Day 17 Butterfly Offspring — Part 1			
Reading Strategy: Culminating Activity		**Science Concept:** Butterfly Offspring	
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); 2.10
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: • Model set with dogs (pictures and accompanying phenotype charts) • Copies of parent photo sets 1–7 (each sheet contains 2 parent photos and corresponding phenotype charts below) • Copies of student sheets ("Butterfly Offspring Physical Traits") • Plain white paper, construction paper, art supplies			
Content Vocabulary: **Dominant —** The version of a gene that is observable and is expressed when a parent passes it down to its offspring. **Genes —** Instructions inside every cell that determine the characteristics of organisms. **Genotype —** The versions of each gene contained in one individual. **Phenotype —** The appearance of one individual based on its genes. **Recessive —** The version of a gene that is not observable unless both parents pass it down to their offspring. **Trait —** A characteristic of an organism.			
Science and Literacy Connection: We finish our projects by creating a product to share what we've learned and apply it to something new.			

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."

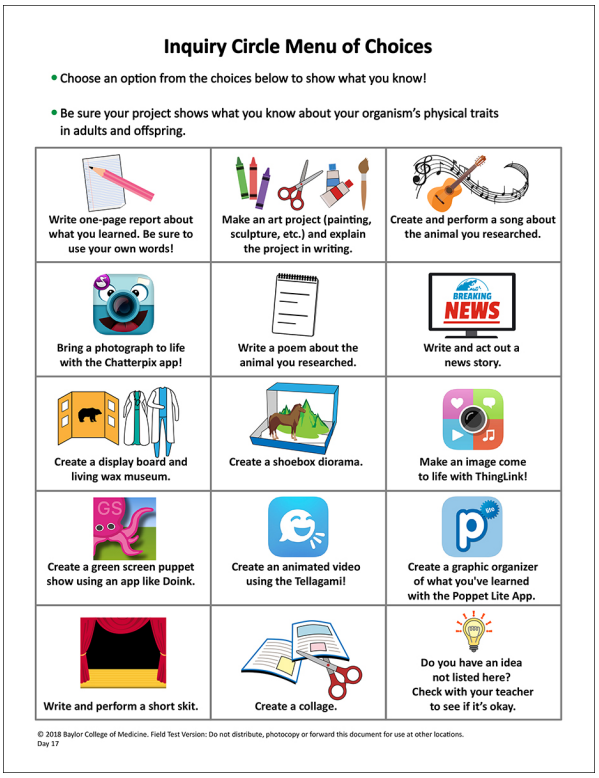
2. Say something like, "Groups will work together to pick one product to create. Remember, your product must show what you know about your organism's physical traits as adults and offspring."

3. Distribute the "Inquiry Circle Menu of Choices" sheet (1 per student), 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.



Inquiry Circle Menu of Choices

- Choose an option from the choices below to show what you know!
- Be sure your project shows what you know about your organism's physical traits in adults and offspring.

Write one-page report about what you learned. Be sure to use your own words!	Make an art project (painting, sculpture, etc.) and explain the project in writing.	Create and perform a song about the animal you researched.
Bring a photograph to life with the Chatterpix app!	Write a poem about the animal you researched.	Write and act out a news story.
Create a display board and living wax museum.	Create a shoebox diorama.	Make an image come to life with ThingLink!
Create a green screen puppet show using an app like Doink.	Create an animated video using the Tellagami!	Create a graphic organizer of what you've learned with the Poppet Lite App.
Write and perform a short skit.	Create a collage.	Do you have an idea not listed here? Check with your teacher to see if it's okay.

Day 17

Science Whole Group Lesson — 30 minutes

OVERVIEW

In this two-part activity, students will be able to create an illustration of what they predict an offspring butterfly will look like based on its parents' physical characteristics.

GUIDING QUESTIONS

How are butterflies and their offspring similar? Different? Why do offspring look like their parents?

BACKGROUND INFORMATION

See the accompanying slideshow for background information.

SETUP

Print sufficient copies (depending on how you group your students for this activity) of the parent photo sets for students. Each group or pair of students should receive one parent set, containing two photos of adult butterflies and corresponding phenotype charts.

MATERIALS

- Model set with dogs (pictures and accompanying phenotype charts)
- Copies of parent photo sets 1–7 (each sheet contains 2 parent photos and corresponding phenotype charts below)
- Copies of student sheets ("Butterfly Offspring Physical Traits")
- Plain white paper, construction paper, art supplies

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

1. Once students have finished observing their butterflies, ask the class something like, "When those butterflies have offspring, what do you think they will look like?" "What could we do to find out?" Guide students to the understanding that, like scientists, we should answer our questions by performing an investigation.

2. Tell students that today they will be looking at pictures of adult butterflies and learning about their traits. They will then use their information to create an illustration of what they think the offspring would look like.

3. Pre-teach the following vocabulary words: dominant, recessive, and genes. You may choose to write these words on a sentence strip or on the board with an image that will help students remember their meaning or use kinesthetic strategies to drive home the concept of dominant traits being "observable" and recessive traits being "hidden."

4. Model the procedure with the PowerPoint® example set ("Model Set with dogs").

5. Show students slide 2 and point out that the traits of each parent are listed within the phenotype charts below the pictures. Ask them what they notice about the words in the chart (some words are in all uppercase letters).

6. Tell the students that the dominant traits are written in all uppercase letters, and the recessive traits are written in all lowercase letters.

7. Go through the traits of each parent and ask students to help you figure out which ones are dominant and recessive. Ask something like, "If the male dog's coat is *BLACK* and the female dog's coat is *brown*, which color do you think will be observable? Will the offspring have the dominant coat color, or the recessive coat color?"

8. Show slide 3. Ask the students to help you fill in the blank offspring phenotype chart by writing down the traits that they predict the puppies of those two adult dogs would inherit.

9. Show the students slide 4 with the complete picture with the puppies. Compare the traits of the puppies to the phenotype chart. Do the puppies look like what was predicted? Why or why not What did they notice about dominant and recessive genes?

Explore

10. Now tell the students that they will work in their groups using what they have learned to complete a "Parent Butterfly Physical Traits "sheet. Let groups choose their set of parent butterflies with corresponding phenotype charts.

11. Model how to use a sample chart. Go through the traits of each parent and ask students to help you figure out which ones are dominant and which are recessive.

12. Ask students to make a prediction about what their butterfly offspring will look like **before** they choose their traits.

13. Instruct students to choose only one phenotype per trait, either from the male or the female. This will represent the phenotype that the offspring will inherit.

14. Allowing them to choose from either parent will raise new questions about why the offspring may or may not inherit that trait. (In order to inherit a recessive trait, you need 2 copies of that recessive gene. If one parent has a dominant trait and the other has a recessive trait, the dominant trait appears.)

15. Once students have selected one phenotype for each of the traits, they should fill out their "Butterfly Offspring Physical Traits" sheet. Accept all choices! The discussion tomorrow will help them understand the feasibility of their offsprings' appearance.

16. Students can then begin to construct their offspring. They can draw, use construction paper and glue, etc. It is likely that they will need more time to work on this in tomorrow's activity.

Expanded Standards

Reading 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: 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.
2.10 The student knows that organisms resemble their parents and have structures and processes that help them survive in their environments.