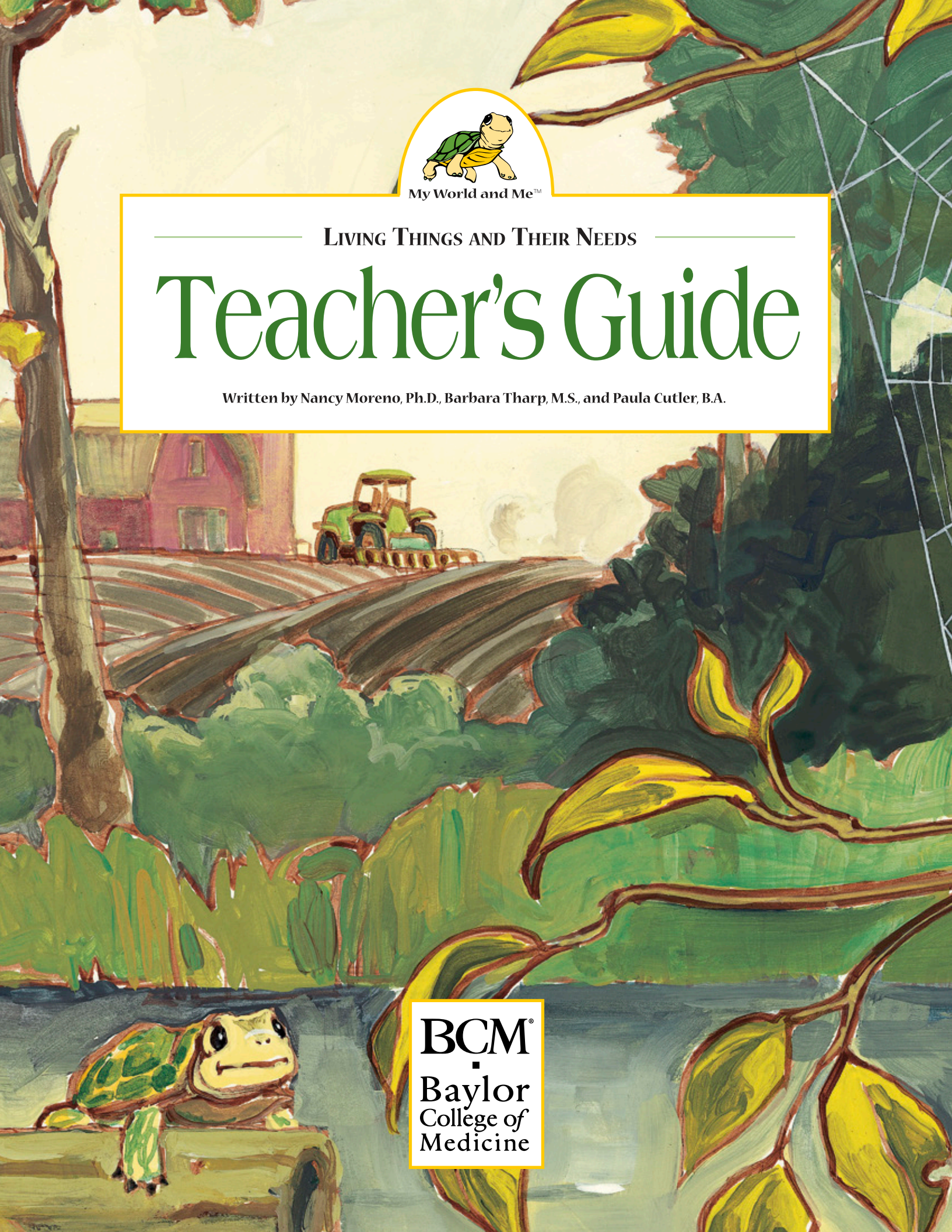


My World and Me™

Living Things and Their Needs

Teacher's Guide

Written by Nancy Moreno, Ph.D., Barbara Tharp, M.S., and Paula Cutler, B.A.

BCM®
Baylor
College of
Medicine

My World and Me™

Living Things and Their Needs

Teacher's Guide

Written by Nancy Moreno, Ph.D., Barbara Tharp, M.S., and Paula Cutler, B.A.

BCM®
Baylor
College of
Medicine

Printed in the United States of America.

ISBN: 978-1-888997-66-8

BioEd℠

Teacher Resources from the Center for Educational Outreach at Baylor College of Medicine.

Development of My World and Me® educational materials was supported, in part, by the National Institutes of Health, National Center for Research Resources, grant number RR25 RR13454, and National Institute of Environmental Health Sciences, grant number R25 ES10698. The opinions, findings and conclusions expressed in this publication are solely those of the authors and do not necessarily reflect the views of Baylor College of Medicine or the funding agencies.

Authors: Nancy P. Moreno, Ph.D., Barbara Z. Tharp, M.S., and Paula Cutler, B.A.
Editor: James P. Denk, M.A.
Design: Martha S. Young, B.F.A.

The My World and Me project at Baylor College of Medicine has benefited from the vision and knowledge of scientists and educators from a wide range of specialties. Our heartfelt appreciation goes to William A. Thomson, Ph.D., Professor of Family and Community Medicine and Director, Center for Educational Outreach, who has lent his support and expertise to the project.

Special acknowledgment is due to our partner in this project, the American Physiological Society (APS). We especially thank Marsha Lakes Matyas, Ph.D., and Katie Frampton of APS, for their invaluable reviews of draft materials and direction of field tests, focus groups, and dissemination activities in the Washington, DC area.

Special thanks go to the National Center for Research Resources of the National Institutes of Health (NIH) for its support of the My World and Me Project, and to the National Institute of Environmental Health Sciences, NIH, for its support of classroom implementation of My World and Me materials in the Houston area.

We are grateful to the many classroom teachers in Washington, D.C., and Houston, Texas, who participated in the field tests of these materials and provided invaluable feedback. We especially thank Rachel J. Cunningham, Wanda J. de Vries and Nannette M. Schultz at Whidby Elementary School in Houston for their contributions and suggestions.

BCM®
Baylor College of Medicine

Center for Educational Outreach
Baylor College of Medicine
One Baylor Plaza, BCM411
Houston, Texas 77030
713-798-8200 | 800-798-8244
www.bioedonline.org | www.bcm.edu/edoutreach

Contents

My World and Me

This My World and Me *Teacher's Guide* may be used with the following other components of this unit.

- *Tillena Lou's Day in the Sun*
- *The Math Link*
- *The Reading Link*

About My World and Me

The My World and Me Project's exciting Activities and Adventures link students, teachers and parents to significant knowledge of the environment, life science, physical science and health. Prepared by teams of educators, scientists and health specialists, each My World and Me unit focuses on a different aspect of science and health. The activity-based, discovery-oriented approach of the My World and Me materials is aligned with the National Science Education Standards and the National Health Education Standards.

The components of each My World and Me unit help students understand important health and environmental issues.

- *Adventures* presents the escapades of Tillena Lou Turtle in an illustrated story book that also teaches science and health concepts.
- *Teacher's Guide* presents activity-based lessons that entice students to discover concepts in science, mathematics and health through hands-on, guided inquiry activities.
- *The Reading Link* provides language arts activites related to the story.
- *The Math Link* connects the story with hands-on science activities to mathemetics skill-building exercises.

My World and Me materials offer flexibility and versatility, and are adaptable to a variety of teaching and learning styles.

These educational materials engage students and help them to acquire knowledge and skills recommended by the National Science Education Standards. For your convenience, a chart has been included in this guide, detailing how the unit helps develop science, mathematics and language arts (and reading) skills.

To facilitate management of your science classroom, this My World and Me guide provides a Word Bank of vocabulary used in the unit, as well as templates for a student science journal and badges for students to wear when they work in cooperative groups. We recommend that students rotate cooperative group job assignments for different activities, so that each student will have an opportunity to experience all roles.

Meeting National Standards

Each My World and Me unit engages students and helps them acquire knowledge and skills recommended by the National Science Education Standards. The chart below details, by activity (1–10), how this unit meets science, mathematics and language arts standards. For your convenience, the information pertaining to each individual activity also appears under the Skills section for that activity.

	1	2	3	4	5	6	7	8	9	10
SCIENCE										
Observing		●	●	●	●	●	●	●	●	
Sorting and classifying		●			●	●				
Predicting		●	●			●			●	
Comparing			●	●	●				●	●
Contrasting			●	●	●					
Recording data	●		●	●						
Communicating	●				●		●	●		●
Interpreting data			●							
Generalizing	●	●	●		●	●	●	●		
Applying knowledge		●							●	●
Inferring									●	
Charting		●			●					
Identifying patterns		●								
Measuring				●		●	●			
Sequencing									●	
Graphing			●							
MATHEMATICS										
Observing			●	●		●	●			
Sorting and classifying		●		●						
Predicting										
Comparing				●						
Contrasting				●						
Recording data										
Communicating				●			●			
Interpreting data										
Generalizing							●	●		
Applying knowledge										
Inferring										
Charting			●	●						
Identifying patterns			●						●	
Measuring			●			●	●			
Sequencing			●	●						
Graphing			●							
LANGUAGE ARTS										
Listening	●	●	●	●	●	●	●	●	●	●
Communicating	●	●	●	●	●	●	●	●	●	●
Reading for information				●					●	
Identifying words		●	●	●					●	
Developing vocabulary			●	●					●	
Understanding word meanings		●	●	●	●					
Developing comprehension skills		●	●	●	●			●		
Writing			●	●	●	●	●	●		
Using descriptive language	●		●	●	●	●	●	●		●
Following directions	●	●	●	●	●	●	●	●	●	●

Unit Materials List

You will need the following materials and consumable supplies to teach this unit to 24 students working in six cooperative groups. See the Setup section within each activity for specific preparations needed prior to class and alternatives materials.

Safety Issues:
Always follow all district and school science laboratory safety procedures. It is good laboratory practice to have students wash hands before and after any laboratory activity. Clean work areas with disinfectant.

ACTIVITY 1 (p. 1)
- 24 sheets of white drawing paper
- Crayons or markers

ACTIVITY 2 (p. 2)
- 24 sheets of white construction paper, 18 in. x 12 in. (see Setup)
- 24 rulers
- 24 pairs of scissors
- 24 pencils
- Clear tape
- Crayons or markers
- Glue

ACTIVITY 3 (p. 6)
- 25 plastic knives
- 25 plastic teaspoons
- 24 hand lenses
- 24 peat pots, 3 in.
- 20 cups of potting soil
- 7 fresh radishes
- 6 clear plastic cups, 9 oz (see Setup)
- 6 plastic trays
- 6 spray bottles (water mister)
- 4 resealable plastic bags, 12 in. x 15 in. (gallon-sized)
- 4 plastic plates, 10¼ in.
- Package of radish seeds (approx. 500)
- Paper towels
- Permanent marker

ACTIVITY 4 (p. 11)
- 54 clear plastic cups, 9 oz
- 48 paper plates, 8 in.
- 24 candy "gummy" worms
- 24 hand lenses
- 24 live earthworms (order in advance)
- 24 metric rulers
- 12 sheets of black construction paper, 9 in. x 12 in.
- 6 two-liter plastic soft drink bottles, clear
- 6 cups (2 boxes) of chocolate cookie crumbs (or crumbled graham crackers)
- 6 large rubber bands, #84 (to fit around 2-liter bottle)
- 6 resealable plastic bags, 12 in. x 15 in. (gal-sized)
- 6 resealable plastic bags, 4 in. x 6 in. (quart-sized)
- 6 plastic trays
- 6 spray bottles
- 4 cups of potting soil
- 3 cups of crumbled, dry leaves
- 3 cups of oatmeal
- 3 cups of sand
- 3 cups of used coffee grounds
- 16-oz plastic soft drink bottle with cap
- Crayons or colored pencils
- Glue
- Masking tape
- Paper towels
- Prepared water (see Setup)
- Strips of tagboard (or heavy paper), 10 cm x 70 cm (4 in. x 28 in.)

Unit Materials List (cont.)

ACTIVITY 5 (p. 18)
- 24 paper plates, 8 in. (see Setup)
- 24 wooden craft sticks
- 2 sets of Tillena Lou's World cards (see Setup)
- Crayons or colored pencils
- Glue

ACTIVITY 6 (p. 22)
- 50 raw popcorn kernels, plain
- 25 clear plastic cups, 9 oz
- 25 plastic teaspoons
- 24 hand lenses
- 7 pkgs (3.2 oz) of instant pudding, any flavor
- 6 plastic trays
- 6 tablespoons
- 12½ cups of milk
- Package of plain, microwave popcorn
- Paper towels

ACTIVITY 7 (p. 25)
- 33 clear plastic cups, 9 oz
- 25 plastic teaspoons
- 6 plastic trays
- 6 small pitchers
- 3 cups plus 2 tsp of sugar
- 250-mL bottle (a little over 1 cup) of lemon juice
- Paper towels
- Cool or cold water
- Cup of milk
- Cup of orange juice
- Cup of another kind of juice
- Fresh lemon
- Sharp knife

ACTIVITY 8 (p. 27)
- 48 paper cups, 3 oz (bathroom-size)
- 24 clear plastic cups, 9 oz
- 2–3 drinking straws, cut in half
- Dishwashing detergent, 8-oz bottle
- Gallon container
- Glycerine, 4-oz bottle (drugstore)
- Overhead projector
- Paper towels
- Water

ACTIVITY 9 (p. 30)
- 6 sets of Match Up Game Cards (see Setup)
- 6 resealable plastic bags
- Crayons or markers

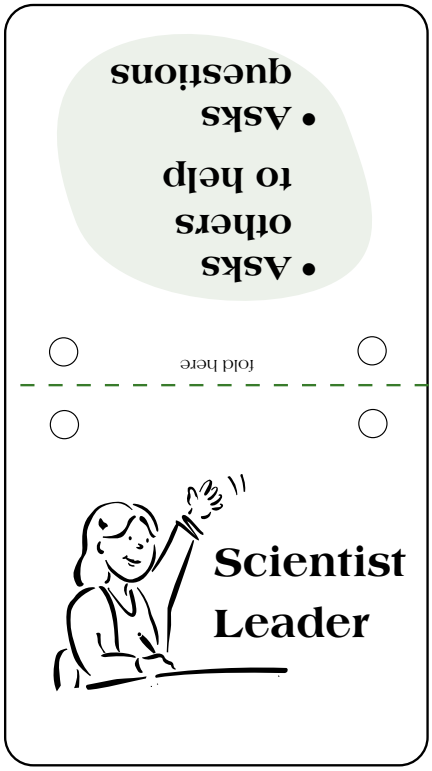
ACTIVITY 10 (p. 34)
- 24 sheets of white construction paper, 18 in. x 12 in.
- Crayons or markers

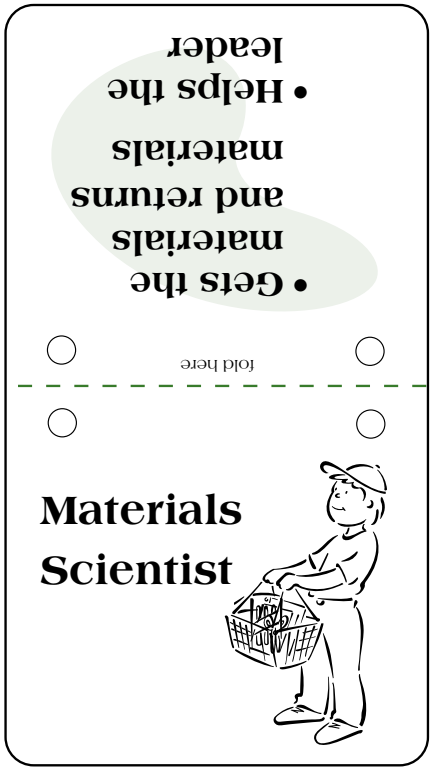
Using Cooperative Groups

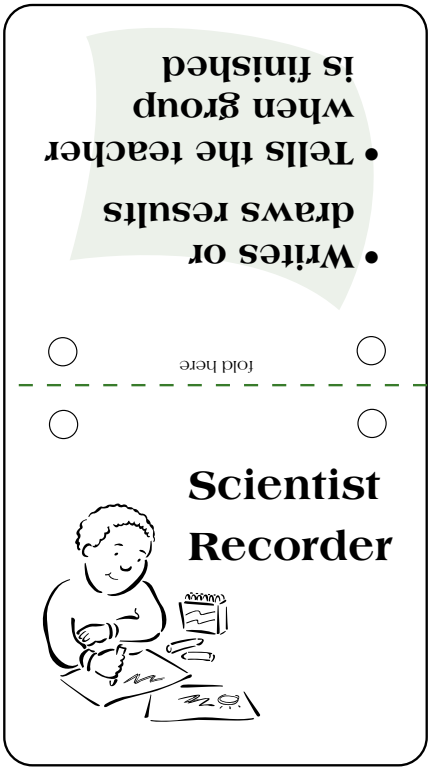
Cooperative learning is a systematic way for students to work together in groups of two to four. Quite often, early primary students need to have their own materials, but can work in groups to share ideas and to learn from one another. Through such interactions, students are more likely to take responsibility for their own learning. The use of cooperative groups provides necessary support for reluctant learners, models community settings where cooperation is necessary, and enables the teacher to conduct hands-on investigations in a more manageable environment.

Students wear job badges that describe their duties. Tasks are rotated within each group for different activities so that each student has an opportunity to experience all roles. Teachers even may want to make class charts to coordinate job assignments within groups.

Once a cooperative model for learning has been established in the classroom, students are able to conduct science activities in an organized and effective manner. All students are aware of their responsibilities and are able to contribute to successful group efforts.







Word Bank

As you work through the unit, the following words or phrases may be used to reinforce or supplement the activities. Space has been provided for you to add your own words to the list.

air
animal
bird
breathe
fish
fruit
habitat
hunger
living
mammal
model
moist
need
necessary
nonliving
nutrient
observe
organism
photosynthesis
plant
plant eater
predict
radish
record
reproduce
root
seed
skin
soil
spider
sugar
sunlight
survive
vegetable
want
worm

My Science Journal

Name _____ Date _____

Project Name _____

DRAWING

KEY WORD TO USE

I OBSERVED . . .

Pre-assessment

This activity is designed to heighten student awareness and to help teacher estimate levels of student understanding.

Read the book, *Tillena Lou's Day in the Sun,* with students after completing this activity.

All living things require certain resources from the environment in order to live, grow and survive. While each type of organism may have individualized needs, all living things need a source of energy (food, for example), water, air and a place to be. The needs of human beings are similar to those of other organisms, especially animals. People need food, water, air and shelter to survive.

Young students may have difficulty identifying the difference between needs and wants. Activity Two will help students distinguish between these two concepts.

This activity is designed to focus student attention and to help you, the teacher, gauge students' existing knowledge about living things, including people, and their needs. Results of this activity can be saved and compared to the matching post-assessment to evaluate student learning over the course of the unit.

SETUP

Conduct discussion with entire class. Have students work individually.

PROCEDURE

1. Explain to students that they will be observing and learning about living things (also called organisms).
2. Distribute sheets of drawing paper and tell students to draw pictures of themselves. Have students create their artwork individually. Wait until later to conduct a class discussion so that you can use their drawings as a pre-assessment of knowledge.
3. After students have drawn their pictures, ask them to draw on their sheets all the basic things that they, as living things, might need to live, grow and survive.
4. As a whole group activity, encourage students to explain their drawings. Help students to conclude that they are living organisms with needs/wants.
5. Display or save students' drawings in their portfolios. Explain to students that they will be learning more about living things during the coming days.

   Note. The drawings can be used to estimate students' knowledge or misconceptions about the needs of living organisms. Look for representations of basic needs, such as kinds of food, water (drinks), houses (shelter), etc., in their artwork to gain insight into their current levels of understanding.

CONCEPTS

- Living things have basic needs.
- Living things can survive only when their needs are met.

SKILLS

Science: Recording data, communicating, generalizing
Language Arts: Listening, communicating, using descriptive language, following directions

TIME

Set-up: 5 minutes
Class: 30 minutes

MATERIALS

Per student

- Crayons or markers
- White drawing paper

LIVING THINGS . . .

- Use food or sunlight for energy
- Need air
- Need water
- Grow and change over time
- Have offspring (reproduce)
- Sometimes can move on their own
- Can keep the conditions inside their bodies different from conditions outside
- Interact with other living things and with the nonliving environment

Need or Want?

Students will learn to distinguish between basic survival "needs" of human beings and things that are not essential for life ("wants").

CONCEPTS

- People, like other animals, have basic needs.
- People need water, food, air and a place to be.
- People also need ways to keep themselves warm or cool enough.
- "Needs" are things that are essential for survival; "wants" are things that are desired, but not essential.

SKILLS

Science: Observing, sorting and classifying, predicting, generalizing, applying knowledge, charting, identifying patterns
Mathematics: Sorting and classifying
Language Arts: Listening, communicating, identifying words, understanding word meanings, developing comprehension skills, following directions

TIME

Set-up: 15 minutes
Class: 45 minutes

MATERIALS

Per student

- Clear tape
- Crayons or markers
- Glue
- Pair of scissors
- Pencil
- Ruler
- Sheet of white construction paper, 18 in. x 12 in.
- 2 copies of "A Kid Like Me," and 1 copy of "My Stuff" student pages
- Copy of "My Science Journal" (optional)

Human beings have the same needs as other animals. Namely, people need food, water and air. In addition, they need to keep themselves at an optimal temperature with clothing and/or shelter. Just like many animals, people need safe places to rest and care for themselves and their offspring.

At the same time, human beings also create things for themselves that make life safer, easier and more pleasurable. Examples include new and improved kinds of foods, televisions and radios, computers, comfortable furniture, air conditioning, convenience food, automobiles and games. Many of these things are not essential for basic survival. This activity is designed to help students distinguish between actual needs of people and other things that are desirable, but not necessary for life.

SETUP

Make copies of the activity sheets for each child. Students also will be folding 18-in. x 12-in. sheets of construction paper to create pocket charts.

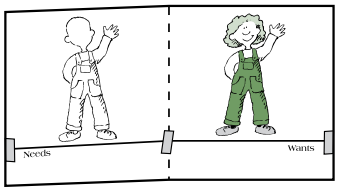
You may want to prepare the construction paper in advance for younger children. First, fold the paper in half (to 9 in. x 12 in.). Unfold the sheet and draw a vertical line on the crease. Flip the sheet over and draw a horizontal line 2 inches from the bottom of the page (to create a guide for folding).

PROCEDURE

1. Ask students, *What do people need to live?* As students answer, call attention to the difference between a need and a want or desire. Ask students, *Could a person survive without this* (the item)? Help students understand that an item is identified as a need or want by whether it is necessary for a person to stay alive. Prompt students to think about some of the characteristics of living things, including the ability to grow, reproduce and move, and the need for resources such as air and water.
2. Explain to students that they will make a "Things I Need or Want" pocket chart.
3. Distribute a 18-in. x 12-in. sheet of paper to each student. Tell students to fold the sheet in half like a book (18-in. side is horizontal) and crease the fold. Have them open the sheet up and draw a vertical line on the crease. With the sheet still open, have students fold the paper up from the bottom to form a 2-in. pocket. Students should secure the pocket with a small piece of tape on each folded-up side and in the middle of the sheet.

Note. Pockets on the chart will be used to hold cutouts from the "My Stuff" student sheet until final decisions are made by each student about where the images belong on the chart.

4. Have students write "Needs" on the left pocket and "Wants" on the right pocket.
5. Give each student two copies of the student page, "A Kid Like Me." Have students completely color the figure of the child on only one of the pages. Students should cut out both figures.



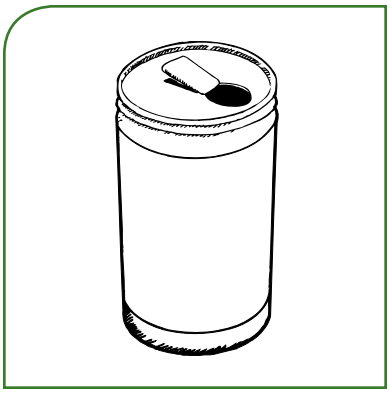
6. Have students paste the blank figure in the middle of the "Needs" page (above the pocket on the left) and paste the colored-in figure in the middle of the "Wants" page (above the pocket on the right).
7. Distribute copies of the "My Stuff" student pages. Have students color the drawings, then cut out the pictures. Ask students to identify each item and put the items in either the "Needs" or "Wants" pocket of their folders.
8. As a group, discuss the students' decisions, allowing the students to justify or explain their choices. Reiterate the difference between need and want: if the item is necessary for a person to stay alive and healthy, it is a need; if it is not necessary for survival, it is a want.
9. Instruct students to pull the items out of the pockets carefully, keeping each group of items in two separate stacks (needs and wants).
10. Follow by having students arrange "Needs" pictures on the left side of the chart and "Wants" images on the right side of the chart. Allow students to change their minds about their initial choices. Then, ask them to paste each of the "Needs" inside of (or on top of) the blank figure and paste the "Wants" around the colored-in figure.

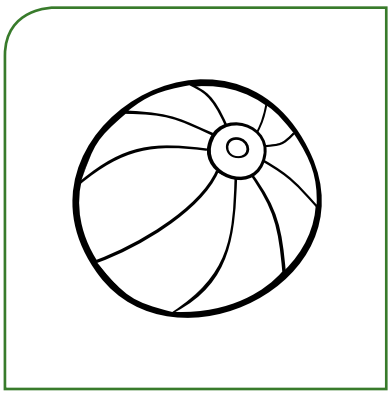
EXTENSIONS

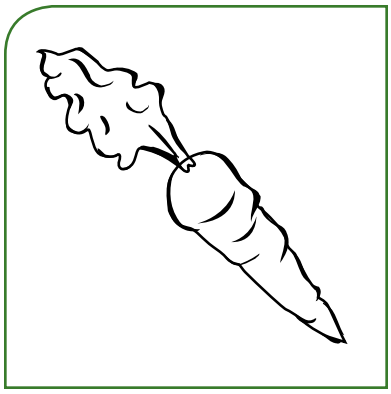
- Allow students to add additional items to their "Things I Need or Want" charts. Have students select and cut items from magazines or have them draw the items on a separate sheet of paper.
- Have students think about the ways in which people are unique from other animals. Possibilities include building and using complicated tools and machines to do work or to extend their senses; building large complex cities in which to live and work; creating new forms of transportation; etc.
- Challenge students to think about whether all living things can move on their own. Have them compare familiar animals with familiar plants to prompt their thinking.

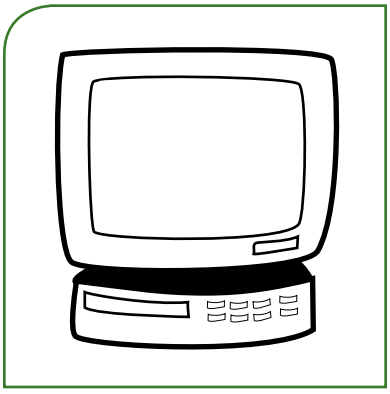
A Kid Like Me

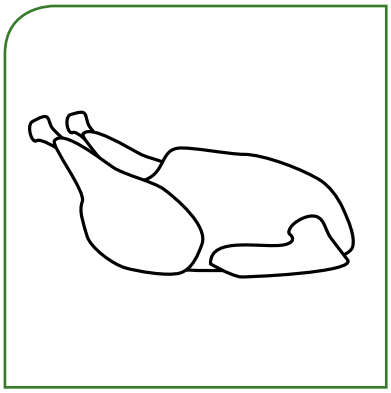
My Stuff

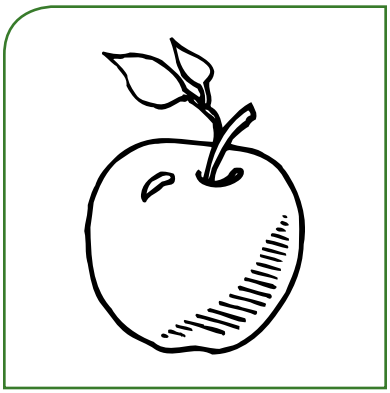


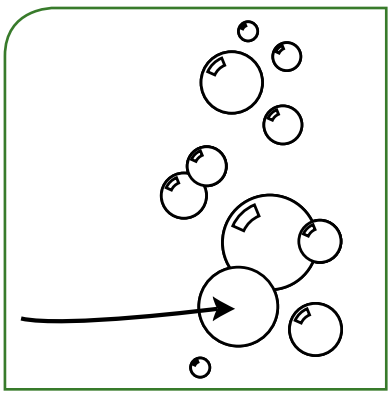


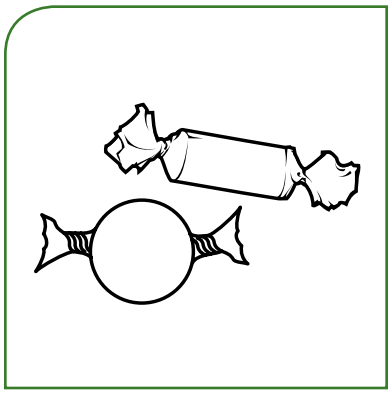


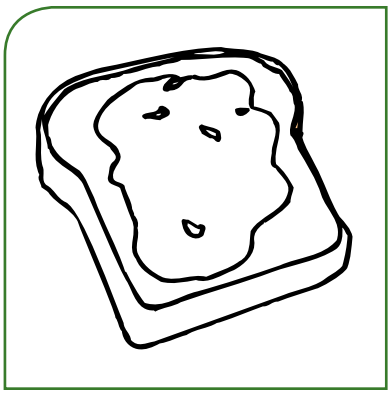


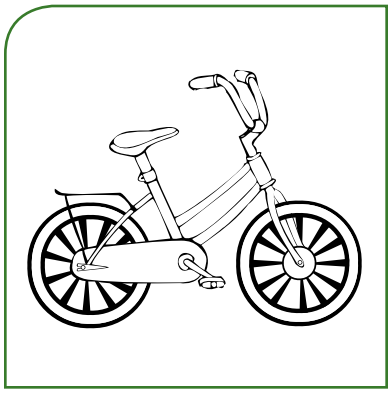












3

Needs of Plants

Each student will make his/her own mini-garden and will observe the growth and development of radishes. To help students learn about requirements for plant growth, the teacher will make four experimental gardens and place them in different locations with different conditions.

CONCEPTS

- Plants have basic needs.
- Plants need sunlight, water, air and nutrients from soil.
- Plants can survive and grow only when all their needs are met.

SKILLS

Science: Observing, predicting, comparing, contrasting, recording data, interpreting data, generalizing, graphing
Mathematics: Observing, charting, identifying patterns, measuring, sequencing, graphing
Language Arts: Listening, communicating, identifying words, developing vocabulary, understanding word meanings, developing comprehension skills, writing, using descriptive language, following directions

TIME

Set-up: 15 minutes
Class: Two sessions of 15 minutes per group for Parts 1 and 2

MATERIALS

See p. 7.

Almost all life on Earth depends on energy from the sun. Green plants and other organisms, such as algae (seaweeds) and some bacteria, are able to trap and store energy from the sun through a process called photosynthesis. The green color of plants and algae is caused by chlorophyll, a green pigment that is primarily responsible for the "light-trapping" part of the process. Sugar is the initial product of photosynthesis. In fact, more than 150 million tons of sugar are produced by the plants on Earth each year! Plants use some of this sugar to provide energy for life. They also use it as raw material to make starches, which are long molecules that can store energy until it is needed.

Plants need light energy, water and carbon dioxide from air for photosynthesis. They need additional chemicals, called nutrients, to manufacture the many other molecules necessary for life. Nutrients must be dissolved in water before they can be absorbed. Aquatic plants and algae can take the nutrients they need from the water around them. Land plants absorb dissolved nutrients from water in soil through their roots. Three of the most important plant nutrients—nitrogen, potassium and phosphorous—are common ingredients in most lawn fertilizers.

Plants cannot walk from place to place in search of resources. However, they are capable of some kinds of movement. For example, flowers open and close, stems bend toward light, and leaves and flowers follow the movement of the sun.

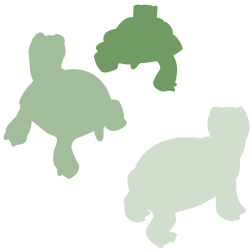
Plants and other photosynthetic organisms are called producers. Other organisms, such as animals and fungi (mushrooms, molds and their relatives), rely on foods consisting of the sugars, starches and other molecules "produced" by plants.

SETUP

Part 1 requires at least three weeks to complete. Part 2 requires one to two weeks to complete, depending on how quickly the radish seeds sprout. To save time, you may want to begin Part 2 shortly after setting up student mini-gardens in Part 1.

Part 1. Place materials for each group on trays in a central location. In advance, fill each peat pot two-thirds full of soil for students. Small disposable cups, with a hole punched through the bottom, can be substituted for peat pots (prepare as above). Also, place about 40 radish seeds in each of six cups (at least 6–10 seeds per student in each group).

Part 2. Assemble supplies for the teacher-led activity: four small plastic plates, paper towels, plastic spoon, radish seeds, water mister,



and four gallon-sized resealable plastic bags that are labeled "Garden 1," "Garden 2," "Garden 3" and "Garden 4."

PROCEDURE

Part 1. Create individual radish gardens

1. Ask students, *Are plants living or nonliving? How do we know?* (Plants are living because they grow, have offspring, use resources, have a life cycle). *Are seeds plants?* Help students understand that seeds are living parts of plants and that seeds contain all the necessary materials to start a new plant under the right conditions. Ask, *What do you think plants need to grow?* Record responses on a classroom chart. For younger students, you may need to use drawings or pictures to indicate needs (sunlight, water, nutrients, air, space).
2. Introduce the radish planting activity by discussing radishes with the students. Ask, *What do you know about radishes?* (plant, red, small, vegetable, etc.). Show the class a radish and give each group of students a radish and a few radish seeds. Have students cut their radishes apart. You may wish to cut radishes for younger students. Have them observe the radish and seeds with their hand lenses.
3. Distribute the student sheets. Explain that each student will plant his or her own radish seeds and watch them grow over the next few weeks. Using a spoon, demonstrate how to plant radish seeds just under the soil in a peat pot, and how to mist the soil lightly.
4. Label the pots with each student's name. Give each student his or her own peat pot.
5. Give each group of students a cup of radish seeds and a plastic spoon. Have each student plant about 6–10 seeds in his or her own pot.
6. Have students place their pots in a sunny place or under a grow light. Students should wash their hands when the planting is completed.
7. Each day, ask students to observe their radishes. Have them record the radishes' growth by writing or drawing on their "My Own Radish Garden" student sheets at least once per week. When the soil in the cup is dry to the touch, students should mist it lightly. You also may want students to measure the changes in plant height, using a paper clip chain or marked straws, every 2–3 days. They also may create graphs to record the growth of their plants.
8. After the radishes have developed (approximately 3–4 weeks), allow students to remove them from the pots. Have students wash the radishes thoroughly. They should use descriptive language to record their

MATERIALS

- 20 cups of potting soil (approx. 3 lbs)
- 4 resealable plastic bags, 12 in. x 15 in. (gallon-sized)
- 4 plastic plates, 10¼ in.
- Fresh radish
- Package of radish seeds (approx. 500 seeds, see Setup)
- Paper towels
- Permanent marker
- Plastic knife
- Plastic teaspoon

Per group

- 4 peat pots, 3 in. (prepared, see Setup)
- Clear plastic cup, 9 oz (prepared, see Setup)
- Fresh radish
- Plastic knife
- Plastic teaspoon
- Plastic tray
- Spray bottle (water mister)

Per student

- Hand lens
- Paper towel
- Plastic teaspoon
- Copy of "My Own Radish Garden" and "My Science Journal" student sheets

observations about their radishes. Point out to students that the edible portion of the radish plant actually is part of the root system. Older students may want to measure the circumference (distance around) or length of their radishes.

Part 2. Investigating needs of plants

1. Ask students, *What would happen to the radishes if one or more needs for plant growth were left out?* (e.g., no water, no sunlight or no soil). After students respond, mention that their suggestions will be applied to create four experimental radish gardens.
2. Explain to students that they will observe, over the next week or so, the progress of radish gardens that have four different sets of growing conditions. Begin assembling Garden 1 (control) and explain the steps you are taking as you assemble it.
   - Fold a paper towel in half and place it on a plastic plate.
   - Sprinkle 2 heaping teaspoons of potting soil across the top of the paper towel.
   - Sprinkle approximately 10–20 radish seeds onto the soil.
   - Lightly spray the soil surface with the water mister so that it is moist, but not soaking wet.
   - Carefully slide the plastic plate into a gallon-sized resealable plastic bag that is labeled "Garden 1." Seal the bag.
   - Place Garden 1 in a sunny spot.
3. Ask students, *Does this radish garden provide everything that the seeds will need to grow?* Make sure that students identify soil, water and sunlight as being present. Air also is present inside the bag.
4. Include students in the preparation of the other gardens, each of which will be missing one requirement for healthy seed germination (sunlight, water or soil). See Garden Treatments chart to the left.
   - Place Garden 2 (same as Garden 1) in a dark place.
   - Place Garden 3 (no water) in a sunny spot or under a growlight.
   - Place Garden 4 (no soil) in a sunny place or under a growlight.

Garden Treatments

	Sunlight	Water	Soil
Garden 1 (control)	☼	🌿	▭
Garden 2	no sun	🌿	▭
Garden 3	☼	no water	▭
Garden 4	☼	🌿	no soil

☼ Sunlight 🌿 Water ▭ Soil

Part 3. Observing experimental gardens

1. Each day, have students check the gardens to make sure that the towel or soil is moist (Gardens 1, 2 and 4 only). Allow assigned students to mist the gardens with water when necessary. If bags become clouded with condensation, leave them partially open to allow the excess moisture to evaporate.

   Note. Bags that are allowed to stay too damp probably will develop a growth of mold. If mold appears, seal the bags and do not reopen.
2. Students should observe the gardens daily or every other day and record their observations on their science journal student sheets. The

Garden Observations

	Garden 1 (control)	Garden 2 no sun	Garden 3 no water	Garden 4 no soil
Day 1				
Day 4				
Day 7				
Day 8				
Day 9				
Day 11				
Day 14				
Day 16				

Sunlight Water Soil

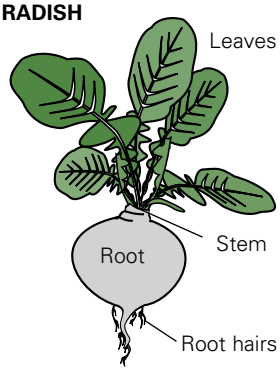
observations also can be recorded during the week on a class chart (see Garden Observations chart above).

3. At the end of one or two weeks, as a culminating activity, ask the class, *What differences have you observed about the seeds (sprouts) in the experimental gardens?* Prompt students to notice that the seeds with sunlight (Garden 1) developed green leaves and are growing normally; the seeds in the dark (Garden 2) germinated, but did not turn green or develop normally; the seeds without water (Garden 3) did not germinate; and that the seeds without soil (Garden 4) did not grow very much.
4. Guide students toward understanding that seeds need water to germinate, but that they also need nutrients (in soil) and sunlight to grow and develop. You may want to point out that air, also needed by plants, was present in all of the bags.

WHAT ARE RADISHES?

Radishes belong to the mustard family of plants. The part we eat is the root. Other roots that we eat are carrots, turnips, parsnips and beets.

RADISH



EXTENSIONS

- Make radish roses, dip or a salad with radishes to share with the class.
- Bring other examples of vegetables to class for students to identify and examine.

My Own Radish Garden

Name _____ Date _____

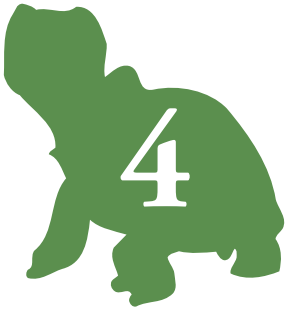
WEEK 1

WEEK 2

WEEK 3

WEEK 4

Animals' Needs



Student teams will observe a worm model and a live worm, create worm terrariums, and observe worms over time.

Unlike plants, animals must rely on other organisms as sources of food. Food provides energy, chemicals necessary for life and some water. Most animals are adapted to eat only certain foods. Some animals are plant eaters, some eat other kinds of animals and others are able to use a variety of foods. All animals are "consumers" of energy sources.

Since most animals cannot digest all the food they eat, the leftovers are released back into the environment as waste. This waste serves as food for other kinds of organisms, such as bacteria and fungi.

Animals also need water. Water is essential for transporting nutrients and other chemicals inside animals' bodies and is important for chemical reactions inside cells. In addition, some animals are able to live in fresh or salt water.

Like water, the oxygen in air is essential for chemical reactions inside cells. Even plants need oxygen to live. Only a few kinds of microorganisms on Earth can survive in environments without oxygen.

Many animals also require safe places to rest, store their food, hide or nurture their young. These places vary from elaborate tunnels created by ant colonies to nests built by birds.

SETUP

This activity requires live earthworms, which need to be obtained prior to conducting this activity. Worms also can be obtained from bait shops or pet stores.

Part 1. Place candy worm models (or scrunched paper straw wrappers) in clear plastic cups (one worm model and cup per student). Cover with crumbled chocolate cookies (or graham crackers) to simulate soil.

Part 2. Place live earthworms in clear plastic cups (one worm and cup per student). Cover the worms with 1/4 cup of damp (not wet) soil. Let about 300 mL of tap water sit overnight to eliminate chlorine. Pour the prepared water into 6 cups (about 50 mL each) and into 6 spray bottles.

Part 3. In advance, collect six 2-liter plastic soft drink bottles and six 16-oz plastic bottles with caps (1 set per group). Cut the top 1/4 off of each 2-liter bottle. Use masking tape to cover the sharp edges. Prepare 6 plastic bags with about 1/2 cup of sand in each, and 6 plastic bags with 2 cups of potting soil in each. Place materials on trays in a central location.

Have students work in teams of 2–4 to share materials.

PROCEDURE

Part 1. Observing worm models

1. To stimulate student interest, ask, *What can you tell me about worms?*

CONCEPTS

- Animals have basic needs.
- Animals need air, water, food and a place to be.
- Animals can survive only in environments where all their needs are met.

SKILLS

Science: Observing, comparing, contrasting, recording data, measuring
Mathematics: Observing, sorting and classifying, comparing, contrasting, communicating, charting, sequencing
Language Arts: Listening, communicating, reading for information, identifying words, developing vocabulary, writing, using descriptive language, understanding word meanings, developing comprehension skills, following directions

TIME

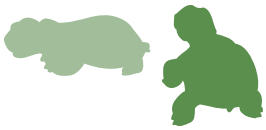
Set-up: 5 minutes
Class: 30 minutes plus 5 minutes each day for 2–4 weeks

MATERIALS

See p. 12.

HOW DO WORMS MOVE?

Worms' bodies are partitioned into fluid-filled segments. By contracting the segments in waves, worms are able to push and pull their way through soil. Small bristles on the segments help anchor worms' bodies as they move.



MATERIALS

- Masking tape
- Paper towels

Per group (see Setup)

- 3 cups of potting soil
- 2 sheets of black construction paper, 9 in. x 12 in.
- 1/2 cup of crumbled dry leaves
- 1/2 cup of oatmeal
- 1/2 cup of sand
- 1/2 cup of used coffee grounds
- 2-liter plastic soft drink bottle
- 16-oz plastic soft drink bottle with cap
- Glue
- Large rubber band #84 (to fit around the 2-liter bottle)
- Plastic tray
- Resealable plastic bag, 12 in. x 15 in. (gallon-sized, for soil)
- Resealable plastic bag, 4 in. x 6 in. (quart-sized, for sand)
- Spray bottle of prepared water and one cup of water
- Strip of tagboard (or heavy paper), 10 cm x 70 cm (4 in. x 28 in.)

Per student (see Setup)

- 2 clear plastic cups, 9 oz
- 2 paper plates, 8 in.
- 1/4 cup chocolate cookie crumbs
- Candy "gummy" worm (or scrunched paper wrapper from drinking straw)
- Crayons or colored pencils
- Hand lens
- Live earthworm
- Metric ruler
- Copy of student sheets

How do they look? How do they feel? Where do worms live? Are worms plants or animals? Make a list of students' ideas on the board. Tell students that they will be learning more about worms.

2. Distribute a prepared cup with worm model covered with cookie crumbs, magnifier, metric ruler, paper plate and a copy of the "My Worm Model" sheet to each student. Have students place their models on the paper plates.
3. Give students a few moments to examine the models using their hand lenses. Then have them make observations, using the questions on the student sheets. With younger students, you may want to read each question aloud as they work through the observations.

Part 2. Observing live worms and making comparisons

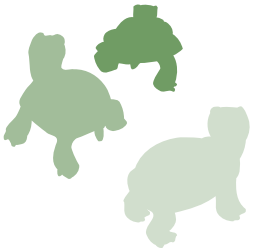
1. Show students how to handle live earthworms. Explain that worms have soft bodies and should be held gently. Because earthworms breathe through the skin, they need to be moistened frequently when removed from soil (about every 10 minutes). Gently dip a worm into a prepared cup of water (see Setup) to show students how to rinse off surface soil or to moisten the worms.
2. Distribute a cup with soil and a live worm, paper plate and copy of the "My Live Worm" sheet to each student. Give each group a cup of prepared water for rinsing and moistening the worms.
3. Have students gently place the worms on paper plates. Each student should use his or her hand lens to make observations and should complete a student sheet individually.
4. Once students have finished their observations, have them carefully place the worms back in the cups with soil.
5. Ask students, *Is the worm you have been observing alive? How do you know?* Help students conclude that the worm is alive because it moves, needs water and food, grows, etc. Ask, *What about the model worm? Is it alive? Why or why not?*
6. Create a class chart or Venn diagram (see "Logical Relationships, p. 13) to record and compare students' observations about the models and living worms. Ask, *In what ways is the model worm like the living worm? In what ways are the two kinds of worms different?* Discuss the differences between living and nonliving things.

   Note. If students will not be making worm terrariums on the same day, place earthworms in a container of damp (not wet) soil.

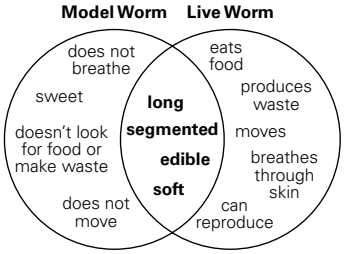
Part 3. Making terrariums

1. Explain to students that they will be preparing a place in which the earthworms can live. Ask, *What do earthworms need to live?* Remind students of the differences between the living and model worms.

2. Follow by asking, *Where do worms find their food? What do they eat? Where do worms find water?* Help students conclude that soil provides worms with most of the things they need.
3. Show students the materials they will need to build a terrarium: earthworm, prepared 2-liter bottle (container), 16-oz plastic bottle with lid, small bags of sand and soil, used coffee grounds, uncooked oatmeal, black paper, rubber band and water mister (loose materials on tray).
4. Begin to demonstrate how to prepare a terrarium—but carry out the steps in the wrong sequence. For example, place the container upside-down and set the other materials on top. Encourage students to volunteer ideas to help build the terrarium correctly (see sidebar).
5. Distribute the tagboard strips and copies of "Building a Terrarium" student sheets. Have students cut out the instruction cards from the sheets. Ask students to arrange the cards in logical order along the length of the tagboard strip (the strip may be folded in half three times to create eight equal spaces). Have students number the cards and glue them to the strip.
6. Have groups build the terrariums by following the instructions on the sequence strips. OR create a class chart with the steps listed for students to follow. Allow groups to assemble their terrariums.
7. Once the terrariums are complete (including the addition of earthworms), wrap each with black paper and secure with a rubber band. Label the terrariums with students' names.
8. Have students remove the paper covering the terrariums and observe their worms' homes daily for 2–4 weeks. Since the smaller bottle takes up much of the space within the terrarium, students will be able to observe the activities of the earthworms. They should note worm behavior and changes in the habitat, either by drawing what they see or writing descriptive phrases in their journals. Once daily observations are complete, students should cover the terrariums with the paper.
9. Help students monitor the moisture content of the terrariums and mist the top layer, if necessary. Do not allow students to over water. The soil should be damp, but not wet.
10. During and after the 2–4 week period, discuss students' observations. Help students understand that worms, like all animals, need water and food to survive. Have students identify which substances in the terrarium are food for worms (leaves, coffee grounds and oatmeal). As an assessment, consider having students draw a detailed, labeled picture of the worm habitat and describe or draw all of the things that the worms need to survive.



LOGICAL RELATIONSHIPS



STEPS TO PREPARE THE TERRARIUM

1. Pour the bag of sand into the large container.
2. Place the small bottle (with its cap on) inside and at the center of the container.
3. Pour the bag of soil around the small bottle and on top of the sand.
4. Cover the soil with a thin layer of uncooked oatmeal.
5. Cover the oatmeal with a thin layer of coffee grounds.
6. Carefully place the worms on top of the coffee grounds.
7. Gently spray the worm and coffee ground layer with water.
8. Cover the moist layer with leaves.

EARTHWORMS . . .

An earthworm has no eyes or ears. It burrows through soft soil and eats dead plant and animal material. This material is digested as it passes through the worm's body. Waste is excreted at the tip of the tail. A worm produces its own weight in waste, known as castings, in just one day.

My Worm Model

Study your worm carefully. Draw a picture of your worm below.

1. What color is your worm? _____
2. How long is your worm? _____
3. How wide is your worm? _____
4. Can you tell its front from its back? _____
5. Can you tell its top from its bottom? _____
6. Does your worm have eyes? _____
7. Does your worm have a mouth? _____
8. Does your worm have a nose? _____
9. Does your worm have legs? _____
10. How many segments does your worm have? _____
11. How does it move? _____
12. How does it smell? _____
13. How does it feel? _____

My Live Worm

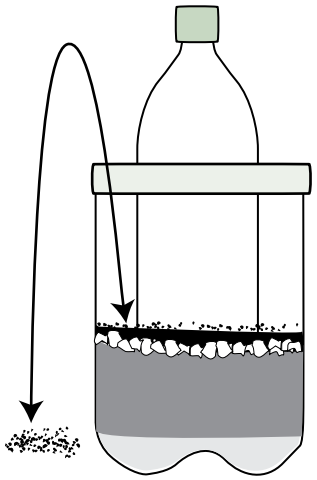
Study your worm carefully. Draw a picture of your worm below.

1. What color is your worm?_____
2. How long is your worm?_____
3. How wide is your worm?_____
4. Can you tell its front from its back?_____
5. Can you tell its top from its bottom?_____
6. Does your worm have eyes?_____
7. Does your worm have a mouth?_____
8. Does your worm have a nose?_____
9. Does your worm have legs?_____
10. How many segments does your worm have?_____
11. How does it move?_____
12. How does it smell?_____
13. How does it feel?_____

Building a Terrarium

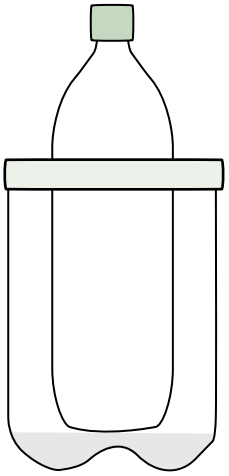
Step _____

Cover the oatmeal with a thin layer of coffee grounds.



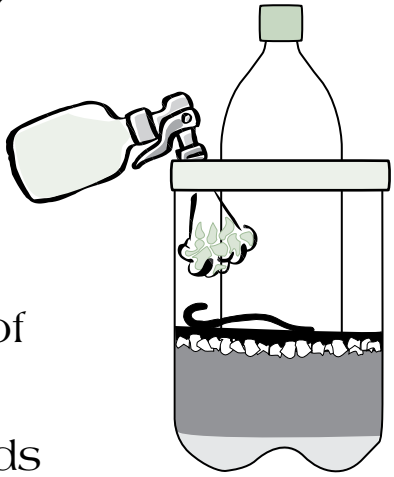
Step _____

Place the small bottle (with its cap on) inside and at the center of the container.



Step _____

Gently spray the worm and layer of coffee grounds with water.



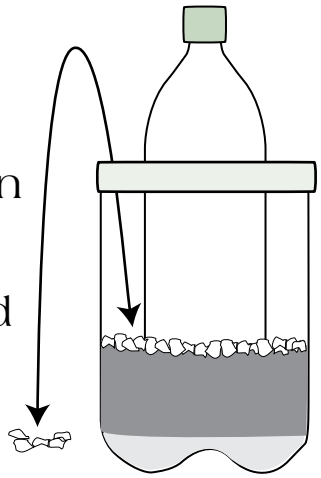
Step _____

Pour the bag of soil around the small bottle and on top of the sand.

Building a Terrarium

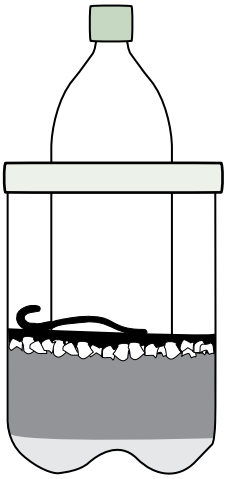
Step _____

Cover the soil with a thin layer of uncooked oatmeal.



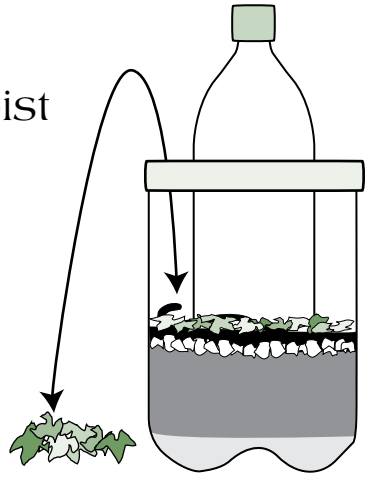
Step _____

Carefully place the worms on top of the coffee grounds.



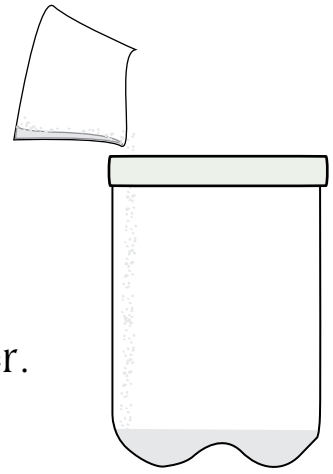
Step _____

Cover the moist layer with leaves.



Step _____

Pour the bag of sand into the large container.



Plant or Animal?

Students will explore two major kinds of living things, plants and animals, and compare their needs.

CONCEPTS

- Plants and animals are kinds of living things.
- Animals and plants have some needs that are similar and some that are different.
- Animals need air, water and food, while plants need air, water, nutrients and light.
- Some plants are alike in appearance and in the things they do, while others are very different from one another. This also is true for animals.

SKILLS

Science: Observing, sorting and classifying, comparing, contrasting, communicating, generalizing, charting

Language Arts: Listening, communicating, understanding word meanings, developing comprehension skills, writing, using descriptive language, following directions

TIME

Class: 45 minutes

MATERIALS

- 2 sets of Tillena Lou's World cards (12 cards per set, see Setup)

Per student

- Craft stick, wood
- Crayons or colored pencils
- Glue
- Paper plate, 8 in. (prepared, see Setup)
- Copy of "My Science Journal" student sheet

At this point in the unit, students have observed and learned about a plant and an animal. This activity provides them with opportunities to test their assumptions about plants and animals, and to learn about plant and animal diversity. If students can explore outdoors, they might be able to observe the following kinds of animals and plants.

Animals without backbones

- Mollusks (snails, slugs, clams) - soft moist body, uses a large muscular "foot" to move.
- Crustaceans (crayfish, pill bugs, sow bugs) - hard outer covering (exoskeleton), jointed bodies and legs.
- Insects (ants, bees, wasps, flies, butterflies, beetles, mosquitoes) - body made of three segments, one pair of antennae, often with one or two pairs of wings, six jointed legs.
- Spiders and their relatives (ticks, mites, daddy longlegs) - body of two segments, no antennae, four pairs of legs.

Animals with backbones

- Amphibians (frogs, toads) - soft moist outer skin, four legs.
- Reptiles (lizards, turtles, snakes) - dry, scaled skin, four or no legs.
- Fish - scaled skin, no legs, has fins and gills, lives in water.
- Birds - feathers, beak as a mouth, two wings, two legs.
- Mammals (squirrels, cats, dogs, horses, cows, hamsters, people) - body hair, four legs or two legs and two arms.

Non-Flowering Plants

- Mosses - low-growing green plants in damp places and on trees, leaves very small. Mosses do not produce flowers or true seeds.
- Ferns - long-branched leaves that start at the base of the plant, leaf divisions arranged like the teeth of a comb. Ferns do not produce flowers or true seeds.
- Pines and their relatives (pines, cedars, fir) - trees and shrubs with needle-like or scale-like, evergreen leaves. These trees and shrubs produce cones instead of flowers.

Flowering plants

- Monocots (grasses, lilies, irises, palms, onions) - parallel veins in leaves, flower parts in multiples of three, leaves often originating at base of plant, one seed leaf (cotyledon).
- Dicots (oaks, maples, elms, willows, petunias, clover, dandelions) - veins in leaves arranged like a fan or branching from a central vein, flower parts very numerous or in multiples of four and five, leaves often distributed along a stem, two seed leaves (cotyledons).

SETUP

You will need a copy of the book, *Tillena Lou's Day in the Sun,* to read to students as part of this activity.

Copy the student sheet (p. 21) on card stock, then cut out each card. Each student should receive one card.

Each student also will need a paper plate. Cut a short slit in the center of each plate. The slit should be wide enough to allow a craft stick to slip through and stand vertically (see illustration below).

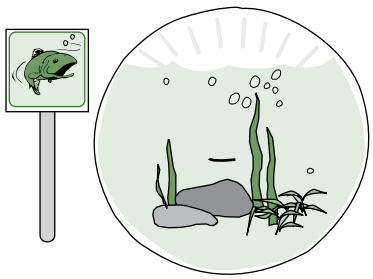
Create a two-column chart to be filled out during class. One column will list ways in which plants and animals are alike and the other will list ways in which they are different.

Introduce this activity to the entire class. Students will build individual puppets in Part 1 and will solve riddles in teams in Part 2.

PROCEDURE

Part 1. Plant or animal?

1. As a whole group, reread *Tillena Lou's Day in the Sun*. Call attention to the different animals and plants in the story, and to their needs. Following the reading, assess student understanding by asking questions such as, *Who needs water?* (all plants and animals in the story), *Who needs food, air, soil, sun* (etc.)? *Who swims? Who hops? Who plants seeds? What do bees gather?* Guide students toward noticing differences between plants and animals. Emphasize the characteristics that make each living thing special (e.g., *Do all animals wear clothing? Does every living thing eat corn?*).
2. Explain to students that they each will receive a picture of an animal or a plant from the story to make into a puppet. Distribute one card and other materials to each student. Have each student color his or her card, then glue the card to one end of his or her craft stick. While students are working, ask each to recall the role his or her animal or plant (or "puppet") played in the story.



3. Give each student a paper plate. Have students flip the paper plates over (convex side) to make color drawings of the their puppets' habitats (animal or plant)—where the organisms live, their food sources, etc.

EXTENSION

Take the students on a mini-field trip, either within the school building or around the schoolyard, giving them time to observe, write and draw. You may want to stop at certain points to let them sit and observe. Help them find examples of different living organisms by asking questions. Have them note parts like leaves, flowers, backbones, legs, etc. Call attention to how the organisms move, where they are, what they are doing.

Upon returning to the classroom, ask students what living organisms they saw. Use these observations to prompt a discussion about types of living things and their needs.

WHAT IS A HABITAT?

The kind of place where a given organism normally lives is called its habitat. "Habitat" is different from "home," because habitat refers to the setting in which a kind of organism lives. Living things obtain everything they need to grow, survive and reproduce from their habitats.

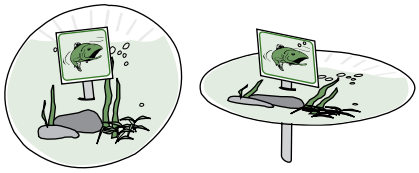
CHARACTERISTICS OF PLANTS

- Nonmoving (from place to place)
- Have green parts (which are responsible for trapping sunlight)
- Use sunlight to make food (photosynthesis—it's a good idea to expose children to accurate terms)
- Produce seeds (usually)
- Have roots, stems and leaves, and often produce flowers or cones, fruits and seeds
- Need water, sunlight, nutrients from soil, and air
- Rely on animals, wind and water for the transport of plant pollen and seeds

CHARACTERISTICS OF ANIMALS

- Capable of willful movement (from place to place)
- Usually don't have green parts (and if they do, the green parts do not trap energy from the sun)
- Produce live young or eggs, but not seeds
- Must use other living things or parts of living things as food
- Have body parts (mouths, etc.) that help them eat
- Need water, food and air to survive

4. When the drawings are complete, have students insert the puppet craft sticks through the slits in the plate. Students should hold the stick/puppet vertically so that it "stands" erect. They may tilt the plate/habitat or hold it in a horizontal position (see illustrations to the right).



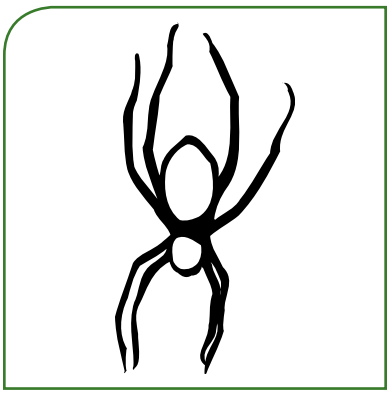
5. Ask each student to share his/her puppet's habitat with the rest of the class. You may have students display their habitats in different parts of the room.
6. Create a two-column class chart listing how plants and animals are alike and different. (For the benefit of those students who do not read yet, you may want to decorate the chart with pictures of plants and animals that you have drawn, or with pictures cut from newspapers and magazines.) Invite students to volunteer information to complete each half of the chart.

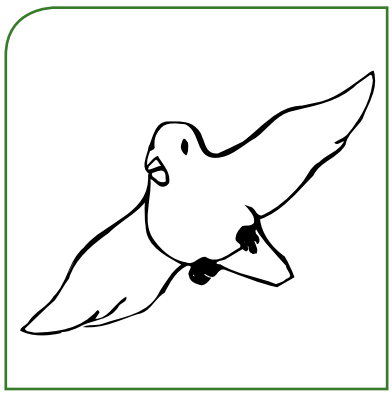
   Note. After this activity, students should be able to identify some or all of the characteristics typical of plants and animals, as shown in the sidebar to the left.

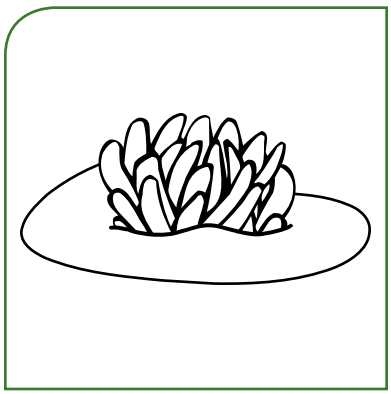
Part 2. Silly scenario

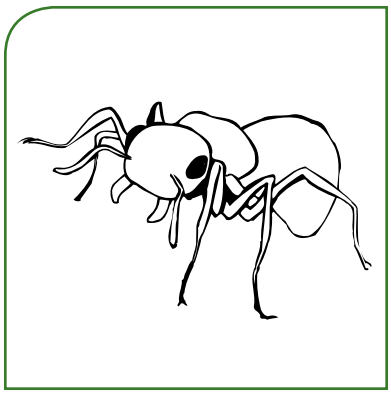
1. To assess students' understanding of how animals and plants are alike and different, ask silly scenario questions based on characters in the My World and Me story book. (You may want to dramatize the concepts with the students playing roles.) The following are just a few examples.
   - Can a water lily climb onto the log with Tillena Lou?
   - Does Tee have leaves?
   - Does the deer produce her own food through photosynthesis?
   - Can Tillena Lou fly to the bird's nest?
   - Do Taffy, Tee and Tillena go to a farm to grow their own food?
   - Can a bee swim underwater?
   - Can lizards live on the surface of water?
   - Can the cattails eat a hamburger?
   - Does a duck drink its water from a glass?
   - Do spiders produce seeds?
2. After students have responded to the questions, discuss how the organisms in question actually behave.
3. Divide students into groups and have each group come up with its own silly scenario to share with the rest of the class or to dramatize using its puppets. OR have students create a class book with their scenarios.

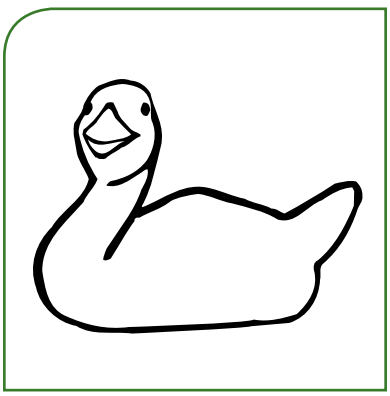
Tillena Lou's World

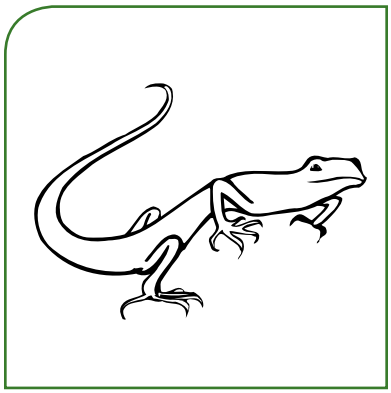


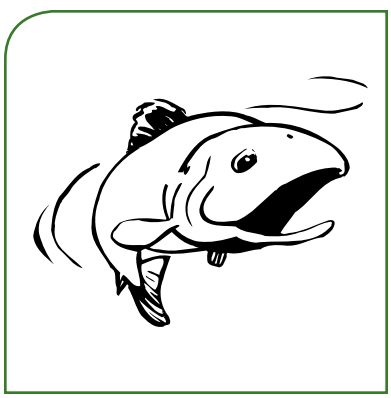


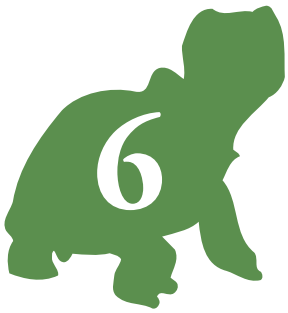












Food for Kids

Students will learn how cooking makes some foods easier to eat by observing uncooked popcorn and cooked popcorn. They also will make a snack (pudding) in class.

CONCEPTS

- Different animals eat different kinds of food.
- Unlike other animals, people often cook their food or combine several foods together.
- Cooking helps make some kinds of food easier to eat and to digest.

SKILLS

Science: Observing, sorting and classifying, predicting, generalizing, measuring
Mathematics: Observing, measuring
Language Arts: Listening, communicating, writing, using descriptive language, following directions

TIME

Set-up: 10 minutes for Part 1; 20 minutes for Part 2
Class: 30 minutes

MATERIALS

- 50 raw popcorn kernels
- Instant pudding, 3.2-oz pkg
- 1/2 cup of milk
- Clear plastic cup, 9 oz
- Package of microwave popcorn, plain (see Setup)
- Plastic teaspoon
- Tablespoon

Per group

- 4 clear plastic cups, 9 oz (prepared, see Setup)
- 4 plastic teaspoons
- 2 cups of milk
- Instant pudding, 3.2-oz pkg
- Paper towels
- Plastic tray
- Tablespoon

Per student

- Hand lens
- Copy of "My Science Journal" student sheet

All organisms that cannot trap and convert energy from the sun through photosynthesis must obtain the energy and other substances they need through food. Animals, fungi (mushrooms and their relatives) and many kinds of bacteria, for example, must eat plant parts, other animals or decaying plant or animal material. Living things that obtain energy from food are called consumers.

Not all animals have the same food requirements. People, for example, need to eat a variety of foods, including many different fruits and vegetables, to obtain all of the nutrients needed for growth and good health.

Important components of food are listed below.

- **Carbohydrates** are the body's main source of fuel. Starchy foods like breads, spaghetti, rice, potatoes, corn and cereals all are made up mostly of carbohydrates. Sugary foods like candy, jam and syrups also are carbohydrates. When possible, it is preferable to eat whole-grain breads and cereals, and to avoid sugary foods.
- **Fats** include butter, margarine, lard, shortening and cooking oil. Cheese, cream, chocolate, some meats and many desserts have a lot of fat. Fats are very concentrated sources of energy. Fats from animal sources, such as lard and butter, and fats that are solid at room temperature, generally are not as healthy as plant oils, such as olive, canola and nut oils.
- **Proteins** are important for the growth and repair of the body and muscles. Foods rich in protein include eggs, milk products, meat, dried beans, chicken, turkey and fish.
- **Minerals** are found in small amounts in food. They are needed for many body functions. Calcium, found in dairy products, is important for developing strong bones and teeth.
- **Vitamins** are other chemicals found naturally in food and are needed in small quantities by the body. Vitamin A, for example, helps maintain normal vision and healthy skin. It can come from dark green, leafy vegetables, and yellow and orange vegetables and fruits.

Unlike other animals, people combine ingredients and/or cook them to make their food better tasting or easier to digest.

SETUP

Have students work in groups to complete activities. Assign a cooperative learning job to each student.

Part 1. Prepare the bag of microwave popcorn and allow it to cool. As an alternative, you may purchase a bag of prepared unflavored popcorn.

Part 2. Prepare a tray of materials for each group. Each tray will include

four 8-oz plastic cups—each containing 1/2 cup of milk; an opened package of dry pudding mix (any flavor); one tablespoon; four plastic spoons; and paper towels.

PROCEDURE

Part 1. Popcorn observations

1. Before students begin handling food, make a point of demonstrating how to wash hands with soap and water (see box below, "Hand Washing and Food Safety"). Have students wash their hands.
2. Prompt students to think about how they feel when they are hungry. Ask, *Do you ever feel hungry? What do you do when you feel hungry?* Discuss student responses.
3. Have students think about the types of food they eat. Help them identify the different kinds of foods available: breads and cereals; fruits; vegetables; milk and other dairy products; meats, fish, poultry and beans; fatty or oily foods; and sweets. Have students name examples of each kind of food. Ask, *Do you eat this food raw? Why or why not?*
4. Open the uncooked bag of popcorn. Give each student a hand lens and a few kernels of unpopped popcorn to observe. Have students use as many senses as possible to observe the corn. They will be able to smell, see (without and with the magnifier), hear (the kernel makes sound when dropped on a surface), touch and, if permitted, taste (by touching the tongue to a piece of the kernel).
5. Direct students to write about or draw their observations in their a science journals.
6 Prompt students to consider why we need to cook some foods. Ask, *Do we eat uncooked popcorn? Would you like to eat this for a meal or a snack? Why or why not?* Ask students to predict what they think would happen if the popcorn was cooked.
7. Show students the prepared popcorn. Give each student a few pieces of the popcorn to observe. Again, have students use all of their senses to examine the new sample. Cut a kernel in half for them to observe. Have them record their observations as before.
8. Ask the class, *How did the popcorn change after it was cooked? Would you rather eat the uncooked or the cooked popcorn?*

HAND WASHING AND FOOD SAFETY

Follow these steps before preparing or eating food.

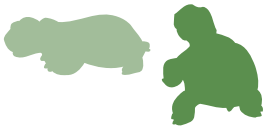
- Moisten hands with warm water.
- Apply soap and rub hands together for 20 seconds.
- Rinse thoroughly.

EXTENSION

Ask students, *What are other foods that are made of corn?* Possible answers are:

- Candy corn (corn syrup and coloring molded to look like a corn kernel)
- Corn bread (cornmeal mixed with eggs, milk, etc., and baked)
- Corn chips (fried tortillas)
- Corn chowder (soup made with corn, potatoes and milk)
- Corn meal (finely ground corn used as flour or cereal)
- Corn on the cob (cooked ears of corn with husks and silk removed)
- Corn tortillas (soaked and ground corn, mixed, flattened and baked)
- Creamed corn (fresh corn kernels cooked with milk)
- Grits (coarsely ground dried corn kernels or hominy)
- Hominy (soaked corn kernels with hulls removed)
- Hush puppies (fried, seasoned cornmeal)
- Succotash (fresh, boiled corn kernels and lima beans)
- Tamales (ground corn mixed with lard or butter, flavored and steamed in a corn husk)

Have examples of several of these foods and allow students to taste them. Emphasize that humans use this plant to make many foods that they eat (humans are consumers; plants are producers). Ask, *Do other animals prepare or cook their foods?*



EXTENSION

Use the recipe below to make cornstarch pudding without using a mix. Discuss with students the advantages and disadvantages of foods made from "scratch" (usually less expensive, take more time to prepare, often taste better, etc.). Discuss with students the list of ingredients printed on a box of instant pudding. Help them understand that the pudding mix already contains several different ingredients.

- Beat 2 eggs (well) in a mixing bowl.
- In a saucepan, mix 1/2 cup sugar, 6 tbsp of cornstarch and 1/4 tsp of salt. Once these ingredients are mixed, continue stirring and slowly add 4 cups of milk.
- Cook over low heat, stirring constantly, until mixture thickens (about 10 minutes).
- Remove about 1 cup of mixture and slowly incorporate it into the eggs in the mixing bowl.
- Pour the egg mixture into the saucepan and continue to cook for 2 minutes (stirring constantly). Remove the pan from the heat.
- When the pudding is slightly cool, mix in 1 tsp vanilla.

Be careful not to over cook the pudding. It will thicken more as it cools.

Cornstarch, the thickening ingredient in this recipe, is a fine flour made from the insides of corn kernels.

9. Help students understand that many foods must be cooked to make them easier to eat and digest. Ask students to think of other examples of foods that usually are cooked before they are eaten.

Part 2. Making pudding

1. Challenge students to think about how they eat different foods. Ask, *Do you always eat plain bread or milk? Do you ever mix one or more kinds of food together to make something that tastes good? How about pudding? What do you think it contains?*
2. Explain that students will make pudding and then eat it.
3. Remember to have students wash hands before touching food. Emphasize to students the importance of washing hands before handling food or eating.
4. Demonstrate to the class how to make the pudding. Measure two level tablespoons of pudding mix into 1/2 cup of milk. As you stir the mixture, advise the students to stir well, without sloshing, so that all of the dried mix is thoroughly combined with the milk. Show students how the mixture changed from a dry mixture in liquid to soft pudding.
5. Have Materials Scientists from each group pick up their tray of materials to make pudding.
6. Each student should make his or her own pudding. The students should take turns using the tablespoon to measure the dry pudding mix from its container. After all students have made their pudding, give them time to eat their snacks.
7. Discuss the ingredients in the snack students have made. Ask, *What did you mix together to make your snack? Did you end up with something that was different from the ingredients you started with? Can you think of any other foods that are made of mixtures?*

GRAINS

Corn kernels are examples of grains (which are seed-like fruits) produced by members of the grass family.

In some parts of the world, corn (which originated in the New World) is referred to as "maize," from the Spanish word "maiz."

Other grains that are important food sources around the world are rice, wheat, oats, barley and millet.

We Need Water

Students will make lemonade by mixing lemon juice, sugar and water. They will discover that the water they need every day is sometimes in sources other than drinking water.

All living things on Earth require water in some form. Even desert organisms that appear to survive without water need it in one way or another. Some desert animals can get all the water they need from the food they eat. One example is the sand cat, which lives in North Africa and the Arabian Peninsula. Camels also can go for long periods of time without drinking water, as long as they have green vegetation and dew to feed on. Contrary to popular myth, camels' humps are reservoirs for fat—not water.

Young children need to take in about eight cups of water each day, either directly by drinking it, or indirectly through foods and other beverages.

SETUP

Prepare the supplies for each group beforehand. Set up one tray per group as follows: 4 prepared cups (each marked with a "fill-line" across the middle and containing 2 teaspoons of lemon juice); small pitcher of water containing 2 cups of cool or cold water; 1/2 cup of sugar; 4 plastic teaspoons; and paper towels.

PROCEDURE

Part 1. Making lemonade

1. Before beginning this activity, have students wash their hands (see "Hand Washing and Food Safety," p. 23).
2. Ask students, *Where does Tillena Lou live?* (pond). *What do we find in a pond?* (water). *Do you think Tillena needs water to survive?* Encourage students to think about the ways in which Tillena, a turtle, might need water. These include water for drinking, water to keep her body cool, and water as a place where she finds food to eat. Write students' ideas on the board.
3. Next ask students, *What about you? Do you need water?* Allow students time to volunteer ways in which they need water (drinking, washing, cooking, etc.). Follow by asking, H*ow do you get the water you need?* Students may offer a variety of answers, including water from the faucet, bottled water, or water from the drinking fountain.
4. Challenge students by asking, *Do you drink things other than pure water? What are some of your favorite things to drink?* Make a list of students' favorite drinks. Ask, *Do you think that these drinks also give your body water?* Tell students that they will be thinking about this question as they make their own lemonade to drink.
5. Demonstrate how to obtain juice from a lemon by cutting one in half

CONCEPTS

- All living things need water.
- People and many other animals take in water through their food and by drinking a variety of liquids.

SKILLS

Science: Observing, communicating, generalizing, measuring
Mathematics: Observing, communicating, generalizing, measuring
Language Arts: Listening, communicating, writing, using descriptive language, following directions

TIME

Set-up: 20 minutes
Class: 30 minutes

MATERIALS

- 9 clear plastic cups, 9 oz
- 250-mL bottle of lemon juice (a little over 1 cup, see Setup)
- 2 tsp sugar
- Cup of milk
- Cup of orange juice
- Cup of another kind of juice
- Fresh lemon
- Plastic teaspoon
- Sharp knife
- Water (see Part 2)

Per group

- 4 clear plastic cups, 9 oz (prepared, see Setup)
- 4 plastic teaspoons
- 1/2 cup of sugar
- Paper towels
- Plastic tray
- Small pitcher (see Setup)

WATER NEEDS

Every day, we lose about 2,500 mL of water that must be replaced for us to live.

Even K–2 students need a total of about 8 cups of water from drinks and food each day.

EXTENSION

Most foods contain significant amounts of water. A tomato, for example, is 90% water. Have students compare and contrast different kinds of food that are available in both dried and fresh forms. Examples include fresh meat or fish, and beef jerky and dried fish or shrimp; grapes and raisins; plums and prunes; and bananas and banana chips. Allow students to use hand lenses to examine differences between the fresh and dried versions. Let students taste the different examples and discuss how the loss of water has changed each item.

Students can make their own dried grapes or apple slices as a class experiment by stringing the fruit on a cord and hanging it near a sunny window. Do not eat the dried fruit.

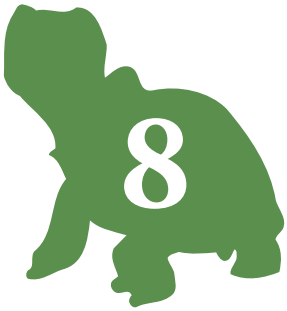
and squeezing each half over a clear cup. You may want to give each student a spoon and allow students to taste a few drops of the juice. Ask students, *Would you want to drink this as a snack? What might we add to the lemon juice to make it taste better?*

6. After students have discussed alternatives for improving the lemon juice, measure 2 teaspoons of sugar into the cup. Add 1/2 cup of water and stir. Let students predict how the new mixture might taste.
7. Have students work in groups of four to share materials as they make lemonade. Each student should make his or her own cup of lemonade. Have the Materials Scientists from each group pick up a tray of materials from a central location or create a station where students in each group can make their lemonade.
8. Have each student measure 2 teaspoons of sugar into one of the marked cups (that already contain lemon juice). Next, he or she should add water to the cup, up to the marked fill-line, and stir the mixture.
9. As students drink their lemonade, ask, *What happened to the sugar when you mixed it with the water and lemon juice?* (dissolved or "disappeared"). *How can you tell that the sugar is still there?* (taste). *Is the lemon juice still there? How do you know?* (taste). *What about the water? Can you taste it?* (probably not). *Does your body get water when you drink lemonade?*

Part 2. Other liquids

1. In front of the class, show 8 clear cups. Fill the first 3 cups with milk, orange juice, and another juice, respectively. Fill the remaining 5 cups with water. Hold up a cup of water and explain that our bodies need about 8 cups (this size) of water every day. Ask students if they know what liquid is in each of the other cups.
2. Ask, *What ingredient did we add to the lemon juice?* (water). *Do you think these other beverages also contain water? Why or why not? What about the drinks on our list? Do you think they contain water?* Help students understand that they obtain needed water from a variety of sources.
3. Conclude by having students draw or write about other examples of foods or liquids comprised mainly of water. Examples include soups, fruits, hot chocolate, etc. OR have students list or draw all the foods they might eat in a day and place a check mark next to all those that they think may contain water. Let them share their ideas within their groups and later with the class.

Air and Breathing



Students will explore breathing and air by blowing bubbles and by observing themselves and others during breathing.

Animals need oxygen from air to carry out the reactions that release and transform energy from food. Carbon dioxide is released as a waste product during these processes.

In mammals, including humans, air enters the body through the nose and mouth, and moves into the lungs. Once in the lungs, oxygen from air passes through the moist interior of the lungs and is dissolved into the bloodstream. The heart pumps oxygenated blood to the rest of the body. Some mammals, such as whales, porpoises and seals, breathe air, but are able to hold their breath for long periods of time while they are under water.

Other animals have evolved different ways to capture oxygen. A worm, for instance, breathes through the damp surface of its body. Oxygen dissolves in the surface moisture and passes into the body and the bloodstream. Fish and many other aquatic animals use gills to absorb oxygen from water. The gills of fish, for example, consist of thin sheets. Water is drawn in through the fish's mouth and flows across the gills, where oxygen passes directly into the bloodstream through tiny capillaries (blood vessels).

SETUP

To make bubble solution, gently pour 8 ounces of dishwashing detergent (Ivory or Dawn works best) and 4 ounces of drugstore glycerine (glycerol) into a gallon container that is nearly full of water. Mix slowly to avoid making bubbles. As an alternative, you may purchase the bubble solution.

Create bubble-makers for students to use by removing the bottoms from small paper cups.

Students should conduct this activity in teams of two.

PROCEDURE

1. Pour about a tablespoon of bubble solution onto the projection area of a standard overhead projector. Ask students, *What do you see?* (liquid on the overhead). Next, gently place the tip of a straw into the liquid and blow to create a bubble. Students will be able to observe the bubble as it is projected. Ask, *What is different about the liquid?* (it contains a bubble of air). You also can conduct this introduction by blowing the bubble on a table to form a dome full of air.
2. Mention that air is all around us, but usually cannot be seen. However, when air is trapped in a container, like a bubble, we are able to observe it. Ask students, *What do you think is inside the bubble?* Give students time to think and respond. Responses will vary. Prompt students' thinking with additional questions, such as, *Can you see*

CONCEPTS

- Animals need air to live.
- People and many other animals take in air by breathing.

SKILLS

Science: Observing, communicating, generalizing
Mathematics: Generalizing
Language Arts: Listening, communicating, developing comprehension skills, writing, using descriptive language, following directions

TIME

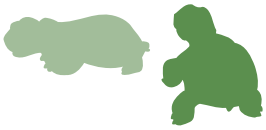
Set-up: 20 minutes
Class: 30 minutes

MATERIALS

- 2–3 drinking straws, cut in half
- Dishwashing detergent, 8-oz bottle (see Setup)
- Gallon container
- Glycerine, 4-oz bottle (drugstore, see Setup)
- Overhead projector
- Water

Per group of two

- 4 prepared paper cups, 3 oz (bathroom-size, see Setup)
- 2 clear plastic cups, 9 oz
- Paper towels
- Copies of the student sheet



EXTENSIONS

- Have students experiment with different sizes of bubble makers to discover whether bubble size is affected.
- Ask students, *How long can you hold your breath?* Most people can hold their breath for about one minute. Compare this to a hippopotamus, which can hold its breath for 15 minutes. Or to a beaver that can hold its breath for 20 minutes. Or to a whale that can go for an hour without taking a new breath!
- Challenge students to think of other ways we can detect the presence of air. Examples might include containers that hold air, such as balloons or automobile tires; or objects that are moved by air, such as flags or pinwheels. Have students draw different "air detectors."

what's in the bubble? Help students to conclude that the bubble contains air.

3. Tell students that they will be making bubble containers full of air.
   Note. You may wish to do this part of the activity outside.
4. Give each student a clear plastic cup that is about one-third filled with bubble solution.
5. Ask students to dip the larger end of the small cup—original opening—into the solution carefully. Then have students lift the small cup, aim their bubble blowers away from any other persons, and carefully blow on the smaller end. (Make sure students do not touch their mouths to the ends dipped in bubble solution.) Students should observe the bubbles.
6. Ask, *Where did the air in the bubble come from? Will a bubble form if you do not breathe into the cup?*
7. Have students draw a picture of the bubbles they created, and/or, depending on their ages, write three different words that describe the bubbles.
8. Conclude by having students think about where the air they blew into the bubble came from. Help them understand that they inhaled air into their bodies, and then exhaled air that wasn't needed (along with water products) back out.
9. Have students place their hands over their chests while sitting still for one minute. Ask, *What did you notice?* (students should note that the chest is moving in and out). Follow by asking, *What is happening?* Talk about the fact that all animals breathe: take air in and let air out. *What is happening when your chest is moving?* Help students understand that their chests' expand when they breathe air into their bodies (or lungs).
10. Conclude by having students imagine what a bubble might look like if it were created by a really large animal, such as a hippopotamus. Ask, *Do you think that the bubble would be larger or smaller than the ones you made?* Have students write a fun story or draw a picture about the possibilities.

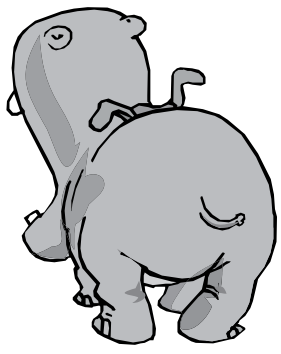
Bubbles Away!

8

Name _____ Date _____

1. Draw and color the bubbles you created.

2. Write a story about or draw a picture of a giant bubble blown by a hippopotamus.



9

A Place to Be

Students will play a "Concentration" type card game, matching animals with their "places to be."

CONCEPTS

- All living things need a place to be.

SKILLS

Science: Observing, predicting, comparing, applying knowledge, inferring, sequencing
Mathematics: Identifying patterns
Language Arts: Listening, communicating, reading for information, identifying words, developing vocabulary, following directions

TIME

Set-up: 5 minutes
Class: 30 minutes

MATERIALS

Per group

- Crayons or markers
- Resealable plastic bag
- Set of Match Up Game Cards, (16 cards per set, see Setup)

EXTENSION

Encourage students to create their own sets of matching cards as they learn other suitable content (two 2-in. x 2½-in. blank card templates are provided on p. 33).

Within any given ecosystem, each living thing occupies a physical space in which it survives and is able to meet its needs. Young children may identify most with places that resemble human houses (for example, birds' nests, ant mounds or bears' dens). It is important to keep in mind, however, that most plants and animals do not have a "home" in the same way as people. At the same time, animals, in particular, do need safe places in which to hide from predators, raise their young and rest.

Plants, animals and other organisms interact in countless ways. In most ecosystems, organisms share some resources (air, for example) and compete for others (nutrients in soil, food and, in some cases, water). The places where a given organism can survive are limited by its requirements for food and water and by the temperature range in which it is adapted to live.

SETUP

You will need a copy of *Tillena Lou's Day in the Sun* to read to students.

Copy the student sheet (p. 32–33) on 8½-in. x 11-in. card stock, then cut out one set for each group of students.

Begin this activity with the entire class. Students should play the game in groups of 4.

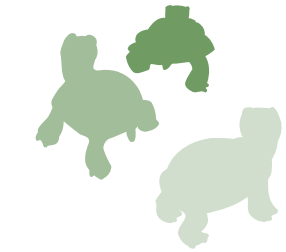
PROCEDURE

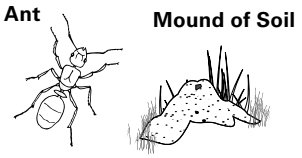
1. Read the story to the class and instruct them to raise their hands whenever "a place to be" is mentioned. Discuss some of the different places mentioned in the story (pond, field, etc.).
2. Give each group of students a set of cards. Have each student in the group color the drawings on four of the cards. The reverse side of the cards should be left blank.
3. Place each group's set of cards in a plastic bag.
4. Have students sit in a semi-circle around a table or on the floor. Demonstrate how the game is played.
5. First, take the cards from the bag and mix them up, being sure to keep the image sides down.
6. Place the cards, face down, in four rows of four each (4 x 4). Ask one student to select a card and turn it face up so that everyone can see the drawing. Then have the same student select another card from any row, turn it face up, and decide if it is a match. A match occurs when a student selects an animal on one card and the place where it may be found on the second card. When there is a match, students keep the cards (see sidebar to the right for correct matches). If the cards selected are not a match, the student places both cards face down in their

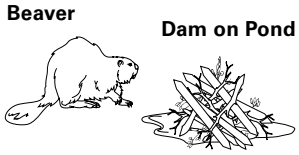
respective positions, and the next student repeats the process. As the game progresses, students in the group will observe the cards selected and gain information to use when they have their turns. The game continues until all matches are made. The student with the most cards wins the game.

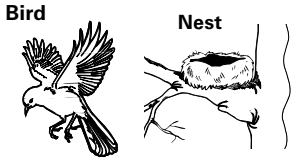
Note. Encourage students to select a different card than the one chosen by the previous player, so a match can be found.

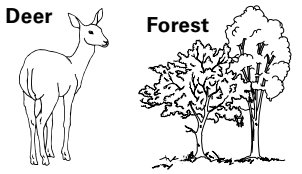
7. Conclude by discussing the game with students. Ask, *Did every plant and animal have a place to live? Did any two different plants or animals occupy exactly the same place?* Help students understand that each living thing occupies a slightly different place and uses resources in a different way.

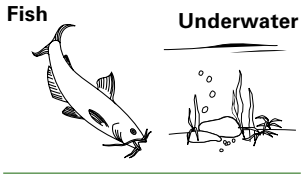


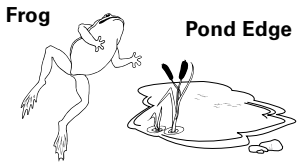


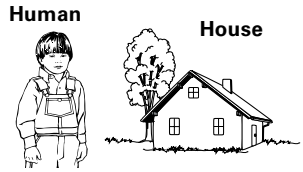


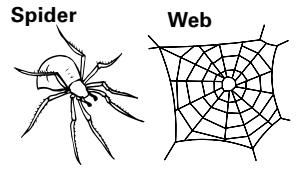










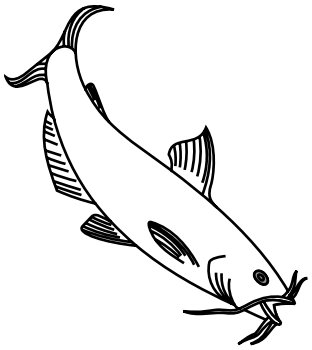


Match Up Game Cards

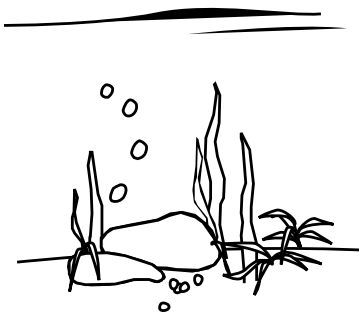
Human

House

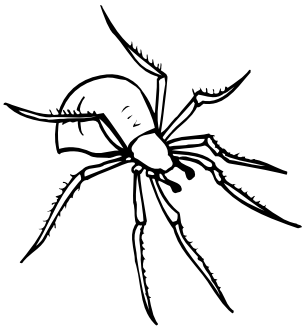
Fish



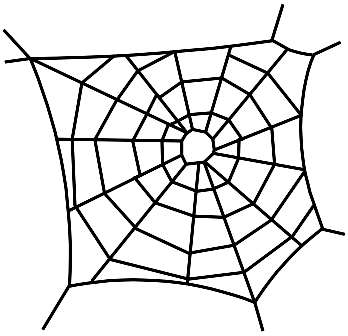
Underwater



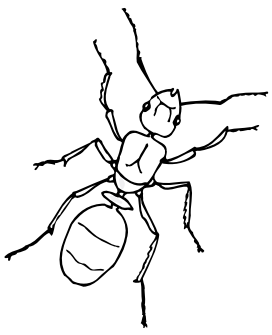
Spider



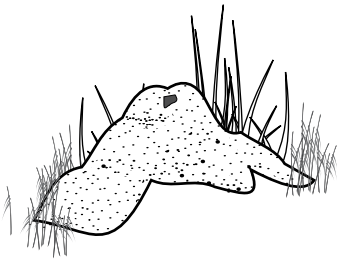
Web



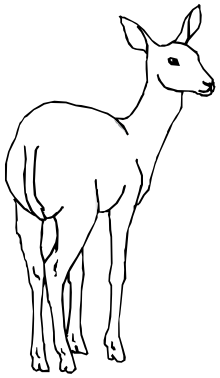
Ant



Mound of Soil

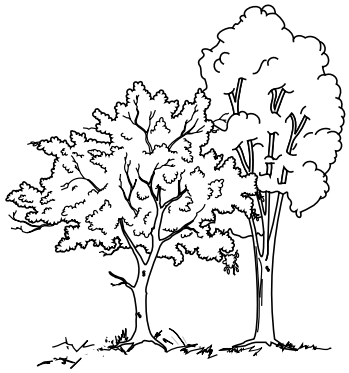


Deer

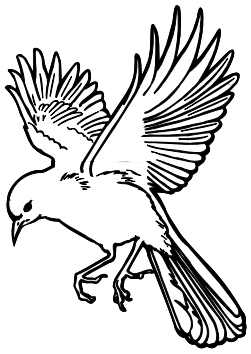


Match Up Game Cards

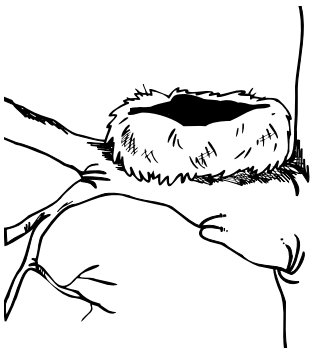
Forest



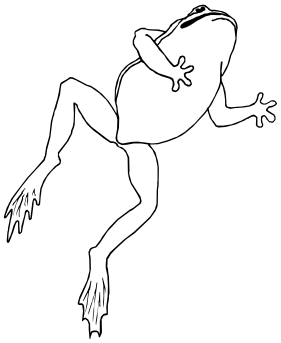
Bird



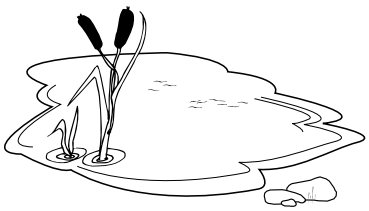
Nest



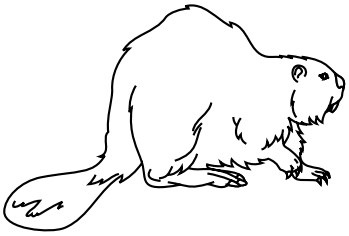
Frog



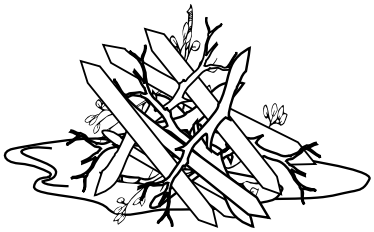
Pond Edge

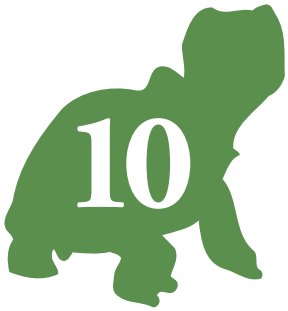


Beaver



Dam on Pond





Post-assessment

Students will apply concepts learned in this unit by revisiting the pre-test, where they recorded what they needed to live. This activity will be extended by including another animal and its needs.

CONCEPTS

- All living things have basic needs that must be met.

SKILLS

Science: Comparing, communicating, applying knowledge
Language Arts: Listening, communicating, using descriptive language, following directions

TIME

Set-up: 5 minutes
Class: 30 minutes

MATERIALS

Per student

- Sheet of white construction paper, 18 in. x 12 in.
- Crayons or markers

EXTENSION

Students may write a story or poem about an animal or plant and its needs. Younger students could "brain storm" in groups and dictate their ideas to the teacher or make picture books.

Most living things need air, food and water. Organisms also need physical space. Some plants and animals are similar in the ways they use resources from the environment and in the places where they live; others are very different from one another. Plants, in general, need air, nutrients from soil, water and sunlight in order to grow and reproduce. Plants can capture, store and use energy from the sun through a process known as photosynthesis. Animals are dependent on plants and other photosynthetic organisms (such as seaweeds) for food. Some animals eat only plants, others eat only animals, and some eat both plants and animals. Animals also need air and water.

Like all other living things, people need air, food, water and a place to be. Unlike plants and animals, people cook and combine their foods to make them better tasting and easier to digest. Unlike other organisms, people also create and use things to make their lives more comfortable and more pleasurable.

This final activity is designed to help you, the teacher, assess what your students have learned during this unit about the needs of living things. Part of the activity is matched to the drawing they created at the beginning of the unit. The second part of the activity lets you judge how they have been able to extend their knowledge.

SETUP

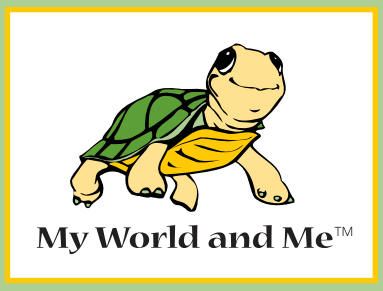
Collect paper and crayons or markers.

PROCEDURE

1 Distribute materials and instruct students to fold the large piece of paper in half (like a book), so that the folded page is 9 in. x 12 in. They should make a crease on the fold, open the paper and draw a line down the crease. On the left side of the page, each student should draw a picture of him or herself. Students then should draw images of their basic needs around the pictures of themselves.

2. Next, have students draw an image of one living thing (plant or animal—their choice) on the right side of the page. After they complete the animal or plant drawings, have students add images of what is needed by the selected animals or plants for survival. Older students may want to label the objects.

3. Return to students' original pre-assessment activities. As a group, compare the pre- and post-drawings, and have students identify additional elements present in the new drawings.



BioEd℠

Teacher Resources from the
Center for Educational Outreach
Baylor College of Medicine

ISBN: 978-1-888997-66-8