FEELIN' BUGGY

INSECTS | LEVEL 2

Skills
Observing, creative writing, discussing, comparing and contrasting, reading, describing, and taking notes

National Science Standard
Content Standard A: Science as Inquiry
Students should develop abilities necessary to do scientific inquiry and an understanding about scientific inquiry.

Objectives
- Students will compare and contrast human and insect senses.
- Students will use adjectives to describe things they touch, smell, and see.
- Students will write a story describing what it would be like to be the size of an insect.

Assessment
Observe student participation in the senses activity. Evaluate students' activity sheets to make sure adjectives were used correctly and that correct comparisons were made between humans and insects.

Materials
- Activity sheets for each student:
- "Feelin' Buggy"
- "This Makes a Lot of Sense"
- "The Day I Was an Insect"
- Objects of varying size, texture, and color (one for each group of students plus one for the whole class)
  Examples: flowers, produce, brightly colored toys (include some objects that are red since insects generally cannot see red)
- Grocery bag for each pair of students
- Paper
- Pencils
- Chalkboard or overhead projector

Subjects
Science
Language Arts

Time
Preparation: 15 minutes
Teaching: 50 minutes
Evaluation: 10 minutes per student

Vocabulary
Definitions on Page 4 of Lesson
sense
antennae
adjective
compound eye
facet
sensilla

**More Ideas & Technology Connection located at the end of each lesson!*

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Background

Humans and insects sense the world in distinctly different ways. This lesson will focus on how insects and humans learn about their surroundings through sight, touch, and smell.
Note: The descriptions below are general and do not necessarily apply to all insects.

Sight

Insects' eyes are not like humans' eyes. Insects have **compound eyes**, while humans have only one lens in each eye. Compound eyes have many hexagonal-shaped parts, or facets, with a lens in each one. Some insects have good color vision and can see ultraviolet light. Humans cannot see ultraviolet light but can see red, while an insect's vision generally does not extend to deep red colors and sometimes not even to orange. Some insects also see movements better than shapes. Some insects see better when they move their eyes across a field of view or scan rather than look directly at something.

Visual Spectrum

HUMANS:	red	orange	yellow	green	blue-green	blue	violet	
HONEYBEES:			yellow	green	blue-green	blue	violet	ultraviolet

Touch

An insect's sense of touch is controlled by small hairs with a nerve at the base of each one. These hairs are called **sensilla**. The insect can sense the presence of objects when they brush against the hairs. The hairs also help insects like flies and bees determine what position they are in so they can orient themselves. For instance, when a bee is in its hive, the hairs can sense the direction of gravity so that the bee can tell whether it is upside down or right side up. Insects' sense of touch also helps them respond to wind or a gentle breeze. That's what makes a fly so hard to catch. It can feel the air being pushed toward it by a hand or fly swatter. A grasshopper can sense air that is moving less than one-tenth of a mile per hour. Hairs on some insects' bodies are also sensitive to vibrations.

Smell

An insect's **antennae** are very sensitive and provide enormous amounts of information about the world around them. One function of antennae is to detect odors. They can smell small amounts of a scent much farther away than humans. Insects can find mates, communicate messages, locate food, and recognize enemies through their sense of smell.

Students will be using adjectives to describe what they experience. **Adjectives** are words that describe nouns, such as hot, rough, or shiny.

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Lesson Preparation

Humans and insects sense the world in distinctly different ways. This lesson will focus on how insects and humans learn about their surroundings through sight, touch, and smell.
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Lesson Presentation

Part I: Describing the Senses

Begin the lesson by reviewing what an **adjective** is. Choose an object to pass around the class. As students have a turn to hold it, have them use an adjective to describe the object and say what sense they used to evaluate the object. They should say sight, touch, or smell. Make sure that the adjective fits the sense. (For example, if they said that the object was slimy, they should say that they used the sense of sight or touch.) Record adjectives used to describe the object on the board or overhead.

Students will now have the opportunity to use the senses discussed to learn information about an object. Divide students into groups of two or three. Students will first explore the sense of touch. Before they begin, have them experience the way an insect uses its sense of touch. Without touching their skin, students should run a pencil along the short hairs on their arms or the backs of their necks. Are they able to tell anything about the pencil? No, the only thing they can tell is that something is there. Explain that an insect's sense of touch is more developed than that, but an insect also uses hairs called **sensillae** to touch. Instruct students to feel the pencil with their fingers. While an insect's hairs are more sensitive to touch than a human's hairs, human fingers allow the possibility to feel detail, such as the ridges, engraved words, and the difference in texture between the wood and the eraser.

Now give each group a bag with an object in it, and give each student a "Feelin' Buggy" activity sheet. Have students take turns touching the object in the bag without looking at it. There should be no talking during this portion of the exercise. Students should write as many adjectives as they can that describe the object in the bag on part I of their "Feelin' Buggy" activity sheets. They should not discuss what they write.

After students are finished touching the object, have them take it from the bag and look at it. Have students fill in adjectives for the sight portion of the "Feelin' Buggy" activity sheet. When they are finished writing words about what they see, they should then smell the object and record adjectives about what they smell. (For some objects, there may be nothing to write for smell.)

Discuss the information in the background section, reviewing sight, touch, and smell. Pass out the "This Makes a Lot of Sense" activity sheet to each student. Tell students to read the information on the activity sheet and match the sense to the correct insect or human body part. Now have students think about the differences between human and insect senses. How does an insect experience its environment? What parts of its body does it use? Do insects have eyes? Do they have fingers? Do they have noses? What would insects be able to sense about the objects in the bags? Using the information from the "This Makes a Lot of Sense" activity sheet, have students complete part II of the "Feelin' Buggy" activity sheet.

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Part II: Imagining the Senses
Now that students have begun to understand the different ways that insects view the world, have them imagine that they are now the size of an insect. They can have any insect senses they want in order to survive. Which ones would they choose? Have a class discussion about how insects use their senses. What senses would an insect use in order to find food? To escape a predator? To find a mate? Pass out "The Day I Was an Insect" activity sheet to each student. Have students write a short story about a day in the insect world. They should use adjectives to describe what they experience. Students might discuss some of the issues brought up in the class discussion and talk about other issues, like finding shelter or what the world looks like.

With the leaves food source represented by sheets of paper, explain that the paper must be turned into small pieces, using only the hand holding a tool.

Finally, explain that for the plate of marbles food source, the marbles must be picked up and gathered using only the tools for gathering foods.

Modifications
Beginning: Choose one object to examine as a class. Have students take turns touching, looking at, and smelling it. Write adjectives that students suggest on the chalkboard. Discuss as a class the questions on the "Feelin' Buggy" activity sheet.

Advanced: Have students conduct further research on the differences between human and insect senses. Afterward, have a class discussion about why these differences might exist. What demands are placed on insects by their environment that might cause one sense to be more important than another?

Discuss with the class the concept of writing in the first person. Have them write their short stories in the first person, as if they were an insect writing the piece. They should take into account the different ways that insects perceive the world and include facts and ideas that they learned in their research.

More Ideas
Have students trade their "Feelin' Buggy" activity sheets with members of another group and see if they can guess what the object was by the adjectives written down. If you plan to do this activity, make sure that students don't show their objects to the rest of the class.

Have students go outside and touch, look at, and smell objects. Have students take along paper and pencil so they can make lists of the adjectives that describe the objects they find and which sense they used.

Have students read their creative writing pieces to the class.

Technology Connection
Have students create a table with three columns in a word processing program. The headers of the columns are sight, touch, and smell. Students must choose an object in the classroom and type at least two adjectives in each column that describe that object. Students must think carefully about the object they choose, because for many objects it may be difficult to think of two words that describe smell.

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Definitions:

SENSE A function of the body that allows it to perceive the outside world. Includes sight, smell, hearing, taste, and touch.

ANTENNAE Sensory organs attached to and extending from the head.

ADJECTIVE A word that describes a noun or pronoun (person, place, or thing).

COMPOUND EYE An eye consisting of hundreds or thousands of tiny, light-sensitive parts, with each part creating a portion of the image insects see.

FACET Any of the individual units that make up a compound eye.

SENSILLA Simple sense organs, usually in the form of a hair or bristle.

FEELIN' BUGGY

ACTIVITY SHEET

NAME _____ OBJECT _____

Part 1

Write down as many adjectives as you can to describe what the object feels like.

Write down as many adjectives as you can to describe what the object looks like.

Write down as many adjectives as you can to describe what the object smells like.

Part 2

Think about an insect's senses. What adjectives would describe what an insect could learn about your object?

Touch:

Sight:

Smell:

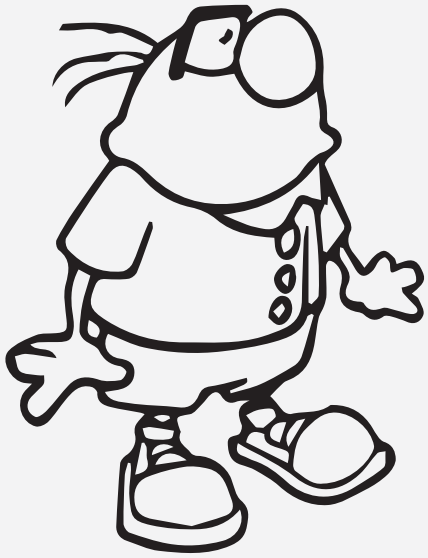
What are some possible characteristics of your object that you cannot sense but that an insect could? Make some guesses, because you cannot sense everything an insect can.

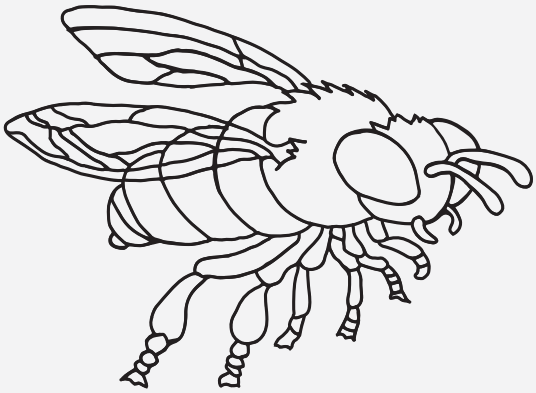
THIS MAKES A LOT OF SENSE

ACTIVITY SHEET

NAME _____

Read the information below. Draw arrows to the correct parts of the insect and human bodies.





Human

Sight

Humans can see colors in the spectrum ranging from violet to red. They can see shapes easily. The eye has only one lens.

Smell

The human nose can smell many kinds of odors but it is not specially attuned to any of them.

Touch

All parts of humans are sensitive to touch, but they generally determine the shape and texture of objects with their hands.

Insect

Sight

Insects can see colors in the spectrum ranging from ultraviolet to orange and sometimes lighter shades of red. They have compound eyes, or eyes with many hexagonal-shaped parts, each one with a lens. Each of these parts is called a facet. They see movement better than shapes, so they view their environment by scanning it or continually moving their eyes.

Smell

One function of insect antennae is detecting odor. They are specialized and are very sensitive to smells that are important to their survival, such as the smell of their enemies, potential mates, and the particular food they eat.

Touch

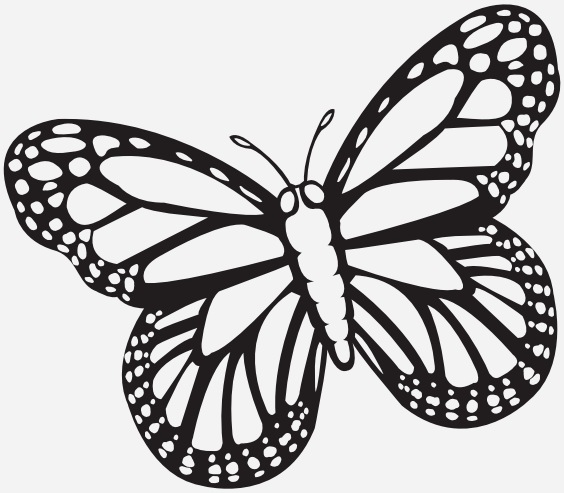
An insect's body is often covered with tiny hairs, called sensillae, connected to nerves. These don't determine shape or texture, but they do help the insect know when an object is near, orient itself while flying, sense changes in air currents, pick up on vibrations, and detect chemical messages.

THE DAY I WAS AN INSECT

ACTIVITY SHEET

NAME _____

Write a story about what it would be like to be an insect.
Use adjectives to describe all the things you would sense about your world.



THE DAY I WAS AN INSECT

CONTINUED

Draw a picture to accompany your story.