

# Insect Communication: Termites

## Essential Question:

*How do termites communicate?*

## Background Information:

Termites are social insects that eat wood. There are two basic types of termites, those that live entirely in wood, and those that can tunnel into the ground. The wood-inhabiting termites are the more primitive type. Their colonies consist of excavated galleries inside dead branches or logs. Once the dead wood is consumed the colony dies. Since single pieces of dead wood can not sustain a very large family, their colonies rarely ever number more than a few thousand termites. These wood inhabiting termites have a primitive type of caste system. There is a reproductive king and one or two queens. They have workers, which are older nymphs who have undergone a regressive molt and temporarily stay in the nest galleries and help their parents to raise more brothers and sisters. The soldiers have enlarged orange heads and long toothed jaws. The soldier's main purpose is to defend the colony from termite's mortal enemies, the ants. Both the workers and soldiers have creamy white bodies and are blind. Most nymphs gradually grow wing pads and then transform into winged termites called alates. The alates fly from the colony at a certain time of the year to mate and start new colonies.

The small soldiers initiate the search for food. By applying a chemical secretion (pheromone) from an abdominal gland onto the ground, they create a short-lived chemical trail leading back to the colony. This is initially not followed by workers. However, once such initial trails have been reinforced by frequently commuting soldiers, workers also follow this trail. They further increase the chemical marking of the trail, resulting in the recruitment of high numbers of nest-mates to monopolize and to exploit food sources jointly. It is thought that soldiers and workers have different levels of sensitivity to the trail pheromone.

A "Bic" ballpoint pen contains a chemical that is very similar to the pheromone, which the soldiers secrete, and the workers follow. By drawing on a piece of paper with this ballpoint pen you can imitate a termite trail. When termites are added they will generally follow the trail.

## Getting Ready:

You will need to find termites prior to the activity. They are usually readily found in forested areas in dead trees and rotting logs (check under the bark). It is easier to find them when weather is warmer. They can also be ordered from scientific supply houses like Carolina Biological Supply. For each group of students you will need several colors of Bic® pens, other types of pens, pencils, crayons, or markers. Mix these together in a box so students will select them at random. Some students will not choose Bic® pens; some will choose different colors of Bic® pens. This will allow students to make different observations about termite behavior. You will need paint brushes on hand to gently manipulate the termites and keep them on the page. You

**Location:** Classroom/Outdoors

**Objectives:** *Learners will:*

- 1) investigate insect communication
- 2) observe pheromone communication with termites

**Skills:** communication, observation, listening, analysis

**Supplies:**

- termites
- "Bic" ballpoint pens
- paper
- other writing utensils
- small paint brushes
- termite worksheets

**Subjects:** science

**Time:** 20 min

may want to begin this activity by giving the student a little bit of background information on termites or you can have them research the answers for themselves.

**Procedure:**

1. Divide students into groups of three or four.
2. Distribute several sheets of paper to each group.
3. Students will select a writing instrument from the box.
4. Distribute paintbrushes.
5. Before distributing the termites, tell students they are going to be observing termite behavior. Tell them they will watch the termites crawl on the paper and also for them to try drawing a figure eight on the paper to see if this affects their behavior.
6. Distribute the termites.
7. Give students approximately five minutes to observe the termites.
8. After five minutes, ask students to record what they observed on the Insect Communication: Termites Worksheet. Have them share their observations with the class. Write their observations on the board. [Some students will say they termites followed the drawing of the red pen (Bic®) and others will say they did not follow the red pen (because it was not a Bic® pen).
9. Ask students to hypothesize why termites followed some drawings and not others. Ask them how would they set up an experiment to find the answer. [Explain that they must only test one thing a time.]
10. Give students time to experiment.
11. After students have conducted their experiment, discuss their results. Complete this process until they
12. You can complete the discussion and conclusion as a group or have students research the answers. Be sure that students understand that the termites will follow the drawing because the chemical in the “Bic” ballpoint pen is similar to the pheromones that termites leave in a trail when they food. The termites are blind and cannot see the trail but they are sensing it with their antennae.

**Discussion/Assessment:**

Why did the termites follow the trail?

How did they sense the trail?

Why is sight now important for worker and soldier termites?

What are some disadvantages to the communication system?

How would the termites signal danger?

# Insect Communication: Termites Worksheet



Name/s: \_\_\_\_\_

\_\_\_\_\_

**Observations:**

**Hypothesis:**

**Discussion:**

**Conclusion:**