ALL for Science™
Authentic Literacy and Language for Science

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

Day 5: How Do We Set Up an Investigation?

Mini-Lesson	Children practice previously taught reading strategies as needed.
Inquiry Circles	Children continue to work on their Inquiry Charts, answering more questions or adding additional information from a different resource.
Guided Science Investigation	Children will set up their science investigations and are introduced to the "Pill Bug Investigation" journal.

Literacy Strategy: practice monitoring comprehension and using fix-up strategies	**Reading TEKS** ELA.1.6I	**CCSS** RI.1.7
Science Concept: good science questions are testable and can be answered in a measurable way through investigations or experiments.	**Science TEKS** **2018–19:** 1.2A, 1.2B **2024–25:** 1.1A, 1.1B	**NGSS** 1-LS3-1
Science and Literacy Connection: science consists of asking questions and planning investigations to search for answers. Scientists, like strategic readers, use all kinds of information to make sure they understand or can make sense of what they are observing or researching.		

Mini-Lesson (15 minutes)

OVERVIEW

The mini-lesson today should be used as a time to practice the reading strategies previously taught in this unit. Teachers are encouraged to use this time to best meet the needs of their learners. Perhaps your class needs more time with the previous mini-lesson or the one from the day before. The choice is yours; we just ask that you use this time to practice!

Teachers should determine if the mini-lesson will be facilitated with the whole team or a small team (i.e., a particular inquiry circle team) who needs additional support. If you are working with a small team, we suggest your other learners spend additional time within the inquiry circles.

Science Inquiry Circles (30 minutes)

OVERVIEW

Learners continue to practice the work of scientists engaged in research as they work on finding answers to more questions on their Inquiry Charts.

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
- 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 and considerations are in parentheses.

Before Inquiry Circles

1. *It is time to get into our inquiry circles. You will be with the same inquiry team as yesterday.*
2. *Yesterday, we answered more of our Inquiry Chart questions. Some of you completed an entire column and others started to answer more than one column.* (This may or may not be true for your class. Please adjust as needed.) *Today we will continue to work on our Inquiry Chart.* (Use a third source about pill bugs to model how to record the source in a new section on the class Inquiry Chart. Be sure to use a variety of resource types, such as books, eBooks, videos, while modeling. Depending on your example, you may add additional information to the first question's column or you may be able to answer another question. Be sure to model this for your learners. To incorporate the mini-lesson from today, you can also model monitoring comprehension while reading and using a fix-up strategy.)
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, you may use a different resource to add to a question you've already started to answer, or you may answer a completely different question.* (Remind learners that 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. While teams are working together, walk around the room to facilitate as needed.)
2. *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.)

3. (At this point, teams might have information under multiple questions and from multiple sources. You many need to remind teams that information in the same **row** (across) is from the same source, and information in the same **column** (down) pertains to the same question. One source might answer multiple questions.)
4. *Remember, we have anchor charts to help guide your thinking. Do not forget to use them while in your 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.)
5. *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 will have a chance to share the questions they answered, as well as what they accomplished and what literacy strategies they used. The Lab Director will lead the discussion about today's results. Discuss what the team learned 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.)
2. *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

Today learners will set up their team investigations. They will also be introduced to and make their first entries into their "Pill Bug Investigation" journals. Due to the work involved today, the teacher should either allow extra time for completion or break today's lesson into two parts, whichever best meets the needs of the class.

GUIDING QUESTIONS

What question are we investigating? How will we set up our investigations?

BACKGROUND INFORMATION FOR THE TEACHER

After observing a phenomenon or conducting research, a scientist formulates a question or questions. The question(s) allow(s) scientists to plan and conduct investigations either alone or collaboratively with other scientists. The question they are investigating should be answerable in a measurable way and should provide evidence that supports an answer to their question. Sometimes investigations lead to more questions!

SAFETY

- Children should wear gloves as they handle the pill bugs, then wash their hands after the investigation.
- Remind learners of the rules for observing pill bugs.

MATERIALS

Each team member needs:

- pencil
- "Pill Bug Investigation" journal

Each team needs:

- prepared team mini-habitat (1 per team)
- plastic spoons
- gloves

Teacher needs:

- class pill bug habitat
- gloves
- materials to set up team mini-habitats
- "Setting Up Habitats" document (see "Before the Unit Begins")

SETUP

Before the class:

- Print the "Pill Bug Investigation" journals (1 per learner).
- Prepare the small containers that will be used for the team habitats (1 per team; see the "Setting Up Habitats" document).

DAILY OBSERVATIONS

There are no observations at this time.

PROCEDURE

Engage

1. Announce to the class that today they will set up their team science investigations! Direct their attention to the table or area where you have assembled the materials they will use.
2. Point out the mini-habitats and tell them that each team will have one to work with. Explain that they are a smaller version of the class habitat and contain the same materials (soil, dried leaves, etc.)

Explore

1. Ask the Equipment Directors to collect one spoon and a bag of gloves for their team. Explain that each team will place several pill bugs into their habitat, but first they must put on gloves.
2. When ready, the teacher will model how to scoop the pill bugs with the spoon into the habitat, cupping one hand under the spoon in case the pill bugs slip off. If the pill bug slips off, instruct the children to gently hold it and place it into the mini-habitat. (The pill bug will most likely ball up.)
3. Tell them that **each** team member will get to use the plastic spoon to place a couple pill bugs at a time into the team habitat. (There should be 6–8 pill bugs in each habitat.) **Note: the teacher**

will have one team at a time come up to do this and monitor to ensure that every team member has a chance to relocate the pill bugs!

4. **Explain that they will add the food to the habitats in the next class day when they begin observations.**
5. When teams are finished, ask the Lab Directors to make sure their work area is clean and all materials are returned to the designated area. Also, indicate where they will place the mini-habitats after they are finished at the end of class.

Explain

1. Distribute the "Pill Bug Investigation" journals. Instruct learners to write their names on the front.
2. Remind the class that they will need to observe and record in their journals what they see happening in their team's mini-habitat each day. Remind them of the "Inquiry Toolbox" anchor chart and tell them they will recognize icons (pictures) that will help them remember what to write!
3. Then, direct learners to the first page, **"Getting Started,"** where they will begin.
4. Read the first sentence: **"We would like to learn more about ____."** Ask**,** *What do we want to learn more about?* (Accept responses and ask learners to write the team's answer in their journals.)
5. Next read, **"The question we will investigate is ____."** Ask, *What will you write here?* ("What do pill bugs eat?")
6. Then read **"Hypothesis or Predictions"** and explain, *A hypothesis is an idea that we can test or investigate to see if it is true; a prediction is our best guess about what we think will happen.* Read the sentence stem **"We predict pill bugs will eat ____"** and direct them to write in their food choice.
7. Next read, **"Why do you think they will eat it?"** Ask learners to write their answers in the space that begins with **"because ____."** Allow time for recording and offer prompts as needed.
8. Point to the next prompt, **"Planning an Investigation."** Ask, *What should you do to find the answer to your question?* Direct learners to finish the prompt **"We think we should ____"** (place our food in the habitat and observe).
9. Tell learners, *After today, you will write and draw what the pill bugs are doing and what the food looks like. Maybe we will see them eating! Remember that we talked about how organisms get energy from food, so it will be interesting to see what the pill bugs are doing every day.*
10. Instruct the Equipment Directors to take the mini-habitats to the designated area.
11. Instruct the Lab Directors to gather up all the plates and containers and dispose of them in the proper receptacles.
12. Ask all team members to dispose of their gloves and wash their hands after they are finished.
13. Begin to gather the class again on the floor. Tell learners, *While we wait for everyone to finish handwashing, I would like for you to turn and talk to someone on your team about any questions, comments, or observations you have about setting up the investigations.*
14. After a few minutes, invite volunteers to share what they discussed and address any questions or observations.

Elaborate

1. After the discussion, tell the class that tomorrow the teams will begin collecting *data*—information they will collect during their investigation about the eating behavior of their pill bugs. Explain, *We will talk more about how you will collect your data, or information, tomorrow.*

Remember that scientists also write down and draw what they observe so that they can compare what happens from one day to another.

Evaluate

1. Did learners communicate a reasonable understanding of the question they are investigating?
2. Did they communicate a reasonable understanding of how they will find the answer to their question?

Science Language

- A **testable question** can be answered by conducting an investigation or experiment.
- A **scientific investigation** is a plan for finding answers to questions and solving problems.
- A **hypothesis** is an idea that can be tested or investigated to see if it is true.
- A **prediction** is our best guess about what we think might happen.

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.1.7: use the illustrations and details in a text to describe its key ideas.

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: 2.A: ask questions about organisms, objects, and events observed in the natural world. **2.B:** plan and conduct simple descriptive investigations such as ways objects move.

2024–25: 1.A: ask scientific questions and define engineering problems based on observations or information from text, phenomena, models, or investigations. **1.B:** use scientific practices to plan and conduct simple descriptive scientific investigations and use engineering practices to design solutions to problems.