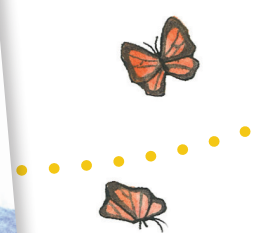




Discovering the plant biology in great children's books



by Helen Frost
Illustrated by Leonid Gore



Published by Atheneum Books
for Young Readers (2008)
Grade Level: K-3



Books In Bloom: Monarchs and Milkweed
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Monarch and Milkweed



What We Love About This Book

- Beyond the chrysalis — provides a closer look at the Monarch life cycle and the plant that makes it possible



Discover the Book

Monarch and milkweed are made for each other, and their special relationship is the focus of this beautiful picture book. Newcomers and butterfly enthusiasts who are already familiar with the Monarch's annual migration will learn about the biological interdependence of this butterfly and the milkweed plant. The circular structure of the book, beginning with the emergence of one milkweed seedling and ending with another a calendar year later, also presents a complete life cycle of the Monarch. The beginning stages of plant and insect development are presented in parallel on alternating pages up until the moment when the butterfly first feeds on milkweed in full bloom and their stories intertwine.

Readers will appreciate the clear illustrations. The details of the yellow, black, and white Monarch caterpillar; stages of the chrysalis; and mature Monarch are presented in a larger-than-life format. The softly textured pastel and acrylic paintings highlight the close-up biological details, yet also provide panoramic cross-country landscapes in aesthetically pleasing earth tones. Migration routes are found in the book's end pages, with the spring and summer northward migration at the front, and fall and winter southward route represented at the back. An author's note at the back provides further information and lists relevant websites for those who want to learn more.



Explore the Biology

This book tells the twin tales of the milkweed plant and the Monarch butterfly by walking the reader through the life cycle of both insect and plant and illustrating how the two intersect. Perhaps the obvious question is: why do Monarch larvae feed on milkweed? Why not on other plants? The answer is that nature is filled with specialized relationships; some are mutually beneficial and others benefit only one partner. In this case, the Monarch gains at the expense of the milkweed. Milkweed is a common plant that is best known for the role it plays in completing the life cycle of these lovely lepidoptera. Milkweed produces a toxic compound that tastes bitter and discourages insects and large herbivores from consuming it. Monarchs have evolved resistance to this compound, so the larvae use this food source without dying. They are one of the few organisms that can eat this plant; as a result, they have little competition for their food. Even better, the Monarch larvae accumulate the toxin and themselves become poisonous as they mature. This is one of the reasons few birds prey upon this butterfly.



Digging Deeper

Talking Points

1. How are the life cycles of Monarchs and milkweed interrelated?

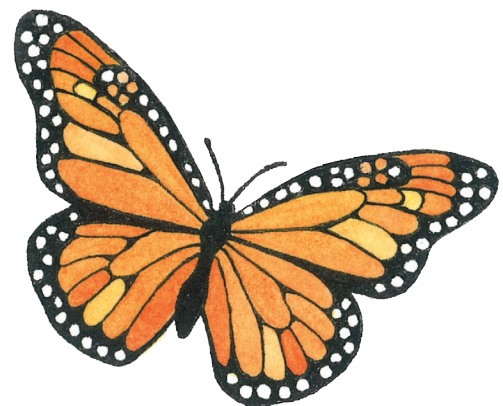
After reading the book, ask your readers to describe the stages of the Monarch's life cycle, identifying when it coincides with milkweed's. Find the images in the text that highlight their relationship at different stages; for example, a mature butterfly is shown landing on a milkweed in bloom and sipping nectar; later, a developing Monarch larva is shown feasting on milkweed leaves.

2. Is this a partnership or a one-way relationship?

Ask the readers if the dynamic between the butterfly and the milkweed is a true partnership or a one-way relationship. In other words, what does the Monarch get from the milkweed and what does the milkweed get from the Monarch? They should come to see that the butterfly is the clear beneficiary in this one-way relationship because the milkweed plant serves as a food source for the developing larvae and produces the toxin that makes the adults bitter and poisonous to eat. The milkweed gains little from the relationship. Monarchs can pollinate milkweed flowers, but so can moths, other butterflies, and bees. What led to the evolution of this relationship is that few insects could eat milkweed, so there was little competition for this food source, and the toxin protected the insect from being eaten.

3. Can Monarchs only eat milkweed?

Using the images in the book, ask your readers what the larvae feed on (milkweed leaves) and what the adult butterflies eat (nectar from many types of flowers). The adults require a sugar solution to survive, and in nature this is found in nectar-producing flowers and rotting fruit. Since many flowers produce nectar to attract pollinators, adult Monarchs are able to feed upon many different species, ensuring that they can eat throughout their travels, even when milkweed is not in bloom. The larvae, on the other hand, feed only on milkweed.



Related Books



Monarch Butterfly

Written and Illustrated by
Gail Gibbons

Published by Holiday House (1991)

Grade Level: 2-4



An Extraordinary Life: The Story of a Monarch Butterfly

Written by Laurence Pringle
Illustrated by Bob Marshall

Published by Orchard Books (1997)

Grade Level: 3-6



Are You a Butterfly?

Written by Judy Allen
Illustrated by Tudor Humphries

Published by Kingfisher (2003)

Grade Level: K-3

Learning Experiences

1. Merge the milkweed and Monarch life cycles.

To understand the parallel developmental stages of the Monarch and milkweed, use pictures to represent the seedling-to-seedling and butterfly-to-butterfly progression featured in the book. Have your readers color and cut out the pictures. Using the book as a reference, first order the milkweed pictures on the floor or glue them to a sheet of paper. Next, place the Monarch stages next to the milkweed to show when the two life cycles intersect.

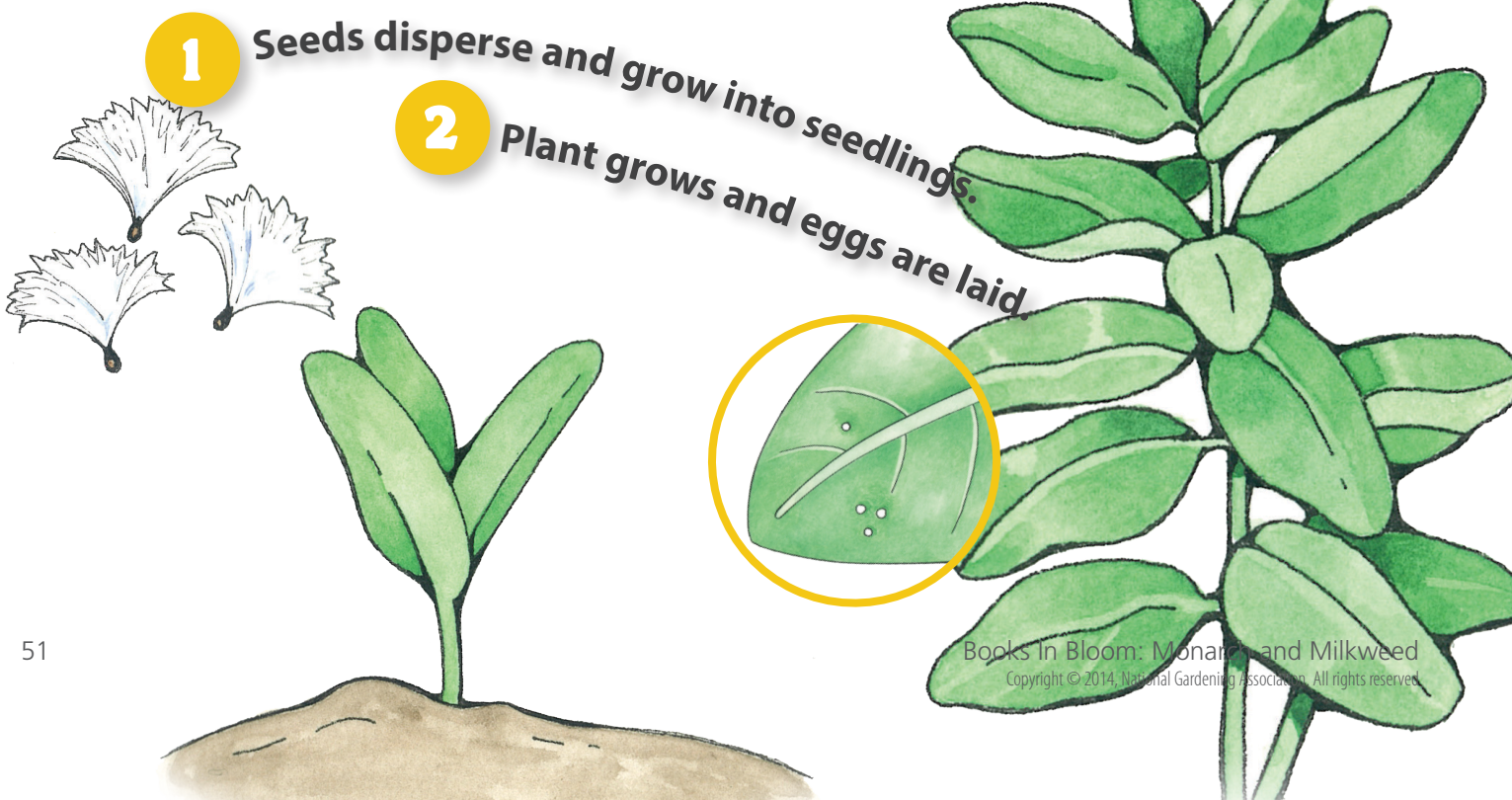
2. Track the migration.

Monarch development and migration is a rich curricular topic, and this multigenerational trek is one of the most beloved natural events in North America. There are many websites that offer up-to-the-minute tracking of the Monarch's migration and videos of metamorphosis. Print a map of North America and, using online resources, draw the various migration routes that Monarchs follow. Depending on reader interest and reading levels, the map can be as simple as the one shown on the end pages of the book, or can be made more complex by adding layers of detail such as migration dates, generations, speed, and specific locations en route.

3. Plant a Monarch way station.

As Monarchs make their journey north and south each year, they must find stops along the way to refuel and reproduce. Create a way-station habitat that provides for all the Monarch's needs, including nectar plants for adults, milkweed for larvae, nearby structures for chrysalis attachment, dark stones for warming in the sun, and puddles for water. Your habitat can be planted directly in the ground, in raised beds, or in containers. In addition to providing a temporary home for Monarchs, your new butterfly habitat will provide the perfect location for observers.

The Life Cycle of the Monarch Butterfly and Milkweed Plant





Lesson Plan

Monarch Migration Map

Objective To explore the journey of the Monarch butterflies.

Time 8 to 10 weeks

Materials

- Map of North America
- Milkweed plants or seeds
- Monarch observation worksheet

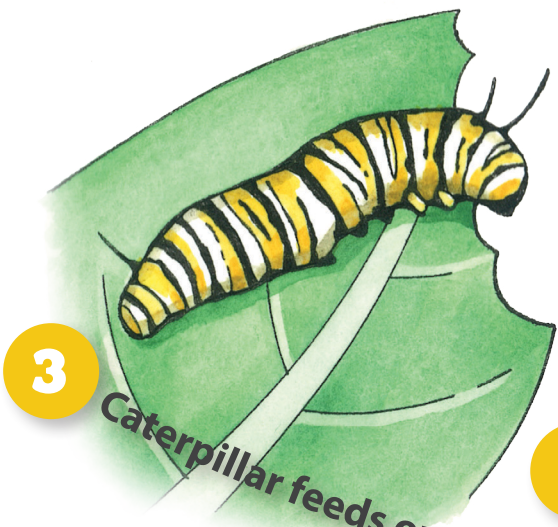
Laying the Groundwork Ask readers:

• **What is the life cycle of a butterfly?**

(Butterflies go through many changes during their lives. A butterfly starts as a small egg, which then hatches into a caterpillar. This caterpillar then feeds on plant leaves and grows. When it reaches a certain size, it builds a chrysalis around itself. Even though it may look like it is dormant and in a sleeping bag, the developing butterfly is busy forming its wings within this structure. In the last stage of its life, the butterfly emerges from its chrysalis and takes flight. It eats nectar and pollen from flowers and lays eggs to complete the life cycle. Butterflies lay their eggs on plants that caterpillars like to eat so that as soon as the young hatch, they can begin growing.)

• **What is migration?**

(Migration refers to the movement of animals, usually seasonal, to find food or more favorable environmental conditions. Monarchs move south each fall to escape cold temperatures and north each spring to find additional food sources.)



3

Caterpillar feeds on growing leaves.

4

Chrysalis forms.

5

Plant flowers and butterflies emerge.

Exploration

1. Using a map of North America, discuss the migration routes that Monarchs follow.
2. Add dates indicating approximately when the Monarchs first reach each stage in their journey to your map, using data submitted to the citizen science project Journey North at www.learner.org/jnorth/monarch/.
Data is available from 1997 to the present.
3. Brainstorm with your readers the reasons that the dates would vary each year.
Temperatures and food availability should top the list.
4. Begin observation in your outdoor space.
Plant milkweed plants in containers, in raised beds, or in the ground and observe regularly. Record temperatures for each day and note how many Monarchs are observed. You can share this data online through the Journey North website with other observers across the country.

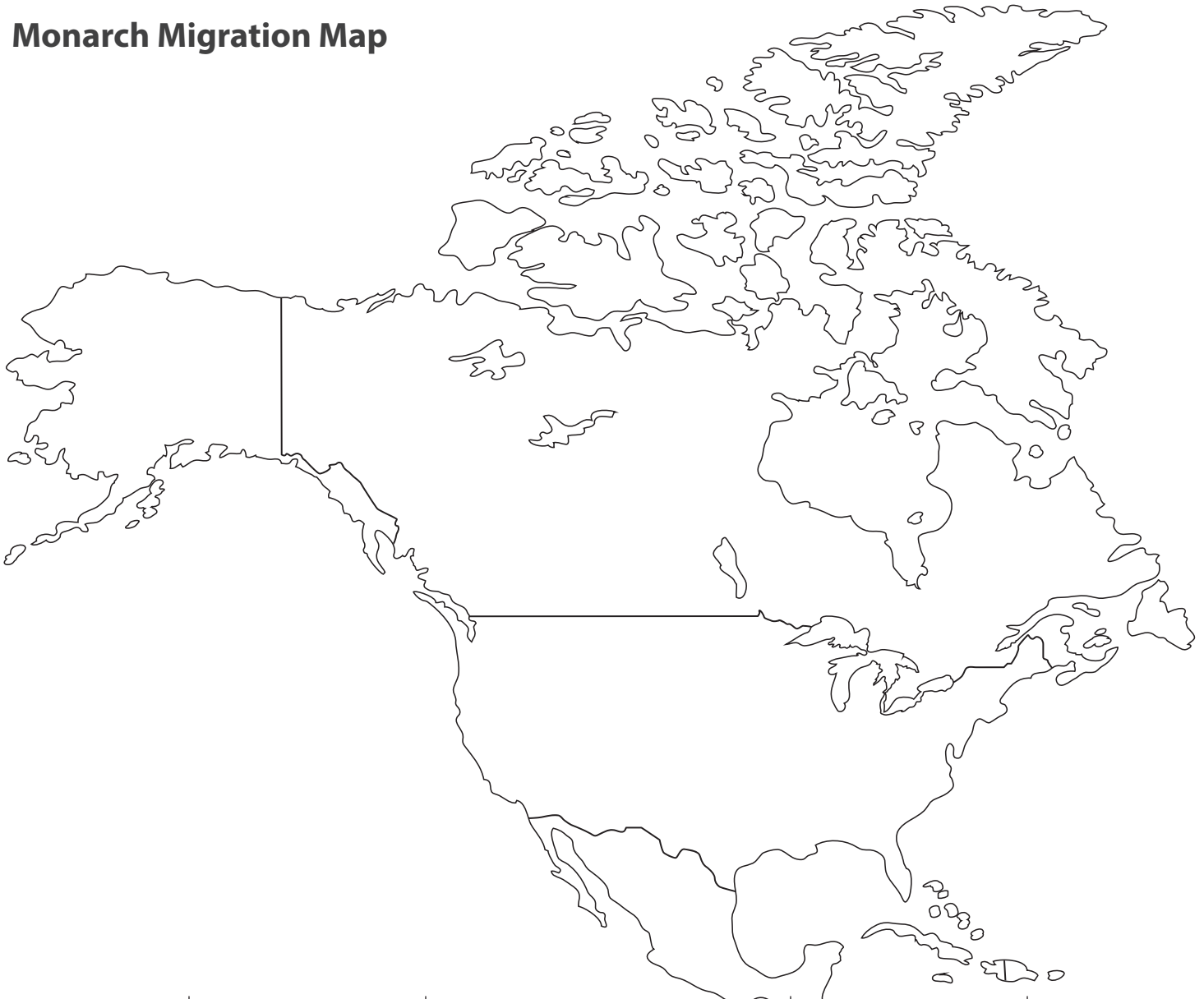
Branching Out Ask students to pretend they are Monarch butterflies and have them write a diary about their journey. Make sure they understand that an individual butterfly does not survive to fly all the way north and back each year, but rather, multiple generations make the journey.



NAME _____

DATE _____

Monarch Migration Map



Date	Temperature		Number of Monarchs Observed
	High	Low	

Date	Temperature		Number of Monarchs Observed
	High	Low	

NAME _____

DATE _____

Life Cycle Stages of the Monarch Butterfly and Milkweed Plant

