

How Weather Affects Animals Activity #5

Standard IV

Students will gain an understanding of Life Science through the study of change in organisms over times and the nature of living things.

Objective 2

Identify basic needs of living things (plants and animals) and their abilities to meet their needs.

Intended Learning Outcomes

Generating evidence: Using the processes of scientific investigation (i.e. framing questions, designing investigations, conducting investigations, collecting data, drawing conclusions)

Communicating Science: Communicating effectively using science language and reasoning.

Content Connections: Language Arts

Background Information

Observing nature can give us clues about changing weather. Insects, plants animals, and birds react to changes in the air. How do animals respond when the temperature changes? This activity is designed to help students discover the answer in their own way and, through active observation, make connections to what they already know.

Research Basis

Marzano, R.J., Gaddy, B.B., & Dean, C. (2000). What works in classroom instruction. ERIC #ED468434.

K-12 educators are provided with strategies for instruction. Research has shown that these strategies have the greatest likelihood of positively affecting student learning. They include similarities and differences, summarizing, and graphic organizers.

Regional Laboratory Network. (1994) Improving science and mathematics education - a Toolkit for professional developers: Alternative assessment. U.S. Department of Education. ERIC #381360.

The learner is active, personally constructing meaning from experience and gathered information. The learner then uses pre-existing knowledge (schema) to create a link to new understand.

Lim, C., & Wang, K. (2001). Effects of Project Activities Based on Multiple Intelligences to Elementary School Children's Science Achievement. *Journal of the Korean Association For Research in Science Education*. 21(1). Pp13-21. ERIC #EJ656424

This article examines the influence of projects and activities on science achievement in elementary school. The article compares the variance of science achievement by "General Intelligence" and investigates science activities that influence the various aspects of "Multiple Intelligences."

Assessment Suggestions

- Performance assessment
- Journaling

Invitation to Learn

True/false weather questions:

1. It can't rain cats and dogs, but it can rain frogs and fishes. (True. Frogs fell in Tennessee in October 1946 and in Arkansas in January 1973. Fish fell in Wales in 1859, Australia in 1935, and on Louisiana in 1947. How? The animals were swept up by wind in rainstorms and fell down again with the rain.)
2. Temperature on Earth changes because of distance from the sun. (False. The tilt of Earth changes the angle of the sun's rays, thus affecting the amount of heat we get from the sun. When our part of Earth is tilted toward the sun we receive more direct light, creating more heat. When it is tilted away, we get less.)
3. When frogs feel a drop in air pressure, they croak more. They are often referred to as "living barometers." (True. According to a Chinese study, frogs are very accurate in predicating falling air pressure.)
4. We can smell a rainstorm coming. (True. As air pressure drops, the air picks up traces of plant oils and damp soil.)
5. Snow is always white. (False. In 1755, red snow fell in Switzerland. Red sand from the Sahara Desert caused the color change. In 1925, gray snow fell in Japan, caused by dust from an erupting volcano. No one knows why black snow fell in France in 1926.)
6. Lightning can cure baldness. (Maybe. This was a trick question, but here's a fun fact. Edwin Robinson, age 53, had been bald for a number of years when he was struck by lightning and knocked unconscious for about 20 minutes. Two months later, his hair started growing again.)

Instructional Procedures

Frigid Fish and Chilly Crickets

1. Place the goldfish in the water. Gradually add ice to slowly lower the temperature of the water. The goldfish should become less active as its body temperature drops nearer to that of the water. When the goldfish becomes quite still, take out the ice and place the tank or bowl where it will warm up slowly.
2. Put an observation journal near the warming goldfish. Have students record their observations.
3. Place the cricket in the bottle and put the cap on.
4. Students predict what will happen to the cricket when the bottle is placed in the ice water for a long time.
5. Lower the bottle into the ice water and leave it for some time. Does the insect respond as the goldfish did to the lower temperature? It should.
6. Have students create a Venn Diagram using circle tracers to compare the reactions of the goldfish and the cricket to the lower temperatures.
7. When the cricket becomes still, take the bottle out of the water and place it where it will warm up slowly.
8. Put an observation journal near the warming insect. Have students record their observations.
9. What did students conclude following this activity?

Beat a Bush or Tap a Tree

This activity should be repeated three or four times during different seasons. Discussion should reflect how temperature affects animal behavior. Why are there more living things in spring than in winter?

1. Have students bring their observation journals outside for this activity.
2. Weather permitting, have students lay on their backs under a tree or bush and look up. What do they see? Ask students to draw a picture of their observation in their journal.
3. Ask each student to look at a bush carefully and see what animal life they can see on the leaves or stems. Ask them to sketch their observations in their journal.

Materials

- Aquarium or deep container of water
- Live goldfish
- Ice
- Live crickets—one per student
- Empty, dry plastic water bottle
- Weather observation journal (nature)

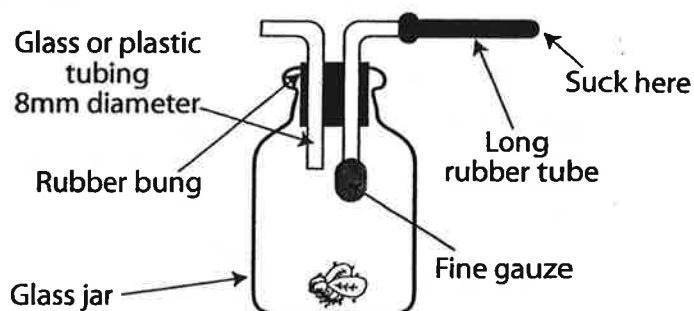
Materials

- Weather observation journal (nature notebook)
- Small, clear deli containers with lids
- Umbrella
- Stick about the size of a walking stick
- 1/4" plastic aquarium tubing
- Fine gauze
- #3 rubber stopper with

4. Try collecting insects and other living things from trees or bushes by hitting a branch sharply with a stick and catching the creatures as they are shaken loose.
5. Use an upturned umbrella as a collection tray.
6. Pooter up your catch for examination.
7. These insects can be placed in the small deli containers and located in a variety of places around the classroom for observation. Try to create cold and warm environments. Release the insects at the end of class.

Making and Using a Pooter

How can you catch an insect without touching it? Try making a pooter! Pooters are ideal for vacuuming up small insects. Try vacuuming an insect from your beating tray umbrella. Be sure to suck on the correct end!

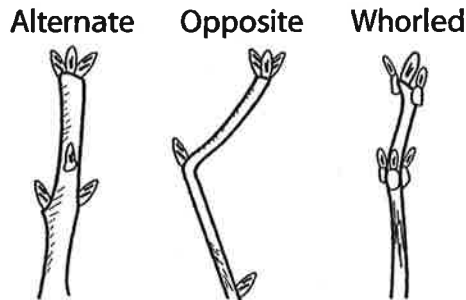


Twig Observations

This activity should be repeated three or four times during different seasons. Discussion should reflect how temperature affects plant growth.

It is helpful to try this simple collection/observation before attempting it with a class. An abbreviated version for students follows.

1. During the winter, locate a tree from which twigs can be cut and observed.
2. Choose twigs with a bud at the very end. This terminal bud is always bigger than the other buds. Make all the twigs in your collection the same length. Cut off the twigs at a slant so that the inside of the wood is visible. Mount the twigs on index cards with tape.
3. Look at one twig. Buds on twigs are arranged in three main patterns.



4. Buds on the sides of the twigs are called auxiliary buds. They began growing the previous spring. During the summer they were at the base of each leaf. The mark left by each leaf falling off is called the leaf scar. Draw a picture of the leaf scar on an index card. Now look at the leaf scar with the magnifying glass. The small dots on the scar are called bundle scars. These spots show where tubes entered the leaf bringing water and where other tubes left the leaf carrying food to be stored in the tree's trunk.
5. Use the magnifying glass to help you find tiny dots on the twig's bark. These are like the pores in your skin and are called lenticels. Air enters the twig through the tiny lenticel's holes and extra moisture leaves through them.
6. Look down the twig from the terminal bud until you find rings that encircle the twig. These show where the terminal bud was a year ago. Measure from the rings to the base of the new terminal bud to find out how much the twig grew last year.

Student twig observation activity:

1. Each student should have a nature notebook, a pencil, and a magnifying glass.
2. Place students in pairs or groups.
3. Each group needs measuring tape, clear tape, and index cards.
4. Lead the class to the pre-determined twig collection site.
5. Allow students to explore the tree environment with their magnifying glasses while you collect the twigs.
6. Give each group one or two twigs to examine.
7. Have each student make a sketch in his/her nature notebook. Be sure they include the location and date of their sketch.
8. Show students how to determine how much their twig grew last year.
9. Point out other spots on the twig that might change by the next observation.

Materials

- Weather observation journal (nature notebook) – one per student
- Pocket knife
- 3" x 5" index cards
- 6 rolls of clear tape
- Magnifying glasses - one per student
- 6 measuring tapes
- Charcoal or crayons
- Sheets of plain white

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10. Ask the groups to mount their twigs on the index cards using the clear tape. They should date their card, note the location, and label it with the group's name.
11. Collect the cards and save them for comparison the next time you do this activity.
12. Repeat this activity as the seasons change to show how temperature affects plant growth.

Resources

Books

Can It Rain Cats and Dogs?, by Melvin and Gilda Berger;
ISBN 0-439-08573-X

Sun, Snow, Stars, Sky, by Catherine and Laurence Anbolt;
ISBN 0670861960

Chicken Soup with Rice, by Maurice Sendak; ISBN 0881034061

It's Raining, It's Pouring, by Kin Eagle; ISBN 1879088712

The Big Snow, by Berta and Elmer Hader; ISBN 0-689-8726-5

Stranger in The Woods A Photographic Fantasy, by Carl R. Small;
ISBN 0-9671748-0-5

Little Cloud, by Eric Carle; ISBN 0-698-11830-8

CLICK!, by Shutta Crum and Joen Beder; ISBN 1-55005-079-6

Science Verse, by Jon Scieszka and Lane Smith; ISBN 0-670-91057-0

Down Comes The Rain, by Franklyn Branley; ISBN 0-06-445166-6

What Will The Weather Be?, by Lynda DeWitt; ISBN 0-06-445113-5

The Kid's Book of Clouds and Sky, by Frank Staub;
ISBN B-8069-7879-1

The National Audubon Society Field Guide to Weather,
ISBN 0-590-05488-0

Night Science for Kids: Exploring the World After Dark,
by Terry Krautwurst; ISBN 1579904114

Web Sites

National Weather Service

<http://nws.noaa.gov/om/reachout/kidspage.shtml>

The Weather Dude

www.wxduke.com

Web Weather for Kids

www.ucar.edu/40th/webweather

Storm Prediction Center

www.spc.noaa.gov

The Weather Channel

www.weather.com

Creatures of the Night

<http://www.42explore.com/night.htm>

Family Connections

- *Animal Activities* worksheet

Animal Activities

Complete one or more of the following activities with a family member.

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| <p style="text-align: center;"><i>Animals in the Soil</i></p> <p>Look closely at some damp soil with your hand lens. Lift up rocks, look under bark, and make a list of the living things you find. Draw and label your observations.</p> | <p style="text-align: center;"><i>Flashlight Quest</i></p> <p>Ask a family member to go with you on a flashlight quest. Look around your yard and under rocks after dark. What living things did you find? Why do you think some animals are more active at night? Record your observations in your journal.</p> |
| <p>Draw a picture of animals in the soil, including rocks, logs, grass, weeds, and any of the living creatures you discovered in either of the activities above.</p> | |

Cricket Thermometers

A snowy tree cricket's chirping will speed up in hot or warm weather and slow down in cool or cold weather. These insects are sometimes called "thermometer crickets" because their chirping can tell you the temperature. With help from a family member, search the Internet to find images of the snowy tree cricket and listen to online recordings of its song at different temperatures.

Now you are ready to look in your own backyard! Once you have identified a snowy cricket, listen and count the number of chirps your cricket makes in one minute. Ask for help to divide that number by four, and then add 40. Check to see if your answer is close to the actual temperature.

Chirps per minute: _____

Predicted temperature (according to cricket chirps): _____

Actual temperature: _____