

DAY 1: INTRODUCTION TO BEING A SCIENTIST



MINI-LESSON

Teacher introduces the “Inquiry Toolbox” and “Team Roles” anchor charts.

SCIENCE INQUIRY CIRCLES

Team choose an animal to research and begin to explore texts about this animal.



GUIDED SCIENCE INVESTIGATIONS

Children play a memory game to compare the effectiveness of working alone versus working as a team.



ABBREVIATED STANDARDS

- Reading TEKS: 2(b)(1)
- CCSS: SL.2.1(a)
- NGSS: 2-LS2-1
- Science TEKS: 2.1(A)(F), 2.5(A)

Day 1: Introduction to Being a Scientist

Literacy Strategy: Introduction to team roles, text investigation, and inquiry circles.

Science Concept: Scientists ask questions before they begin gathering information from text and the natural world, and benefit from working in teams.

Science and Literacy Connection: Scientists use different ways to observe the world including reading scientific texts, conducting investigations and writing reports while working collaboratively with others in the cycle of inquiry.

Mini-Lesson (15 minutes)

OVERVIEW

Teacher instructions are provided for each day's mini-lesson. These instructions consist of **declarative knowledge** (statement of what children will do or learn), **conditional knowledge** (context or background related to what children will learn), and **procedural knowledge** (explicit instruction and practice).

Today's mini-lesson will simply explain what the children will be doing throughout the unit. **The teacher will need to print out and post the "Inquiry Toolbox" and "Team Roles" anchor charts to use in the discussion.**

MATERIALS

Teacher needs:

- chart paper
- marker(s)
- "Team Roles" anchor chart with job cards
- "Inquiry Toolbox" anchor chart
- prepared selection exploratory texts (see "Animal Resources" spreadsheet for ideas)

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 (declarative knowledge)

1. *Today, we are beginning a new unit in which we will investigate living butterflies! We will observe the butterflies as they grow. You will work together with your Inquiry Circle teams to research other animals to help you understand more about life cycles and the science investigations you will conduct in this unit. During inquiry circles, you can ask questions, discuss information you*

collect, and think about other questions you might have about your animal. We have an “Inquiry Toolbox” anchor chart that will help you in your work. (Point to the “Inquiry Toolbox” anchor chart and read aloud to the class.)

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

1. *When we research animals, we will practice our roles as scientists. We will do this because scientists use different ways to observe the world; scientists also have different ways of reading scientific texts, writing reports, and conducting investigations. You will take on the role of a scientist conducting research by speaking like a scientist (using new science language), reading like a scientist (using strategies to find information), and writing like a scientist (using journals to organize important information and observations). There is no better way to learn about science than to become a scientist!*

Tell how to use the strategy (procedural knowledge)

1. *While in inquiry circles, you will take on different scientific roles to conduct the research. Typically, science teams have a leader, called the Lead Scientist, and various other positions, such as Lab Director, Data Scientist, and Equipment Director. These roles are the same as the roles you will have during the science investigations. (Show the class the “Team Roles” anchor chart. Point out each role on the anchor chart and read it aloud. At this point, the teacher can assign roles or allow the children to choose their roles, reminding them that they will have the opportunity to assume different roles later.)*

NOTE: When creating inquiry circles, **we suggest no more than 4 children per team**, although the number of inquiry circles you have will depend on the size of your class and other considerations.

Science Inquiry Circles (30 minutes)

OVERVIEW

During the first Inquiry circle period, teams can choose an animal to research. The exploratory texts are meant to grab the attention of the learners and get them interested in the topic. **(Remember to have a selection of exploratory texts ready ahead of time.** See the “Animal Resources” spreadsheet for ideas.)

If you feel your learners may have difficulty reading the exploratory texts independently, you may choose to read the texts aloud to them prior to starting this unit. That option still allows the opportunity for learners to become interested when deciding which animal to investigate.

MATERIALS

Each team needs:

- list of animals for research (salamander, sea turtle, hummingbird, penguin, coyote, bat, bee, and praying mantis)
- a variety of exploratory texts for each team

Teacher needs:

- list of animal choices for the unit (written on white board)
- “Animal Resources” spreadsheet for ideas

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. *Today during our inquiry circles, each team will pick an animal to research together.*
2. *As a team, you will choose which animal you find most interesting from the list of animals I have written on the white board.*
3. *After you pick your animal, you will find an exploratory to read about it.* (Teacher may point out selected texts that have been preselected for them.)

During Inquiry Circles (20 minutes)

1. *One member of your team can read it out loud for your team, or team members can take turns reading out loud. While you're reading, I will be walking around to assist you as needed.* (Allow class time to read while you facilitate when necessary.)
2. *Later, when all teams are finished reading their texts, you will summarize and share what you have read with the class.*

After Inquiry Circles (10 minutes)

1. *The Data Scientists from each team will now share what their team has learned about its animal.* (Allow enough time for each team to share.)
2. (After all teams have shared, thank them for their hard work, and point out any excellent behaviors that you observed. If you noticed any problems in the teams during the lessons, take a moment to point them out, and explain your expectations for all future inquiry circles.)

Guided Science Investigation (30–45 minutes)

OVERVIEW

In this activity, learners will compare the effectiveness of individuals working alone compared to working in teams collaborating on the same complex task.

GUIDING QUESTIONS

Why do scientists work in teams? What is the value of teamwork?

BACKGROUND INFORMATION FOR THE TEACHER

Over the course of the next four weeks, children will learn about animal life cycles. They will use the model organism of butterflies in the science investigations and also conduct research on their chosen animal during inquiry circles.

Learners will conduct these investigations as members of scientific research teams. Typically, science teams have a leader, called the Lead Scientist, and various other positions, such as Lab Director, Data Scientist, and Equipment Director (**these are the same roles used in the inquiry circles**). In practice, members of each team will participate in all tasks the team performs during the investigation (e.g., measuring, making observations).

MATERIALS

Each team member needs:

- lined paper (1–2 sheets)
- pencil

Each team needs:

- 2 additional sheets of lined paper

Teacher needs:

- “Memory Pictures” slides

SETUP

- Each learner will need two sheets of lined paper, and each team will need two additional sheets.
- Prepare to project the “Memory Pictures” slides for your class.
- If not done earlier, print the “Team Roles” anchor chart and the four job cards and display the pages for learners to refer to.

PROCEDURE

Engage

1. Ask learners how good they think their memories are. Ask if they have ever played the concentration game where they turn over cards and try to match pictures.
2. After discussion, say to the class, *Let’s test your memory.* Project the “Memory Pictures” title slide (**slide 1**). **Do not move past the title slide.**

Explore

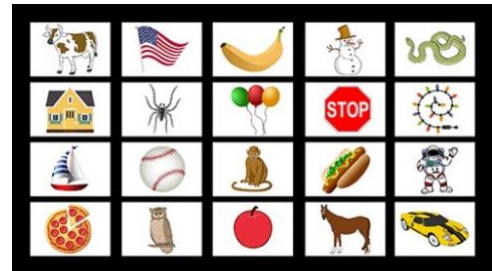
1. Provide each learner with a blank sheet of lined paper. Explain that you will show them a slide with many pictures of objects. Tell them to look at the pictures, but to keep their pencils down until you direct them to begin writing.
2. Project Set 1 (**slide 2**) for 30 seconds then advance to the blank green slide (**slide 3**). Ask learners to list or draw as many of the objects shown in Set 1 as they can remember. Tell them not to talk to each other—the listing of objects must be done from each individual learner’s memory. Allow 2 minutes
3. Have learners exchange their lists with another learner. Show Set 1 again (**slide 2**) and have learners count up how many objects were correctly listed. Create a 3-column chart on the board. Write the number of correct objects from each list in Column 1 on the board.
4. Next, ask learners to work in their teams. Tell them that you will be showing another set of memory pictures. Prompt learners to work together to try and remember as many objects as they can. Observe the strategies they use for remembering pictures. Show Set 2 (**slide 4**) for 30 seconds, then advance to the blank green slide (**slide 5**).



5. Give each team a clean sheet of paper and ask them to list or draw as many objects as they can remember in the next 2 minutes.
6. Have teams exchange lists with other teams. Show Set 2 (**slide 4**) again, and have teams count the number of objects correctly identified. Record the numbers for each team in Column 2.
7. Now tell the teams that you will give them time to discuss the best ways to remember all of the pictures. Give teams a couple of minutes to come up with strategies.
8. Provide teams with a fresh sheet of paper. When ready, show Set 3 (**slide 6**) for 30 seconds, then advance to the blank green slide (**slide 7**). Have teams work together to list or draw all the objects they can remember in the next 2 minutes.
9. After two minutes, have learners stop listing objects. Have teams switch lists as before and show Set 3 (**slide 6**) again for review. Write how many of the 20 objects were correctly identified on each team list Column 3 on the board.

Explain

1. Ask learners to examine the three columns of numbers. Have them report on their observations. What do they see? How well did learners do when working by themselves?
2. Have learners explain what the numbers tell them in Column 1. What was the range of correct identifications (lowest number to highest number)?
3. Repeat the discussion with Column 2, and then with Column 3. Which of the three columns got the best results? Ask learners to explain why.
4. Ask learners to reflect on working in their inquiry circles this morning. How can the lessons they just learned about working with a team be applied to inquiry circles tomorrow?



Elaborate

1. Explain to the class that the purpose of this memory activity is to show how teamwork can enhance the successful completion of a task.
2. Ask how their roles on a science team can help them work together more effectively.

Evaluate

1. Observe how well learners worked together in the second and third memory tests. Did their answers demonstrate progress in reasoning and thinking?
2. Was there evidence of learners working cooperatively?
3. Did learners develop and use special strategies within the team?

Science Language

- **Collaboration** occurs when two or more people work together, learn from each other, and communicate with each other.
- A **scientist** is a person who is an expert in or who studies aspects of the natural or physical world.
- A **team**, or teamwork, is a group of people who work together to accomplish a goal or task.

- **Data** are facts and information (such as images, words, and measurements) collected during an investigation.
- A **life cycle** describes the stages or changes an organism goes through during its life.

Expanded Standards

Reading TEKS

2(b)(1) Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking—oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to: **(D)** work collaboratively with others by following agreed-upon rules for discussion, including listening to others, speaking when recognized, making appropriate contributions, and building on the ideas of others.

CCSS

SL.2.1 Participate in collaborative conversations with diverse partners about *grade 2 topics and texts* with peers and adults in small and larger groups. **(a)** Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).

NGSS

2-LS2-1 Science & Engineering Practices: Planning & Carrying Out Investigations: Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.

Science TEKS

2.1 Scientific and engineering practices. The student asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The student is expected to: **(A)** ask questions and define problems based on observations or information from text, phenomena, models, or investigations; **(F)** record and organize data using pictures, numbers, words, symbols, and simple graphs. **2.5** Recurring themes and concepts. The student uses recurring themes and concepts to make connections across disciplines. The student is expected to: **(A)** identify and use patterns to describe phenomena or design solutions.