

**GRADE LEVEL:**

3-4

**DURATION:**

60 minutes

**NGSS STANDARDS:**

3-LS2-1

Construct an argument that some animals form groups to help members survive

- Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size.

**NE STANDARDS:**

SC4.6.3.B

Animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

**MATERIALS:**

- Sound Powerpoint
- Ipad/projector
- Flashlights
- Termites
- White paper
- Bic pens
- Sharpie markers
- Pencils
- Small paintbrush

**VOCABULARY:**

- Pheromones

**INSECT COMMUNICATION BACKGROUND:**

Some insects (such as crickets or cicadas) communicate by producing sounds while others (like fireflies) emit light to communicate. Many rely on body color and others use chemical cues to communicate. Insects use chemical cues, called **pheromones**, to find mates, warn other insects about danger, and mark trails that can be followed by other insects.

**OBJECTIVES:**

- Describe ways that insects communicate
- Define pheromones and explain why they are important in insect communication

**GUESS THAT SOUND (POWER POINT)**

Assess prior knowledge of insect communication. Ask:

- Does anyone know how insects communicate with other insects?
- What are some different ways that insects communicate? (pheromones, sound, body color, etc.).

**Communication Game**

- Pull up power point on either a projector or laptop.
- Play each sound twice for the students.
- Click to next slide. Have students guess which of the three insects made the noise.
- Reveal which insect made the noise. Have students predict how the insect uses sound to communicate with others.
- Repeat for the duration of the power point.

**Discussion**

- "Can you think of what other insects use sound to communicate?"
- "We talked about insects using sound as a defense alarm or as a way to find mates, what are other reasons insects might use sound?"
- "What are the pros and cons of using sound as a communication method?"

**LIGHT COMMUNICATION (FIREFLIES)**

Assess prior knowledge of fireflies. Important points:

- Fireflies use their light to communicate with other members of their species.
- Fireflies are sensitive to artificial light and light pollution.

**Flashlight Game**

- Have students stand in a circle, facing in towards each other
- A group of 6-10 students are given a card, they should not share what their card says with anyone
- Give each student a flashlight. When instructed to, students should flash the pattern that is on their card
- Students goal is to find the person who is flashing the same pattern

**Discussion:**

- "What are the pros and cons of using light as a communication method?"

- “Do you think using light or sound is better? Why?”

### **FOLLOW THE LEADER (TERMITES)**

Assess prior knowledge of termites. Important points:

- **Termites are an important part of the community of decomposers** - they help break down and recycle dead wood and plants
- **Termites become important economic pests when their appetite for wood and wood products extend to our homes, building materials, and forests.**

### **Termite Experiment**

- “Let’s learn about how termites use pheromones to communicate.”
- Draw large loops on a piece of white paper using the pencil, sharpie marker, and Bic pen. Have students make predictions:
  - **Will the termite follow one of these paths?**
  - **If yes, which one?**
  - **How does the termite know where to go?** (Students may suggest the termite can see the path, can follow an indentation from a pencil marking, or can smell the sharpie)
- Using the small paintbrush, place a termite on the paper.
- Explain to the children that chemicals reside in the ink of the Bic pens that mimic the termite’s pheromones. Show the students that color does not make a difference - the workers are blind. Also demonstrate that termites will not follow lines draw by pencils, other types of pens, or markers - their ink composition does not mimic the termite’s pheromones.

### **Discussion**

- **“Considering what we learned about termite pheromones, has anyone observed ants walking one after another? How do they communicate to one another where to go?”** Discuss student responses.