

**Background:** Often students understand they are different from one another but do not recognize individuality in other species. This activity will demonstrate natural variation within a single species, the charismatic ladybug. Students will have an opportunity to practice their technical drawing skills and fine tune their ability to observe details.

**Grade level:** 1-3

**Academic Standards**:

*NextGen Science*

*Standards:* Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (LS3.B)

*Common Core:* Ideas can be conveyed through drawings. These representations are useful in communicating ideas.

(ETS1.B and SL.2.5)

Draw a bar graph to

represent categories of

data (2.MD.D.10 and 2-

LS2-2)

**Time:** 30 minutes

**Logistics**: Individual assignment

**Materials**:

- Ladybugs (cheap and easily obtained in the spring at local plant nurseries)

- Drawing supplies

- Small viewing cube for ladybugs- available from Nature Watch

**Preparation:** Obtain live ladybugs. The common species sold at plant nurseries is *Hippodamia convergens*. These are usually available in the spring between February and April, maybe later in northern Arizona. Before class, place ladybugs in small plastic containers with clear tops (ideally discovery cubes) to give to students individually. Ladybugs can be stored in the refrigerator for months at a time in an extended hibernation state. It will be easiest to transfer ladybugs from their original packaging to discovery cubes after they have been cooled for several hours in the fridge to slow their movement and prevent them from crawling everywhere while you move them.

**DO - Activity**:

**1.)** *Setting the stage* Ask students what makes them special, how are they different from other people and what makes them unique. Ask if this also applies to other animals. Do other species show similar variation like humans do? Ask the students specifically if ladybugs are all the same or if there are differences between individuals. If so, in what traits, ex. color, number of spots, size?

**2.)** *Pass out the lady bugs* Give each student a ladybug in a bug box or transparent plastic container. Allow each child to get to know their lady beetle and possibly name it. Identify the insect’s head, thorax and abdomen (easier to see from the underside). Distinguish legs and antennae. Lead the class to make a list of features that all the ladybugs have on the board. Tell the students today they will get to be scientists recording every detail about their unique ladybug. Their drawings must be detailed enough that if you gave the picture to someone else they would be able to pick your ladybug out of a crowd.

**3.)** *Technical drawing* Pass out drawing supplies to each of the students to draw their ladybug. Make sure they include all of the features listed previously common to all ladybugs. Remind students that scientists do not draw from their imagination but record only exactly what they see. Encourage them to count the number of dark spots on the beetle’s hardened front wings (elytra). While insects are all the same species, usually *Hippodamia convergens*, the lady beetles will vary in both size (males are smaller) and the number of spots (12 is typical, but some have few or none and some have 16 or more). Walk around the room while the students draw and gently reinforce realism in their drawings. For example, if some pictures include ladybugs with smiling faces, ask students if their ladybug was really smiling at them. They may also use words to supplement their drawing, like labeling the different parts of the insect.

**4.)** *Lady beetle release* Pick a shady spot outdoors, preferably near flowering plants or fruit trees with aphids. Have the students open the boxes and allow the beetles to fly away. (Hint: it won’t be a Born Free moment. Most of the lady beetles will just crawl around on the kids’ hands!)

**REFLECT**

To demonstrate the natural variation within a single species (and to instill graphing skills), after students have finished drawing their ladybugs lead the class to make a bar graph on the board of the number of ladybugs with 0 spots, with 1 to 6 spots, with 7 to 9 spots, etc. This will show students again that each ladybug is slightly different from the others in the class.

**APPLY**

Ask the students what they think the biological significance of the number of spots is for the ladybugs. What purpose might these spots serve in their natural habitat?

**Supplementary information**

A ladybug's spots are warnings to predators. This color combination - black and red or orange - is known as aposematic coloration. Ladybugs aren't the only insects that use aposematic coloration to discourage predators. Just about any black and red/orange insect you can find is signaling the same thing to predators: "Stay away! I taste terrible!"

Recent research shows that a ladybug's colors are an indication of how toxic it is. Brighter ladybugs may have higher levels of bad tasting toxins than paler beetles do. Ladybugs with richer colors were also found to have better quality diets early in their lives.

Although the spots themselves are just part of the "warning" color scheme, the number of spots on a ladybug does have significance. Some people think they're age spots, and that counting them will tell you an individual ladybug's age. That's a common misconception and is not true.

Ladybugs are predators of other insects like aphids that can feed on plants. Ladybugs are actually beetles. There are many different species of ladybugs in the family Coccinellidae. The name ‘ladybug’ or in England ‘ladybird’ comes from European farmers hundreds of years ago. They believed that the beetles were sent by the Virgin Mary to help control pests on their crops.