DAY 2 What's the Green Stuff in the Jar?		
Reading Strategy: Generating Research Questions and Recording with a Visual Format	**Science Concept:** Scientists conduct research or make observations that raise questions to investigate.	
Reading TEKS: 3.13A	**ELPS:** Speaking K-12, 19 TAC 74.4(c)(3) D	**Science TEKS:** 3(b)(2)A, 3b4
Materials for Reading Mini-lesson: Chart paper, markers, pond ecosystem inquiry chart, nonfiction pond ecosystem text to model strategy; 5-10 sticky notes for teacher		
Materials for Inquiry Circle Groups: Inquiry charts for each group (prepare the charts from blank chart paper), pencils, variety of nonfiction texts for each group (Go to website), daily anchor chart; 5-10 sticky notes for each group		
Materials for Science Whole Group Lesson: See Lesson		
Content Vocabulary: **Observation** – the action or process of observing or viewing something or someone carefully to gather information. **Scientist –** Person who is an expert in, or studies aspects (parts) of the natural or physical world. **Team** – Group of persons who work together to accomplish a goal.		
Science and Literacy Connection: Scientists raise questions based on research and observations.		

For an expanded version of the Standards listed above, see page ___.

Reading Mini-lesson — 15 minutes

OVERVIEW

Scientists identify research questions and record their data and findings in an organized way. Students will develop research questions and record their findings on an inquiry chart. To help students learn how to use the inquiry chart, the teacher will model mini lessons each day using the pond ecosystem and will complete a class inquiry chart as part of the modeling process.

In addition to the class inquiry chart, each group will need its own inquiry chart to be created (by the teacher) on a large piece of chart or butcher paper. Be sure the size is manageable for storage when groups are not working together and will be easy for students to record on (big enough for recording space, but not so large that it cannot be laid out in the classroom for the group to work). A model for an inquiry chart is provided in the Day 2 folder for you.

PROCEDURE

- **Tell what the strategy is (declarative knowledge)**
  - Say something like, "Today we will generate questions on a topic (pond ecosystem) and develop a method to record and organize the information on an inquiry chart."
- **Tell when and why to use the strategy (conditional knowledge)**
  - Say something like, "I need to generate questions before I start researching a topic. I do this so I will have a clear direction about what I will research on my topic. Once I find the information that I am looking for, I will record it on an Inquiry Chart. As a scientist, I will record the data in an organized way so it will make sense. Each day during this unit, you will research your topic with your inquiry circle groups to complete your Inquiry Chart.

- **Tell how to employ the strategy (procedural knowledge)**
  While you model the strategy, you might want to say something like this to the Readers:
  - First let's look at the top row of the Inquiry Chart. This is where I will record my research questions. My research questions are simply questions I have about my topic (which, in this case, is pond ecosystems).
  - Now, let's talk about how to write our research questions. First, I will think about what I already know about pond ecosystems. I will write down what I already know on sticky notes. Be sure to only write one fact per sticky note! (*Model your thinking about what you already know and allow students to give you responses to record on sticky notes.)*
  - Next, I will organize the sticky notes into categories by moving them around into logical groups. I can use these categories to generate questions for inquiry. I will ask myself what things I know a lot about and what I know little about. From there, I can decide what I would like to research and learn more about. For instance, one question I might have is… (ask students to give an example). Suggest to the students that they write drafts of 6-7 questions before they decide on the final research questions.
  - Before I record the research questions on the top of the Inquiry Chart, I need to ask myself some questions.
    - Are my research questions too broad or too narrow? *(You should not have yes/no questions).*
    - Are my research questions interesting to me and to others?
    - Will I be able to find information about the research questions?
  - Once I have asked myself those questions and determined that I have good research questions, I will write the them along the top of the Inquiry Chart.
  - Now I will also write what I already know (from the sticky notes) in the correct section.
  - Looking at the inquiry chart, I see that I will also need to record my resources as I gather information. That means I will write the title and author of books I use and the addresses of the websites. (*Remind students of this when they start researching on Day 3*.)

Name of Ecosystem and Group Members Here	Research Question 1	Research Question 2	Research Question 3	Research Question 4	Research Question 5	Other Interesting facts
What we know						
Resource 1 (Record the title, author, website, here)						
Resource 2 (Record the title, author, website, here)						
Resource 3 (Record the title, author, website, here)						
Resource 4 (Record the title, author, website, here)						

Note: For this first day of using the Inquiry Chart while in inquiry circles, students will work together to write their research questions and complete the "what we know" section. After this day, students will use the inquiry chart to record their research data while in inquiry circles.

Inquiry Circle Groups — 30 minutes

OVERVIEW

Scientists work in teams when conducting research and investigations. Each day of this unit, students will work in inquiry circle groups while embodying the role of a scientist. They will do so by taking on roles of scientists in research by speaking like a scientist, reading like a scientist, and writing like a scientist. Each student team will be working on their own set of questions within the inquiry circle.

PROCEDURE

Before Inquiry Circle Groups — 5 minutes

You might want to say something like this to the readers:

- It is time to get into our inquiry circle groups. You will be with the same research team as yesterday.
- When we research North American ecosystems, 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!

During Inquiry Circle Groups — 20 minutes

You might want to say something like this to the readers:

- We have anchor charts to help guide your thinking. Do not forget to use them while in groups. (Refer to the "Inquiry Tool Box" anchor chart and the daily anchor chart. Remind students that they can use all the reading strategies taught, not just the one for that day.)
- My role is to help guide the inquiry circle groups, but I expect you to work as a scientific team to solve your problems together.
- Do not forget to answer your research questions and record your answers on the inquiry chart. It is important to record your sources on the inquiry chart as you complete it. (Be sure to explicitly explain how students should use the chart.)

(While groups are working together, walk around the room to facilitate as needed.)

After Inquiry Circle Groups — 5 minutes

You might want to say something like this to the readers:

- As we are concluding our inquiry circle groups for today, each group will have a chance to share what they accomplished and learned.
- The Lab Director should lead the discussion with their inquiry circle group about today's results. For example, what did you learn about your ecosystem? Which reading strategies did you use? What problems did you encounter? How did you resolve those problems?
- The Data Scientist will now share with the entire class either something the group learned about their ecosystem, which reading strategy(ies) were used, or how the group solved a problem.

Science Whole Group Lesson — 30 - 45 minutes

OVERVIEW

Students are introduced to a jar containing an unknown green substance to make observations, stimulate discussion and raise questions.

GUIDING QUESTIONS

What questions do you have about the green substance? What do you want to know?

BACKGROUND INFORMATION

Scientific work involves a variety of approaches and processes that include observations and research, asking questions, collecting and analyzing data, and explaining information.

Allowing students to carry out investigations they design teaches them about the processes that scientists use in their work. Generating their own questions based on their observations gives them ownership in the process.

SAFETY

Teacher should advise the students not to lift the bottle of the green substance – it is heavy and may spill.

Correct use of the loupes and hand lenses should be modeled by the teacher.

MATERIALS

- A 1- gallon bottle containing a green substance.
- Hand lenses and loupes
- Science notebooks
- Images of green substance
- Large zip loc bags

SETUP

- Teacher will place the gallon bottle of the green substance in a central location for observation.
- Place hand lenses and loupes next to it.
- Make copies of images of green substance (one set per team) and place in a plastic bag.

DAILY OBSERVATIONS

When ready, students will need time to make observations, take photos, and document any changes every day for 5-7 days during the science inquiry time.

PROCEDURE

Engage

1. Ask the students if they have ever come across something they had never seen before, or something that looked "mysterious". How did they react to it? (Did they want a closer look? Did they have questions?) Accept and discuss all responses.
2. Remind them that they are now going to become scientists working in teams. Ask them what they think scientists do when they find something they don't understand or know about. (Research information? Make observations? Ask questions?)
3. Tell the class that you have a jar with something in it for them to observe.
4. Show the class a science notebook and explain that now that they are working as scientists, it will be important for them to use it to record everything they observe, do, or have a question about.
5. Point out the station you have set up with the jar of the green substance and magnifiers.
6. Establish the rules for observation:
    - Instruct them to not lift, shake or in any way move the jar so that the green substance is not disturbed!
    - Use hand lenses (or loupes) for a closer look at the substance
    - Each team has 3-5 minutes for observations (dependent on the number of teams).
    - Write notes about what you observe or have a question about in your notebooks.
    - The teacher will accompany teams to the station to ensure compliance.

Explore

7. Ask the Equipment Directors to distribute the science notebooks (1 per student) to their team.
8. Direct the students to write the date of their observations and work each day that they use the science notebooks. (This will provide important information that they can use at the end of their study.)
9. Tell them that **each team member** will write about their observations in their own notebooks.
10. Next, ask the Equipment Directors to pick up a bag of the digital images (1 per team).
11. Explain that as they are waiting for their turn to see the substance in the bottle, they will look at digital images of the same substance taken through a microscope. They are to write down observations and questions about the images as well.
12. Teams will rotate until all teams have made observations of the jar.

Explain

13. After all teams have had a chance to view the jar and the digital images, ask students to share the observations and the questions they have about the substance.
14. Record their information on chart paper as they share to save for future reference. (They will discuss and refine these questions in the next lesson.)
    Teacher note: It's important to record the students' ideas in their own words, without offering any help or guidance nor dismissing their ideas.
15. Ask if they have any ideas (predictions) about what the substance might be.
    Record these on chart paper as well but refrain from disclosing what the substance is. Explain that as they work through this unit they will discover what it is on their own!

Elaborate

16. Tell the students that as scientists now, they will plan and conduct an investigation over the next few weeks to find answers to their questions.
17. Remind them that they are working as a team where everyone has a role that contributes to the investigation.

Evaluate

18. Did students develop questions based on their observations?
19. Did students record observations and write down questions they had in the science notebooks?
20. Did students include new science vocabulary in their responses or explanations?

Expanded Standards

Reading TEKS: 3.13A Inquiry and research: listening, speaking, reading, writing, and thinking using multiple texts. The student engages in both short-term and sustained recursive inquiry processes for a variety of purposes. The student is expected to: (A) generate questions on a topic for formal and informal inquiry.
ELPS: Student Expectations for Speaking K-12, 19 TAC 74.4(c)(3) The student is expected to: (D) speak using grade level content vocabulary in context to internalize new English words and build academic language proficiency (E)share information in cooperative learning interactions.
Science TEKS: 3(b)(2)A The student is expected to:(A) ask questions about organisms, objects, and events observed in the natural world. 3b4: The student is expected to collect, record, and analyze information using tools, including cameras, computers, hand lenses, metric rulers, Celsius thermometers, wind vanes, rain gauges, pan balances, graduated cylinders, beakers, spring scales, hot plates, meter sticks, magnets, collecting nets, notebooks, and Sun, Earth, and Moon system models; timing devices; and materials to support observation of habitats of organisms such as terrariums and aquariums., 3b4