ALL for Science™
Authentic Literacy and Language for Science

Baylor College of Medicine
DEPARTMENT OF EDUCATION, INNOVATION & TECHNOLOGY
CENTER FOR EDUCATIONAL OUTREACH

Day 8: Why Are Producers So Important?

Mini-lesson	Children learn how to make connections between what they are reading and how it relates to themselves, another text, or the world.
Inquiry Circles	Children add information to their inquiry charts from a different resource or answer a completely different question.
Guided Science Investigation	Learners use organism cards to create a simple food chain.

Literacy Strategy: practice making connections	**Reading TEKS** ELA.3.6E	**CCSS** SL.3.2, W.3.7, W.3.8
Science Concept: food chains, made up of producers, consumers, and decomposers, describe the sequence of who eats whom that transfers energy between organisms.	**Science TEKS** **2018–19: 3.**9B **2024–25: 3.**12B	**NGSS** 3-LS4-4
Science and Literacy Connection: scientists and strategic readers make connections between what is already known and new information that is collected through observations, investigations, and reading.		

Mini-Lesson (15 minutes)

OVERVIEW

A scientist's work requires making connections between their research and investigations. For example, while making observations in nature, a scientist may notice details that can answer a question the scientist is researching, or the research can help explain what the scientist is seeing! Today children learn how make connections between what they are reading and how it relates to themselves, another text, or the world.

Note: You are encouraged to create the "Making Connections" anchor chart with your learners as you move through the lesson, using the provided anchor chart as a model. Post it in the classroom for easy refers and remind learners to use it during inquiry circles.

MATERIALS

Teacher needs:

- chart paper
- marker(s)
- "Making Connections" anchor chart as a model

PROCEDURE

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

EXPLAIN THE STRATEGY

Tell what the strategy is (declarative knowledge)

1. *Our strategy today is called making connections. It is thinking about the text and how it relates to me, another text, or the world. I can also think about science and how it relates to me, other sciences, and the world.*

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

1. *I know to use this strategy (making connections) because the text or science investigation reminds me of something I already know. This strategy is important because my brain stores information in neat compartments (like drawers, or buckets). As I observe the world around me, my brain is always trying to "match" the new information with what I already know. Some people call this schema. Making connections helps me organize new information in my brain so I can find or remember it later.*

Tell how to use the strategy (procedural knowledge)

1. *The first thing I do is access my schema about the topic. I can think about what aspects of the old information can help me understand the new information.*
2. *I can ask myself literacy questions, such as "How does this text relate to something I've already done before? How does this text relate to something I have read before? How does this text relate to something that I've seen in a movie or heard in song or in something someone has told me about before?"*
3. *I can also ask myself science questions such as "Have I observed anything like this in my life? Have I observed anything similar in other experiments? How might my observations relate to something in the real world?"* (Use this time to model making a connection between something in the inquiry text about ecosystems to what you have observed or learned during a science investigation. Invite learners to share their own connections.)
4. *Now, I will use the connections I've made to help me understand what I'm seeing (in science) or reading (in a text). Once I've made the connection, my schema may have changed or been reaffirmed.*

Science Inquiry Circles (30 minutes)

OVERVIEW

Research continues as children add information from a different resource to their inquiry charts or answer a completely different question.

MATERIALS

Each team needs:

- team Inquiry Chart
- pencils
- exploratory texts/media (see the "Ecosystem Resources" spreadsheet for ideas)

Teacher needs:

- class Inquiry Chart (pond ecosystem)
- exploratory text, website, or eBook about pond ecosystems to model the strategy (optional)

PROCEDURE

Each *italicized statement* below contains suggested wording the teacher may 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. *You have answered many of your Inquiry Chart questions. Use your Inquiry Chart to determine which questions still need to be answered and which answers could use additional information from a different book, website, or eBook.*
3. Now, *inquiry teams will work together on their Inquiry Chart.* (Be sure to display the class Inquiry Chart as a model.)

During Inquiry Circles (20 minutes)

1. *Today, as you add information to a question you've already answered or answer a completely different question, do not forget that it is important to record your resources on the Inquiry Chart as you work.* (Remind learners that the pill bug Inquiry Chart is visible as a guide.)
2. *Remember, you have anchor charts to help guide your thinking. Do not forget to use them while in teams.* (Refer to all the mini-lesson anchor charts used to date, which should be posted in the classroom where learners can easily refer to them.)
3. *My role is to help guide the inquiry circle teams, but I expect you to work as a team to solve your problems together.* (While teams are working, 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 the questions they answered, as well as what they accomplished and what reading strategies they used. The Lab Director will lead the discussion about today's results. What did the team learn about its ecosystem? Which reading strategy did team members use, and how did it help? What other problems did the team encounter? How did the team resolve those problems?*
2. *The Data Scientist will now share with the entire class either something the team learned about their ecosystem, a reading strategy, or how the team solved a problem.* (Try to encourage teams to share a variety of things. You do not want just facts about ecosystems, just mini-lesson reading strategies, or just cooperative learning strategies. 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 use the Organism Cards to create a simple food chain.

GUIDING QUESTIONS
What is a food chain? Why are producers and consumers important? How is energy transferred in a food chain? Why is the transfer of energy important in an ecosystem?

BACKGROUND INFORMATION FOR THE TEACHER
There are three types of organisms that make up an ecosystem: producers, consumers, and decomposers. Without producers, the other organisms would not exist—they depend on producers for food. Producers make their own food through chemical reactions in a process called photosynthesis. However, the topic of photosynthesis is not covered at this grade level. Sharing that plants use simple substances and energy from the sun to make their own food will offer learners a working explanation for this unit.

More important for this unit is how producers, consumers, and decomposers make up the food chains in an ecosystem. Food chains describe the general sequence of who eats whom that transfers energy from one consumer to another. For this lesson, the role of decomposers has not been included in the creation of the simple food chain, but it is included in a discussion.

MATERIALS
Each team member needs:
- science notebook
- pencil

Each team needs:
- set of 5 Organism Cards that make up a simple food chain (**teacher will need to sort these ahead of time; include the Sun card in each set**)
- 3 food chain arrows

Teacher needs:
- Organism Cards from Day 7
- "Food Chain Arrows" sheet
- "Food Chain" answer key
- rubber bands or baggies

SETUP
Before the class:
- Print copies of the "Food Chain Arrows" sheet and cut into cards (3 arrows per team).
- Sort out the Organism Cards so that **each team gets only one complete food chain.** Use the **"**Food Chain" answer key as a guide.
- Add **one** Sun card into each set.
- Shuffle the cards before you secure them with a rubber band or place them in a baggie. Place the sets at a designated distribution area.

- Print out or prepare to project the "Food Chain" answer key.

SAFETY

Remind learners to follow safety rules for making observations on their sample.

DAILY OBSERVATIONS

Observations can be made any time of the day as long as they are done daily. Observations should take 5–10 minutes, depending on the data each team is collecting.

PROCEDURE

Engage

1. Begin the class by asking, *What happens if a car runs out of gas?* Responses may include that the car will not "go." Ask them why. (Because it has no fuel to run the engine and the many parts of the car that depend on it.)
2. Ask, *How are our bodies like a car? How do we fuel them?* (With food.) *Why is food important for us?* (It provides the energy and nutrients we need to "go"—to move, think, and grow.)
3. Remind learners that in the previous class they learned how organisms live in specific environments that can provide their needs. One of those needs is food for energy.
4. Explain, *Our (human) food comes from both plants and animals*. *Can you give me some examples of food that comes from plants and animals?* Accept responses. (Vegetables, fruit, legumes, fish, chicken, beef, etc.)
5. *So where do organisms in the natural world get their food?* (From making their own food, like plants, or from eating each other.)
6. Remind learners that, in the previous class, they sorted out cards to figure out which organisms lived in the same environment. *Today you will figure out "who eats whom."*

Explore

1. Ask the Equipment Directors to collect a prepared sets of organism cards **(one set per team)** from the designated distribution area.
2. Explain that each team will be given **ONE** specific group of organisms (a food chain) to work with.
3. Direct learners to make a linear left-to-right progression with the cards to describe the order of who eats whom.
4. Instruct them to **use arrows to point to the organism (or mouth) that consumes (or eats) the organism**.
5. Ask them to write down the sequence in their science notebooks.
6. Allow 5–10 min to complete.

Explain

1. Ask the Data Scientists from each team, *Can you describe your team's food chain and explain why your team organized it that way?* Accept their responses.
2. After all the teams have presented their food chains, direct their attention to the projected slide showing the correct order of food chains. *How do these compare with your work?*
3. Discuss each of their food chains, allowing time for questions if their sequence didn't match the key.
4. Point out that every component in a food chain (producer, consumer, decomposer) has an important role.

5. *Remember, every food chain begins with energy from the sun and simple substances that **producers** (plants) use for making their own food. Why are producers so important to consumers?* Accept responses. (Without producers, consumers would not be able to live because they cannot make their own food.)
6. Explain that as they eat one another, the components of a food chain are passing on some of the energy needed to live, grow, and maintain themselves.
7. Ask learners to write down the correct sequence in their notebooks if needed, **without erasing the incorrect one!** Explain that mistakes are important learning opportunities.

Elaborate

1. Continue the discussion by explaining how **consumers** balance the food chains in an ecosystem by keeping producers and other consumers to a limited number. Without balance, ecosystems would collapse.
2. Explain that decomposers have a special role **in all parts** of a food chain. Ask, *Where would you have placed an organism that's a decomposer in the food chain you created?* Accept responses
3. Share that decomposers would fit in anywhere in the food chain where organisms decay and die. Examples of decomposers include bacteria and fungi.
4. As decomposers eat or break down decaying and dead plants and animals, they are releasing important nutrients back into the ecosystem, which in turn allows more producers to grow, continuing the food chain. Decomposers are nature's recyclers!
5. Explain that today they created only one linear food chain to describe how energy is transferred between organisms. However, in real-life ecosystems, there are many food chains that interact with each other to form food webs. Food webs are made up of many different food chains in a single ecosystem.

Evaluate

1. Write the following prompts on the whiteboard and have learners write a response in their science notebooks: "How is energy transferred in an ecosystem?" "Why is the transfer of energy important in an ecosystem?"
2. Did learners' written responses include new science vocabulary?
3. Did they give reasonable explanations about how food chains transfer energy?
4. Do they communicate an understanding of the components that make up an ecosystem?

Science Language

- A **food chain** describes the sequence of who eats whom that transfers energy between organisms.
- A **food web** is made up of many different food chains in a single ecosystem.
- **Producers** make their own food from simple substances and energy from the Sun. Plants are producers.
- **Consumers** cannot make their own food. They get their energy from eating producers and other consumers.
- **Decomposers** eat or break apart dead plants and animals, recycling nutrients that plants need for growing.
- **Bacteria** are organisms so small they can only be seen through a microscope. Some are decomposers that break down dead organisms.

- **Fungi** are a group of decomposers that feed on decaying matter. Mushrooms are a type of fungi.
- Living things get **energy** from the food they eat to help them move, grow, and survive.
- An **ecosystem** is a community of organisms that live and interact with each other and their nonliving environment.

Expanded Standards

Reading TEKS

3 ELA.3.6E: 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: (E) make connections to personal experiences, ideas in other texts, and society.

CCSS

SL.3.2: Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. **W.3.7:** Conduct short research projects that build knowledge about a topic. **W.3.8:** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

NGSS

3-LS4-4: Crosscutting Concept: A system can be described in terms of its components and their interactions.

Science TEKS

2018–2019: 3.9B: identify and describe the flow of energy in a food chain and predict how changes in a food chain affect the ecosystem such as removal of frogs from a pond or bees from a field.

2020–2024: 3.12B: identify and describe the flow of energy in a food chain and predict how changes in a food chain such as removal of frogs from a pond or bees from a field affect the ecosystem.