



Insect Discovery

LADYBUG DRAWINGS: SCIENTIFIC DRAWING

Lesson Plan – Insect Science Educational Supplements

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
- Discovery cubes or small containers for ladybugs

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.

Preparation: Obtain ladybugs. These are available from local plant nurseries readily in the spring and sometimes in the fall as well. Before class, place ladybugs in small plastic containers with clear tops (ideally bug boxes, available through BioQuip.com) to give to students individually. Ladybugs can be stored in the fridge 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.

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?

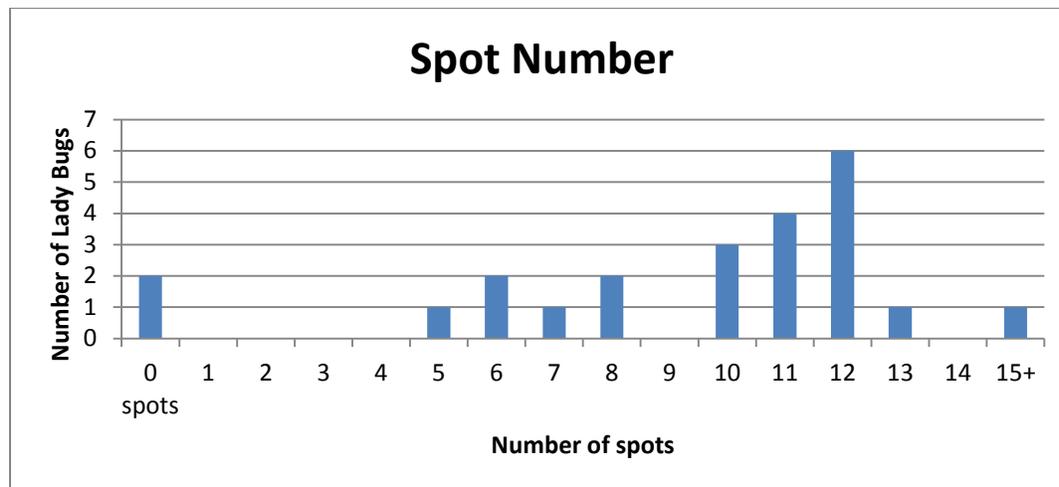
2.) *Pass out the lady bugs* Give each student a lady bug in a bug box or transparent plastic container. Allow each child to get to know his/her lady beetle and possibly name it. Identify the insect's head, thorax and abdomen (easier to see from the underside). Distinguish legs and antennae. Lead the 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 don't 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.

5.) Reinforcement 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 (example below) on the board of the number of ladybugs with 0 spots, with 1 spot, with 2 spots, etc. This will show students again that each ladybug is slightly different from the others in the class. For older students, this can also introduce the concept of natural distribution.



6.) 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!)

Assessment

Reflect Use the graphing activity to visualize individuality and variation between ladybugs

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 actually a warning 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.

The spots themselves are part of the warning color scheme. Some species of ladybugs have affixed number of spots, while other species (like the one in this experiment) exhibits natural variation. 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 it's NOT TRUE!