

Changing Places

Description

In this activity, students observe, describe, and record how ladybugs change their location when the temperature changes.

Time Frame

1 lesson (45 minutes)

Correlation to Texas Essential Knowledge and Skills

During this activity, students will be exposed to the following Texas Essential Knowledge and Skills:

Note: Some TEKS statements below end with a ; or *and* and nothing thereafter—this indicates that further TEKS statements follow but are not included here.

(K.5) Science concepts. The student knows that organisms, objects, and events have properties and patterns. The student is expected to:

- (C) recognize and copy patterns seen in charts and graphs.

(K.7) Science concepts. The student knows that many types of change occur. The student is expected to:

- (A) observe, describe, and record changes in size, mass, color, position, quantity, time, temperature, sound, and movement;

Note: The TEKS listed here are the main content TEKS for this activity; however, this activity may also cover additional content and process skills included in other TEKS.

Materials

6–8 live ladybugs

Ladybug habitat (instructions and materials described in the Materials Notes below)

12 inches of flexible tubing or a large, clear plastic drinking straw (tubing should be large enough in diameter that several ladybugs can move freely inside)

Cotton balls, paper towels, or pantyhose

Cup of warm water

Cup of cold water

Temperature strips or thermometers (2)

Chart paper

Tape

Drawing paper and crayons or markers

Ladybug squares (included at the end of this activity)

Ladybug Temperature Graph (included at the end of this activity)

Materials Notes

Flexible tubing is clear plastic tubing like the tubing used with aquariums. It can be purchased at a hardware or pet store. Large, clear plastic drinking straws can be used in place of the tubing.

Ladybugs

Ladybugs are actually ladybird beetles. They feed on many insects that are harmful to plants, such as aphids. When you order or purchase ladybugs, they will be in the adult beetle stage. Be sure to tell students that this adult stage is the stage that produces eggs and continues the life cycle. A ladybug life cycle is completed in about one month.

You will need the following materials to create a ladybug habitat:

- Ladybugs
- Clear plastic container (at least 1 gallon capacity)
- Mesh or pantyhose
- Rubberband
- Leaves and stems
- Aphids, raisins, or apple slices

Order or purchase the ladybugs for this activity. Ladybugs may be purchased from a nursery or from a biological supplier.

To establish a habitat for the ladybugs, get a clear plastic container of at least a gallon in capacity. Put leaves and stems into the container. Lightly mist the leaves and stems, but do not let water collect on the bottom of the container; ladybugs can drown in very little water. Cover the top of the container with mesh and secure the mesh with a rubberband; pieces cut from pantyhose work for this purpose.

To feed the ladybugs, put leaves with aphids on them in the container. If aphids are not available, put raisins or apple slices at the bottom of the container for the ladybugs to eat.

Replace any wilted plants or add a fresh supply of raisins as needed.

Plan for the safe release of the ladybugs when the activity is completed. Locate bushes that contain aphids that will be a natural food source for the ladybugs.

Responsible Use of Live Animals in the Science Classroom

These guidelines are part of the National Science Teachers Association's Position Statement "Responsible Use of Live Animals and Dissection in the Science Classroom," adopted by the NSTA Board of Directors in June 2005. The full statement is available online at www.nsta.org/positionstatement&psid=44.

NSTA supports the decision of science teachers and their school or school district to integrate live animals and dissection in the K–12 classroom. Student

interaction with organisms is one of the most effective methods of achieving many of the goals outlined in the National Science Education Standards (NSES). To this end, NSTA encourages educators and school officials to make informed decisions about the integration of animals in the science curriculum. NSTA opposes regulations or legislation that would eliminate an educator's decision-making role regarding dissection or would deny students the opportunity to learn through actual animal dissection.

NSTA encourages districts to ensure that animals are properly cared for and treated humanely, responsibly, and ethically. Ultimately, decisions to incorporate organisms in the classroom should balance the ethical and responsible care of animals with their educational value.

While this position statement is primarily focused on vertebrate animals, NSTA recognizes the importance of following similar ethical practices for all living organisms.

Including Live Animals in the Classroom

NSTA supports including live animals as part of instruction in the K–12 science classroom because observing and working with animals firsthand can spark students' interest in science as well as a general respect for life while reinforcing key concepts as outlined in the NSES.

NSTA recommends that teachers

- Educate themselves about the safe and responsible use of animals in the classroom. Teachers should seek information from reputable sources and familiarize themselves with laws and regulations in their state.
- Become knowledgeable about the acquisition and care of animals appropriate to the species under study so that both students and the animals stay safe and healthy during all activities.
- Follow local, state, and national laws, policies, and regulations when live organisms, particularly native species, are included in the classroom.
- Integrate live animals into the science program based on sound curriculum and pedagogical decisions.
- Develop activities that promote observation and comparison skills that instill in students an appreciation for the value of life and the importance of caring for animals responsibly.
- Instruct students on safety precautions for handling live organisms and establish a plan for addressing such issues as allergies and fear of animals.
- Develop and implement a plan for future care or disposition of animals at the conclusion of the study as well as during school breaks and summer vacations.

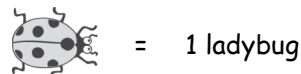
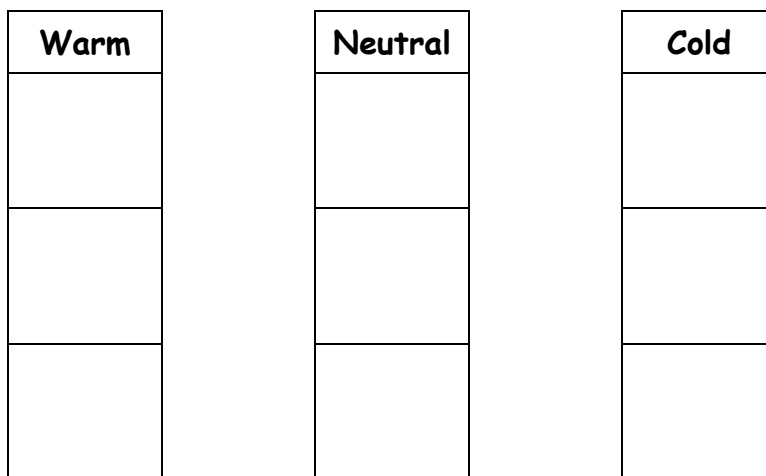
- Espouse the importance of not conducting experimental procedures on animals if such procedures are likely to cause pain, induce nutritional deficiencies, or expose animals to parasites, hazardous/toxic chemicals, or radiation.
- Shelter animals when the classroom is being cleaned with chemical cleaners, sprayed with pesticides, and during other times when potentially harmful chemicals are being used.
- Refrain from releasing animals into a non-indigenous environment.

Advance Preparation

1. Photocopy the ladybug squares, making sure there are enough for each student to have one square. Cut out the squares.
2. With a straight pin, poke several air holes in the flexible tubing or drinking straw. Place 6 to 8 ladybugs in tubing or straw. Close the ends of the tubing by inserting pieces of cotton balls, paper towels, or pantyhose.
3. Prepare one cup of warm water and one of cold water.

Procedures

1. Ask students to raise their hands if they like hot weather better than cold weather. Then ask who likes cold weather better. Explain that some insects are like students and have temperature preferences.
2. Show the class the two different containers of water. Place a thermometer or temperature strip in or on each container. Have students compare the temperatures in the two containers. Which is warmer? Which is colder?
3. Construct a graph on chart paper and title it “Ladybug Temperature Preferences.” The graph could look like this:



Ask students what temperature they think ladybugs will prefer. Give each student a ladybug cutout to tape on the graph over their prediction. Make sure there are enough squares on the graph so that all students have room to tape up a ladybug.

Ask students to think about the information on the graph:

How many students think the ladybugs would move toward warm temperatures?

How many students think the ladybugs would move toward cold temperatures?

How many students think the ladybugs would stay in the middle?

If they stay in the middle, what is the temperature like for the ladybugs?

4. Have students brainstorm how to use the materials available to find out what temperature ladybugs prefer. Ask how they could tell which temperature ladybugs prefer. Guide students in designing a test that places one end of the flexible tube over each container of water, with the middle of the tube not over either container.
5. Place a tube containing several ladybugs across both containers. Be sure there is an open space in the center that is not over either container of water. Allow the students to observe if the ladybugs move toward either end of the tube or remain in the middle.
6. Look at the graph and check the results of the investigation and the predictions made with the graph.
7. Discuss the investigation with students by asking questions:
 - Did the ladybugs change where they were in the tube?
 - What other changes did you see? [*The ladybugs moved from here to there. Their legs moved. Their antennae moved.*]
 - What things were constant or did not change about the ladybugs? [*shape of the ladybug, symmetry, color, number of spots.*]
8. Have the class state what temperatures the ladybugs preferred. Be sure to discuss what evidence led them to this conclusion.
9. Ask students to draw a picture of the investigation, showing the cups, the tubing, and the places where the ladybugs gathered.

