



To Fly or Not to Fly!

You can use monarchs to teach about many things! Stone Mountain Memorial Association (SMMA) uses the monarch butterfly to help students apply their knowledge in other contexts and to different disciplines. The activities relate a grade-level specific GPS to monarch life, habitat or migration. Use this lesson as a post-trip activity following your 1st Grade Mountain Meteorology field trip.

GPS correlation: S1.E1.c. Correlate weather data (temperature, precipitation, sky conditions and weather events) to seasonal changes. Map and Globe Skills: 1. Use cardinal directions. 2. Use intermediate directions.

Preparation:

Read the background information. Print the worksheet, or make an overhead or display on your Interactive white board. Make copies for each student or pair of students. You may choose to provide Popsicle sticks and tape for the students to make monarch “signs” from the pictures at the bottom of their worksheets.

Background information:

In this lesson, we will follow a monarch butterfly as it migrates from its summer range in Canada to its overwintering grounds in Mexico. Each autumn this tropical butterfly makes the long journey south to escape the harsh winters of the north. Along the way, they encounter a variety of weather conditions as the season changes. In some of these conditions, monarchs cannot fly.

Monarch butterflies do not fly at night. On average, they can fly during the day if the temperature is above 60°F. On a sunny day, they can usually fly at temperatures as low as 50°F (the sunlight allows them to warm their muscles enough to fly.) Without a true sunny day, their flight threshold, or lowest temperature at which they can fly, is 55°F.

When it’s raining, monarchs do not fly. If they become very wet, their wings are too heavy to take flight. If their wings are only slightly wet, they can remain still until the water evaporates. Often they will bask in the sun to dry their wings.

Tailwinds (northerly winds blowing in the same direction as the monarchs are traveling) will help the monarch to fly faster. When light winds are blowing from the south (headwinds, blowing against the monarch), Monarchs are still able to fly but will need to stay closer to the ground. If the winds are too strong, they will not fly at all.

Activity:

Summarize the background information for the students and review seasonal changes. Read them the essential question so they understand the focus of the lesson. Hand out worksheets.



Students can cut out and make “signs” from the monarch pictures at the bottom of their worksheet. Read the twelve situations allowing the students to make a decision after the question. They can hold up the correct “sign” to answer.

To fly or not to fly! Situations/Questions:

(Answers follow each situation and are italicized.)

1. In late August, a monarch is ready to leave Canada on its migration to Mexico. The sun is shining and the temperature is 65°F. Is this monarch able to fly at this temperature?

Yes, as long as the temperature is at least 50°F and the sun is shining, monarchs can warm their wing muscles and fly!

2. This monarch spent the night in the state of New York. Morning dew has made the monarch’s wings slightly wet but the sun is shining and temperatures are favorable for flight. Can this monarch fly with slightly wet wings?

No, it cannot fly immediately but the warmth of the sun should dry them quickly and then this monarch can continue its journey.

3. Because it started late in the day, this monarch has not flown very many miles today. The sun is beginning to go down. Can this monarch fly after dark?

No, monarchs only fly during daylight hours. Without the warmth of the sun, their wing muscles quickly get cold.

4. After a cold night in Pennsylvania, this monarch is ready to leave for warmer climates. The skies are clear and winds are blowing in the direction that this monarch needs to travel. Can this monarch fly with a “tailwind”?

Yes, the tailwind will actually allow the monarch to travel faster and further.

5. This monarch found refuge in the branches of a maple tree in Kentucky. It was well camouflaged in the colorful leaves there. Each night the temperatures are getting colder. This morning, the temperature is only 45°F. Can this monarch fly now?

No, monarchs need temperatures of at least 55°F to fly or if the sun is shining and the temperature is 50°F, they can warm their wing muscles and fly. If the temperature warms up to this later in the day, then this monarch can fly.

6. Luckily, temperatures warmed in the late morning to 60°F and this monarch was able to fly into Tennessee. Many wildflowers were blooming in the fields this September and the monarch stopped to drink the sweet nectar. It is late afternoon; the sun is shining. Can this monarch continue its journey?

Yes, it can continue to fly until dusk. Then it must find a place to spend the night.

7. Today’s destination is Arkansas but this monarch will need to fly many miles in order to get there. The weather seems to be changing. Light winds are blowing towards the monarch. Can it fly with this “headwind”?

Yes, this monarch can fly with light headwinds but it will need to fly low (close to the ground).



8. Today it is raining! Can this monarch fly in the rain?

No, monarchs cannot fly in the rain. It will need to wait until the rain stops.

9. Finally the sun breaks through on this October morning and everything including the monarch begins to dry. Temperatures warm and by late morning, its wings are dry. Can this monarch continue its journey?

Yes, if temperatures are at least 50°F, sunny and its wings are dry, this monarch can fly.

10. This monarch flies into Texas. There are many other monarchs that are all flying in the same direction. Look at the map of North America. In which direction were the monarchs flying on their journey from Canada?

Monarchs traveled southwest until they reached Texas and then turned due south.

11. Even though the sun is shining today, the temperature is below 30°F. This monarch shivers to try to warm its wing muscles. Is it too cold to fly?

Yes, this temperature is simply too cold for flight. Perhaps later in the day, temperatures will warm enough so that this monarch can fly south of the U.S. border into Mexico.

12. Luckily temperatures did warm to 50°F in the late afternoon and all of the monarchs crossed the border into Mexico. By November 1st, they reached the state of Michoacan and came to rest in a beautiful oyamel fir forest in the Transvolcanic Mountains. The months ahead would be the coldest of the year. Freezing temperatures, snow and ice could be deadly for the monarchs if they were not protected by the trees. In what season did the monarchs migrate from Canada to Mexico? In what season will the monarchs live in Mexico?

The monarch's migration south into Mexico occurs during the autumn season. They will spend all winter in Mexico, returning to the U.S. in March.



Essential Question:

What kinds of weather allow monarch butterflies to travel to Mexico?



Cut out the monarch pictures below. You can use a Popsicle stick and tape to make “signs.” Hold up the correct “sign” to answer each question about monarch flight.

