

Build a Bug

BROWARD COUNTY ELEMENTARY SCIENCE BENCHMARK PLAN

Grade 1—Quarter 2

Activity 11

SC.F.1.1.5

The student compares and describes the structural characteristics of plants and animals.

SC.F.2.1.2

The student knows that there are many different kinds of living things that live in a variety of environments.

SC.H.1.1.1

The student knows that in order to learn, it is important to observe the same things often and compare them.

ACTIVITY ASSESSMENT OPPORTUNITIES

The following suggestions are intended to help identify major concepts covered in the activity that may need extra reinforcement. The goal is to provide opportunities to assess student progress without creating the need for a separate, formal assessment session (or activity) for each of the 40 hands-on activities at this grade level.

1. Ask, ***Is a spider an insect?*** (Accept both *yes* and *no* answers at this point.) Then explain, ***Spiders have two body parts and eight legs. Are spiders insects? (No.) Why not?*** (Insects have three body parts and six legs.)
2. Use the Activity Sheet(s) to assess student understanding of the major concepts in the activity.

In addition to the above assessment suggestions, the questions in bold and tasks that students perform throughout the activity provide opportunities to identify areas that may require additional review before proceeding further with the activity.

Build a Bug

OBJECTIVES

Students build a model insect that exhibits all the structural characteristics of a real insect.

The students

- ▶ identify the structural characteristics of insects
- ▶ create model insects that meet the identified criteria

SCHEDULE

About 40 minutes

VOCABULARY

abdomen
antenna(e)
bilateral symmetry
head
thorax

MATERIALS

For each student

- 1 Activity Sheet 11
- 1 ball, foam, large
- 2 balls, foam, medium
- 1 pair safety goggles*

For each team of four

- 1 marker, black*
- 2 pairs scissors*

For the class

- 8 shts aluminum foil, 30 cm × 30 cm
- 1 ball, foam, large



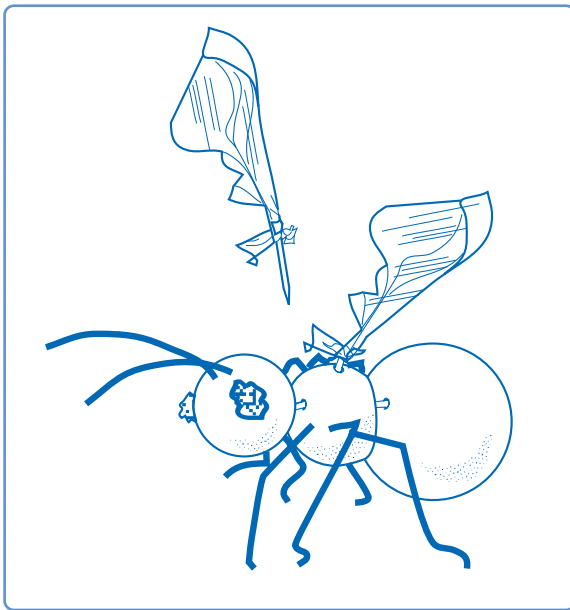
- 2 balls, foam, medium
- 9 shts cellophane, metallic, 30 cm × 50 cm
- 2 btls glitter
- 2 btls glue
- 1 Insects Chart
- 1 Insects Guide
- paint*, bits of felt*, construction paper (optional)
- 7 pkgs pipe cleaners
- tape, transparent*
- 1 box toothpicks

*provided by the teacher

PREPARATION

- 1 Make a copy of Activity Sheet 11 for each student.
- 2 Cut the sheets of aluminum foil into nine 10 cm × 10 cm (4 in. × 4 in.) squares. Cut the sheets of cellophane into four 15 cm × 25 cm (6 in. × 10 in.) pieces. Each student will need two squares of foil and one piece of cellophane.
- 3 Gather and prepare the materials to build a demonstration model that meets the criteria for an insect. (See Figure 11-1 and steps 2 and 3 of Guiding the Activity for more assembly detail.) You will need one large and two medium foam balls, seven pipe cleaners, eight toothpicks, two squares of aluminum foil for eyes, and one piece of cellophane. Choose a large ball for the insect's abdomen and medium balls for the head and thorax. Cut wings from the cellophane. Tape a toothpick to the end of each wing so you will be able to insert the wing into the model's thorax. Practice assembling the insect, then dismantle it and set the materials aside for the class demonstration.

- 4 At a distribution center, place the glue, glitter, tape, and any other materials you want to supply for decorating model insects.



▲ *Figure 11-1. A model showing all major structural characteristics of insects.*

BACKGROUND INFORMATION

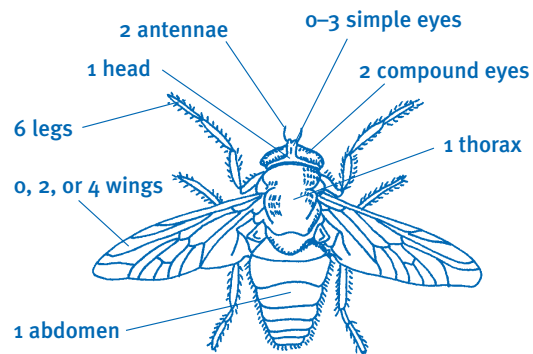
Insects are defined as invertebrates (animals without a backbone) that have three body parts (*head*, *thorax*, and *abdomen*) and six legs attached to the thorax. Most adult insects have two or four wings attached to the thorax, although some have no wings at all.

Insects have two or four *antennae*, two compound eyes, and two or three simple eyes on their heads. Simple eyes can detect only dark and light. Compound eyes are composed of thousands of separate facets and provide insects with a very unique way of seeing the world. Because the compound eyes are usually large and protruding, insects can see in many directions at once.

Antennae are sensory organs that differ greatly from insect to insect. Besides being used as “feelers,” many antennae serve other sensory functions, such as tasting, hearing, and smelling.

▼ Activity Sheet 11

Build a Bug



Build your own insect. Draw it here.

Drawings will vary but should include all structures characteristic of insects. Students may omit wings if they choose.

Guiding the Activity

1 Distribute a copy of **Activity Sheet 11** to each student. Ask, **Does anyone know what an insect is? Are flies insects? How about spiders? Are centipedes insects? How about grasshoppers?**

2 Challenge students to consider their answers as you build a model insect and they note its features on the activity sheet. Begin the demonstration by attaching the foam balls with toothpicks.

Ask, **How many body parts did I give the insect?**

Explain that all insects have three body parts, although they are not always as easy to see as this.

Write *abdomen*, *head*, and *thorax* on the board. Tell students that these are the names of the three body parts of all insects. Have students find each of these body parts on the drawing on the activity sheet. Have students touch their own heads and abdomens. Explain that insects also have a middle body part, a *thorax*.

3 Insert six pipe cleaners for legs into the thorax of your model. Ask, **How many legs did I give our insect? Which body part did I attach them to?** Have students find the six legs on the drawing.

Ask, **Why did I put three legs on one side of the thorax and three on the other side?**

Write *bilateral symmetry* on the board. Explain to students that insects have **bilateral symmetry**, that is, the right and left sides of the body are identical. Ask students to name other things that have two identical sides.

Additional Information

Students will come up with many definitions. Some students may know that spiders are not insects. Many may think that centipedes are. Accept all answers at this point.

A large ball should represent the abdomen, since it is typically the longest part of an insect.

Students should be able to see the three distinct balls, or body parts.

Unlike mammals and birds, whose heads are usually smaller than their bodies, insects' heads are often quite large in comparison with the rest of their bodies, so using the same size ball for the head and the thorax in the model is realistic.

Have students touch their thoraxes—their chests.

Explain that all adult insects have six legs and that the legs are always attached to the thorax.

Students may say that they've never seen an insect with more legs on one side of its body than the other.

Point out that bilateral means "two sides" and symmetry means "equal."

Students may mention valentine hearts and their own bodies.

Guiding the Activity

Crumple two pieces of aluminum foil into balls. Use pieces of toothpick to attach them to the sides of the head. Ask the students, **What is different about these eyes and our eyes?**

Explain that these eyes that sit on either side of the head are called **compound eyes**. Have students locate the compound eyes on the drawing.

Tell students that insects have two different kinds of eyes. With a marker, draw three dots on the top of the model's head. Explain that these other eyes are small and usually located on the top of an insect's head. They are called **simple eyes**.

Write *antenna* and *antennae* on the board. Explain that **antenna** is the scientific name for the insects' feeler on its head. The plural of *antenna* is *antennae*. Insert two toothpicks or pieces of pipe cleaner into the head between the eyes. Tell students that most insects have two antennae, but some have four. Have students locate the two antennae on the drawing. Ask, **What do you think insects use their antennae for?**

Add cellophane wings, attaching them to the thorax. Ask, **Which body part did I attach the wings to?** Have students locate the wings on the drawing.

Ask, **Does my insect need anything else?**

Additional Information

Students may begin by responding that the eyes are made of aluminum foil, but continue asking until they comment on the size and placement of the eyes. An insect's eyes are larger in proportion to its head than our eyes are. Also, its eyes sit on the side of its head rather than in the front.

Tell students that they will see in a later activity why they are called compound eyes.

Students may think that antennae are used only for touching. Explain that insects use their antennae to feel, taste, smell, and hear. Some antennae even can sense dark and light.

Explain that most adult insects have either two or four wings, always attached to the thorax.

Students also may want to give the insect a nose and a mouth. Explain that insects do not have noses and that because their mouths are very different on different kinds of insects, you will just make a black spot with your marker for this model.

Guiding the Activity

4 Again ask, **Are flies insects? How about spiders? Centipedes? Grasshoppers? If not, why not?**

5 Challenge students to build a model insect that has all the body parts of an insect, as shown on the activity sheet. Explain that their insect should be a fantasy insect and not a copy of the one shown in the drawing. Tell them that they can leave out wings if they choose.

Distribute one large and two medium foam balls, two squares of aluminum foil, one piece of cellophane, and eight toothpicks to each student. To each team of four, distribute 28 pipe cleaners of assorted colors, two pairs of scissors, and a black marker.

Tell students that they can attach the three insect parts with pieces of toothpick. Inform them that tape, glue, glitter, and other materials for decoration are available at the distribution center.

As students build their insects, check to see that each exhibits the necessary characteristics (see Figure 11-2).

Additional Information

Students should respond correctly that flies and grasshoppers are insects. Spiders and centipedes do not have three body parts and have more than six legs so they are not insects.

You may have to remind students to share the pipe cleaners fairly.

Toothpicks and pipe cleaners should be broken or cut to desired lengths.

Particularly watch to see that all legs and wings (if included) are attached to the thorax.

Characteristics	Number of each
body parts	3
legs	6
antennae	2 or 4
compound eyes	2
simple eyes	2 or 3
wings	0, 2, or 4

▲ *Figure 11-2. Insect characteristics.*

Guiding the Activity

Additional Information

6

Display the Insect Chart prominently in the room. Read aloud the text in the box. Then, for each insect pictured, ask a volunteer to come up to the chart and point to each of the distinctive structures that characterize all insects.

Show students the Insect Guide, and leaf through the pages so they can see that it has pictures of many different kinds of insects. Also point out that pages 2–3 show “bugs” that are *not* insects. Make the Insect Guide available for students to examine on their own.

In a follow-up discussion, ask, **What insects have you seen alive at home or school or outdoors?**

You may need to help students with some structures. For example, a ladybug’s wings are hidden under the brightly colored “shell” covering its thorax and abdomen. The walking stick and the ant do not have wings. None of the pictures clearly shows the insect’s simple eyes.

Students should name a variety of common insects. As each one is named, ask the class to verify that it is indeed an insect (and not another type of “bug”) and to explain how they know it is an insect. Students should mention the number of body parts, number of legs, pair of antennae, pair of compound eyes, and other distinctive characteristics they have learned about in this activity.

REINFORCEMENT

Have students identify characteristic structures of insects in pictures found in the Insect Guide and on the Insects Chart. Have them look at pictures of spiders, centipedes, and so on, and challenge them to identify the features that differentiate them from insects.

SCIENCE JOURNALS

Have students place their completed activity sheets in their science journals.

CLEANUP

Save your demonstration insect model for use in Activity 12. Collect any leftover materials and return them to the kit. Leave the Insects Chart and the Insects Guide available for students’ reference in Activities 12 and 13.

SCIENCE AT HOME

Encourage students to make model insects at home using materials available there. Let students bring them to school to show to the class.

Connections

Science Extension

Have students make a class Insect Book, with a different type of insect on each page. Encourage every student in the class to contribute one page. Monitor students' choices of insects to avoid duplications. Each page should include the name of the insect at the top, a drawing that the student has done from memory or by copying a picture in a field guide or other book, and labels with pointers to the major structural characteristics discussed in the activity. When all individual pages are completed, have students arrange them alphabetically. Three-hole-punch the pages and use paper fasteners to bind the pages into a book.

Science and Language Arts

Insect antennae are fascinating sense organs that may detect touch, air motion, sound waves, scent, taste, or even light. Ask students to imagine what it would be like to be able to taste, smell, hear, and see, as well as feel, with their arms. Have each student describe doing something with his or her "antennae arms."

Science and Math

Remind students that all insects have bilateral symmetry. Have students make a longitudinal half of an insect with pattern blocks. Then ask them to trade places with a partner and complete the partner's insect. If students have trouble, stand a rectangular mirror beside the middle of the insect so that students can see how the other side should look.

