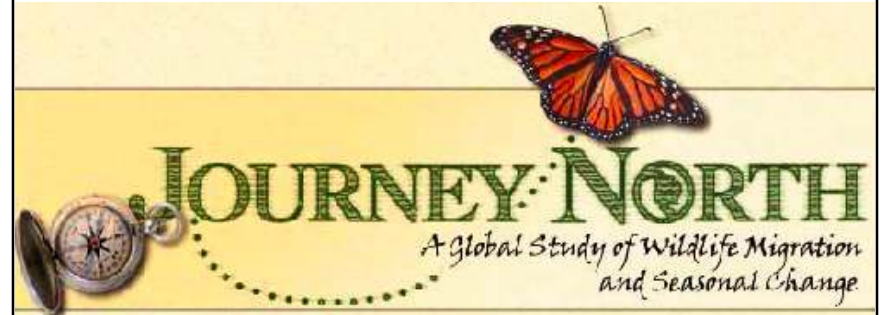




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How High Do Monarchs Fly? And How Do Scientists Know?



by Elizabeth Howard

People have seen monarchs flying over schoolyards and high above the trees. People have seen monarchs gliding by apartment windows and soaring as high as the eye can see.

How high do monarchs fly? Let's find out what scientists know — and don't know— about the height of monarch flight.

This is the city of Dallas, Texas. People have seen monarchs flying past their office windows in downtown Dallas!



One observer saw monarchs from the **10th floor**. How high is that?

1

This observer saw monarchs from the **33rd floor** window. How high do we know monarchs fly based on this observation?



This observer saw monarchs from the **39th floor!** Do you think monarchs can go any higher?



2

This observer saw monarchs flying past the **54th floor**. Wow! That's the tallest skyscraper in Dallas!

- How high do we know monarchs can fly, based on these observations?
- If monarchs can go any higher, how might people be able to observe them?



People have seen monarchs from hot air balloons while floating above the Earth. But scientists have not collected monarch observations like these. Can you think of reasons why?



3

"Locate the birds, and you locate the butterflies," says scientist and glider pilot Dr. David Gibo. Many hawks and monarchs use air currents called "thermals" to soar and glide. Glider pilots use thermals, too.

Dr. Gibo studies monarch flight by comparing gliders and monarchs. He collects observations from glider pilots, too. In Massachusetts, a pilot reported monarchs soaring at 4,500 ft and moving about 19 miles per hour. In Nebraska they were spotted at 4,900 ft along with corn husks!



4

One of the highest monarchs ever seen was spotted by a glider pilot. The monarch and the glider were soaring at 11,000 feet.



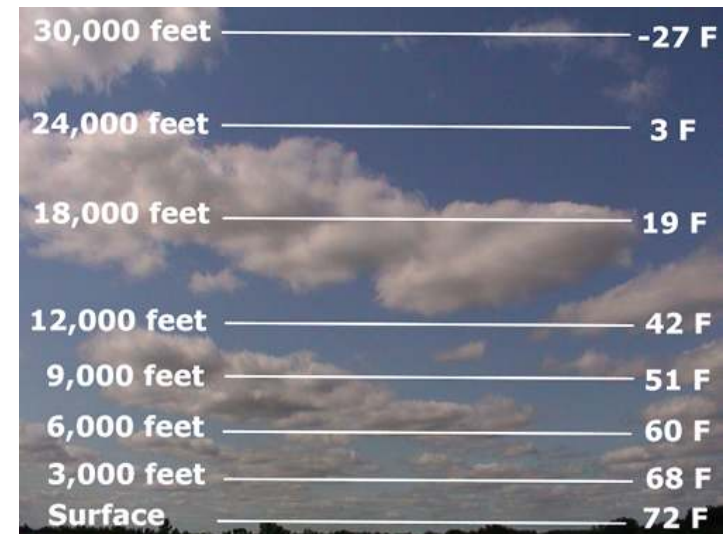
The highest monarchs ever seen were spotted by commercial pilots at 10,000 to 13,000 feet. That's more than 2 miles (3,000 to 4000 meters) above the Earth's surface!



Monarchs have a temperature problem. They can't fly if they are cold. This could be a clue about how high monarchs can fly.

"We generally assume that monarchs can fly if it is above 60 degrees F, and above 50 degrees if it is sunny. The sun allows them to warm their flight muscles enough to fly," says Dr. Karen Oberhauser.

This graphic shows air temperatures on a typical day in early fall. If a monarch went higher and higher it would get colder and colder. What is the highest a monarch could possibly fly at the altitudes shown here?



This is a warm day. Picture what will happen to temperatures later in the fall.

Monarch scientists get clues about migration — and ways to study migration — from other insect research. Here are two examples:

- **Radio transmitters & dragonfly migration:** Dragonflies and monarchs are often seen migrating at the same time and under the same weather conditions. Tiny radio transmitters are used to track dragonflies. However, these are too heavy for monarchs, because the transmitters weigh .3 grams and a monarch weighs .5 grams. Maybe miniature monarch tags will be invented someday.
- **Radar & insect migration:** Millions of tons of insects are aloft in Earth's atmosphere at any given moment, say scientists who use a special "vertical-looking radar" to study their movements. Scientists have detected insects that use high altitude winds to travel at 1,500-7,200 feet.



So how high do monarchs fly during migration? We know they disappear when they fly overhead, and we know a few have been spotted at 13,000 feet. But what happens in between? You can wonder along with the scientists!

Try This! At What Height do Monarchs Disappear?

- **How High Can You See a Monarch?**
<http://www.learner.org/jnorth/tm/monarch/FlightAltitude.html>
- **Monarch Migration Eye Test**
http://www.learner.org/jnorth/images/graphics/monarch/sl/flight/EyeTest1_480.html
- **Dr. Brower's Flight Height Experiment**
<http://www.learner.org/jnorth/tm/monarch/HeightTestLPB.html>



Dr. Brower conducting research to answer a burning question.

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