

# Earth's Birthday Project

## AMAZING BUGS®



### Pre/Post Questions: Ladybug

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#### Introduction

Pre/Post Questions are tools for guiding inquiry and assessing student learning. Students answer the questions before they do the activities in the Amazing Bugs kit (pre) and again after the activities are completed (post).

Students are not expected to score high points the first time they answer the questions. The Amazing Bugs activities will give them many chances to practice the skills needed to improve their answers in the second round.



#### Contents

Questions are presented on one-page, reproducible handouts. Each handout is followed by easy instructions, including quick prep and a rubric or answer key for grading. Use one or two questions, or all four—the more time you invest, the more students learn and the more opportunities you have for assessment.

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#### Scheduling, Time, Materials

Schedule the first round (pre) a few days in advance of the arrival of your live ladybugs. Plan on 10–20 minutes for each question in the first round (pre), and 5–15 minutes in the second round (post). The materials you'll need are two copies of each question, and crayons, for each student.

#### Standards and Benchmarks

The teacher's instruction for each question includes New Mexico science and/or math benchmarks.

**For more information: [earthsbirthday.org/nm](http://earthsbirthday.org/nm)**

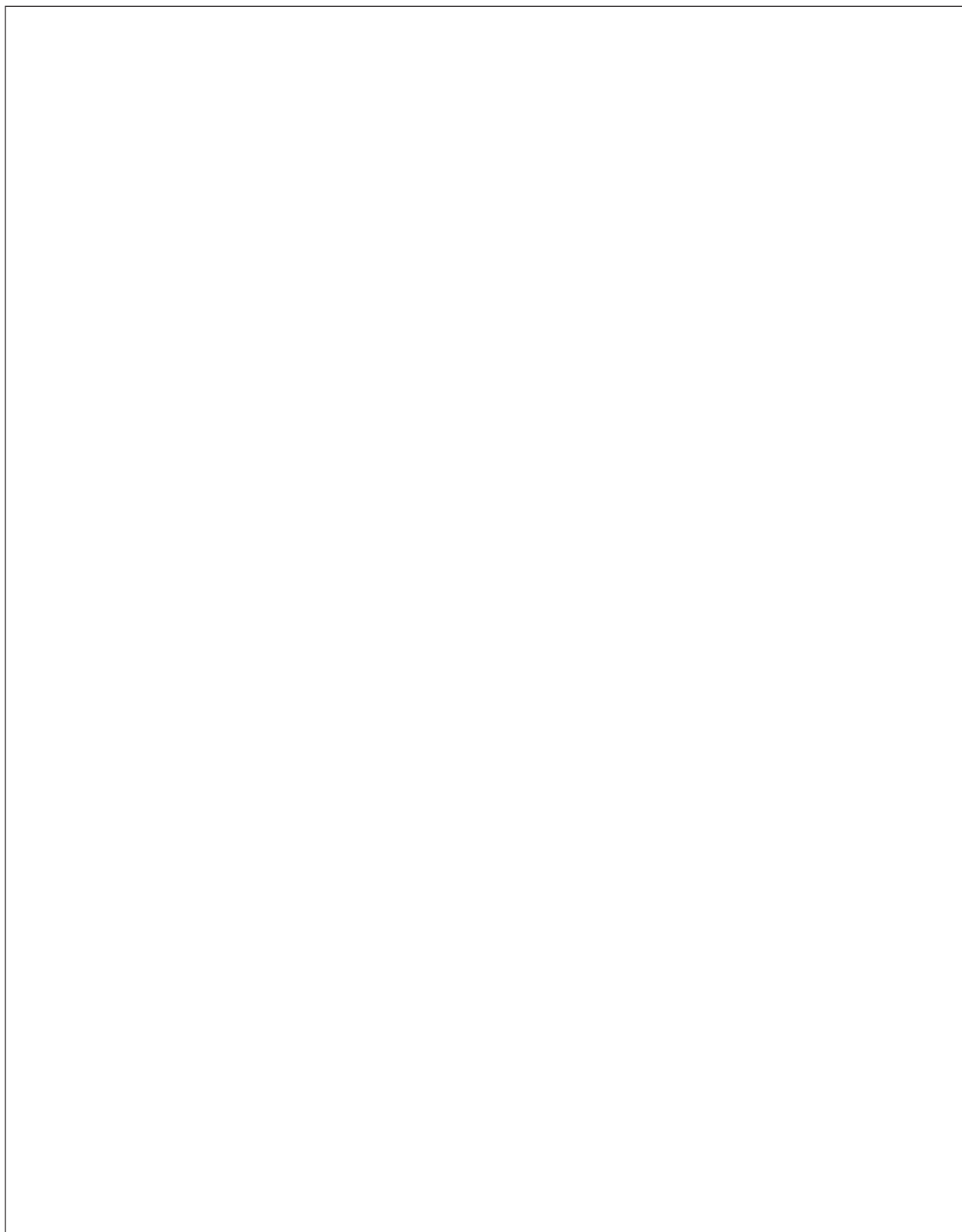
OK to duplicate for use with students!

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Name \_\_\_\_\_

## Draw a Ladybug



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## Question 1: Teacher Instruction

### Science Benchmark

- Content of Science, Standard II (Life Science), K–4 Benchmark I – Know that living things have diverse forms, structures, functions, and habitats.

### Math Benchmarks

- Algebra Benchmark 1 – Understand patterns, relations, and functions.
- Geometry Benchmark 3 – Apply transformations and use symmetry to analyze mathematical situations.

### Teacher Prep

Make two copies of Ladybug Handout Q 1 for each student—one for Pre, one for Post.

### Pre (First Round)

Instructions to students: *Ladybugs are insects. They have legs, antennae, and spots.*

*They are usually black and red. Draw and color a picture of what you think a ladybug looks like. If you're not sure, it's fine to use your imagination. Later we'll look at some live ladybugs to see what they are like.*

Allow students about 10 minutes for their drawing.

### Post (Second Round)

Have students draw and color a ladybug again after they have done the Amazing Bugs activities. Allow about 15 minutes.

### Grading

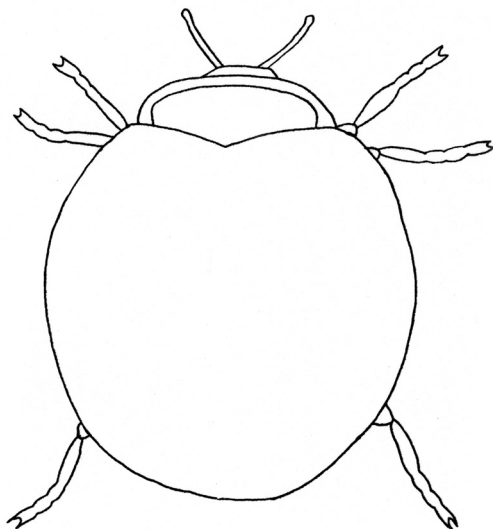
The maximum possible score is 3 points. Students are not expected to score points the first time they draw (pre). Their second drawing *does not need to be realistic, but it should include the details described in the rubric.*

Score	Description
3	The student has drawn the correct numbers of each main part: <b>one head, two spotted wing covers, six legs</b> . The ladybug is <b>symmetrical</b> , with the same sizes and numbers of spots and legs on each side of the body. The ladybug is <b>colored correctly</b> (black head and legs; red, orange, or pink wing covers).
2	The student has drawn all parts, but the numbers may be incorrect (more or fewer than six legs). The spots are approximately the same on each side. Colors are correct.
1	Primary parts are missing (no head, legs) and/or the body is not symmetrical (widely different sizes and numbers of spots and/or legs on each side). Colors are correct.
0	Student's drawing does not show correct body parts, is not symmetrical, and is not colored correctly.

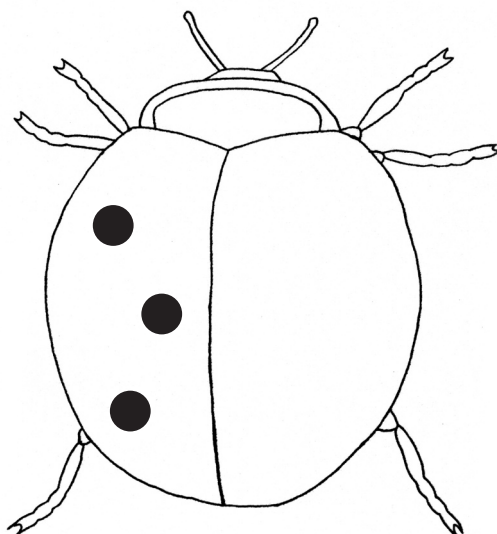
Name \_\_\_\_\_

## Ladybug Symmetry

1.



2.



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## Question 2: Teacher Instruction

### Science Benchmark

- Content of Science, Standard II (Life Science), K–4 Benchmark I – Know that living things have diverse forms, structures, functions, and habitats.

### Math Benchmarks

- Number and Operations 1 – Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- Algebra 1 – Understand patterns, relations, and functions.
- Algebra 2 – Use mathematical models to represent and understand quantitative relationships.
- Geometry 3 – Apply transformations and use symmetry to analyze mathematical situations.

### Teacher Prep

Make two copies of Ladybug Handout Q 2 for each student—one for Pre, one for Post.

### Pre (First Round)

Instructions to students: *Here are two pictures of ladybugs. (1) The first ladybug, the one on top, is the same on both sides of its body. Your job is to draw a black line that divides the ladybug into two halves that are the same. Use a black crayon or a pencil. (2) The second ladybug, the one on the bottom, is not the same on both sides. Your job is to draw some spots*

*that will make it the same on both sides. Use a black crayon or a pencil.*

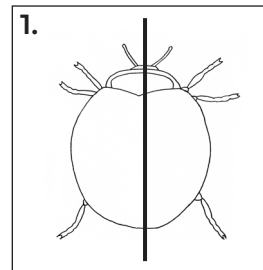
Allow students 10–15 minutes for this activity.

### Post (Second Round)

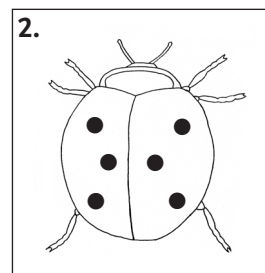
Have students complete the handout again, following the same instructions, after they have done the Amazing Bugs activities. Allow 5–10 minutes.

### Grading

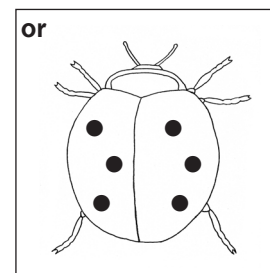
The activity is worth a total of 2 points, 1 for the first drawing and 1 for the second. **Key:**



For number 2, give the point if the student draws three dots that match either symmetrically *or* exactly (see examples).



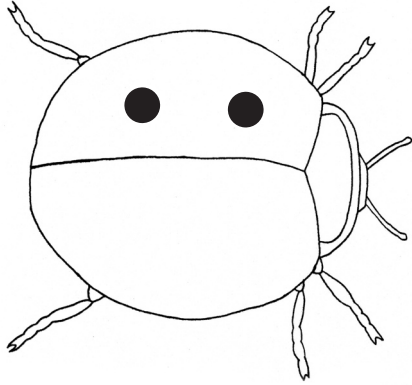
**Symmetrical**



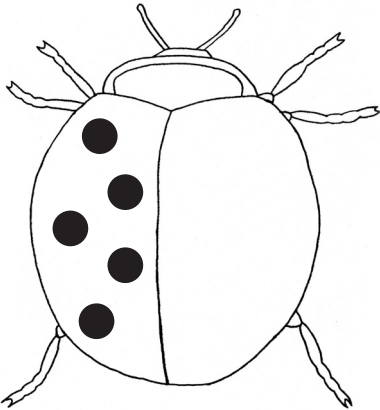
**Exact**

Name \_\_\_\_\_

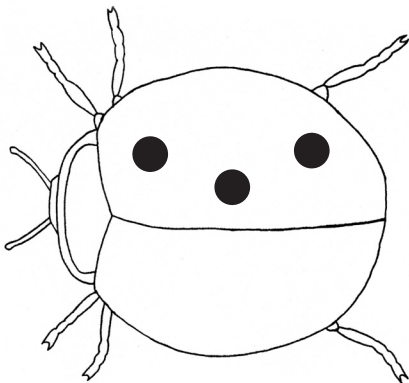
## Count and Draw Spots



\_\_\_\_\_ spots  
on each side



\_\_\_\_\_ spots  
on each side



\_\_\_\_\_ spots  
on each side

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## Question 3: Teacher Instruction

### Science Benchmark

- Content of Science, Standard II (Life Science), K–4 Benchmark I – Know that living things have diverse forms, structures, functions, and habitats.

### Math Benchmarks

- Number and Operations 1 – Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- Algebra 1 – Understand patterns, relations, and functions.
- Algebra 2 – Use mathematical models to represent and understand quantitative relationships.
- Geometry 3 – Apply transformations and use symmetry to analyze mathematical situations.

### Teacher Prep

Make two copies of Ladybug Handout Q 3 for each student—one for Pre, one for Post.

### Pre (First Round)

Instructions to students: *Here are pictures of three ladybugs—one on top, one in the middle, and one on the bottom. They are missing half their spots. (1) On the line next to each ladybug, write the number of spots it should have on each side. (2) Draw the missing spots. The ladybug should look the same on both sides.*

If you like, you can also have students color the ladybugs. Allow about 20 minutes to complete the activity.

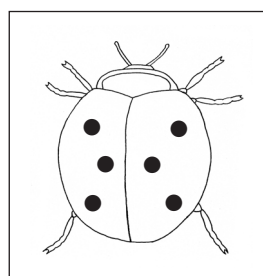
### Post (Second Round)

Have students complete the activity again after they have done all the Amazing Bugs activities. Allow about 15 minutes.

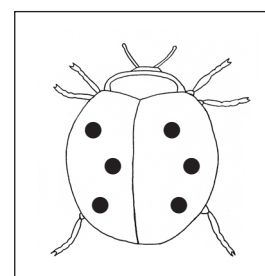
### Grading

The activity is worth a total of 6 points, 1 for each correct number and 1 for each correct pattern. **Key:** Top = 2, Middle = 5, Bottom = 3.

**When grading patterns:** The idea is to match the number and pattern of spots. *Almost right* should score a point, especially in the second round. Base your judgment on how well the student appears to grasp the notion of pattern, not on how well she/he is able to draw. Also, *give the point* when a student copies the pattern of spots either symmetrically *or* exactly (see examples).



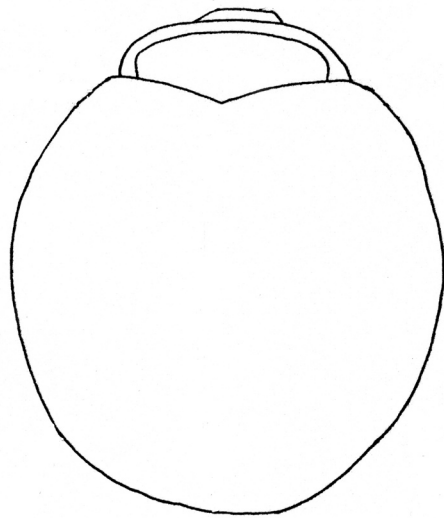
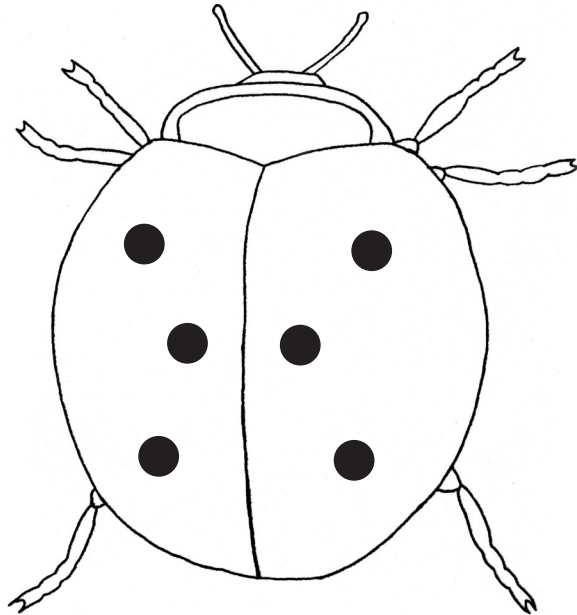
**Symmetrical**



**Exact**

Name \_\_\_\_\_

## Draw Ladybug Legs, Antennas, Spots



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## Question 4: Teacher Instruction

### Science Benchmark

- Content of Science, Standard II (Life Science), K–4 Benchmark I – Know that living things have diverse forms, structures, functions, and habitats.

### Math Benchmarks

- Number and Operations 1 – Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- Algebra 1 – Understand patterns, relations, and functions.
- Algebra 3 – Use mathematical models to represent and understand quantitative relationships.
- Geometry 3 – Apply transformations and use symmetry to analyze mathematical situations.

### Teacher Prep

Make two copies of Ladybug Handout Q 4 for each student—one for Pre, one for Post.

### Pre (First Round)

Instructions to students: *Here are two ladybugs. The one on top has all its legs, antennas, and spots. The one on the bottom is missing legs, antennas, and spots. (1) Draw legs, antennas, and spots on the ladybug on the bottom. It doesn't have to exactly match the ladybug on top, but it should have all the parts that a live ladybug has. (2) Color the ladybug on the bottom to look like a live ladybug.*

Allow about 15 minutes to complete the activity.

### Post (Second Round)

Have students complete the activity again after they have done all the Amazing Bugs activities. Allow about 15 minutes.

### Grading

The activity is worth a total of 4 points. Use the simplified rubric below to score.

<b>Legs</b>	<b>1 point</b> if there are three on each side of the body.
<b>Antennas</b>	<b>1 point</b> if there is one on each side of the head.
<b>Spots</b>	<b>1 point</b> if there are the same number of spots on each wing cover, and spots are in (at least roughly) the same pattern.
<b>Color</b>	<b>1 point</b> if legs, antennas, and head are black, and wing covers are red, orange, or pink.