



The Bio/Diversity Project

Lesson Title: Butterflies as Pollinators

Teacher: Lily and Grace

Grade Level: 9th

Lesson Length: 50 min

Based on Existing Lesson Plans: [Teaching about the Magnificent Monarchs](#) and [The Great Monarch Migration Learning Activity](#)

AZ Science Standard:	<i>HS.L4U1.27</i> Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity
Learning Objective:	- Students will be able to map the migration route of monarchs, including the areas they travel between and stops they make along the way. - Students will be able to describe the threats to monarchs' migration patterns and how these threats affect their population. - Students will be able to explain the importance of monarch migration and what we can do to help.
Scientist of the Week:	- Eduardo Rendón Salinas - Monarch butterfly expert - Manages the monarch butterfly monitoring program at World Wildlife Fund (WWF)-Mexico - Studies and reports colony sizes - Advocates to put monarch butterflies on the IUCN Red (Threatened Species) List to create nationwide policies that protect this species and their environment https://monarchnet.org/featured-scientists



Vocabulary		Materials		
● Migration ● Life cycle ● Adaption ● Deforestation		● Slideshow ● Butterfly Mapping Handout (Class set: 105) ● Colored pencils for a class of ~30 students ● Life Cycle Wheel: - Scissors - Glue or tape - Brass fastener (105) - Print 105 copies: Life Cycle Wheel PDF		
Seasonality: Any				
Monsoons July-Sept.	Autumn Oct.-Nov.	Winter Dec.- Feb.	Spring Mar.-Apr.	Dry Summer May-June
Guiding Questions:				
● What are the key structural features that distinguish butterflies from moths, and how does this affect their methods of pollination? ● What are the varying hypotheses surrounding how the Monarch Butterfly finds the same overwintering site from generation to generation? ● What is the significance of the butterflies as mythical or ritual symbols in pre-Hispanic cultures?				

Engagement/Introductory Activity: Butterfly Life Cycle Wheel Cutout

- How to Make a Life Cycle Wheel:
 1. Copy both of the Life Cycle Wheel templates (Base and Cover). The parts can be laminated or pasted on heavier paper to make them more durable.
 2. Copy the Butterfly Life Cycle Stages sheet.



3. Cut out the life cycle wheel base.
 4. Cut out pictures of the egg, larva, chrysalis, and adult butterfly from the Butterfly Life Cycle Stages sheet.
 5. Glue the life cycle pictures onto the sections of the wheelbase in order clockwise, beginning with eggs and ending with an adult butterfly.
 6. Cut out the wheel cover. Be sure to cut out the window of the cover.
 7. Place the cover over the wheel base. Push a brass paper fastener through the center of the cover and the wheelbase to connect the two. The life cycle wheel is now complete. There are several ways to use the life cycle wheel. You might have the student rotate the cover to a stage of the life cycle and tell you about that stage. You might instead use the wheel to show a student a stage of the life cycle and ask what comes before or after.
- Students will make a revolving wheel that models the phases of butterflies' life stages.
 - Students will have 10 minutes to complete this activity because the circles and butterfly pictures will be pre-cut upon the start of class.

Exploratory Activity: Introducing Migration on the whiteboard

- Start the discussion by asking students to define migration.
- Migration is an example of an animal adaptation, a behavior passed down through generations that helps the species survive. Animals that migrate exhibit this behavior for different reasons—most often to avoid a changing climate, to look for food, or to reproduce.
- After peer-to-peer discussions, interns will ask students for examples of species that migrate, creating a class-generated list on the whiteboard.

Explain: Monarch Butterflies' Migration Routes: Pollinating Along The Way Lecture with aThink-Pair-Share Follow-Up.

- Using the provided slides as a guideline, explain to students the significance of the monarch migration. During the spring and summer months, there is a large population of monarchs dispersed throughout areas of the northern United States and southern Canada. As fall approaches, these monarchs set out on the nearly 3,000-mile journey to the forests of central Mexico that will provide them with shelter from the winter cold. The butterflies will hibernate in these forests for several months until the temperature indicates it is safe for them to emerge. Then they will begin the journey home, traveling north, stopping to reproduce along the way.
- What makes the migration pattern of monarchs so unique and fascinating is not only the vast distance covered, but the fact that it takes several generations of butterflies to complete the journey from start to finish in one year. This means that each butterfly is traveling a route that it has never seen before and that the butterfly completing the cycle by arriving back home is several generations beyond the original butterfly that began the journey. Describe to the students this migration route taken by many monarchs so they fully understand the concept. It may help to display your own map and refer to it while explaining.
- **First leg:** Fall is approaching, temperatures are dropping, and monarch butterflies throughout the northern United States and southern Canada are heading out on a long journey. This generation of butterflies is responsible for traveling all the way to the forests of the Monarch Butterfly Biosphere Reserve in Michoacán, Mexico, to hibernate in Mexico's warm climate and avoid the harsh cold of winter. Once their winter hibernation is over and temperatures indicate spring has arrived, typically by March, these butterflies will awake and begin the journey north.
- **Second leg:** As this generation of butterflies heads north, they will stop to eat and reproduce along the way, laying eggs along milkweed plants. This generation lives the longest, about seven or eight months, hence why they're referred to as the "super generation". After a few weeks of traveling north, these butterflies reach Texas and die, leaving a new generation to emerge from their eggs and continue the journey north.
- **Third leg:** This next generation of butterflies will continue to travel north for about four to five weeks, stopping in various states along the way to eat and lay eggs, before eventually dying. Their offspring will emerge and continue the journey from where their parent butterflies left off for approximately four to five



weeks before dying.

- **Fourth leg:** This pattern happens one or two more times, resulting in a fourth or fifth butterfly generation completing the last leg of the journey to areas of the northern United States and Canada where they rest and reproduce during the warm months. One of the most popular areas for monarchs during the summer is the grasslands of the Northern Great Plains, spanning Nebraska, North Dakota, South Dakota, Wyoming, and Montana in the United States, as well as Saskatchewan and Alberta in Canada. These grasslands provide ideal habitat for monarchs to feed and lay eggs.
- Emphasize to students the relevance of this monarch migration to people. Monarchs are pollinators, responsible for transporting pollen between flowering plants, fertilizing them. The plants then produce seeds and fruit, all of which humans use to make various food products. Without monarchs and other pollinators, a lot of the food we routinely depend on would not exist. It's important for monarchs to complete their migration cycle with the necessary habitat to reproduce and continue their role of pollinating.
- After the lecture, conduct a think-pair-share, asking which of the following migration spots they would like to visit: Michoacán, Mexico, Dallas, TX, Virginia Beach, VA, or Toronto, Canada.

Extension Activity/Questions: Migration Maps

- To better understand the geographical significance of the monarch's efforts and pollination routes, students will create maps that chart their migration pattern.
- Distribute the student map handout included in this activity, as well as coloring utensils, to each student.
- Now that they are familiar with the migration pattern of monarch butterflies, instruct students to be creative and incorporate the information to illustrate this route on their map. Their maps should include the following:
 - Michoacán, Mexico, the location of the Monarch Butterfly Biosphere Reserve and the place where many monarchs spend their winters
 - Migration directions: which way do monarch butterflies travel when it is too cold? Which way do they travel when it is too warm?
 - Arrows that show the direction monarch butterflies travel in the Fall
 - Arrows that show the direction monarch butterflies travel in the Spring
 - Summer breeding areas (most of northern U.S. and nearly all of Western U.S.- area is highlighted on example map)
 - A legend, including symbols to represent the directional flying routes, seasons, the monarchs themselves, etc.

Evaluation Activity: Journal Entry About Habitat Conservation Actions

- Inform students about the challenges monarch butterflies face due to habitat loss in their migratory routes across North America. Discuss how deforestation in Mexico and habitat conversion in the United States threaten these migration patterns by reducing the availability of milkweed, the primary food source for monarch caterpillars.
- Then, we will prompt students to open up a blank page in their journals, and list three specific actions that would support monarch butterfly habitats. Encourage students to work with their neighbors to share ideas, and inform them that it is okay to have similar answers to other classmates. Encourage them to think about actions such as planting native milkweed, reducing pesticide use, or educating others about monarch conservation. After writing their commitments, allow a few students to share their plans with the class, discussing how each action can make a positive impact on monarch populations. This activity combines reflection, creativity, and public speaking skills in a concise format.