

DAY 9: WHAT ARE MONARCH MIGRATIONS?



MINI-LESSON

Teacher introduces the “Monitoring Comprehension” anchor chart and models the strategy.

SCIENCE INQUIRY CIRCLES

Teams continue to research questions about their animals and record the information on their Inquiry Charts.



GUIDED SCIENCE INVESTIGATIONS

Teams play a board game inspired by the amazing annual migration of monarch butterflies.



ABBREVIATED STANDARDS

- Reading TEKS: 2(b)(6)(I)
- CCSS: RF.2.4(a)(c)
- NGSS: 2-LS4-1, 2-PS1-1
- Science TEKS: 2.1(A)(G), 2.5(A)

Day 9: What Are Monarch Migrations?

Literacy Strategy: Monitoring comprehension.

Science Concept: The seasonal movement of monarch butterflies is called “migration.”

Science and Literacy Connection: 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

Scientists always pay close attention to the world around them. When measuring liquids in an experiment, they must monitor the amount poured into a beaker. When making observations on the life cycle of a butterfly, they closely monitor changes in the organism. Scientists also monitor their comprehension while they read.

NOTE: You are encouraged to create the “Monitoring Comprehension” 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 refer to the anchor charts during inquiry circles.

MATERIALS

Teacher needs:

- chart paper
- marker(s)
- class Inquiry Chart
- “Monitoring Comprehension” anchor chart
- butterfly text to model the strategy

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. *Our strategy today is called “monitoring comprehension.” “Monitoring” means I will listen to myself as I read to be sure everything looks right, sounds right and makes sense.*

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

1. *I monitor my comprehension every time I read. As a strategic reader, I monitor as I read because reading is supposed to make sense. This strategy will help me be aware of what I am doing as I read because it makes me pay close attention, especially when the text is difficult.*

Tell how to employ the strategy (procedural knowledge)

1. *To monitor my comprehension, I ask myself three things while I am reading:*
 - *Does that look right?*
 - *Does that sound right?*
 - *Does that make sense?*
2. *If the answer to these questions is yes, then all is well. If the answer is no, then I have to use a fix-up strategy, which we will learn about tomorrow.*
3. *When I am finished reading, I will ask myself, “What did I learn?” If I can answer this, all is well. If I cannot, then I should use a comprehension fix-up strategy.*

Science Inquiry Circles (30 minutes)

OVERVIEW

Today, teams will continue research work to find answers to the questions on the Inquiry Charts or to answer new questions that have been raised.

MATERIALS

Each team needs:

- team Inquiry Charts
- pencils
- access to informational texts/media

Teacher needs:

- “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. *It is time to get into our inquiry circles.* (Have the Equipment Directors gather the Inquiry Chart for their team.) *Today we will continue to look for answers to the questions on your Inquiry Charts. If you have all of your research questions already answered, you may look for more interesting facts and include them on your chart.*
2. *Remember to work as a team, helping each other and using the strategies you have learned as you do your research.*

During Inquiry Circles (20 minutes)

1. *While working in your teams, you may refer to the “Monitoring Comprehension” anchor chart or any of the anchor charts posted to help guide your thinking.* (Point to the posted anchor charts and remind students that they can use all the reading strategies taught, not just the one for that day.)
2. *The Lead Scientists will guide all research for the day by picking which questions will be answered, and the Data Scientists will record all source information and the answers to your research questions on the team Inquiry Chart. The Lab Directors and Equipment Directors must help find the answers to the questions online and in texts.*

3. *I will help guide the inquiry circles, but I expect you to work as a scientific team to solve your problems together.* (While teams are working together, 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 what they accomplished and learned. The Lab Director should lead the discussion with their inquiry circles about today's results. For example, Did your team use "monitoring comprehension" or any other reading strategy today? What problems did your team encounter? How did your team resolve those problems? What did your team learn about its animal?*
2. (After you have allowed the teams to gather their thoughts, have the Data Scientists share with the class. Try to encourage teams to share a variety of things—you do not want just facts about animals, just reading strategies, or just cooperative learning strategies.)
3. (When 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, take a moment to point them out and explain your expectations for all future inquiry circles. Collect all Inquiry Charts or have the Equipment Directors put them in their normal classroom place for ongoing work so learners can easily access them.)

Guided Science Investigation (30–45 minutes)

OVERVIEW

In this activity, teams play a board game inspired by the amazing annual migration of monarch butterflies from the north and central United States to overwintering grounds in southern Mexico. They will learn about the factors that influence the success of a migration.

GUIDING QUESTIONS

Where do the monarch butterflies go each winter? Why do they go there?

BACKGROUND INFORMATION FOR THE TEACHER

Many animals are known to migrate. In North America, many bird species travel south in the fall to avoid cold winter temperatures and limited food supplies. They return to the north as the climate warms in spring and food becomes abundant again. It is an annual cycle that has been repeated for millennia.

One of the world's greatest north-south-north migrations is the annual trek of monarch butterflies from the north-central United States to southern Mexico. It is a journey as long as 3,000 miles. Unlike birds that make the round trip more than once, the monarch migration is a one-way trip for the butterflies. The monarchs that make it to the Mexican overwinter grounds will not return. They will lay eggs, but it is their offspring who will begin to make the return trip to complete the cycle. In fact, it takes several generations of butterflies to complete the trip all the way to northern United States or Canada.

While playing the "Monarch Migration" game, some of your learners might wonder how such small insects are able to travel such great distances. According to the U.S. Department of Agriculture Forest Service, monarchs can travel between 50 and 100 miles a day during their migration. The farthest recorded monarch butterfly flight in a single day is 265 miles! How did the butterfly accomplish that feat and how do we know that? The answer to the second question is simple. Butterfly scientists capture butterflies and press a small identifying tag to one of their wings. The tags do not harm the butterflies,

and if they are caught again, the tags tell scientists how far the butterflies traveled to the new catching site and how long it took to get there. How the butterflies travel the distance is another matter.

Because the monarch life cycle is short, more than one generation of monarchs is needed to travel from the northern United States and Canada to southern Mexico. Feeding on nectar, monarchs store up fat in their abdomens and draw in this fat for energy to make the trip. The monarchs feed along the way and may actually gain weight during the trip. Much is to be learned about how monarchs navigate to Mexico. A combination of seasonal sunlight, Earth's magnetic field, or some other factors guide monarch generations to the same overwintering nesting grounds year after year.

Monarchs flapping their wings can account for only part of the journey. Scientists think that the long daily flights south may also be accomplished by gliding on north winds that push the butterflies southward. Keeping upright and heading south in swirling winds takes maneuvering ability, such as wing flapping and changing the angles of the wings in relation to the butterfly's body.

Many factors influence the annual monarch migration, such as weather, food supply, and time of day. You can learn more about monarch butterfly migration on this YouTube video:

<https://www.youtube.com/watch?v=QpffQtKN-gk>

MATERIALS

Each team member needs

- Butterfly Investigation Journal
- pencil

Each team needs:

- "Monarch Migration" game set (game board, playing pieces, set of playing cards)
- Migration Map

Teacher needs:

- "Monarch Migration" game set
- Migration Map

SETUP

- Prepare the "Monarch Migration" game sets by assembling enough game boards, game card sets, and playing pieces for the teams.
 - Print the game board, playing pieces, and playing cards on white cardstock paper (1 game set per team).
 - The game board consists of 4 panels. Trim the panels along the cut lines and arrange them edge to edge. Tape the panels front and back. The tape will allow you to fold the panels for storage later. Make one game board per team. (See the Migration Map for correct placement.)
- Cut out the game card sets, shuffle the cards, and stack them; secure individual sets with rubber bands.
- Cut out the playing pieces and place them into envelopes.



SAFETY

- Remind teams daily to be gentle with the growth habitats during handling to prevent disturbing the larvae, especially once the chrysalis forms **Ideally, the growth habitats should be placed where teams can do daily observations without moving them.**
- Please follow all district and school science laboratory safety procedures.
- It is good laboratory practice to have teams wash hands before and after any laboratory activity

DAILY OBSERVATIONS

Give learners time to observe their organisms (whether they are in the larva, pupa, or adult stage), take measurements of the larvae (if applicable), and record their observations in their Butterfly Investigation Journals. Facilitate team discussions by asking questions, such as, *What did you notice? What has changed since the last time you observed your organisms?*

PROCEDURE

1. Introduce the concept of migration. Ask, *What does it mean to migrate?* (Move/travel from one place to another; animals have seasonal movements from one region to another.)
2. Ask learners if they can think of any animals that migrate. (Geese, ducks, robins, caribou, salmon, whales, bats, monarch butterflies.). Ask if they know why the animals migrate. (Move to warmer places when winter comes, to find abundant food, to reproduce.)
3. Talk about the monarch butterfly migration. Monarchs thrive during the summer in the United States. In the fall, they travel to southern Mexico to overwinter. For some monarchs, the journey is 3,000 miles long. However, each individual monarch does not make the complete trip. It is completed by successive generations of individual butterflies. When the monarchs arrive in Mexico, they feed and reproduce. Their offspring return in a stepwise migration of multiple generations to the U.S. in spring.
4. Explain that monarchs
 - need warmer temperatures during winter
 - need flower nectar—most flowering plants are dormant during winter
 - can't fly when it rains or is cold
 - are assisted by wind in their journey, if the wind is blowing in the right direction
 - don't fly at night
5. Tell learners that they will play a game to help them understand how these factors affect the monarchs' journey south.

Explore

1. Show learners all the game-parts (game board, game card set, playing pieces) and explain what they represent.
2. Explain that the game begins with each player selecting a colored game piece. The colored piece is placed on the game board on the circle of the same color at the north end of the path lines.
3. Tell them that the circles represent trees where the butterflies can rest at night before continuing the journey the next day.
4. Shuffle the game cards and place them upside down in a stack.
5. Tell learners that the object of the game is for all monarchs to arrive at the overwintering place in Mexico.

Game Rules

You should actively model how the game works for the class before they begin play. **The following instructions are for you.** This is important because of the grade level—walking through the activity

beforehand will allow all learners to better understand how to play. Either the teacher or a learner can do the walk through.

- a. Each player selects a colored game piece. The red player starts first and draws a game card from the stack. The card will tell the player what to do, and the red player moves the game piece accordingly. Used game cards should be placed in a separate stack.
- b. Play continues with the green player and then the purple, blue, and black, then back to red.
- c. Players move from north to south unless a game card provides a different instruction. If a card instructs the player to move to a different path, the player moves to the next nearest path. Red will move one path to the east. Pink can move one path to the west. The other players have the choice of moving east or west.
- d. When all of the game cards are used the first time, the cards should be shuffled to change their order and stacked upside down again so that play can continue.
- e. When one player's butterfly reaches the winter home, that butterfly rests, feeds, and mates to reproduce. Play continues with the other butterflies until all reach the winter home. At that time, the game ends.

Explain

1. When all teams have completed their games, hold a discussion. Ask, *What have you learned about the monarch butterfly migration?*
2. Ask, *How can such small creatures migrate up to 3,000 miles in just a couple of months?* Accept responses.

Evaluate

1. Did learners communicate understanding about why monarchs or other organisms migrate?
2. Were learners able to communicate factors that influence monarch migrations?
3. Were new questions raised about migrations?
4. Did learners use science language in communications, either written or oral?

OPTIONAL

A larger version of the game can be played in an open space. Invert small paper plates (color code them) and place them on the floor to represent spaces (resting trees) on paths leading from northern and central U.S. to the Mexico overwinter grounds. Use string and tape across the plates to connect them and designate the paths. Play the game, but, instead of game pieces, have learners play the part of the butterflies. As learners move from plate to plate, have them flap their wings (arms).

Science Language

- **Migration** is the seasonal movement of animals from one region to another.

Expanded Standards

Reading TEKS

2(b)(6) Comprehension skills: 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: **(I)** monitor comprehension and make adjustments such as re-reading, using background knowledge, checking for visual cues, and asking questions when understanding breaks down.

CCSS

RF.2.4 Read with sufficient accuracy and fluency to support comprehension. **(a)** Read grade-level text with purpose and understanding. **(c)** Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

NGSS

2-LS4-1 Science & Engineering Practices: Science Knowledge is Based on Empirical Evidence-Scientists look for patterns and order when making observations about the world. **2-PS1-1** Crosscutting Concepts: Patterns - Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

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; **(G)** develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem. **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.