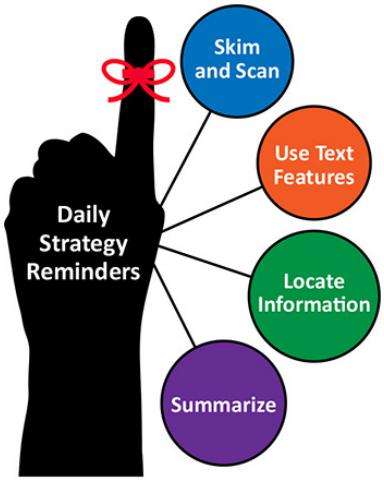
Day 14 Inherited Butterfly Wing Characteristics — Part 1			
Reading Strategy: Synthesizing		**Science Concept:** Inherited Butterfly Wing Traits	
Reading TEKS: 2.6H	**Figure 19:** Reading/ Comprehension Skills F	**ELPS:** Reading 2-12, 19 TAC 74.4(c)(4)	**Science TEKS:** 2.2; 2.10
Materials for Reading Mini-lesson: Chart paper, markers, butterfly inquiry chart, butterfly text to model strategy			
Materials for Inquiry Circle Groups: Group inquiry charts, pencils, variety of nonfiction texts for each group, access to websites and online books			
Materials for Science Whole Group Lesson: See section for details.			
Content Vocabulary: **Offspring —** The young (or "child") of two parents. Examples include bear cubs, fawns, and chicks. **Stripe —** Narrow band of color **Trait —** Feature of an organism			
Science and Literacy Connection: When we have finished our research, we synthesize information from many sources in order to create our own, new information. During an investigation, we must analyze information from multiple sources in order to uncover patterns.			

For an expanded version of the Standards listed above, see page 5.

Reading Mini-lesson — 15 minutes

OVERVIEW

Scientists make discoveries about the world every day! They take what they have read, what they already know, and then make observations that lead to thinking about a topic in a new way.



For the three days dedicated to synthesis, it is suggested that you start with a whole group synthesis statement about butterflies, followed by inquiry circle groups creating their own synthesis statement. Last, facilitate a whole group discussion around all of the organisms to create a synthesis statement for the class.

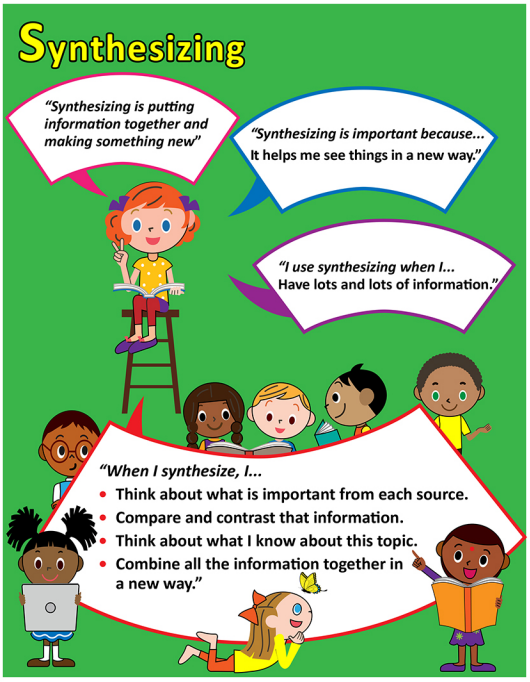
Explain the strategy:

- **Tell what the strategy is (declarative knowledge)**
  - Say something like, "Today we will practice synthesizing what we know about our topic (butterflies). We will combine information across our sources and create our own, new information."
- **Tell when and why to use the strategy (conditional knowledge)**
  - Say something like, "I synthesize because it helps me construct a deeper and broader meaning about my topic across resources. As a strategic reader, I synthesize when I find information from different books, online resources, experts, and videos."

- **Tell how to employ the strategy (procedural knowledge)**
  - Say something like (while you model the strategy), "The first thing I will do is look at my inquiry chart and think what was important from each source. I'll do that as I consider each of my research questions, in turn."
  - "Then I will compare and contrast the important information from each of the sources."
  - "Now, I need to think about what I know about this important information and if I can add something from my own schema that the authors did not mention."

Model the mini lesson (above) and create a synthesis statement about butterflies.

The synthesis statement may be something like, "Butterflies all have similar body types. They have two pairs of brightly colored wings. Adult butterflies pass down their physical traits to their offspring. Offspring are very similar to their parents."



Remember that the concepts this unit has focused on are:

- Organisms have physical characteristics that help them survive.
- Offspring resemble their parents because adult organisms pass down their traits to their offspring.
- Organisms go through life cycle stages.

The synthesis statement you will write about butterflies during this mini lesson should incorporate all of these concepts.

For the three days dedicated to synthesis, it is suggested that you start with a whole group synthesis statement about butterflies, followed by inquiry circle groups creating their own synthesis statement. Last, facilitate a whole group discussion around all of the organisms to create a synthesis statement for the class.

Practice in text (print, video, or interview)
Post the anchor chart in your classroom so students can refer to it while in their inquiry circles. Encourage scientists to use the strategy during in their Inquiry Circles.

Inquiry Circle Groups — 30 minutes

OVERVIEW

Scientists frequently work in teams when conducting their investigations. Each day of this unit, students will work in inquiry circle groups while embodying the role of a scientist. They will do so by taking on roles of scientists in research by speaking like a scientist, reading liking a scientist, and writing like a scientist.

PROCEDURE

Before Inquiry Circle Groups — 5 minutes

1. Say something like, "It is time to get into our inquiry circle groups. You will be with the same research team as yesterday."

2. Say something like, "When we research organisms, we will practice our roles as scientists. We will do this because scientists have a special way in which they observe the world, read scientific texts, and write reports. There is no better way to learn about science than to become a scientist!"

During Inquiry Circle Groups — 20 minutes

1. Say something like, "We have anchor charts to help guide your thinking. Do not forget to use them while in groups." Refer to "Language of a Scientist" anchor chart and the daily anchor chart. Remind students that they can use all the reading strategies taught, not just the one for that day.

2. "My role is to help guide the inquiry circle groups, but I expect you to work as a scientific team to solve your problems together."

3. "Do not forget that today you will be using your inquiry chart to create your own, new information in the form of a synthesis statement just like we did together for the butterflies."

4. While groups are working together, walk around the room to facilitate as needed.

After Inquiry Circle Groups — 5 minutes

1. Say something like, "As we are concluding our inquiry circle groups for today, each group will have a chance to share what they accomplished and learned."

2. "The Lab Director should lead the discussion with their inquiry circle group about today's results. For example, what did you learn about your organism? Which reading strategies did you use? What problems did you encounter? How did you resolve those problems?"

3. "The Data Scientist will now share with the entire class either something the group learned about their organism, which reading strategy(ies) where used, or how the group solved a problem."

Science Whole Group Lesson — 30 minutes

OVERVIEW

In this two-day activity, students will be able to compare and contrast images of adult *Heliconius* butterfly wings to the wings of their offspring. Students will record data they will obtain from examining the butterflies' wings, such as stripe color and wing width.

GUIDING QUESTIONS

How are wings of parent butterflies and their offspring similar? How are they different?

BACKGROUND INFORMATION

Each butterfly has two sets of wings—a smaller forewing and a larger hindwing. This wing arrangement is found in all butterflies. However, there are vast variations in size and pattering of the wings of different species of butterflies. A species is a group of organisms that share common characteristics and

are able to reproduce. The monarch and painted lady are different species of butterflies. All humans, for example, belong to the same species (*Homo sapiens*). Butterfly wings are covered with colorful scales and hairs. In many cases, the wing patterns are typical of different species and are inherited from parents. At the same time, there usually are very small individual differences between an offspring and a parent.

SETUP

Distribute one set of parent/offspring butterfly photos to each group. Some sets will have two parents and one offspring, while others may have two parents and two offspring. Since the focus of this investigation is based on learner choice, have all of the listed materials ready for each group. Depending on what traits they choose to investigate, learners may not use all of the materials. A student observation sheet may look something like this:

What Trait Are You Examining?	Female Adult	Male Adult	Offspring
Wing Length			
Top Stripe Color	**Red**	**Red**	**Red**

MATERIALS

Per Student

- Sets of butterfly parent/offspring photos
- Yarn
- Scissors
- Hand lens
- Science notebook
- Student observation sheet (half page for each student)

DAILY OBSERVATIONS

Give students time to observe their live 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. Show students the "Butterflies of South America" pictures.

2. Say something like, "How do these butterflies look similar? Different? What do you notice about the pattern on their wings?" Allow students to discuss with a partner, and then share out.

Explore

3. Record the guiding questions on the board: "How are wings from parent butterflies and their offspring similar? How are they different?"

4. Tell students they will be comparing the wings of parent and offspring butterflies. It is up to them to decide how they'll compare the wings and which tools to use.

5. Possible comparisons could include comparing wing length or width, or stripe length with pieces of yarn (just as they've been measuring their larvae), describing the stripes as "thick" or "thin", comparing stripe colors, etc.

6. Students record their observations on their student sheet and can glue in the yarn they used to measure (if applicable). This sheet can be glued into their notebooks later.

7. Walk around to observe, encourage, ask questions, and consult if needed. Say something like, "Is there another difference that you see? How could you measure/record that?"

8. As students finish their exploration, ensure that they put their materials and notes in a location they will be able to access tomorrow when the investigation concludes. Material managers may keep track of the parent/offspring photos.

Expanded Standards

ELAR TEKS: 2.6H Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to: (H) synthesize information to create new understanding.

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 Reading 2-12, 19 TAC 74.4(c)(4) The student is expected to: (K) demonstrate English comprehension and expand reading skills by employing analytical skills such as evaluating written information and performing critical analyses commensurate with content area and grade-level needs.

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;
(B) plan and conduct descriptive investigations such as how organisms grow.
(C) collect data from observations using simple equipment such as hand lenses, primary balances, thermometers, and non-standard measurement tools;
(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.