

Grade 3 Lesson 1

Learning math with lichens.

You can use monarchs to teach about anything! 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.

GPS correlation: M3N3 Solve problems involving subtraction and addition. M3P1(a,b) Build math knowledge through problem solving. Solve math problems in other contexts. M3P4(c) recognize and apply math in other contexts.

Preparation: Read the background information. Print the worksheet, or make an overhead or display on your Promethean Board. Make copies for each.

Background Information: Monarchs spend spring and summer in Canada and the United States and overwinter in Mexico. Each habitat contains different rocks on which lichen grows. In this lesson we use math to answer questions a scientist may have if working with different types of rock.

Lichens are two organisms, algae and fungi, living in a symbiotic relationship. Lichens are the first organisms to grow on bare rock. Like water and wind they are responsible for breaking down, or weathering, rocks. Lichens growth rate is extremely slow. It is influenced by moisture and temperature. Lichens prefer cool temperatures and adequate moisture since they cannot store water.

One type of rock that lichens grow on is granite, like Stone Mountain. Stone Mountain's granite quarries operated for 100 years. Quarries are areas of rock with enough economic value that people will cut or blast out stone. Some quarries can operate for decades and cut fresh stone daily. Other quarries may be closed because the stone is no longer in demand allowing lichens and plants to grow back. Quarries were located at five different areas around the mountain. The quarries closed in 1950 because the land was sold to the state of Georgia for use as a park.

Lichen can also grow on volcanic rock like that found in the Transvolcanic Mountains in Mexico. The geology of this Mexican range consists of very high, old volcanic mountains. The volcanic rock, usually known as scoria, is very jagged, rough and has many small holes. Still it has been quarried and used for centuries in construction. A recently reconstructed ancient ceremonial site, called Tzintzuntzan, has round ceremonial platforms and a huge, rectangular council house platform built of this volcanic rock.

Activity: Tell the students the background information. Read them the essential question so they understand the focus of the lesson.

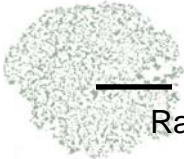
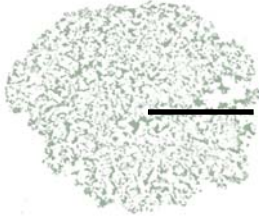


Essential Question: How can I use math to solve problems in science, such as how long does lichen take to grow?

<p>Stone Mountain Granite Quarry Site</p> <p>We first saw lichen grow in 1935. We blasted off the rock in _____</p> <p>Lichen grows on granite in _____ years.</p>	<p>Tzintzuntzan Ceremonial Site of Scoria</p> <p>We first saw lichen grow in 1983. We rebuilt the ceremonial site in _____</p> <p>Lichen grows on scoria in _____ years.</p>
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In what year would we first expect to see lichen growing on a rock we scraped clean?

<p>Stone Mountain Granite Quarry Site</p> <p>We cleaned lichen off granite in 1935. Lichen grows on granite in + _____ years.</p> <p>We expect to see lichens in year _____.</p>	<p>Tzintzuntzan Ceremonial Site of Scoria</p> <p>We rebuilt the house platform in 1973. Lichen grows on scoria in + _____ years.</p> <p>We expect to see lichens in year _____.</p>
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<p>What size lichen may a scientist see at each spot?</p>  <p>Radius = 2 inches</p> <p>What is the diameter?</p>	 <p>Radius = 3 inches</p> <p>What is the diameter?</p>
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3rd grade lesson answers

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Stone Mountain Granite Quarry Site	Tzintzuntzan Ceremonial Site of Scoria
Lichen grows on granite in <u> 25 </u> years.	Lichen grows on scoria in <u> 21 </u> years.

Stone Mountain Granite Quarry Site	Tzintzuntzan Ceremonial Site of Scoria
Lichen grows on granite in + <u> 25 </u> years.	Lichen grows on scoria in + <u> 21 </u> years.
We expect to see lichens in year <u> 1960 </u> .	We expect to see lichens in year <u> 1994 </u> .
What size would you see at each spot?	
4 inches	6 inches