ALL for Science™
Authentic Literacy and Language for Science

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

Day 4: What Do Pill Bugs Eat?

Mini-Lesson	Children learn how to use a fix-up strategy to improve reading comprehension as they create an anchor chart with the teacher.
Inquiry Circles	Children add new information to their inquiry charts using a different resource or answering a different question.
Guided Science Investigation	Children develop a testable question to investigate about what pill bugs eat.

Literacy Strategy: practice using fix-up strategies	**Reading TEKS** ELA.1.6I	**CCSS** RI.1.4, RI.1.5, RI.1.6
Science Concept: good science questions are testable and should be answered in a measurable way through investigations or experiments.	**Science TEKS** **2018–19:** 1.2A **2024–25:** 1.1A	**NGSS** 1-LS3-1
Science and Literacy Connection: scientists consider specific information when formulating testable questions as they plan to conduct research and investigations.		

Mini-Lesson (15 minutes)

OVERVIEW

Scientists know it is important to understand what they read and observe during their investigations. Sometimes they read an entire page and realize they have no idea what they read, and sometimes they get confused while doing an investigation. When that happens, a scientist will use a fix-up strategy to help them understand what they are reading and doing.

Note: You are encouraged to create a “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 use the strategy during inquiry circles.

MATERIALS

Teacher needs:

- chart paper
- marker(s)
- "Fix-up Strategy" anchor chart as a model
- "Modeling Comprehension" anchor chart made in class on Day 3
- exploratory text about pill bugs to model the strategy

PROCEDURE

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

EXPLAIN THE STRATEGY

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

1. *I use a comprehension fix-up strategy when I am reading and I encounter a problem that causes me to not understand what I read. Sometimes when I am reading, I forget what I just read. Sometimes I am interrupted or distracted while reading. 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 use the strategy (procedural knowledge)

1. *Yesterday we learned how to monitor our comprehension. Remember, I use metacognition to listen to myself and talk to myself as I read to be sure everything makes sense!* (Refer to the "Monitoring Comprehension" anchor chart.)
2. *If I do not understand something I read because I was distracted or there was too much noise around me or something else went wrong, then 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. I know something has gone wrong when I read, and I think, "What in the world did I just read?"*
4. *Once I recognize that I'm not understanding, then there are a few things I can do to fix it.* (Remind the learners of the examples you provided yesterday when monitoring comprehension. Did you use a fix-up strategy then? If not, here are some options that could have been used. Alternatively, you can read a new section of one of the texts about pill bugs to model monitoring comprehension and then using a fix-up strategy.)

   Some fix-up strategies are:
   - *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 someone in my inquiry circle.*

Science Inquiry Circles (30 minutes)

OVERVIEW

Children will continue their work looking for answers to yesterday's question or they might begin exploring a new question They will continue to record information they find to answer the questions on their Inquiry Charts. Teacher should monitor progress and guide the children as they search for answers.

The process today may move slowly, but it is important for establishing how inquiry should be done. Resources provided include audio books and videos to address all reading abilities.

MATERIALS

Each team needs:

- pencils
- team Inquiry Chart
- exploratory texts/media (or a Nearpod or similar tool created by the teacher; see the "Exploratory Texts and Media" spreadsheet for ideas)

Teacher needs:

- class Inquiry Chart about pill bugs
- marker(s)
- exploratory text about pill bugs to model the strategy

PROCEDURE

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

Before Inquiry Circles

1. *You will be with the same team as yesterday, but we will rotate the scientific roles. Remember that each team member has a role or a job within your team.* (Assign roles at your discretion and have the Equipment Directors gather the inquiry chart for their team).
2. *Remember, when we explore outdoor 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!*
3. *Yesterday, we started looking for the answer to the first inquiry question with our first resource. Today we will answer a different question or use a different book, website, or eBook to add information to a question we have begun to answer. Now that we know that roly-polies are also called pill bugs, we can add "Pill Bugs" under "Roly-polies" on our class Inquiry Chart.* (Use a new resource about pill bugs and the class Inquiry Chart to model how to record the source in a new row. Depending on your example, you may add additional information to the first question's column or you may proceed to answer another question. Either way be sure to model this for your learners. To incorporate the mini-lesson from today, you can also model using a fix-up strategy at this time.

4. *Now, you may begin working together on your Inquiry Chart.* (Be sure to display the class Inquiry Chart about pill bugs as a model.)

During Inquiry Circles (20 minutes)

1. *As you continue looking for information about your organism, do not forget that it is important to record your resources on the Inquiry Chart as you complete it.* (Point out to learners where sources are located on the Inquiry Chart and how one source may answer multiple questions. Remind your learners to record the title and author for texts and the URL for websites. Be sure the class Inquiry Chart is visible as a guide. Also, you may choose to be more explicit for your class and only allow them to answer one question at a time daily. Use your judgement on the level of guidance, especially in the first few days.)
2. *Remember, we have anchor charts to help guide your thinking. Do not forget to use them while in teams.* (Refer to the "Inquiry Toolbox," "Monitoring Comprehension," and "Fix-up Strategy" anchor charts. Remind learners to monitor their reading and use fix-up strategies as needed.)
3. *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, making note of their progress and offering guidance as needed.)

After Inquiry Circles (10 minutes)

1. *As we conclude our inquiry circles for today, each team member will have a chance to share with each other the questions they answered, as well as what they accomplished and what literacy strategies they used.*
2. *The Lab Director should lead the discussion about today's results. For example, What did the team learn about its outdoor organism? Did team members monitor their reading comprehension? If the team came across a reading problem, which fix-up strategy did it use? What other problems did the team encounter? How did the team resolve those problems?* (While teams are working together, walk around the room to facilitate as needed.)
3. *The Data Scientist will now share with the entire class either something the team learned about their outdoor organism, which fix-up strategy they used, or how the team solved a problem.* (Try to encourage teams to share a variety of things—you do not want just facts about outdoor organisms, just fix-up 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

The lesson begins with a review of the needs of living things. Then, the teacher will guide a discussion leading to a testable question that can be used for a science investigation.

GUIDING QUESTIONS

Why do organisms need energy? Where do organisms get energy from? What do pill bugs eat?

BACKGROUND INFORMATION FOR THE TEACHER

Pill bugs are detritivores, feeding on dead or decaying organic material which is called detritus. In the wild, they consume mainly plant detritus, such as leaves and grass. They will also feed on damp vegetation, young plants, algae, fungi, and rotting wood. Pill bugs are decomposers that return, or recycle, important nutrients back to the soil from their consumption of detritus. They also consume their own poop (a practice called coprophagy) as a source of copper, an important element they need to live! In habitats, pill bugs will eat, among other things, fruits and vegetables, oatmeal, and even fish food. **Remember not to reveal this information to the class—they should come up with their own answers about what pill bugs eat through their own investigations!**

SAFETY

Remind learners of the rules for observing pill bugs.

MATERIALS

Each team needs:

- access to the class pill bug habitat
- access to the "What we want to know about roly-polies" class list
- access to class Inquiry Chart about pill bugs

Teacher needs:

- "What we want to know about pill bugs" class list made on Day 2
- class Inquiry Chart about pill bugs
- class pill bug habitat
- "Needs of Living Things" placards
- chart paper
- marker(s)

SETUP

Before the class:

- Post the "What we want to know about roly-polies" class list and the class Inquiry Chart about pill bugs where all can see (either paper or on smartboards).
- Post a new sheet of chart paper titled **"What do pill bugs eat?"**

DAILY OBSERVATIONS

Learners have the opportunity to observe the pill bug habitat as a team for general observations.

PROCEDURE

Engage

1. Gather the class in a circle and place the pill bug habitat in the middle of the circle.
2. Remind the class that yesterday they talked about what living things need to survive.
3. Hold up the placard for "**A place to live."** Ask, *What were your ideas yesterday about where pill bugs live?* Accept all responses (outside, under rocks, etc.). Explain that all living things need a place to be or live. Our classroom pill bugs live in their habitat. Ask, *Where do you live?*
4. Hold up the placard for **"Air."** Ask, *Do you remember how pill bugs breathe?* (They use gill-like structures instead of lungs.) Remind learners that all living things need air to breathe. Ask, *Is there air in the pill bug habitat?* (Yes, although we cannot see air we know it is there. There is air

in our classroom too, but we cannot see it.) Ask, *How do we know it's there?* (Because we are breathing it and are alive!)

5. Next, hold up the placard for **"Water."** Ask, *Has anyone seen a water dish in the habitat? (No.) Why do you suppose there isn't one?* (Pill bugs may drown.) Explain that spraying the habitat lightly with water keeps the habitat moist but not too wet. Remind learners that pill bugs like a moist environment and can take in water through their gill-like structures from the moist air. They can also take in water from the food they eat. Add that all living things on Earth need water to live.
6. Hold up the placard for **"Food for energy."** Ask, *Who remembers where living things get their energy?* (From food.) Point to the class Inquiry Chart and ask the teams to share some of the foods listed on their team Inquiry Charts for the organism they are investigating.
7. State that all living things need food for energy. Ask, *Why is energy important?* Accept all responses. (Because it helps us to do everything we need to move, grow, and live!)

Explore

1. Ask the class, *Have you noticed any food in the pill bug habitat? What do you think pill bugs eat?* Accept all responses and write them on the chart paper titled **"What do pill bugs eat?"** Listen for children sharing information they may have found during their inquiry circles.
2. When the list is complete, you can add (if they have not already) that you would like to include plants, grasses, and/or vegetables as your suggestions. **At this point do not reveal that they prefer detritus. It is hoped that children will learn this on their own as they proceed through the unit**
3. Read over their list of possibilities together. *Think, how can we figure out what pill bugs eat?* Listen to their ideas—someone may suggest doing an experiment or testing!
4. Explain that scientists always have questions about the world around us. The things we know and can explain about the natural world came through discoveries that were made in science investigations that began with a ***testable*** question.
5. Ask, *What do you think a "testable" question is?* Accept all responses.
6. Explain that testable questions are questions that **can be answered either through observations or investigations**. Scientists can conduct research in a lab, read about another scientist's work, or go out and do fieldwork to find answers (like going out to the ocean to study fish).
7. Explain to the children that they already have a question to work with: **"What kind of food do pill bugs eat?"**
8. Ask, *Is this a testable question?* Accept their responses, then confirm that they do indeed have a testable question. Ask, *How do you think we will find the answer?*
9. Explain that, just like scientists, they will plan and conduct an investigation to find the answer!
10. First, each team will pick a food from the list of possibilities that they would like to use in their investigation. (If there are any food items that may be harmful to the pill bugs, take time to discuss them and explain why they cannot be used.)
11. Ask them to huddle up together in their teams to decide which food they want to test. Tell them that they have 3 minutes to decide and that each team will need to pick a different food from the list.
12. **Let them know that they can only pick one food. They cannot change to a different food once the investigation has started.**

Explain

1. When time is up, ask each Data Scientist to report on which food their team would like to investigate. Use an identifier to indicate their choices (a name, a number). Be prepared to negotiate same-choice foods!
2. When all teams have reported, read over their choices and discuss feasibility before agreeing to them.
3. When choices have been agreed on, explain that each team will set up an investigation by placing the food they have chosen in a small habitat of their own that they will observe every day to see if the pill bugs are eating it!
4. Explain that by observing the pill bugs, they will collect information that will give them the answer to their question **"What do pill bugs eat?"** Ask, *Do you think your pill bugs will eat the food you picked?* Accept all responses.

Elaborate

1. Let the class know that they will set up their team habitats in the next class. Explain that, as scientists, they will record what happens every day during the investigation in a journal—a special book where they will write and draw what they see. They will receive their journals in the next class.

Evaluate

1. Did learners communicate understanding of the needs of living things?
2. Did they contribute reasonable ideas about the food choices pill bugs might like?
3. Was there evidence of working as a team to make decisions?
4. Are learners using new science language in their communications?

Science Language

- **Organisms** are living things that carry out the activities needed to live, grow, and survive.
- Organisms have **needs** for surviving, such as water, energy, air, and a place to live.
- Living things get **energy** from the food they eat to help them move, grow, and live.
- A **scientific investigation** is a plan for finding answers to questions and solving problems.

Expanded Standards

Reading TEKS

ELA.1.6I: 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. Connections to the Nature of Science: science investigations begin with a question.
Science TEKS **2018–19: 1.2A:** ask questions about organisms, objects, and events observed in the natural world. **2024–25: 1.1A:** ask scientific questions and define engineering problems based on observations or information from text, phenomena, models, or investigations.