if human activities and/or other problems affecting them do not change.

Rare species are naturally small but stable in population. Rare animals are particularly vulnerable to environmental threats, since their numbers are low to begin with.

In the past various species have become extinct because of natural changes in their environment. Some could not adjust to long-term changes in climate, lost food sources, or altered living conditions. Over the last 200 years, the situation has changed. Human activity has become the major cause of animal extinctions. While species once became extinct at the rate of one or two each year, now as many as 17,000 species may become extinct each year.

MATERIALS

Teacher

bag of peanuts in shells
25 brightly colored pencils
string
black marker
pictures of threatened, endangered, and extinct animals
picture of a koala bear or other wild animal

Per student

science journals
pencil

Benchmark Education Co. books:

Endangered Animals

John James Audubon

Jacques Cousteau

Jane Goodall

TEACHING TIPS

1. These activities take place outside. So that you don't lose the materials, pick an area where the materials will stand out and not get camouflaged.
2. Keep all student-produced materials and journals for assessment purposes.
3. Before engaging students in "the effect of pesticides on some animals" activity, mark the peanuts that represent "poison" with a black marker. These marked peanuts are for the pesticide activity only.

ENGAGE

Show the students pictures of animals that are threatened, endangered, or extinct.

Ask: *What do these animals have in common?*

Show a picture of the koala bear or other wild animal.

Ask: *What does the koala bear need to survive?* Answers should include the koala bear's habitat, food, water, and space.

Tell the students they are going to participate in some activities that will help them understand some of the reasons that animals become endangered or extinct.

EXPLORE

These role-playing activities will help students better understand some of the reasons animal species become endangered.

To show the effect of shrinking habitats (caused by humans taking over land and resources for their own use):

1. Scatter the 25 brightly colored pencils on the ground and choose five students to play the animals.
2. Tell each "animal" they will need 5 pencils in order to build a home. The "animals" will gather the pencils to build a home.
3. Scatter the pencils again. Choose another student to play the role of a human who needs materials to build a house.
4. Have the "human" take away 8 pencils.
5. Then instruct the 5 "animals" to try to build their homes again. Clearly there is a problem. Discuss this.
6. Repeat, this time with 2 "humans" removing 8 pencils each, leaving fewer pencils for the "animals".
7. Discuss other ways humans may affect the ability of animals to build homes (e.g., clearing wooded areas or draining wetlands to set up farms, factories, shopping centers, parking lots, golf courses).

To illustrate how overcrowding (due to shrinking habitat) poses a threat to an animal's food supply:

1. Place a large circle of string on the ground or floor, representing the habitat.
2. Scatter 25 peanuts (the food source).

3. Choose three students (representing animals of the same species) to go inside the circle at a given signal, each picking up 5 peanuts, one at a time (the minimum needed to survive). All three students should have no trouble meeting their needs.
4. Reform the circle and scatter the 25 peanuts once more.
5. This time pick six students to scramble for food. Since the habitat is now more crowded, at least one can't get enough to eat.
6. Continue to increase the number entering the circle.
7. Point out how gradual overcrowding makes it harder and harder for individuals to survive.
8. Discuss things that might make animals live in an overcrowded area (e.g., fire in the forest, building new housing developments).

To demonstrate the effect of pesticides on some animals:

1. Place a large circle of string on the ground or floor, representing the habitat.
2. Scatter the peanuts (the food source) within the circle.
3. Place students in groups of four. They will represent a mother bird, a father bird, and two chicks.
4. Select one person from each group to be the parent responsible for going out and getting food for all of them to live.
5. Each "parent bird" will go inside the circle at a given signal, each picking up 8 peanuts, one at a time (the minimum needed to survive for the four birds). Every bird must receive its "food" in order to survive.
6. Reform the circle and ask if any of the "birds" has a peanut with a black mark. Explain to the students that the marked peanuts represent food that has been exposed to pesticides. Eating them results in the death of a bird. Explain that it is usually impossible for animals to tell if foods they normally eat have been poisoned until it is too late.
7. If both parents in the "family" have died, then the "babies" cannot be fed and they will also die.
8. All "dead" birds must sit down so that the extent of the damage from pesticides can be seen.
9. Discuss the types of things we might find in the environment, which might be harmful to animals.

EXPLAIN

1. After completing the activities, discuss the following questions:
What are some ways that humans contribute to an animal becoming endangered?
What happens to animals that don't have enough food to eat or their habitat is destroyed?
How can humans help to prevent an animal from becoming endangered?
What are some ways of protecting animals?
Why should we protect endangered animals?
How is building new housing developments both a positive and a negative issue?
How is spraying pesticides both positive and negative?
2. Jane Goodall, a scientist who studied chimpanzees in the wild, once said: "Only when we understand can we care. Only when we care will we help. Only if we help shall they be saved." Discuss what she meant by this statement. Read the book *Jane Goodall*.

3. Discuss how each of the following helps protect animal habitats:
 - cleaning up after picnics
 - recycling newspaper, aluminum, glass, and plastic
 - not disturbing animals' homes
 - putting out fires after camping or cookouts
 - planting a wildflower garden
 - using screens instead of insecticides to keep insects out of the house in the summer.

EXTEND/APPLY

1. Divide the class into small groups (3 or 4 students) with each group given its own animal to investigate. Choose from the following list of extinct, endangered, or threatened animals or the group may select its own:

Extinct

Passenger pigeon
Auk
Dusky seaside sparrow

Endangered

Arabian Oryx
Galapagos Tortoise
cheetah

Threatened

Red Kangaroo
Utah prairie dog
Florida box turtle

Allow time for groups to find out as much about the animal as possible. Encourage the use of reference materials, magazines, Internet searches, and nonfiction books. Then invite each group to make a “Needs” poster that pictures the animal and describe, in their own words, what it needs to survive.



2. Invite guest speakers from environmental education groups (Audubon Society, Sierra Club) to speak to the class about endangered animals.
3. Read and discuss any or all of the listed books as they all support these benchmarks and task analyses.

EXTENSIONS

1. Develop a class project to help meet the needs of local wildlife (e.g., clean up local habitats, build animal feeders, create wildflower gardens).
2. Publish a class newspaper entitled, for example, *Habitat News*. The newspaper will be created through the research of the class. It may include articles on various environmental topics, including endangered animals, recycling, helping animals, etc.

ASSESSMENT

Students demonstrate understanding through successful completion of the activities and in class discussions.

REUSE, REDUCE, AND RECYCLE IT!



BENCHMARKS AND TASKS

SC.D.2.1.1 The student understands that people influence the quality of life of those around them.

SC.G.2.1.2 The student knows that the activities of humans affect plants and animals in many ways.

- The student recognizes that humans are an integral part of the ecosystem.
- The student classifies and justifies changes humans make in the environment as positive and negative.
- The student identifies resources as things we get from the living and nonliving environment.
- The student recognizes and explains why some resources are limited.
- The student recycles materials that can be used again, sometimes in different forms.
- The student creates a plan for being more personally responsible about caring for the earth.

KEY QUESTION

How can we use our resources better?

BACKGROUND INFORMATION

The trend to recycle is based upon an important factor: landfills, which have been the traditional source of waste disposal for the last 50 years, are filled to capacity and we are running out of space to dispose of our waste materials. Paper and other wood products have traditionally taken up a great deal of this space. Recycling efforts center today around newsprint and cardboard products, which can be easily recycled. However, the average family consumes 1½ trees per year just in junk mail that is not recycled. A very small amount of landfill waste is composed of organic matter.

To **reuse** materials is to use a material again, perhaps in a new or different way. Fabric scraps from shirts or dresses are made into quilts; wheels from wagons are used to create new toys; greeting cards are cut up and used in scrapbooks; assorted materials are used in art work, jewelry, or in other creative ways.

To **recycle** is to collect materials and transform them to a state in which they may be used in a similar manner again. Paper can be collected and processed to be used as paper again. Glass can be melted, plastics can be transformed into new plastics, and tires can be shredded and used to create new materials.

To **reduce** requires that decisions are made and actions are taken to lower the consumption of materials: being aware of the packaging of materials and making choices based upon the amount

of waste; eliminating most “junk” mail; and choosing to use recyclable versus disposable materials whenever possible.

Materials

Teacher

“gift” wrapped in tissue paper and placed in a gift box, wrapped in wrapping paper with a large bow.
newspaper and recycled drawing paper
2 different plastic soda bottles
a piece of clear glass and a piece of stained glass
a small object placed in a large grocery bag
milk jug
Saving Our Planet (Dominie Press)
Benchmark Education Co. books:
 Riches From Nature
 Clean Beaches
 Reduce, Reuse, and Recycle
 Are We Hurting the Earth?
Can Kids Save the Earth? (Ranger Rick)

Per group

box of found materials (e.g., articles of clothing, paper, wood products, metals, wire, plastic)
To make paper:
3 pieces of used paper
3” x 3” piece of window screen
flat pan (cookie pan)
2-4 pieces of newsprint or drawing paper (blotting paper)
bowl
egg beater or wire whisk
rolling pin or cylindrical container
newspaper
2 tsp. liquid starch
2 cups hot water
small box of cereal
various sizes of containers

TEACHING TIP

This activity has numerous sections and will take several days to complete.

ENGAGE Part 1

Show the students the elaborately wrapped gift box. Open it and throw away the tissue paper, the wrapping paper, the bow, and the box. Keep only the gift.

Say: *Think about what I just did and we’ll talk about it after the activity.*

EXPLORE

Give each group of three or four students a box of found materials.

Ask them to sort the materials into two groups: useable and not useable. Allow the groups to explain their groupings.

EXPLAIN

Tell the students that some materials are considered waste and should be thrown away. This is because there is no other possible use for these materials.

Tell the students that some materials may be reused in new ways. An example might be scrap wood that can be used to create something new.

Ask: *Would this action be positive or negative for our environment? Are there materials in the boxes that can be reused?*

As a class, generate a list of materials that can be reused. Write on chart paper and label the list as *reusable*.

Ask: *Why do you think we usually throw things away rather than reusing them?*

EXTEND/APPLY

Each group will choose an item from their box of found materials and write/draw in their science journals how they would reuse the item.

Ask:

After unwrapping the gift, could I have done something differently rather than throwing away the tissue paper, wrapping paper, bow, and the box?

ENGAGE Part 2

1. Show the students some materials that may be recycled: milk jug, soda can, white paper, etc.

Ask:

What do you think these materials have in common? Allow them to respond.

2. Show the students sets of original and recycled materials (e.g., newspaper and recycled drawing paper; a plastic soda bottle and a plastic soda bottle that has been recycled; a clear piece of glass and a piece of stained glass).

Discuss how the recycled materials are alike and different from the original materials.

Explain that the original materials are changed to create the new recycled materials.

3. Tell the students they will be making paper out of used paper.

EXPLORE

- Ask students what materials in their community are recycled. These materials can be reformed into the same, or a similar material, for use again. Generate a list of possible materials that can be recycled. Write on chart paper and label the list as *Recycle*.
- Guide the student groups to make paper.
 1. Tear the 3 pieces of used paper into very small bits in the bowl. Add 2 cups of hot water and beat the paper and water with the beater to make paper pulp.
 2. Add 2 teaspoons of starch to the pulp.
 3. Pour the pulp into a flat pan.
 4. Slide the screen into the bottom of the pan and move it around until it is evenly covered with pulp.
 5. Lift the screen out carefully. Hold it level and let it drain for a minute. Then put the screen, pulp side up, on a blotter, then on a thick layer of newspaper.
 6. Put another blotter over the pulp, more newspaper over that, and roll the rolling pin over it to squeeze out the rest of the water.
 7. Take off the top newspaper. Turn the blotter sandwich over so the screen is on top. Then take off the blotter and screen carefully. Don't move the pulp! Put a dry blotter on the pulp and let the pulp dry. You have just made paper from paper.

EXPLAIN

Share the following: It takes 17 trees to make one ton of paper from wood. Recycled paper is made from other paper, not wood. If people buy paper made from paper instead of wood, they will be saving trees. Many kinds of paper can be used to make new paper. Some companies use old newspapers, some use office paper, and some even use old milk cartons. Not all recycled paper is alike. Some paper looks and feels just like the original. Some has the ink taken out, some leaves the ink in. If you tear a piece of cardboard at the corner, you will see all sorts of

specks of ink and coloring from the old paper and maybe even short pieces of paper mashed together. Making new paper is like cooking. Each type of new paper requires a special recipe.

Ask:

When we recycle materials, is this positive or negative? Explain.

What materials are recycled at school and at home now?

Are there materials we could recycle in our classroom?

EXTEND/APPLY

1. Ask students to look at items they have at home that say they are made from recycled materials. Generate a list of recycled materials in our homes.
2. Share the book, *Can Kids Save the Earth?*

ENGAGE Part 3

Show students the large grocery bag with a small object (e.g., pencil, candy bar, bag of pretzels) in it.

Ask: *Is this the best packaging for this item? Why or why not?*

Tell the students they will be looking at items to find unnecessary waste.

EXPLORE

Give each group of students a small unopened box of cereal and several different sizes of containers. Ask them to predict which container would best hold the contents of the cereal box. Tell the students to open their cereal box, bring out the plastic bag containing the cereal, and to pour the cereal into the container they've chosen.

EXPLAIN

Ask:

Is paper wasted in cereal packaging? Explain your answer.

What are some other ways that we waste paper?

What else do humans waste besides paper?

Is being wasteful positive or negative for our environment?

EXTEND/APPLY

1. Challenge the students to go home and find examples of unnecessary waste and record their findings in their science journals.
2. Have students create posters showing materials that can be reused or recycled.
3. Make a class 3 R's (reuse, recycle, reduce) chart to remind everyone not to be wasteful.
4. Sing the following song to the tune of "Bingo."

We all should be responsible

For caring for our planet.

We must keep it clean!

We must keep it clean!

We must keep it clean!

Reduce, reuse, recycle!