Earth's Birthday Project

AMAZING BUGS®

Pre/Post Questions: **Painted Lady Butterfly**

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.

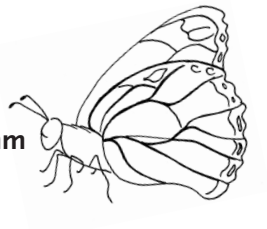
Scheduling, Time, Materials

Schedule the first round (Pre) a few days in advance of the arrival of your live caterpillars. Plan on 10–30 minutes for each question in the first round (Pre), and 10–25 minutes in the second round (Post). The only materials you'll need are two copies of each question, and a pencil, for each student.

Standards and Benchmarks

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

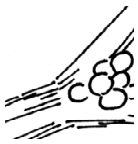
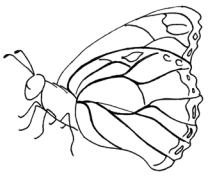
For more information: earthsbirthday.org/nm



Name _____ Date _____

Butterfly Life Cycle

A butterfly's life cycle has four stages. On the chart, the name of one stage is missing.

			
Egg	_____	Pupa	Adult

1. Write the missing name on the chart.

2. Explain what happens after a caterpillar hatches from its egg.

Question 1: Teacher Instruction

Science Benchmarks

- Scientific Thinking and Practice, Standard I, K–4 Benchmark II – Use scientific thinking and knowledge and communicate findings.
- Content of Science, Standard II (Life Science), K–4 Benchmark I – Know that living things have diverse forms, structures, functions, and habitats.
- Content of Science, Standard II (Life Science), K–4 Benchmark II – Know that living things have similarities and differences and that living things change over time.

Teacher Prep

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

Pre (First Round)

Instructions to students: *The chart shows the stages in a butterfly life cycle. The name of one stage is missing. If you know the name—it's OK if you don't—write it on the line below the picture. Then write some sentences that describe what happens after a butterfly hatches from its egg, as it changes into an adult.*

Allow students 15–20 minutes to write answers.

Post (Second Round)

Have students answer the questions again, two or three weeks later, after they have done all the Amazing Bugs butterfly activities. Allow 15–20 minutes for writing the description of butterfly metamorphosis.

Grading

The maximum total score is 3 points.

- **Question 1** is worth 1 point. **Key:** Larva or caterpillar.
- **Question 2** is worth 2 points. Use the rubric below for grading.

Score	Description
2	The student's explanation includes the names of all four life stages: **egg, larva, pupa**, and **adult**. The life cycle sequence is described in the **correct order**, from egg to adult, and knowledge of the **differences in behavior and appearance** at each stage is expressed.
1	The student has used the names of at least three of the life stages in the correct order and describes behavior and appearance in at least two of the stages.
0	The student names fewer than three of the stages and describes behavior and appearance in fewer than two stages.

Name _____ Date _____

Life Cycle Chart

Mark and Maria watched a butterfly larva change into an adult. They made this chart to show how many days the change took.

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Day 7	Day 8	Day 9	Day 10	Day 11	Day 12
Day 13	Day 14	Day 15	Day 16	Day 17	Day 18
Day 19	Day 20	Day 21	Day 22	Day 23	Day 24

1. How many days was the butterfly in the larva stage? Write the answer in the box.

Days

2. How many days was the butterfly in the pupa stage?

Days

3. How many days did it take for the butterfly to become an adult?

Days

Question 2: Teacher Instruction

Science Benchmark

- Scientific Thinking and Practice, Standard I, K–4 Benchmark I – Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.

Math Benchmark

- Data Analysis and Probability, 1 – Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Teacher Prep

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

Pre (First Round)

Read the handout together and then allow 10–15 minutes for students to write their answers.

Make sure that everyone understands the symbols used in the chart (for egg, larva, pupa, and adult butterfly), but do not provide in-depth explanation.

Post (Second Round)

Have students answer the questions on the handout again, two or three weeks later, after they have done all the Amazing Bugs butterfly activities. Allow no more than 10 minutes.

Grading

One point for each right answer, a total of 3 points possible.

Answer Key	
Question	**Answer**
1	11 days
2	8 days
3	22 days *or 23 days**

* Either is correct.

Name _____ Date _____

Painted Lady Butterfly Table

Maria, Mark, and Gus watched a cup of painted ladies change into adult butterflies. They made this table to show how many days the larvas were in each life stage.

First, add up the total number of days. Write the answer in the blank space at the bottom of the table.

Next, use the numbers in the table to fill in the chart. The painted ladies were eggs on day one. To start, draw the symbol for egg in the square with Day 1. Then fill in the rest of the squares, up to Day 22.

TABLE

Stage	Days
Egg	3
Larva	11
Pupa	7
Total Days	

CHART

● = Egg  = Larva  = Pupa  = Adult Butterfly

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Day 7	Day 8	Day 9	Day 10	Day 11	Day 12
Day 13	Day 14	Day 15	Day 16	Day 17	Day 18
Day 19	Day 20	Day 21	Day 22	Day 23	Day 24

Question 3: Teacher Instruction

Science Benchmarks

- Scientific Thinking and Practice, Standard I, K–4 Benchmark I – Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.
- Scientific Thinking and Practice, Standard I, K–4 Benchmark II – Use scientific thinking and knowledge and communicate findings.

Math Benchmark

- Data Analysis and Probability, 1 – Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Teacher Prep

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

Pre (First Round)

Read the handout together and then allow 10–20 minutes for students to write their answers. Make sure that everyone understands the symbols used in the chart, but **do not provide in-depth explanation** of how to complete the chart.

Post (Second Round)

Have students complete the table and chart again, two or three weeks later, after they have done all of the Amazing Bugs butterfly activities.

Allow about 10 minutes.

Grading

The **first** question is worth 1 point. The **chart** is worth 3 points. **Key: First question:** "Total Days" equal 21 (this answer should be entered in the blank square at the bottom of the table).

Chart

 Day 1	 Day 2	 Day 3	 Day 4	 Day 5	 Day 6
 Day 7	 Day 8	 Day 9	 Day 10	 Day 11	 Day 12
 Day 13	 Day 14	 Day 15	 Day 16	 Day 17	 Day 18
 Day 19	 Day 20	 Day 21	Day 22	Day 23	Day 24

Rubric for chart: 3 points for completing chart exactly as shown above; **2 points** for inserting symbols in correct order but with minor mistakes in number of days; **1 point** for correct order and major mistakes in number of days; **0 points** if symbols are out of order.

Name _____ Date _____

Butterfly Experiment

Sally thought that cold might slow down the change from larva to adult butterfly. To see if this was true, she compared two cups of painted ladies. She placed Cup 1 in a cold room and Cup 2 in a warm room. She looked at the cups every day and wrote what happened on a table.

Stage	**Cup 1, Cold Room (days)**	**Cup 2, Warm Room (days)**
Egg	5	3
Larva	14	11
Pupa	9	7
Total Days		

1. Add up the total number of days for each cup. Write the totals on the table.

2. Did Sally prove that cold slows down the change from larva to butterfly? Explain why or why not.

_____

_____

_____

_____

3. List other two things that might slow down the change.

a) _____ b) _____

Question 4: Teacher Instruction

Science Benchmarks

- Scientific Thinking and Practice, Standard I, K–4 Benchmark I – Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.
- Scientific Thinking and Practice, Standard I, K–4 Benchmark II – Use scientific thinking and knowledge and communicate findings.
- Scientific Thinking and Practice, Standard I, K–4 Benchmark III – Use mathematical skills and vocabulary to analyze data, understand patterns and relationships, and communicate findings.

Math Benchmark

- Data Analysis and Probability, 1 – Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Teacher Prep

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

Pre (First Round)

Read the handout together before students begin writing answers. Make sure that everyone understands the description of Sally's experiment. If students need more room to write, have them use the back of the page. Allow about 30 minutes.

Post (Second Round)

Have students complete the table and answer the questions again, two or three weeks later, after they have done all the Amazing Bugs butterfly activities. Allow 25 minutes.

Grading

The maximum total score is 6 points.

- **Question 1** is worth 2 points, one for each correct total. Totals should be written in the blank spaces at the bottom of the table. **Key:** "Total Days" for Cup 1 is 28; for Cup 2 is 21.
- **Question 2** is worth 2 points. Score 1 point for yes, no, or maybe answer (any one of these is correct). Score 1 point for a careful explanation. For example, "No because she only did it once." "No because other caterpillars could be different." "Yes because the warm cup [cup 2] took less days." "Maybe because some caterpillars might like cold." "Maybe because she could of done it wrong." "Maybe because she could have counted wrong."
- **Question 3** is worth 2 points, one for each short answer. Good answers are ones that show the student has given some thought to the conditions under which the larvas are developing: for example, heat; light; dark; noise; different food; bad food; time of year; being still; getting moved around; wind; less (or more) air; indoors; outdoors; out of the cup; getting looked at less; getting looked at more; getting talked to or not; being at school instead of at home.