ALL for Science™
Authentic Literacy and Language for Science

Baylor College of Medicine
CENTER FOR EDUCATIONAL OUTREACH

DAY 10: ARE ALL BUTTERFLIES THE SAME?

MINI-LESSON

Teacher introduces the "Fix-Up Strategy" anchor chart and models the strategy.

SCIENCE INQUIRY CIRCLES

Teams continue to research questions about their animals and record the informaton on their Inquiry Charts.

GUIDED SCIENCE INVESTIGATIONS

Learners compare, contrast, and record the structures and characteristics of adult butterflies.

ABBREVIATED STANDARDS

- **Reading TEKS: ELA.1.6I**
- **CCSS: RI.1.4, RI.1.5, RI.1.6**
- **NGSS: 1-LS3-1**
- **Science TEKS: 2.1(A)(E), 2.2(B), 2.5(A)(F)**

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Day 10: Are All Butterflies the Same?

Literacy Strategy: Fix-up strategies.

Science Concept: All species of butterflies share common characteristics, but there are differences that set them apart.

Science and Literacy Connection: As strategic readers, we have to determine whether we understand a text and can move on or need to spend more time clearing up our understanding with a fix up strategy. Scientists also use different strategies for making sense of complex research text or data collected from investigations.

Mini-Lesson (15 minutes)

OVERVIEW

Whether reading a research text or trying to make sense of the data collected from an investigation, a scientist uses many strategies to make sure they understand what they are reading or observing.
As a learner, I can use fix-up strategies when I don't understand what I am reading.

NOTE: You are encouraged to create the "Fix-Up Strategy" anchor chart with your learners as you move through the lesson, using the provided anchor chart as a model. Post it for easy reference when completed and remind learners to refer to the anchor charts during inquiry circles.

MATERIALS

Teacher needs:

- chart paper
- marker(s)
- "Fix-Up Strategy" anchor chart
- class Inquiry Chart about butterflies
- butterfly text to model the strategy (see "Animal Resources" spreadsheet for ideas)

PROCEDURE

Each *italicized statement* below contains suggested wording the teacher may choose to use for the lesson; additional teacher actions and considerations are in parentheses.

Tell what the strategy is (declarative knowledge)

1. *Today we will practice using comprehension fix up strategies when we read. A comprehension fix-up strategy is a tool we use when we don't understand what we read.*

Tell when and why to use the strategy (conditional knowledge)

1. *I use a comprehension fix up strategy when I'm reading and I don't understand what I just read. Sometimes I am interrupted or distracted while reading and forget what I just read. And, sometimes, the text is just too hard! When this happens, I use comprehension fix-up strategies because I am a strategic reader.*

Tell how to employ the strategy (procedural knowledge)

1. *Yesterday we learned how to monitor our comprehension. Remember, that means that I ask myself, Does it look right, sound right, and make sense?*
2. *If I don't understand something I read (because I was distracted or there was too much noise around me or something else went wrong), I need to use a comprehension fix-up strategy.*
3. *There are several comprehension fix-up strategies I can use. But first I have to recognize that something has gone wrong in my reading.*
4. *I know something has gone wrong when I read, and I think, What in the world did I just read? Once I recognize that I'm not understanding, there are a few things I can do to fix it:*
    - *I can look at the graphs, charts, and pictures in the text.*
    - *I can read out loud.*
    - *I can visualize or create a picture in my head.*
    - *I can re-read the text.*
    - *I can stop and think about what I already know.*
    - *I can ask a friend in my inquiry circle.*

Science Inquiry Circles (30 minutes)

OVERVIEW

Today teams will complete research work to find answers to questions on their Inquiry Charts or to add interesting facts. At this point in their research, teams should begin to look for connections between the animal they are researching and the butterflies. Making these connections will be more evident as they begin to synthesize information over the next three days.

MATERIALS

Each team needs:

- team Inquiry Chart
- pencils
- access to informational texts/media

Teacher needs:

- "Animal Resources" spreadsheet for ideas

PROCEDURE

Each *italicized statement* below contains suggested wording the teacher may choose to use for *the lesson; additional teacher actions and considerations are in parentheses.*

Before Inquiry Circles

1. *It is time to get into our inquiry circles.* (Have the Equipment Directors gather their team's Inquiry Chart).
2. *Today we will finish finding the answers to the questions on your Inquiry Charts. If you have already answered all your research questions, you can begin to think about how your animal is similar to butterflies. Discuss with your team how they are alike and different.*
3. *Remember to work as a team, helping each other and using the strategies you have learned as you do your research.*

During Inquiry Circles (20 minutes)

1. *While working in your teams you may refer to the "Fix-Up Strategy" anchor chart and all the anchor charts posted to help guide your thinking.* (Point to the posted anchor charts and remind learners that they can use all the reading strategies taught, not just the one for that day.)
2. *The Lead Scientists will guide all research for the day by picking which questions will be answered, and the Data Scientists will record all source information and the answers to your research questions on the team Inquiry Chart. The Lab Directors and Equipment Director must help find the answers to the questions online and in texts.*
3. *My role is to help guide the inquiry circles, but I expect you to work as a scientific team to solve your problems together.* (While teams are working together, walk around the room to facilitate as needed.)

After Inquiry Circles (10 minutes)

1. *As we conclude our inquiry circles for today, each team will have a chance to share what they accomplished and learned.*
2. The Lab Director should lead the discussion with their inquiry circle team about today's results. For example, *Did your team use the "fix-up" strategy or any other reading strategies today? If so, which one(s)? What did your team learn about its animal? What problems did your team encounter? How did your team resolve those problems?* (Give teams time to discuss.)
3. (After you have allowed the teams to gather their thoughts, have the Data Scientists share with the class. Try to encourage teams to share a variety of things—you do not want just facts about animals, just reading strategies, or just cooperative learning strategies.)
4. (When all teams have shared, thank them for their hard work and point out any excellent behaviors that you observed. If you noticed any problems in the teams during the lessons, take a moment to point them out, and explain your expectations for all future inquiry circles.
5. Collect all Inquiry Charts or have Equipment Directors put them in their normal classroom place for ongoing work so that learners can easily access them.)

Guided Science Investigation (30–45 minutes)

OVERVIEW
In this activity, learners will compare and contrast structures and characteristics of adult butterflies, then record their observations on a team chart.

GUIDING QUESTIONS
Are all butterflies the same? How are they different?

BACKGROUND INFORMATION FOR THE TEACHER
A species is a group of organisms that share common characteristics and are able to reproduce. All humans, for example, belong to the same species (*Homo sapiens*). The monarch and painted lady are different species of butterfly. Although each species has basic characteristics that are the same, there are differences that set them apart.

For example, 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 patterning of the wings of different species of butterflies. Butterfly wings are covered with colorful scales and hairs. In many cases, the wing patterns are typical of different species.

MATERIALS
Each team member needs:
- Butterfly Investigation Journal
- pencil
- "Parts of Butterfly" page

Each team needs:
- 1 copy of the "Butterflies Are Colorful" image (or digital access)
- 1 copy of the "Same or Different?" chart
- hand lenses

Teacher needs:
- "Butterflies Are Colorful" image
- "Same or Different?" chart
- "Parts of a Butterfly" page

SETUP
- Make copies of the "Butterflies are Colorful" image (1 per team) and "Same or Different?" chart (1 per team).
- Make copies of the "Parts of a Butterfly" page (1 per team member).

SAFETY

- Remind teams daily to be gentle with the growth habitats during handling to prevent disturbing the larvae, especially once the chrysalis forms. **Ideally, the growth habitats should be placed where teams can do daily observations without moving them**.
- Please follow all district and school science laboratory safety procedures.
- It is good laboratory practice to have teams wash hands before and after any laboratory activity.

DAILY OBSERVATIONS

Give learners time to observe their live organisms (whether they are in the larva, pupa, or adult stage), take measurements of the larvae (if applicable), and record their observations in their science notebooks. Facilitate team discussions by asking questions, such as, *What did you notice? What has changed since the last time you observed your organisms?*

PROCEDURE

Engage

1. Show learners the "Butterflies Are Colorful " image. Explain that today they will use their observation skills to look closely at the details of each of the pictured butterflies.
2. Working as a team, they will look for things that are the same and things that are different about this group of butterflies.

Explore

1. Distribute the "Butterflies Are Colorful " images and the "Same or Different?" chart (1 per team).
2. Let teams know they have 10–15 minutes to complete their work. Encourage them to use a hand lens for details.
3. Remind learners that they are working as a team and need to share the picture and ideas with one another. The Data Scientists for the day can record their team's information on the "Same or Different?" chart.
4. As teams work, walk around to observe, encourage, ask questions, and consult if needed.
5. Prepare a similar "Same or Different?" T-chart on the whiteboard to record children's responses.
6. When time is up, ask learners to put down their pencils and to prepare to share their work.

Explain

1. Ask the Data Scientists to share and explain their team's work. Accept all responses and write them on the T-chart you have prepared. Wait until all have responded before beginning a conversation.
2. When all teams have shared, review their observations. (Responses for sameness should include 2 sets of wings; one set of wings smaller that are smaller/larger than the other; head; body; antennae; and eyes. Differences should include color, wing shapes, patterns, body shapes, size.)
3. Congratulate teams on their keen observations As you read down their shared responses, you may add the following details (distribute the "Parts of a Butterfly" page, 1 per team member, for reference during this part of the activity):
    - Butterflies have 2 sets of wings, smaller forewings, and larger hindwings.
    - The wings are covered with scales.

- The head has the eyes, antennae (which act like a nose), and a proboscis (which is like a mouth).
- The "body" is made up of a head, the thorax (which has the wings and legs on it, allowing the butterfly to move and fly), and an abdomen (which contains all the organs the butterfly needs to survive).
- The colors on a butterfly can warn predators that they are toxic, or poisonous to them.

Elaborate

1. Follow the discussion with this video, which explains more about the structures of butterflies: https://www.youtube.com/watch?v=rkpklRRLr0A

Evaluate

1. Did learners communicate a reasonable understanding about the structures, both same and different, of butterflies?
2. Were any new questions raised?
3. Are learners using new science language in their communications (written or oral)?

Science Language

- **NOTE:** There are no science language cards for today; instead, we have created the "Parts of a Butterfly" page used in the science lesson.

Expanded Standards

Reading TEKS

ELA.1.6.I Monitor comprehension and make adjustments such as re-reading, using background knowledge, checking for visual cues, and asking questions when understanding breaks down.

CCSS

RI.1.4 Ask and answer questions to help determine or clarify the meaning of words and phrases in a text. **RI.1.5** Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text. **RI.1.6** Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.

NGSS

1-LS3-1 Science & Engineering: use information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena.

Science TEKS

2.1 Scientific and engineering practices. The student asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The student is expected to: **(A)** ask questions and define problems based on observations or information from text, phenomena, models, or investigations; **(E)** collect observations and measurements as evidence; **2.2** Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to: **(B)** analyze data by identifying significant features and patterns**; 2.5** Recurring themes and concepts. The student uses recurring themes and concepts to make connections across disciplines. The student is expected to: **(A)** identify and use patterns to describe phenomena or design solutions; **(F)** describe the relationship between structure and function of objects, organisms, and systems.