

We3 Bridging Document: Department of Agriculture

Ladybugs to the Rescue

Grade 3

Abstract

Students experience biological control in the classroom when they design and carry out an investigation (a.k.a. guided inquiry) to answer a question about the relationship between aphids and ladybugs.

Connection to State Science Standards (Grade 3)

Strand I – History and Nature of Science

Sub-Strand A – Scientific World View

Standard – The student will understand the use of science as a tool to examine the natural world.

Benchmark

1. The student will explore the use of science as a tool that can help investigate and answer questions about the environment.

Strand I – History and Nature of Science

Sub-Strand B – Scientific Inquiry

Standard – The student will understand the use of science as a tool to examine the natural world.

Benchmarks

1. The student will ask questions about the natural world that can be investigated scientifically.
2. The student will participate in a scientific investigation using appropriate tools.

Activity

Ladybugs to the Rescue (spring activity),
www.mda.state.mn.us/news/publications/kids/pestpatrolactionkit/rescuespring.pdf

- † Go to Activity
- † Go to www.mda.state.mn.us/kids/actionkit.htm
- † Then scroll down to *Kit Contents*.
- † Below *Kit Contents*, scroll to *Activity 2a: Looking at Ladybugs*.

Students' prior knowledge or alternate conceptions about key concepts/ideas and implications for teachers/advisors

Misconceptions about life sciences

<http://homepage.mac.com/vtalsma/misconcept.html#biology>

Misconceptions about insects

www.umass.edu/ent/BugNetMAP/r_misconcept.html

Materials

- Live ladybugs found outside on garden plants, in the house, or ordered from the biocontrol suppliers.*
- *Tips: How to Care for Live Ladybugs*
www.mda.state.mn.us/news/publications/kids/pestpatrolactionkit/caringforlb.pdf
- Two or more aphid-infested plants (Borrow from local greenhouse or gardeners, such as students' parents.) **
- Video/CD *Putting Ladybugs to Work*. This child-narrated 7-minute video acquaints students with ladybugs and their important work, www.mda.state.mn.us/kids/actionkit.htm and scroll down to Activity 1 to link to the video.
- *Teacher Guide for Video Viewing* (and video script)
www.mda.state.mn.us/news/publications/kids/pestpatrolactionkit/videoscriptguide.pdf
- *Pest Patrol: A Backyard Activity Book for Kids*, page 16, Pests Have Enemies Too! Aphids and Ladybugs
www.mda.state.mn.us/news/publications/kids/pestpatrol/pestshaveenemies.pdf

- Yellow cards and petroleum jelly
- Hand lenses
- Journal for observations (one for each student or each pair)

** **Ladybeetles:** Ladybeetles can be found: (1) Outside on plants in late May or early June. (2) In houses or cabins in early spring (the Multicolored Asian Ladybeetle). (3) Through a biocontrol catalog. (4) At the Dept. of Agriculture's Biological Control Teaching Greenhouse.
www.mda.state.mn.us/plants/insects/plantscape/biofacility.htm

** **Aphids:** Aphids can be found: (1) Outside in spring: large red aphids on cup plants, goldenrod, and roses; yellow species on milkweed and butterfly weed; small greenish blackish aphids on plants like sedum and burdock; soybean aphids on soybean plants; aphids on peppers in summer. (2) At the Dept. of Agriculture's Biological Control Teaching Greenhouse. (3) At your local conservatory, greenhouse, or mall which may have temporary aphid outbreaks.

Key concepts/ideas

- Like people, insects have different "jobs" and their bodies (e.g. mouthparts) are suited for different kinds of work.
- When the "work" of certain insects helps humans, we call them beneficial.
- When certain insects harm plants, damage property, or make people or animals sick, we call them pests.
- When certain pest insect populations grow out of balance, they can kill the plants they feed on.
- If there are too many aphids on a plant, they can destroy it. Ladybugs eat aphids, which helps keep their population levels below those that harm or kill plants.
- Scientific experiments can help us gain knowledge about our environment.

Connection to Minnesota Environmental Literacy Scope and Sequence Benchmarks

- Social and natural systems are made of parts. (preK-2)
- Social and natural systems may not continue to function if some of their parts are missing. (preK-2)
- When the parts of social and natural systems are put together, they can do things they couldn't do by themselves. (preK-2)
- In social and natural systems that consist of many parts, the parts usually influence one another (3-5)
- Social and natural systems may not function as well if parts are missing, damaged, mismatched, or misconnected. (3-5)

For the full Minnesota Environmental Literacy Scope and Sequence, see www.seek.state.mn.us/eemn_c.cfm

Connection to State of Minnesota Environmental Education Goals

To view Minnesota State Statute § 115A.073, "Environmental education goals and plans," go to www.seek.state.mn.us/eemn_g.cfm and scroll down to Statute 115.073. It is the second statute listed on this page.

Background knowledge for teachers

- **What is a pest?** In *Pest Patrol: A Backyard Activity Book for Kids*, p. 1, (What's a Pest?) To find this, go to www.mda.state.mn.us/plants/pestmanagement/ipm/ipmpubs.htm and scroll down to Join Our Pest Patrol, toward the bottom of the page. Click on Insects: What's a Pest?
- **What is Integrated Pest Management (IPM)?** Choosing among various ways to treat pests (insects, weeds, etc.), the goal of IPM is to lessen pest damage while protecting human health, the environment, and economic viability. www.mda.state.mn.us/news/publications/pestsplants/pestmanagement/ipm/fsoverview.pdf
- **Integrated Pest Management (IPM)** Helpful resources, www.mda.state.mn.us/news/publications/kids/pestpatrolactionkit/resources.pdf
- **Integrated Pest Management publications** www.mda.state.mn.us/plants/pestmanagement/ipm/ipmpubs.htm
- **Bulletin board ideas**, www.mda.state.mn.us/news/publications/kids/pestpatrolactionkit/bbideas.pdf
- **Ladybug facts** www.geocities.com/sseagraves/ladybugfacts.htm
- **Guide to Encounters with the Orders of Insects**, www.mda.state.mn.us/plants/insects/insectorders/default.htm
- Minnesota Pollution Control Agency information on integrated pest management and reducing pesticides in Minnesota schools, www.pca.state.mn.us/oea/ee/ipm.cfm

How to make this activity relevant to students' learning and lives

- In younger grades, kids are naturally curious about small living organisms, making it more likely for younger students to encounter insects and other bugs more frequently. Through this activity, students gain an understanding of the jobs ladybugs and other bugs do.
- Students may have gardens at home and can apply their knowledge about ladybugs to understand their role in the garden as a natural enemy of plant-eating insects. Knowing how to look for differences between insect predators and plant-feeding insects can help avoid unnecessary use of pesticides, which can help maintain the health of their gardens, with the help of their parents.

Related state agency K-12 outreach resources

Insect-related activities

- *Pest Patrol Activity Book*, www.mda.state.mn.us/plants/pestmanagement/ipm/ipmpubs.htm#pestpatrol
- *Pest Patrol Action Kit* (Complete with printable games and insect order poster) www.mda.state.mn.us/kids/actionkit.htm
- Visit (or arrange to have a visit by) the Minnesota Department of Agriculture's Biological Control Teaching Greenhouse for hands-on presentations geared to the age level of your students. www.mda.state.mn.us/plants/insects/plantscape/biofacility.htm

Other Department of Agriculture resources/activities

Minnesota Agriculture in the Classroom

- AgMag and Teacher's Guides (grades 4-6) www.mda.state.mn.us/kids/maitc/agmags.htm
- AgMag Jr. and Teacher's Guides (grade 1) www.mda.state.mn.us/kids/maitc/agmagjr.htm
- Teacher Resources www.mda.state.mn.us/kids/maitc/teachresources.htm
- Project Food, Land and People www.mda.state.mn.us/kids/maitc/teacheredu.htm
- The Farmer Grows a Rainbow, nutrition education kit (preK-5) www.agclassroom.org/rainbow/index.htm
- *Fields of Energy* DVD and Teachers Guide (7-12)

Assessment options

1. Before the activity, tell students what they will be doing and draw the two plants covered with aphids, one with ladybugs and one without. Ask them to describe what they think the differences might be. After the activity, repeat the drawings. Students should label different parts of the picture, describing the differences they observed between the one with and the one without the ladybugs.
2. Have students divide a sheet of paper into 4 areas by drawing lines. In each of the 4 areas, students describe a different part of the experiment: (1) asking questions and choosing a question to investigate, (2) planning a simple investigation, (3) carrying out the plan and (4) communicating their results. They may use pictures or words.
3. Students create a presentation about their experiment. In the presentation, they describe what they did including what worked well and what they would change next time.

We save—Ideas for action

1. In preparation for this activity, plant a small garden using plants that attract various kinds of insects. This can be done at your school in the spring or in the fall before the frost. For ideas about the kinds of plants that are used at the Biological Control Teaching Greenhouse, visit www.mda.state.mn.us/plants/insects/biogarden.htm
2. When you are finished with your observations and experiments, release the ladybugs into the school garden to eat the aphids that feed on garden plants.
3. If the school already has a garden or native plant area, see if students can find aphids and release the ladybugs where the aphids are found. The ladybugs will help get rid of the aphids without the use of pesticides.
4. Check back later with the students and search for the different life stages of the ladybugs on the plants. See if you can observe eggs, larva, pupa, and/or adults (In the late spring, you may be able to find at least three out of four life stages.)