

Exploring Insect Movement and Behaviour

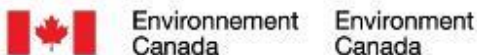


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Activity Name: Exploring Insect Movement and Behaviour

Ages: 6-14

Activity Energy: low

Length of time: 60 – 90 minutes

Number of Participants: 10 – 20

Indoor/Outdoor: Indoor

Concept: Using real-life insects, students perform a series of experiments to see which environments or food the insects like best. Students learn about the mechanics of insect movement.

Materials Required: Captured insects (see methods), cardboard boxes (4), lamp, heat pad, food items (ground beef, rotted veggies, fresh leaves, rotted wood), other props as desired (see methods).

Introduction: Animal behaviour is a fascinating area of study, and insects make an excellent subject for study because they are freely available, diverse, and relatively easy to handle. This lesson requires some prep time to identify and collect insect specimens that are available at your location and time of year, as well as to collect and construct the experiment environments. If you are interested in collecting insects as a class, check out our lesson (Insect Collections and Introduction to Entomology) for recommended methods for catching them. We have produced two PowerPoint presentations that can be used to introduce students to insects and highlight a selection of interesting species found in the Pacific Northwest, see the other files attached to this resource.

Methods:

1. **Collect insects for study:** The types of insects that will be available to you will be largely determined by your geographic location and time of year. A greater diversity of insects will be available at warmer times of year. Some suggested 'hot spots' to look for suitable specimens are under logs and stones, under the forest floor, in wood piles, and in the branches of shrubs during spring and summer. Care should be taken to store the insects in cool moist containers with good airflow between collection and experiment. Do not keep the insects inside and try to keep them for a day at most.
2. **Set up the following experiment environments:**
 - A. **Temperature:** take an open cardboard box about 12"x24" and tape the crevices in the bottom closed so that the insects cannot hide in the folds of the box, draw a line down the middle of the bottom of the box to split it into two. Set up a heating pad (such as one common for starting plant seeds) under one end of the box. Ideally this will create a warm side and a cool side. In the absence of a heat pad a desk lamp or hot water bottle can be used. The heat may spread a bit so you may want to have the pad under just 6" of one end.
 - B. **Food:** Using a cardboard box as described above, place different types of food at different places in the box. Recommended foods are raw ground beef, rotten fruit, fresh green

leaves, or dead insects. We recommend covering the box with a lid and waiting 15-20 minutes before checking the experiment. Insects may be too focused on hiding to consider food if left uncovered.

- C. **Dark vs light:** Create a cardboard box with one side closed up with a narrow space on the bottom for an insect to crawl inside. Leave the other half of the box open.
 - D. **Dry vs wet:** Take a cardboard box and pour a small amount of water on one half of the bottom with the objective of soaking the cardboard. You will have to cut a line through the bottom of the box, tape the edge, and then tape it back together to prevent the water from soaking the whole bottom.
3. **Lead-in:** Ask a series of questions to encourage the students to start thinking about the topic of insect movement and behaviour. How do humans move? What about insects, do they move differently than us? What kinds of insect movement are there? (Adults walking, larvae crawling, flying, swimming, burrowing, climbing, jumping). Why do insects move? (Avoid predators, find food, find mates, find places to lay eggs or build nests, move to warmer or colder places, and move to drier or wetter places). Insects do not have an internal skeleton like we do, they have an exoskeleton. The muscles that move their legs are attached to the exoskeleton. Soft bodied insects rely on keeping hydrostatic pressure in their bodies so that their muscles have something to press against.
 4. **Introduce experiments:** Today we are going to try some experiments with real live insects to observe their behaviour. We will determine which foods they prefer, if they prefer dry or moist, if they like dark or light, and if they like warmer or colder places.
 5. **Conduct experiments:** Have the students record guesses about which environmental conditions they think each of the insect species will like and why. Place a number of the insect specimens you collected at the center of each experiment environment. Have the students record the time and make observations. Some insects will move right away but most will take time to settle into their preferred location or food source.
 6. **Activity – move like a beetle:** While the class waits for the insect behaviour experiments, have them try to move like a beetle as follows: Beetles have six legs, like all insects do. They move by taking a step forward with the front + rear legs on one side and the middle leg of the opposite side, and then repeat, alternating sides. In order to replicate this movement you will need to get the students into teams of three. Have the students stand as far apart from each other as they can while keeping their hands on the shoulders of the person in front of them. Get the team to move like a beetle as described above. Depending on how well this works you can get teams to race each other.
 7. **Wrap-up:** What environments did our insects prefer? Was this the same or different than what we predicted? What other observations did we make?

Tips for Teachers:

- This lesson was taught in the Southern Gulf Islands in November after a couple of hard frosts and it was very difficult to find insects to work with. We ended up finding quite a few common ground beetles (*Pterostichus sp.*), cutworm larvae, and sow bugs, which are isopods, not insects.

- In our experience the insects are too busy trying to hide to be interested in food. Perhaps if the experiment was left overnight you may be able to observe the insects feeding. A more secure container such as an old aquarium is recommended for unattended experiments.
- We found the sow bugs to be a poor subject for study because they were able to climb out of the boxes, which distracted the students.
- After walking like a beetle, have the class form one long line and walk like a centipede. Have the students occasionally yell together as they walk: "WE ARE A CENTIPEDE!"