

Day 20 Presentation Day			
Reading Strategy: Presentation Day		Science Concept: Life Cycle of a Butterfly	
Reading TEKS: 2.13 E & G	Figure 19: Reading/Comprehension Skills F	ELPS: Speaking K-12, 19 TAC 74.4(c)(4)D	Science TEKS: 2.2(A, D, E, F); 2.10(C)
Materials for Culminating Activity: Inquiry Circle Group Menu of Choices; materials to support group projects will vary based on choice			
Materials for Science Whole Group Lesson: See section for details.			
Content Vocabulary: Metamorphosis — In an insect or amphibian, the transformation from an immature form to an adult form in two or more distinct stages. Larva/larvae – Wingless, often worm-like form of a newly hatched insect (larva is singular, larvae is plural). Caterpillar – Larva of a butterfly. Butterfly Group of insects that have four broad wings, narrow body and fly mainly in the daytime. Life cycle -Series of change undergone by an organism over its lifespan. Cycle -a series of events regularly repeated in the same order			
Science and Literacy Connection: Your students have embodied the role of scientists through speaking, reading, thinking, and writing like a scientist. Now it is time to share and celebrate all they have discovered!			

For an expanded version of the Standards listed above, see page 4.

Culminating Activity — 30–45 minutes

OVERVIEW

Students have worked in inquiry circle groups to research various organisms. During this time, students have practiced becoming a scientist by speaking, reading, and writing like one. Inquiry circle groups will work together to create a product to share at the scientific symposium.

PROCEDURE

1. Say something like, “Now that everyone has written a synthesis statement about their organism, we will create a product to share what we know in a scientific symposium.”
2. Say something like, “Groups will work together to pick one product to create. Remember, your product must show what you know about your organism's physical traits as adults and offspring.”
3. Pass out the choice sheet and review the options. For technology-based products, be sure the app is available in your school district and that you are familiar with it.
4. Facilitate groups (if needed) to come to a consensus about which product to create.
5. Including today, there are four days scheduled to work on the culminating product.
6. Groups will present their products on the last day of the unit.

Science Whole Group Lesson — 30 minutes

OVERVIEW

Students apply new knowledge about the life cycle of a painted lady butterfly to create a final diagram.

GUIDING QUESTION

What does the life cycle for the painted lady butterfly look like?

BACKGROUND INFORMATION

The painted lady butterfly life cycle is especially interesting. It goes through a process called complete metamorphosis. Painted lady butterflies begin as eggs, transform into larvae, dissolve into mush inside chrysalises, and emerge as adult butterflies that reproduce through mating and the laying of new eggs. The Painted lady butterflies for the classroom arrived from the supplier as already hatched larva. After three to four weeks of physical changes, the adult butterflies emerge from chrysalises. If males and females are present, the cycle begins anew with mating and egg laying.

In this activity, students will create a life cycle diagram for the Painted Lady using the notes and observations they have collected in their notebooks. They should begin this activity after the emergence of the adult butterflies.

MATERIALS

- Copy of Life Cycle 3-page set (20-LifeCycle 3pgSet.pdf)
- Colored markers, pencils, or crayons
- Glue stick
- Hand lens
- Petri dishes (optional)
- Scissors

DAILY OBSERVATIONS

Give students time to observe their organisms (whether they are in the larvae, pupa, or adult stage), take measurements of the larvae (if applicable), and record their observations in their science notebooks. Facilitate group discussions by asking questions like, “What did you notice?” “What has changed since the last time you observed your organisms?”

PROCEDURE

Engage

Write the word “metamorphosis” on the board. Ask for ideas about what this word means. Write all responses on the board. If prompts are needed, circle “morph”. Ask if anyone has read about or seen an action figure “morph”. What happens? (it changes shape or becomes something else)

1. After a discussion about their ideas, ask “How we can use *metamorphosis* to describe the changes you have seen in your organisms?”
2. Tell the class that today they will summarize and communicate their findings about the different stages in the life of the butterflies (metamorphosis). Allow time for sharing what they have learned.

Explore

3. After discussion, ask the groups to work together to organize a chart or diagram that shows how the butterfly has changed over time. Encourage them to draw and label their work. Circulate among the groups to listen to their discussions and offer prompts as needed. **It is important at this stage of the lesson for them to construct their own ideas!**

Explain

4. When all groups have completed their work, ask them to share their diagrams/charts with the class. Accept all representations.
5. Bring the group back to the idea of the butterfly's life cycle. Explain that a cycle is a series of events that happen over and over again. (Ex: night/day). How does the butterfly complete a life cycle? (it goes through the changes you have described in your diagrams) Then what happens?
6. Explain that scientists often use a circle to organize the information in a "cycle". Draw a large circle on the board. Begin at the top of the circle and add a smaller circle on the top (like the blank painted lady life cycle diagram). Ask the students "what happens first in the butterfly's life cycle?". Write the word "eggs."
7. Tell them that although they did not see it, the life cycle began with the eggs laid by a butterfly. Show them a picture of actual painted lady butterfly egg (look up "painted lady butterfly egg" on the internet to see pictures) and talk about their actual size (pinhead size).
8. Proceed in a clockwise direction and add another circle, ask "what happens here?" (write the word larva). Proceed around the circle asking for their words to complete the cycle.
9. When the cycle is finished, tell the class that they will now create their own life cycle diagrams for their notebooks. Give each student a copy of the "painted lady Life Cycle blank" student page.
10. Have them draw scientific illustrations of the four life stages inside the four smaller circles and label the stages.

Elaborate

11. When their illustrations are complete, hand out the "Life Cycle Descriptions" page. Read over the text in each box with the class. Ask students to think about where in their diagrams these words might fit. When they have decided where they should go, cut and glue the boxes next to the life cycle stage that it describes.
12. End the lesson by showing the class the "Completed Painted Lady Life Cycle" image. Celebrate all they have learned as they compare diagrams! Make sure that they add their diagrams to their science notebooks.

NOTE: By the time this unit ends, all the butterflies should have emerged.

13. Allow students to observe the recently emerged adult butterflies. What are they doing? How do they look when flying? How do they look when not moving (wings will be folded up)?

14. How many wings do they have? Are the tops of the wings the same color as the bottom of the wings? What do the heads look like? How do the butterflies feed? It will likely require more than one observation session to answer all of these questions.
15. Have students illustrate the adult butterflies in their notebooks. Illustrating will be challenging because of the movements of the butterflies. Ask students for ideas on how to improve their observations. (Since adult butterflies have a short life span, butterfly scientists often base their illustrations on adults that have died).
16. When the adult painted lady butterflies die, protect them by placing them in petri dishes or other containers that are clear. Some of the butterflies will have their wings folded while others may be spread out. If you have the time, mounting instructions are available on line at:

<https://bughunter.tamu.edu/collecting-and-preserving-butterflies/>

Evaluate

17. Listen for the accurate use of new vocabulary and concept understanding as students describe the different parts of the life cycle of the butterfly.

Expanded Standards

ELAR TEKS: 2.13 E & G Inquiry and research: listening, speaking, reading, writing, and thinking using multiple texts. The student engages in both short-term and sustained recursive inquiry processes for a variety of purposes. The student is expected to: (E) demonstrate understanding of information gathered; (G) use an appropriate mode of delivery, whether written, oral, or multimodal, to present results.

Figure 19: Reading/Comprehension Skills. Students use a flexible range of metacognitive reading skills in both assigned and independent reading to understand an author’s message. Students will continue to apply earlier standards with greater depth in increasingly more complex texts as they become self-directed, critical readers. The student is expected to (F) make connections to own experiences, to ideas in other texts, and to the larger community and discuss textual evidence.

ELPS: Student Expectations for Speaking K-12, 19 TAC 74.4(c)(4) The student is expected to: (D) speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency; (E) share information in cooperative learning interactions.

Science TEKS: 2.2 Scientific investigation and reasoning. The student develops abilities necessary to do scientific inquiry in classroom and outdoor investigations. The student is expected to:

- (A) ask questions about organisms, objects, and events during observations and investigations;
- (D) record and organize data using pictures, numbers, and words;
- (E) communicate observations and justify explanations using student-generated data from simple descriptive investigations; and
- (F) compare results of investigations with what students and scientists know about the world.

2.10 Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments. The student is expected to:

- (C) investigate and record some of the unique stages that insects such as grasshoppers and butterflies undergo during their life cycle.