

Ladybug Lifecycles

Overview: One of the most well-known insects, the ladybug is a celebrated garden hero for keeping common plant pests like aphids in check. Not only are they fun to observe, ladybugs also offer opportunities to teach students about insect life cycles, food webs, and biological pest control.



Grade Level/Range: K-2nd, 3rd-5th

Objective(s):

Students will:

- Learn about complete metamorphosis by studying the life cycle of ladybugs.
- Search for and identify ladybugs in gardens or natural spaces.
- Understand the habitat needs of ladybugs.
- Discover the important role ladybugs play in the garden.

Time: 1 to 2 Hours

Materials:

- Ladybug Lifecycle Worksheet
- Ladybug identification tool
- Pencil
- Clipboard or a piece of cardboard
- Ladybug Life Cycle and Observation Worksheets

Background Information:

Ladybugs are insects that most people can identify not only because they are extremely common, but also because they are just so adorable! Scientifically, ladybugs are a type of beetle. Although ladybugs are typically featured with red elytra, or wing coverings, with a smattering of black dots, there are over 5,000 different types of ladybugs with varying spots and patterns (and some without spots), and they can be found in other colors, including shades of yellow, orange, and black. Their bright colors could be an adaptation to help keep predators away, as red and orange coloration is often a signal that an animal is toxic (or, at the very least, not tasty). Many ladybugs do, in fact, release a foul-smelling chemical when disturbed or crushed.

Typical of all insects, ladybugs have the traditional parts of six legs along with a head, thorax, and abdomen. Like all beetles, they have compound eyes, antennae, a hard shell, and two sets of wings. Their lifecycle represents complete metamorphosis with four distinct stages. They begin as yellow eggs, usually attached in a cluster to the underside of a leaf. They then hatch into larvae, which bear no resemblance to the adult ladybug — some liken their appearance to that of little alligators. They spend this stage of their lives eating and can eat between 300 and 400 aphids as they grow. They then enter a pupal stage where they appear as hard shells attached to a leaf or stem. Although they seem inert, looks can be deceiving. Although the pupae appear motionless on the outside, a significant transformation is occurring inside. Finally, they emerge as adult ladybugs ready to eat again, mate, and eventually lay more eggs.

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Adults lay their eggs on plants already hosting pest populations like aphids so that once the eggs hatch, the larvae have a buffet ready to devour. Although aphids are a favorite food of ladybugs, they also eat other insects like scale and mites. Some even consume pollen and nectar. Ladybugs are both predators and prey in the food web. Although their bright colors can scare off some predators, ladybugs are preyed upon by birds, frogs, wasps, spiders, and dragonflies.

Ladybugs can inhabit a wide range of habitats, although they are most commonly found in temperate climates. They are found on every continent except Antarctica. During the cold months, they enter a hibernation state known as diapause until temperatures warm again.

The introduction of non-native ladybug species has become a concern in the United States due to their ability to adapt to a wide range of habitat conditions. One of the native ladybug species, the nine-spotted ladybug, has become increasingly rare as the populations of Asian ladybugs have been expanding. Although all ladybugs offer the benefit of targeting plant pests, some of the non-native species are not as cold-hardy and can become a nuisance by invading houses during winter months as they seek shelter from the cold. Cornell University has launched [The Ladybug Lost Project](#) to engage citizen scientists, including students, in tracking and studying ladybug populations. Through their work, scientists are attempting to determine patterns in ladybug populations and whether native species are losing habitat to non-native species.

Pesticides can also pose a concern for ladybug populations. Although they are lauded for their help as a biological control for eating plant pests, ladybugs are susceptible to the same insecticides used on these same pest populations. Gardeners who want to host ladybug workers must also be willing to tolerate some pest damage. Ladybugs must have plenty of pests to munch on in order to be happy in their habitat.

Additional fun ladybug facts:

- Adult ladybugs can eat up to 75 aphids a day.
- They are symbols of good luck.
- They are the state insect of Delaware, Massachusetts, New Hampshire, New York, North Dakota, Ohio, and Tennessee.
- They have traveled into space, where scientists observed the impact of gravity on aphid consumption.

References

- "Beetles in Action." 2020. TIME for Kids. <https://www.timeforkids.com/a5/beetles-action-2/>.
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- "Ladybug." San Diego Zoo Wildlife Alliance. <https://animals.sandiegozoo.org/animals/ladybug>.
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Laying the Groundwork:

Share a time-lapse video of the ladybug lifecycle like the one on [The Kid Should See This](#). Explain that the ladybug lifecycle represents complete metamorphosis, which is a word that means to change form or structure. *Ask students:* Why do you think it is called “complete” metamorphosis?

On a dry-erase board or chalkboard, list each stage and have students describe what the ladybug is doing in each stage.

Finish up by asking students to complete the [Ladybug Lifecycle Worksheet](#).

Exploration:

For the exploration, organize a ladybug hunt at a nearby garden or greenspace. Prepare by reviewing with students what ladybugs look like at each stage of their lifecycle. Additionally, introduce students to differences among ladybug species by sharing photos using a digital identification app, like [Seek by iNaturalist](#), or a printed identification tool, like guides from [The Lost Ladybug Project](#).

1. Plan your hunt. You can vary the details of your hunt depending on the time available and the interest/developmental level of your students:
 - For a simple hunt, focus only on finding ladybugs in the different stages of their lifecycle, without trying to distinguish among different ladybug species. A simple observation page can be created by dividing a piece of paper into four sections representing egg, larva, pupae, and adult stages, or you can use our sample observation worksheet. Students can work individually, in groups, or the hunt can be a collective group effort. Use tally marks to track each ladybug found.
 - For a more challenging hunt, use a digital app or printed guide to try and identify the species of ladybug found, and also log detailed notes such as the date and time along with a description of the location found (i.e., found under a leaf, found on a plant with aphids, seen on a flower, found in a densely planted area). This additional information can help students learn more about their habits and habitats. Taking photos can also be a useful tool to aid identification back in the classroom. See the sample observation worksheet.
2. Before the day of your hunt, remind students to dress appropriately for the weather. Water bottles, along with sunscreen and/or hats, may be needed depending on the time of year.
3. On the day of the hunt, review expectations, instructions, and the process for recording findings before traveling to the garden or greenspace. *Ask students:* How many ladybugs do you think we might see today? Which stage of the lifecycle do you think we will see the most? Make sure to bring your Ladybug Lifecycle Worksheet and the identification tool of your choice on your adventure to help with the search.
4. Once on location, encourage students to be patient and help them identify locations to observe. *Ask students:* What in our garden or greenspace might attract ladybugs? Should we be looking at the tops of leaves or underneath them? What if you do not see any ladybugs? Even if you do not see any ladybugs, there are still many observations that can be made. What is missing from this space that might make it less desirable to ladybugs? Are there any other conditions that might be present, keeping

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ladybugs away? You can turn students' attention to looking for sources of food for ladybugs, such as aphids, scale, or whiteflies.

5. After the hunt, turn your findings into a chart or graph of your choosing and discuss the results. *Ask students:* What did we find? How accurate were the estimations we made before the hunt about the number of ladybugs we would find? Why do you think the results were the same or different? Do you think our count would be different at different times of the day? Different times of the year? Do you think the garden or greenspace we visited was a good habitat for ladybugs? Is there something we could do to make it a better ladybug habitat?

Making Connections:

One of many beneficial garden insects, ladybugs play a crucial role as biological pest controls. As a class, learn more about [beneficial insects](#) and how to attract them to your garden or greenspace. Have students create a flyer about ladybugs and beneficial insects to take home and share with families and friends.

Branching Out:

To extend your investigation, consider participating in the [Lost Ladybug Project](#). The Lost Ladybug Project is an initiative of Cornell University that invites citizen scientists to submit photos of ladybugs they find, along with their locations. The site includes detailed instructions on how to find, collect, and photograph the creatures, as well as teaching resources and interactive kids' pages. Participating in data collection and contributing to a national program can be very motivating and rewarding for students.

Connection to Standards

This lesson can be used to teach the following Next Generation Science Standards:

K-LS1-1. Use observations to describe patterns of what plants and animals) need to survive.

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals and the places they live.

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.

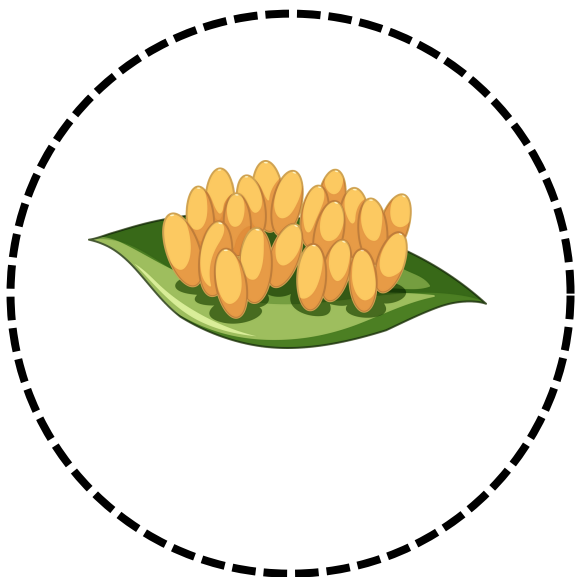
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

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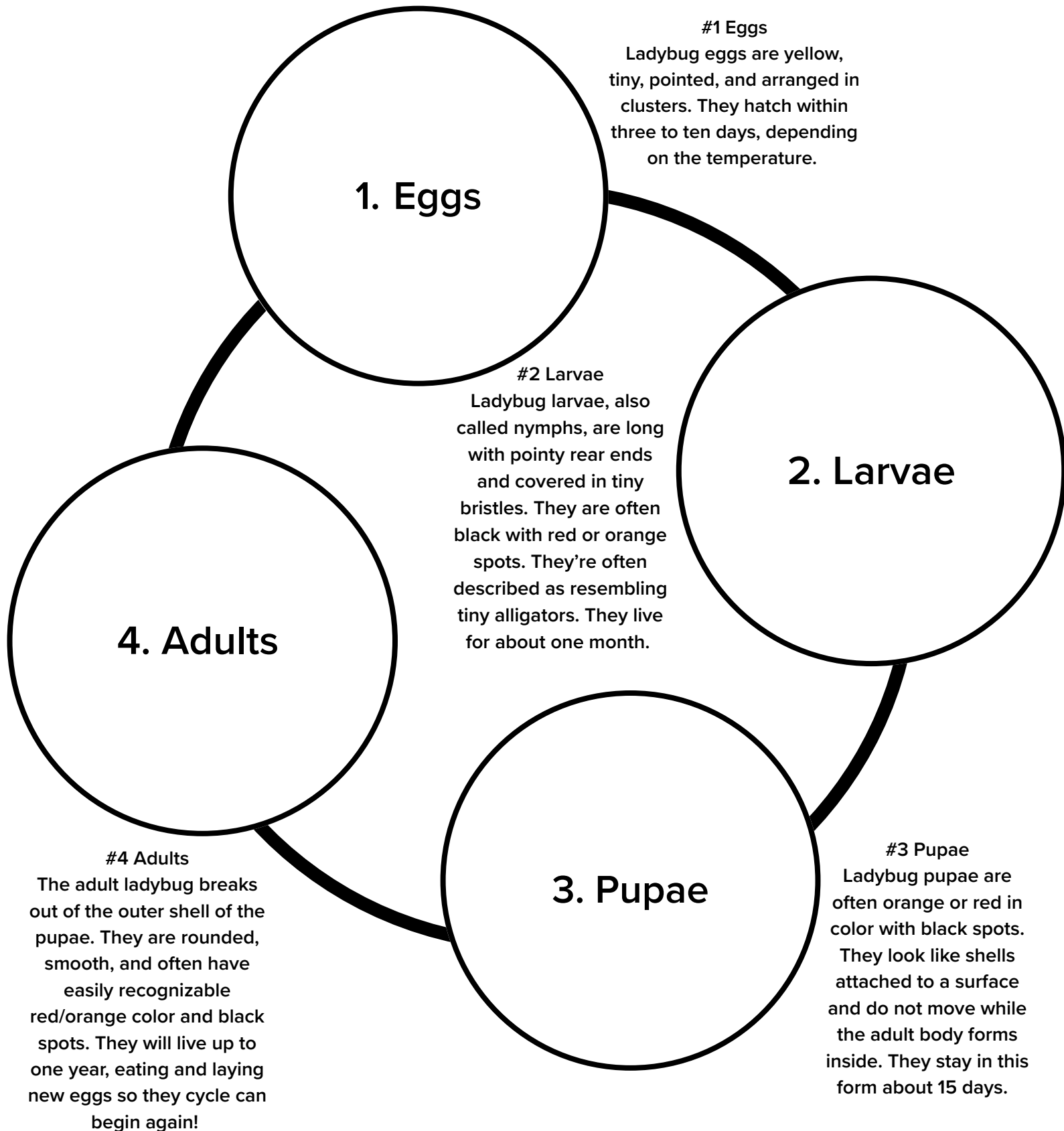
Ladybug Life Cycle

Instructions: Ladybugs, like most living things, grow and change from birth into adulthood. Cut out the pictures below and then read the descriptions on the next page to paste them in order.



Ladybug Life Cycle

Name: _____



Name:

Instructions: Place a tally mark in the appropriate lifecycle stage for each ladybug that you see.

Egg	Larvae
Pupae	Adult

Name:

Instructions: Create a log of every ladybug (in any stage of development) that you see.

Date/Time	Location Found	Life Cycle Stage (egg, larva, pupae, adult)	Brief Description (color/spots)	Other Notes/Photo #