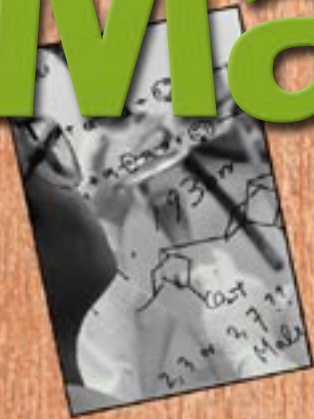


# Math Trail



Discover  
Paris  
Mountain  
STATE PARK

## FRIENDS OF PARIS MOUNTAIN STATE PARK

### The Math Trail at Paris Mountain State Park

Just a short drive from downtown Greenville, Paris Mountain State Park ([discoversouthcarolina.com/stateparks/](http://discoversouthcarolina.com/stateparks/)) is a haven for those seeking a quiet place in a mountain setting. Formerly a watershed for the city, Paris Mountain is one of the oldest protected areas in the state. This 1,275-acre park is well known for its stands of large trees, lake swimming, hiking and numerous picnic areas.

What is a Math Trail? It's a mathematical journey anywhere - on a city street, in a garden or museum, at the Mall - even on a trail at a Paris Mountain State Park. We're about to explore math on a park trail. Hopefully, you will learn some new math concepts, some new ideas about math and look at math a little differently. Teachers at Paris Elementary, and middle and high school teachers from different areas of South Carolina helped to develop the activities on this Math Trail. They found examples of math concepts and math problems along a trail. We hope this math trail gives you a new view of math and nature, math and community, and math and you!



The Math trail at Paris Mountain State Park is based on the Nature Trail around Lake Placid. Use the Post Markers as a guide for the math activities suggested.

### ACTIVITIES

**1.** Before going on the trail, make a list of five items you think you will see on the trail. Keep a tally of those items. Stop recording when you count twenty of the same item. At the end of the walk you can examine your data, graph it in a bar graph or a pictograph, and calculate the percent of each type of item found, then create a circle graph. What other ideas do you have?



**2.** Begin the Math Trail at the Education Center (Bathhouse). Look closely at the steps going down to Lake Placid. If you have a partner, take turns walking down the steps, with ONE of you placing your hand on the head or shoulder of the person in front of you. Notice which steps feel different as your partner walks down them. Then, you step down behind them. Trade places and repeat the activity. If you are alone, use a yardstick or other measure to find differences in the step heights and treads. Find a straight stick and lay it from one step to another. As you move it, notice the difference of the "steepness" of the stick on different steps. This is called the slope. Which slope makes the most comfortable stepping down the stairs?

**3.** Turn to the left at the bottom of the steps. Walk along the lake until you come to the footbridge. Before crossing, estimate how many steps you will take to walk across. Walk across and stop at Post 1. Compare your estimate with the number of steps you actually took. Remember that number - you will use it later on the trail!

**4.** As you walk along the trail to Post 2, notice the symmetry in the leaves and plants. Symmetry is when the two halves of something are exactly the same. Think of a butterfly, a heart shape. These shapes have symmetry. What do you see that has symmetry?



**5.** Stop at Post 2. Notice the different patterns in the bark of the trees. Can you identify the trees by name? Identify trees that are the same kind of tree by the bark. How else can you identify the same species of tree?

**6.** As you walk along the trail, look across Lake Placid at the dock. Estimate how far it is across the Lake. What strategies could you use to determine the actual distance? Discuss them with a partner or group (if you are with one). Continue recording items you find on the trail.

**7.** After passing Post 3, walk about 20-30 paces and you will come to a place where there are fallen trees on the side of the trail near the lake. You can explore the relationship (ratio) of the circumference (the measure around the tree) to the diameter (the distance across the tree at its middle). Take any item you have that could be used as a measure (a string, a belt, and a scarf). Measure across the tree's diameter and keep that measure marked with your finger or by tying a knot in the scarf or string. Using that marked measure, measure how many times you can go around the circumference of the tree. Repeat this with three or four trees of different diameter. What did you discover about the measure of the circumference to the diameter?

**8.** At Post 4, look for more patterns in the trees, their bark, their leaves and other items in nature. Pinecones have a remarkable mathematical property called Fibonacci Spirals. Fibonacci was a famous mathematician of the Middle Ages. He discovered a sequence that seems very simple: the first two numbers are 1, and the next term is found by adding the two previous numbers. For example, 1 is the first term, 1 is the second term, 2 ( $1+1$ ) is the third term, 3 ( $2+1$ ) is the fourth term, 5 ( $3+2$ ) is the fifth term. What are the sixth, seventh and eighth terms? Yes, 8 ( $5+3$ ), 13 ( $8+5$ ) and 21 ( $13+8$ )! The interesting thing about the pinecone and Fibonacci is that if you look at the bracts in the spirals, one set rises steeply and one rises gradually from the base of the pinecone. If you count the numbers of bracts in the two spirals, they are nearly always the two adjacent numbers on the Fibonacci sequence! Artichokes

and pineapples also have these Fibonacci ratios.

**9.** As you walk beyond Post 5, down the trail to the waterfall, and cross the bridge at the waterfall, what kinds of math problems can you create thinking about the waterfall? How high is it? How fast (what velocity) is the water flowing down the waterfall and the stream?



**10.** At Post 6, at the other side of the waterfall, stop and look at the patterns in the rocks in the dam. How can you use this to estimate the height of the dam? The dam was built in 1898. How old is it? How many years before you were born was the dam built?

**11.** Continue walking along the Lake Placid Trail enjoying Nature and thinking about math. At Post 7, you will see Shelter 1. Notice the geometry used in the building of this shelter, the angles of the beams. What do you estimate their measure to be? How could you measure the angles?

**12.** Do you remember the number of steps you made when you crossed the footbridge at the beginning of the Math Trail? As you continue on from Shelter 1 along the trail back to the Education Center, you will soon cross a larger footbridge. Use your estimate from the first footbridge to determine how many steps will it take you to cross this bridge. How far is it across the bridge in feet? yards? What strategies can you use to determine the length?

**13.** After crossing the footbridge, bear to the right and walk through the picnic flats. Count the number of tables. How many people can sit at each table? How many people can picnic in the picnic flats at one time?



**14.** As you walk back to the Education Center, think about the math activities we have done or thought about on the Math Trail. You have worked on math problems in the following topics: numbers and number sense, algebra, data, geometry and measurement.

**Isn't it surprising and enlightening what can happen when you take mathematics out of the classroom and search for it on a wooded trail!!!**

