



Action Kit

Summary:

With the teacher collecting bugs in a sweep net, students identify and observe different areas around their school and draw conclusions about bug populations in natural environments as well as in any pesticide-treated areas. They compare biodiversity in the swept areas and consider the importance of the web of life in pest-control decision making, just as entomologists do in the field.

Materials:

- Bug magnifying jars
- Hand lenses
- Sweep net
- White cotton sheet
- MDA Major Insect Orders poster
- Insects: A Golden Guide*
- Pest Patrol: A Backyard Activity Book for Kids*, page 22
- A few plastic spoons for picking up bugs

* Students take their journals and pencils out in the field for this activity.

Sweep Net Safari

Investigate Biodiversity in Your Schoolyard

Biodiversity: The variety of organisms found within a specified geographic region.

Explore the concept of biodiversity with an action packed, hands-on field trip into your own schoolyard. These areas provide homes for a host of tiny animals (insects, spiders, mites, etc.) that we rarely see. Peeping into shrubs and bushes or lifting rocks to spy what's underneath are fun, but wait until you try a sweep net to capture a sampling of these tiny animals for study. Let the safari begin!

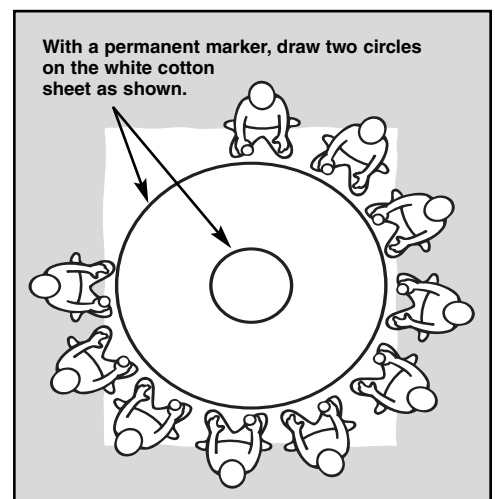
NOTE: Insects are easiest to find when it's pleasant outside. They hide for protection when it's hot, cold, or wet. Time your safari for a nice day. Prepare the white cotton sheet as shown in the diagram below.

Guiding the Activity

1. Ask children what kinds of "bugs" they have seen on the playground and schoolyard. *Which areas have more bugs? Are different bugs in different areas of the schoolyard? Which areas are natural? Which areas have been planted? Which may have been fertilized?* (Verify this with the custodial staff.) Then draw a simple schoolyard map of the various areas identified by the class. Use labels such as field, hedges and shrubs, ball fields, playground, natural areas, landscaped areas, building foundations, wet areas, and woodlands.
2. Show students the materials they will use for their sweep net study of bugs in the schoolyard.
3. Gather materials and journals and visit each of the different areas in the schoolyard to sample and record the bugs. You are investigating the biodiversity in your schoolyard using the same techniques as entomologists use in the field. **Plan to do more than one replication at each site for best results.**

Once outdoors and before you start sweeping at the first location, prepare your students: Spread the white sheet on the ground and ask students to kneel along the perimeter outside the outer circle.

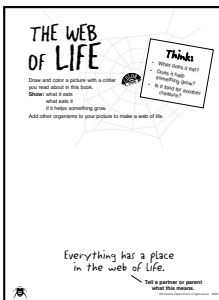
For the first sweep, appoint a timekeeper and measure a variable to give students an idea of how entomologists work. Empty the sweep net onto the sheet and start timing for 60 seconds. Students then tally the fly-away bugs with hatch marks. After 60 seconds, how many bugs are left? Sweep and repeat, just as entomologists do in the field. As you move to other locations, together estimate and have students record the number and kinds of bugs found at each. Look for chances to illustrate biodiversity concepts.



4. When you have a good sweep, instruct children to keep an eye on just one or two insects and observe how “their bugs” move on the sheet. Which one will reach the outer circle first? Once the bugs have crossed the outer circle, allow the students to carefully collect bugs in their magnifying jars to take back to the classroom for identification and detailed drawing. (Plastic spoons are helpful for picking up bugs.)

5. Return to the classroom to identify some of the bugs you found (see IPM: Helpful Resources) and to discuss what you learned.

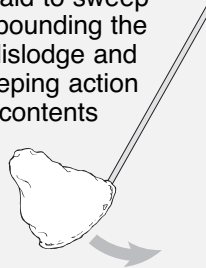
6. Turn to *Pest Patrol: A Backyard Activity Book for Kids*, p. 22 to complete “The Web of Life” activity.



7. Carefully release the bugs back in the habitat where you found them.

Your Sweep Net Technique


Grasp handle firmly. Swing the net low into grasses and leafy shrubs. Test with a few swings, following through with an upward action and twist of the wrist to fold the net bag over the rim, thus capturing flying insects inside. Don't be afraid to sweep close to the ground, even pounding the base of the vegetation to dislodge and capture bugs. Repeat sweeping action a few times before tipping contents out into the center of the white cotton sheet for observation by students.





Discussion Questions

- Did any areas have mostly one kind of bug? What might explain this?
- What could happen if there is mostly one kind of bug?
- What is the value of biodiversity? (Systems with greater biodiversity are healthier and populations are self-managed. When many different kinds of organisms are in an ecosystem, they don't have to compete as fiercely for resources as they would if all had similar needs and adaptations.)
- How do human actions influence biodiversity? How about human-made products such as fertilizers, insecticides and herbicides? How can human attitudes about maintaining perfect lawns, buying perfect fruits and vegetables, and killing all insect pests cause problems with biodiversity?
- Why is it important to consider the web of life in pest-control decision making?
- What do you predict about the biodiversity of your own back yard? How could you find out?

Digging Deeper

 Return to the same habitats and repeat the activity at different times of the day or month. Compare the data to determine changes in insect populations and biodiversity.

 Interview an entomologist to find out how they use sweep nets and what they learn from this technique.

 Research the organisms you found to learn more. How do they fit into the ecosystem where you found them? Are they predator or prey? Decide if they are welcome guests or pesky pests.

Bulletin Board IDEAS

On the MDA Major Insect Orders poster, add paper stars next to the insects you found in the schoolyard. Cut a big paper star and write the word “Biodiversity” on it. Add other stars labeled with names of the spiders from your bug collections. (Spiders are not insects so they don't appear on the poster).

Did You know?

- By reducing the use of pesticides, IPM helps protect biodiversity.
- Sometimes dragonflies just open their mouths as they fly through a swarm of small insects. Their mouths may get so full that they can't close their jaws!
- More than 70 percent of all living creatures known to us today are insects—and many are still undiscovered!
- “Bug” is a term used to refer to insects in general, but it's correctly used only for members of the insect order hemiptera, the true bugs.

Minnesota Graduation Standards, Grade 3

- History and Nature of Science:**
B. Scientific Inquiry.
- Life Science:** B. Diversity of Organisms; C. Interdependence of Life.
- Reading and Literature:**
B. Vocabulary Expansion.
- Writing:** D. Research.

