003 - Insect Field Study

Supports PA STEELS Standards

- 3.1.3.A Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- 3.1.3.H Make a claim supported by evidence about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change
- 3.1.6-8.I Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem
- 3.1.6-8.L Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- 3.4.6-8.E Collect, analyze, and interpret environmental data to describe a local environment
- 3.1.9-12.L Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
- 3.1.9-12.N Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity
- 3.4.9-12.E

Summary and Timing

Students use sweep nets to investigate micro-habitats in the schoolyard or other outdoor locations by sampling the insects. Conduct this lab in the fall or spring while the temperatures are warm. Use this lab to answer questions about insect anatomy and biodiversity in your schoolyard. The kit includes 8 sweep nets, collection bags, and insect samples in acrylic blocks. Suggested timing - 1+ class periods.

Materials *Teacher Provided (view materials)

- Sweep Net
- Ziploc Bag (gallon size)
- Acrylic Insect Blocks
- Insect Terrarium
- *Clipboard

Safety

- Check with the school nurse to identify students with bee sting allergies. Modify the lesson accordingly for students with allergies.
- Avoid stinging insects
- Avoid butterflies and moths, the net may damage their wings
- Avoid entering tall grass, use the long handle to reach into sample areas

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- Check for ticks
- Release insects away from people
- Use good judgment to avoid sampling in swarming areas that may present a danger

Guiding Questions/Phenomena

How do insect diversity and quantity vary among different environments? How does insect anatomy (structure) relate to body function? Is our schoolyard insect population diverse?

Credits and Document Version

The sweep netting procedure was modified by V. Stone from Manitoba, Canada, Agriculture Dept Monitoring Insects Using A Sweep Net in 2017 and updated in 2025.

Teacher Notes

1. Review the safety section of this document.
2. Identify safe sampling locations before conducting the lesson with students.
3. This investigation works best when the grass is dry. Sampling in wet or dewy grass usually results in messy nets and squashed bugs that are difficult to identify.

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Procedure

1. Observe the acrylic insect blocks to refresh your knowledge of insect anatomy and life cycle.
2. Choose two locations to compare for insect diversity and quantity. For example, you may choose to compare a meadow versus a mowed lawn or a sunny versus shady location.
3. Form a hypothesis about the quantity and diversity of insects in the sample locations.
4. Use the sweep net in a sweeping motion to catch insects in the selected location (Figure 1).
    a. Sweep the net back and forth across the top of the foliage.
    b. Sweep once for each step that you take, take 10 steps.
    c. If you can safely walk through the location, use the 180° sweep as you walk.
    d. If you cannot walk safely through the location, walk along the perimeter using a 90° sweep.
5. After your last sweep, tap the handle several times to force the insects to the bottom of the net.
    a. Grasp the net about 12” from the bottom to close the net and trap the insects.
    b. Push the part of the net containing the insects through the mouth of the net (inside out) into a Ziploc bag.
    c. Close the bag as you remove the net to seal the insects inside.
    d. For easier viewing, place the insect bag on a white background.
6. Count the total number of insects and the number of different kinds of insects. Record the sample data in Table 1.
7. Observe the insect’s structure, how many insects in your sample are crawlers? Flyers? Hoppers? Record the sample data in Table 1.
8. Release the insects in the sample area. Open the bag away from people.
9. Repeat steps 4-8 in the second sample location.

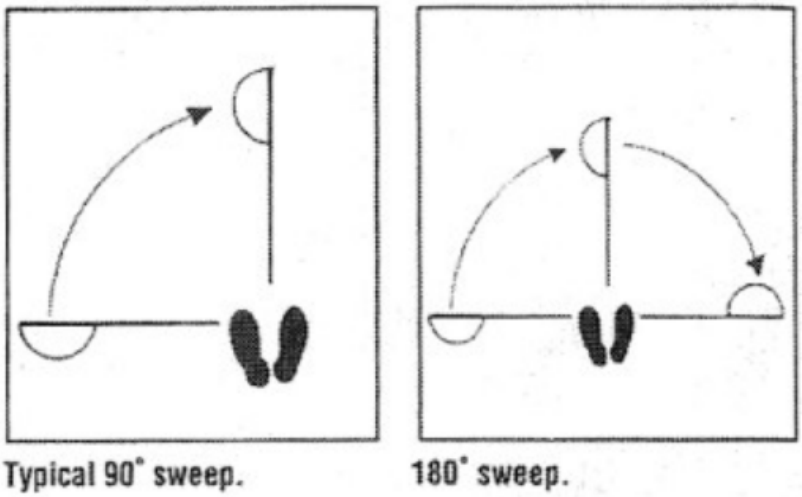

Figure 1. Use the 90◦ sweep for sample areas that you cannot safely walk through. Use the 180◦ sweep for areas that you can safely walk through. Image credit Government of Manitoba.

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Student Data Sheet

Name	

State your hypothesis about the quantity and diversity of insect life in the two sample locations:

Table 1. Insects collected in the schoolyard

	Sample Location 1	Sample Location 2
Location name		
Location description		
Total number of insects		
Different types of insects		
Number of **flying insects**		
Number of **hopping insects**		
Number of **crawling insects**		

Describe or sketch the typical body structure for flying, hopping, and crawling insects in Table 2.

Table 2. Insect body structure

Flying insects	Hopping insects	Crawling insects

Questions

1. Which location had the most insects? Why?
2. Which location had the most diversity of insects? Why?