Essential Question:
The habitat of the monarch butterfly both in Georgia and Mexico has been affected by weather, plants, animals and people. Listen carefully to each situation. Which one of these factors has affected the habitat? There will be one correct answer for each situation.

Use a marker to hold a place on the HABITAT BOARD for each correct answer. You may only use one marker for each situation read. The monarch butterfly symbol is a free space. Try to fill every space in one row or in one column to win!

HABITAT BOARD

 WEATHER	 PLANTS	 FREE SPACE	 PEOPLE	 ANIMALS
 ANIMALS	 FREE SPACE	 PLANTS	 PEOPLE	 WEATHER
 PLANTS	 WEATHER	 PEOPLE	 FREE SPACE	 PLANTS
 FREE SPACE	 ANIMALS	 WEATHER	 WEATHER	 PLANTS
 PEOPLE	 PLANTS	 ANIMALS	 ANIMALS	 FREE SPACE

How Do These Monarchs Measure Up?

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 2nd Grade Stone Mountain Animal Life Cycles field trip.

GPS correlation: M2M1. Students will know the standard units of inch, foot, yard and metric units of centimeter and meter and measure length to the nearest inch or centimeter. a. Compare the relationship of one unit to another by measuring objects twice using different units each time. b. Estimate lengths, and then measure to determine if estimations were reasonable.

Preparation:

Read the background information. Print the worksheets, or make an overhead or display on your Interactive white board. Make copies for each student or pair of students. Rulers with inch and centimeter markings are needed for this activity. If rulers are not available, use this pdf http://inst.eecs.berkeley.edu/~ee192/sp09/documents/ruler.pdf.

Background information:

The life cycle of the monarch butterfly is an example of complete metamorphosis. Female monarchs lay single eggs on milkweed plants. Eggs are very small (0.12 cm in height and 0.09 cm wide). After about 4 days, caterpillars emerge and eat the milkweed leaves.

When the caterpillars grow and become too large for their exoskeleton, they molt or shed their "skin." The intervals between molts are called instars. Monarchs go through five instars. The approximate length of the body at each instar stage is as follows: 1st instar, 0.2 – 0.6 cm; 2nd instar, 0.6 – 0.9 cm; 3rd instar, 1.0 – 1.4 cm; 4th instar, 1.3 – 2.5 cm; 5th instar, 2.5 – 4.5 cm. This process takes about 9 -14 days. (Two of the monarch instars, the 4th and 1st, are pictured in the student worksheet. These drawings are taken from the copyrighted publication "A Field Guide to Monarch Caterpillars *(Danaus plexippus)*" by Oberhauser and Kuda and are used with the written permisson of Dr. Oberhauser.)

The next stage of metamorphosis is the pupa, or chrysalis, which lasts 10-14 days before the adult emerges. Chrysalides average 2.4 cm in length and 1.1 cm in width. Adults that emerge in the spring and summer months usually live for 2 – 5 weeks. The wingspan of the adult monarch can range from 8.6 to 12.4 cm.

Activity:

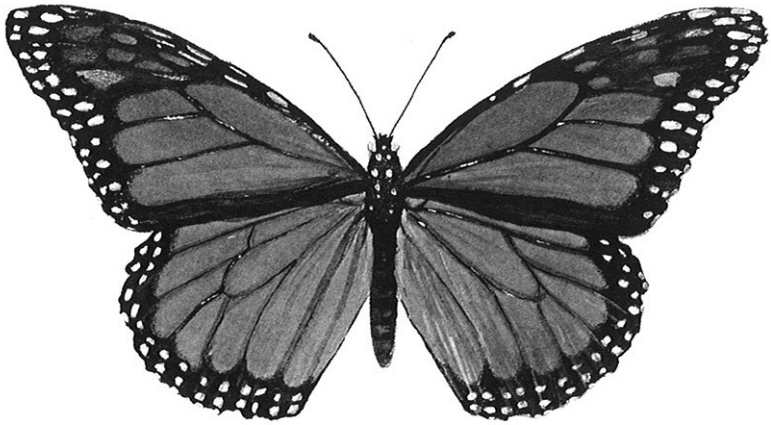
Read the background information to students. Read them the essential question so they understand the focus of the lesson. Hand out worksheets and rulers with centimeter and inch markings.

Essential Question:
Compare the centimeter and inch measurements of these insects. How do you estimate the length of the caterpillar?

First measure this monarch caterpillar using a centimeter ruler. _____ centimeters
Measure only the body. Do not include the tentacles.
Then measure it using an inch ruler. _____ inches

This drawing is actually 5 times larger than the real caterpillar.

Now measure this monarch butterfly using the centimeter ruler. _____ centimeters
Measure the wingspan from wing tip to wing tip at the widest point.
Now measure it using the inch ruler. _____ inches



This photograph is the actual size of a monarch butterfly.

Estimate the length of this caterpillar in centimeters _____ and inches _____.

Now measure it using a centimeter ruler and then an inch ruler. _____ centimeters
_____ inches

This drawing is actually 10 times larger than the real caterpillar.

Were your estimates reasonable? Why or why not? _____

Each measurement is made to the closest cm or in.

Monarch caterpillar	6 centimeters 2 inches
Monarch butterfly	11 centimeters 4 inches
Smaller caterpillar	3 centimeters 1 inch

Estimates will vary. As will answers to the final quesions depending on the student's estimates.