ALL for Science™
Authentic Literacy and Language for Science

Baylor College of Medicine
CENTER FOR EDUCATIONAL OUTREACH

DAY 11: IT'S ALL ABOUT CLAIMS!

MINI-LESSON

Teams begin writing claims for each of their Inquiry Chart questions and provide include evidence and reasoning to support each claim.

SCIENCE INQUIRY CIRCLES

Teams continue writing claims for each Inquiry Chart question and provide evidence and reasoning to support each claim.

GUIDED SCIENCE INVESTIGATIONS

Teams make a claim that answers the question they are investigating about their plant and provide supporting evidence.

ABBREVIATED STANDARDS

- Reading TEKS: 4.7.C, 4.13.H
- CCSS: W.4.2(b)(d), W.4.7, W.4.8
- NGSS: 4-ESS2-2, 4-LS1-1
- Science TEKS: 2018–19: 4.2F; 2024–25: 4.1E, 4.3B

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Day 11: It's All about Claims!

Literacy Strategy: Making evidence-based claims part 2: writing claims.

Science Concept: Data collected during an investigation can be used as evidence to support claims.

Science and Literacy Connection: Scientists formulate claims about their investigations, then use evidence acquired through their work to validate them.

Mini-Lesson (15 minutes)

OVERVIEW

Scientists communicate in many ways about their investigations. In addition to talking about their work, scientists share their findings—and the procedures they used to reach them—through writing. Scientists make claims about their findings, and they validate their claims by explaining the supporting evidence that proves their claims to be true. These kinds of claims often appear in products scientists make, such as reports, informational videos, and informational texts.

In the previous class, you modeled how to write a claim and support the claim with evidence and reasoning, then inquiry circle teams discussed and shared an oral claim for one of their inquiry questions. Today teams will begin writing claims for each remaining inquiry question. Some teams may have finished their synthesis statements yesterday and will be writing their first claim statement today. Other teams may have made their first claim yesterday and are ready to continue writing claims for their remaining inquiry questions. Use this time to support teams as needed. You may need to model making a claim again (using the same materials from yesterday) for teams who are just starting to make claims.

NOTE: You are encouraged to return to the "Making Evidenced-Based Claims" anchor chart that you created with your learners yesterday. 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)
- "Making Evidenced-Based Claims" anchor chart as a model

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 and why it is important (declarative knowledge)

1. *Remember that evidence-based claims are statements that I (as a scientist) make that I believe to be true because I have data (information) to support those statements. This is different from statements that may be my opinion or something that I think about a topic. Recently we learned about making evidence-based claims when we speak to other scientists. Today we will learn about writing evidence-based claims.*
2. *In our previous example, I read that cacti often have sharp spines to ward off predators. This was different from what my cousin told me, which was that the spines on cacti are there to poison me. The information I got from a book could be considered evidence-based, while what my cousin told me is really just his opinion, or something he heard from someone else. You probably have seen a lot of proposed claims written on the internet and social media that are not evidence-based.*

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

1. *Making evidence-based claims is an important part of being a scientist. When other scientists read what I write, they expect me to write things that are valid and that I can prove or show that someone else has proven. This is also true when I'm writing to share with someone who may not be a scientist).*
2. *I write evidence-based claims not only to communicate valid information to others but also to share when I have learned something new and want others to learn it too.*
3. *When I make a claim, it is a statement about what I think is true about my investigation. Next, I describe or provide the evidence I have collected that supports my claim. Then I explain HOW the evidence supports my claim (my reasoning).*

Tell how to employ the strategy (procedural knowledge)

1. *The first thing I will do is choose one of my inquiry questions and look at the synthesis statement I wrote for that question.*
2. *Then, I will use my synthesis statement to write a claim. A claim will sound like an answer to my inquiry question. My synthesis statement and my claim might be very similar. My claim should not include my opinions.*
3. *Next, I will look at the evidence in my Inquiry Chart and the sources I listed. I will write about what I found in my investigation that supports my claim. I will be careful to include only factual knowledge from my reading or information from my scientific investigations.*
4. *Then, I will think about how my evidence supports my claim.*
5. *Finally, I state my claim in writing and cite my evidence as part of my statement.*

You might present the following model claim as part of this mini lesson:

1. *My inquiry question was, "What features of a cactus allow it to survive and thrive in its habitat?" My synthesis statement was, "Cacti can survive in hot, dry places where it does not rain for long periods of time. This is because they have roots that take up water quickly, stems that store water, and spines that keep water inside the plant."*
2. *Based on my synthesis statement I can make a claim. To support my claim with evidence, I need to return to my Inquiry Chart and reference some of the sources I used to gather information. Finally, I will explain why my evidence is important and how the evidence supports my claim.*

   Claim: *Cacti have structures that help the cacti survive in hot, dry environments.*

Evidence: *I read in* Prickly Plants: Stuck! *by Ellen Lawrence that cacti live mostly in hot, dry places. Then I read in* From Seed to Cactus *by Lisa Owings and* What Do You Find on a Saguaro Cactus? *by Megan Kopp that cactus roots spread out wide to take up water quickly when it rains. Finally, I read on the DK Find Out website that cacti have thick stems to store water and spines that lose water slower than leaves. In my investigation, I observed the spines on the surface of a cactus. I have also seen cacti living in dry places like Texas and Arizona.*

Reasoning: *The evidence supports my claim because these are structures that would help plants survive in hot, dry places. Having wide roots would help a plant take up water quickly when it rains, and having stems and spines that keep water inside the plant would be helpful when it does not rain again for a very long time. This is important because these structures would prevent a cactus from drying out so it can live longer in a hot, dry environment.*

Note that there are no opinions in this model. I might have an opinion about cacti, such as how some cacti can be scary-looking, and some are pretty. This is my opinion and not a fact, so it does not serve to make my claim more valid.

If learners need further support, you might offer sentence stems as a scaffold. Here are some examples:

Claim
We claim …

Evidence
We read in [title] by [author] that …
[Author] said that …
In our investigation, we observed …

Reasoning
The evidence supports my claim because …
This is important because …

Science Inquiry Circles (30 minutes)

OVERVIEW

Today teams will work on writing claims for each of their inquiry questions and include evidence and reasoning to support each claim.

MATERIALS

Each team member needs:

- science notebook
- pencil

Each team needs:

- team Inquiry Chart
- team “Plant Observations” booklet

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 circle teams. You will be with the same inquiry team as yesterday.*
2. *We have answered all (or most) of our Inquiry Chart questions. Yesterday we discussed and shared our claims with the class. Today we will start writing our claims* (make adjustments for teams that are not quite ready.)
3. *Now, inquiry teams will work together to make claims.*

During Inquiry Circles (20 minutes)

1. *Today your team will follow a similar process as yesterday when you discussed and shared one claim for one inquiry question. Today, you will begin to write down our claims for the rest of your inquiry questions.*
2. *As you work on today's claims, remember the claim you discussed and shared yesterday.*
3. *Choose one inquiry question at a time and write a claim as a team.* (You might also give teams the option to divide up the inquiry questions and have each team member write one claim. Facilitate in a way that works best for your learners.)
4. *Write your claims in your science notebooks. Remember to look in your science notebooks to find the synthesis statements the team wrote for each question. These will help you write claims.*
5. *Work together as a team to examine the important information from one column in your Inquiry Chart and the synthesis statement that you wrote. Ask yourselves, what can I claim about all this information?* (Remind learners that a claim might be similar to the synthesis statement and sound like an answer to the inquiry question for that column.)
6. *Remember that each claim you write should be supported by at least one piece of evidence from your Inquiry Chart, your reading, or your science investigations. Do not forget to include your reasoning, or how the selected piece(s) of evidence support(s) the claim.*
7. (Remind learners that they can use the "Making Evidence-Based Claims" anchor chart to help them, as well as any other anchor charts they have used.)
8. *My role is to help guide the inquiry circles, but I expect you to work as a 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, the Data Scientist from each team will have a chance to share one claim the team made today, one piece of evidence that supports the team's claim, and one reason that the evidence supports the claim. Teams may also share a problem they encountered or how they resolved a problem. Lab Directors, take a moment to make sure that your team is ready to share.* (After you have allowed the teams to gather their thoughts, have the Data Scientist share with the class.)
2. *The Data Scientist will now share with the class one of the team's claims, including the team's evidence and reasoning.* (**Encourage teams to share how they developed their claims.** If you saw a great example in action, encourage that team to share with the entire class.)

Guided Science Investigation (30–45 minutes)

OVERVIEW

Learners will use data as evidence to support an answer to the question they investigated. **Note:** The work today may require extra time for completion. Alternatively, the teacher may choose to allow time in the next class for the presentation/discussion of each team's findings.

GUIDING QUESTIONS

Do we have an answer to our question about plant structures? What information can we use as evidence that supports the answer?

BACKGROUND INFORMATION FOR THE TEACHER

After an inquiry is concluded, scientists make claims regarding the answers they have found to the questions they were investigating. They analyze and organize all their information and look for patterns or connections that can provide the evidence they need to support their claims. The next step is to explain *how* the evidence supports their claim.

Often, new questions arise, and scientists have to go back and re-evaluate their claims and their evidence, which sometimes lead to a new direction for their investigation.

Teaching children how to organize their information logically as scientists do helps them understand how relevant data can support an explanation. Moreover, making the connections between their claims and evidence develops reasoning skills that lead to successful argumentation in science or any other core discipline.

MATERIALS

Each team member needs:

- science notebook
- pencil

Each team needs:

- team Inquiry Chart
- copy of Team CER Chart
- team "Plant Observations" booklet
- access to the "Organizing the Data" charts
- access to all live plant specimens
- access to all plant images (Days 6-9)

Teacher needs:

- "Organizing the Data" charts created on Day 10
- CER Chart
- all live plant specimens
- all plant images (Days 6–9)

SETUP

- Post the "Organizing the Data" charts created on Day 10 where all children can see them.

- Make copies of the Team CER Chart (1 per team), with extras to have on hand.
- Place all team "Plant Observations" booklets, team Inquiry Charts, bags of plant images, and live plant specimens in an accessible designated area.

DAILY OBSERVATIONS

Daily observations have been concluded.

PROCEDURE

Engage

1. Announce, *It's time to make a claim about what you have discovered about plant structures!*
2. Remind teams that, as they conducted their investigations, they were looking for an answer to a question they had about plant structures.
3. *Today, using what you have already learned about making claims, each team will make a statement, or claim, that answers the question they are investigating about their plant, show the evidence that backs up this claim, and explain **how** the evidence supports the claim.*
4. Ask the Equipment Directors to collect one copy of the Team CER Chart for their team. Explain that learners will work as a team to provide this information:
    - The question they were investigating
    - The statement or claim they are making that answers their question
    - The evidence that supports their claim
    - The reasoning that explains ***how*** the evidence supports the claim
5. Remind them to think about what they learned in the mini-lesson and in inquiry circles about writing claims.
6. Advise them to take time to discuss how to best provide the information you are asking for. Let them know that they may or may not agree on what claim or information they will provide. Remind them to respectfully listen to each other's ideas and to come to their decisions as a team.
7. Point to the posted "Organizing the Data" charts from the previous class and advise them to use any of the data recorded on it, as well as all the resources they have available (team "Plant Observations" booklet, team Inquiry Charts, images, etc.).
8. Ask if there are any questions before they begin. Let them know that you will be moving between teams and can make clarifications or offer guidance as needed, but the work must be their own.
9. Let them know they have 30 minutes to complete their claims.

Explore

1. As teams work, move between them and listen for the reasoning behind the claims they are making and the evidence they are choosing, but refrain from making any corrections.
2. If there is a dispute over the claim or evidence, remind them that scientists don't always agree with others and that they should respectfully consider all ideas. (If, after a team discussion, there is a deadlock, you can offer the option of allowing team members to develop their own claim as long as they can support it with evidence.)

Explain

1. When time is up for writing the claims, allow time for the Data Scientist from each team to share the team's completed work. Prompt discussions for clarification with an open-ended questions, such as, *Can you explain or describe again how your evidence supports your claim*? Invite other class members to also ask questions.

2. After all teams have had a chance to present their findings, commend the teams for their work and point out any outstanding examples of teamwork you observed.
3. Ask the Lab Directors to collect any of the materials used (images, booklets, etc.) and return them to the designated area.
4. Collect the Team CER Charts for teacher review.

Elaborate

1. Now that the teams' plant investigations are complete, ask if anyone would like to describe what their overall experience as a "scientist" conducting an investigation was like. Did the experience give them a better idea of what a scientist does?
2. Share that, in the next class, teams will have a chance to put their paleobotanist skills in identifying plants to the test using fossil images they have not seen.

Evaluate

1. As you moved among the teams, were all team members actively contributing to the work?
2. After review of the Team CER Charts, did learners demonstrate progress in their ability to use evidence to support claims effectively?
3. Did learners correctly use science language in their communications, either written or verbal?

Science Language

- A **claim** is a statement of what you think is true based on observations and evidence.
- **Evidence** is data collected during an investigation to support (back up) explanations and answers.
- **Reasoning** means thinking about and explaining **how** the evidence supports a claim.
- **Data** are facts and information (such as images, words, and measurements) collected during an investigation.
- **Plant adaptations** made some species of plants better suited to living in a particular habitat or environment.
- An **extinct** organism has no living members of its group in existence.
- **Species** refers to a group of organisms that share similar characteristics.
- **Plant structures** include roots, stems, leaves, and flowers**.** Structures have **functions**, or jobs, that provide what a plant needs to survive.

Expanded Standards

Reading TEKS

4.7C: Use text evidence to support an appropriate response. **4.13H:** Use an appropriate mode of delivery, whether written, oral, or multimodal, to present results.

CCSS

W.4.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly **(b)** Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic, and **(d)** Use precise language and domain-specific vocabulary to inform about or explain the topic. **W.4.7:** Conduct short research projects that build knowledge through investigation of different aspects of a topic. **W.4.8:** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

NGSS

4-ESS2-2: Analyze and interpret data to make sense of phenomena using logical reasoning. **4-LS1-1:** Construct an argument with evidence, data, and/or a model.

Science TEKS

2018–19: 4.2F: Communicate valid, oral, and written results supported by data.

2024–25: 4.1E: Collect observations and measurements as evidence. **4.3B:** Communicate explanations and solutions individually and collaboratively in a variety of settings and formats.