

Pest Patrol

Action Kit

Summary:

Students experience biological control in the classroom when they design and carry out an investigation (**guided inquiry**) to answer a question about aphid/ladybug relationships.

Materials:

- Live ladybugs purchased with voucher in kit. (Allow one week from date of mailing your voucher.)
- Tips: How to Care for Live Ladybugs
- 2 or more aphid-infested plants (Borrow from local greenhouse or gardeners, such as students' parents.)
- Video/DVD "Putting Ladybugs to Work"
- Teacher Guide for Video Viewing (and video script)
- Pest Patrol: A Backyard Activity Book for Kids*, page 16
- Yellow cards and petroleum jelly
- Hand lenses
- Journal for observations

Ladybugs to the Rescue

Do this in **SPRING** because your ladybugs must have aphids as a food source.

When you are hungry, what's your favorite thing to eat? You might choose different things on different days, but not if you were a ladybug. They love aphids for breakfast, aphids for lunch, aphids for dinner, aphids for snacks! Farmers and gardeners appreciate the ladybug's appetite for destructive aphids. Ladybugs come to their rescue to help save aphid-infested plants and crops so farmers can avoid using pesticides when possible. But don't take our word for it. Find out for yourself how hungry a ladybug can be!

Guiding the Activity

Build Background Understanding:

You may wish to read or conduct "Looking at Ladybugs: Observing Like a Scientist" before you do "Ladybugs to the Rescue." Read *Tips: How to Care for Live Ladybugs*.

With the class, view "Putting Ladybugs to Work" and do p. 16 in *Pest Patrol: A Backyard Activity Book for Kids*. Set out the yellow cards, petroleum jelly and hand lenses. Write these facts on the board:

- Aphids are attracted to the color yellow.
- Aphids damage plants.
- Ladybugs eat aphids.

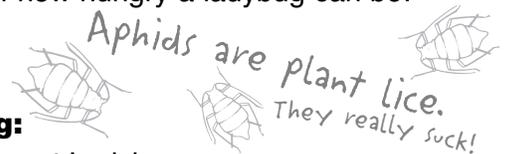
Then lead students through the inquiry process:

Inquiry:

1. Asking questions. Begin by observing both aphids and ladybugs in action. Let students use their hand lenses to study the aphids and observe plant damage. Have students brainstorm questions raised by observations and the background activities. For example, students may wonder: *How many aphids will the ladybugs eat? Will petroleum jelly smears on yellow cards really trap aphids? (See aphid trap directions in Pest Patrol: A Backyard Activity Book for Kids, p. 16.) How fast do ladybugs eat aphids on a plant? Which is better for getting rid of aphids: a yellow aphid trap or ladybugs on the plant?*

2. Choose a question to investigate. After the brainstorming session, help children decide which question they want to investigate and write the question in their science notebooks.

3. Plan a simple investigation. Guide students in planning and remind them that a "fair test" will require that only one variable at a time is changed and that all other variables must be kept constant. They will need a **control** (an aphid-infested plant) and a **variable** (an aphid-infested plant on which you'll test one aphid-ridding technique). They need to treat the plants equally (e.g., same amount of water, light, type of location). Discuss how you will measure the results. Suggest recording observations such as number of aphids, degree of plant damage and so on. Ask: *What do you think will happen?* Have students outline their plans and predictions in their science notebooks.



4. Carrying out your plan. Find separate areas (one for each aphid-infested plant) in the classroom to conduct the investigation(s). Ask: *How can we keep the conditions the same for each plant so we have a "fair" test?* Also ask students how they could keep the ladybugs and aphids from escaping from the test areas. (They may suggest enclosing the plants in terraria or screened boxes, or covering the plant with sleeves of netting to prevent the beetles from flying away.)

- Students who decide to test aphid traps as their variable should set up the yellow cards with a smear of petroleum.
- Students testing ladybugs as aphid eaters should release the ladybugs onto the test plant.
- Give children time to observe, draw, and record what they see over the next few days. Then ask: *What story do the data tell? Is your question answered?*

5. Communicate the results to others.

Scientists make the results of their investigations public; they describe the investigations in ways that allow others to repeat them. They critique and analyze their work and review and ask questions about the results. Provide opportunities for children to think and act like scientists.

Observations

Draw what you see on your plants:

Sample	
Control	Variable

Date: _____

How many aphids on...

Day 2	Day 2
Day 3	Day 3
Day 4	Day 4
Day 5	Day 5
Day 6	Day 6
Day 7	Day 7

Other Observations: _____

Digging Deeper



Come spring, try another biological control in your classroom. Praying mantids are amazing predators that feed on most garden pests including caterpillars, aphids, wasps, flies and crickets — but NOT on plants. It is possible to keep a single mantid in a small aquarium or suitable container to observe its impressive hunting skills. The mantid's voracious appetite allows it to grow to an astonishing length of four to five inches. Feed your mantid aphid-laden leaves or small insects each morning. After a week or so, release the mantid into your garden. (You can purchase mantid egg cases at garden stores in the spring.)

IMPORTANT! Be sure to release all surplus ladybugs outside so they can live on and do their important work.

Don't Miss This!
 Bug Eyes
http://insected.arizona.edu/lesson_17/default.htm

Did You Know?

- Colonies of beneficial insects are reared at Minnesota's Biological Control Facility (BCF) in St. Paul. The BCF educates the public about biological control and demonstrates its principles.
- You can see insect species from around the world displayed at Minnesota's Biological Control Facility (BCF) in St. Paul.
- Most pesticides work by killing pests' young through attacking developmental or immune systems; because of this, scientists believe elderly people and young children are more susceptible to ill effects of pesticide exposure.
- Biological control includes letting natural enemies of pests do their job. Add natural enemies to your yard or garden, create conditions that encourage natural enemies, and be sure products or practices you use don't harm the beneficial creatures.
- Don't forget about birds and bats! Put up a birdhouse or bat house so these natural enemies will stay and eat mosquitoes.
- In warm weather, if the host plant is healthy, an aphid can produce 50 babies in one week. These will mature 1 week later. In one season, a single cabbage aphid and its young, if none died, could produce 1,560,000,000,000,000,000,000 (1 heptillion, 560 hexillion) individuals under ideal conditions.



See "Mosquito-Eating Machines" in *Pest Patrol: A Backyard Activity Book for Kids*, p. 15.

Bulletin Board IDEAS

Display student drawings or data sheets with captions that describe your guided inquiries. Examples:

- "Thanks, Ladybugs!"
- "Champion Aphid Eaters."
- "Ladybugs Help Us."
- "Ladybugs to the Rescue."
- "Biological Control Scorecard: Ladybugs vs. Aphids."

Minnesota Graduation Standards, Grade 3

- History and Nature of Science:**
 A. Scientific World View.
 B. Scientific Inquiry.
- Life Science:** C. Interdependence of Life.
- Reading and Literature:**
 B. Vocabulary Expansion;
 D. Research.
- Writing:** A. Types of Writing.
- Speaking, Listening and Viewing:**
 A. Speaking and Listening.

