

THE GEOLOGY OF THE TAYLORS FALLS AREA AND IN PARTICULAR THE TAYLORS FALLS INTERSTATE STATE PARK

Objectives:

1. Receive a comprehensive view of how the igneous and sedimentary rock was formed in this area.
2. Get an understanding and appreciation for changes made by the Wisconsin Ice Age and gain an insight into the power of mile thick ice sheet in motion.
3. Learn how giant potholes or glacial kettles were formed providing the largest collection of above ground glacial kettles in the world

LESSON OVERVIEW:

The area of the Minnesota Interstate State Park has many unique geological features found anywhere in the world. From the formation of the basalt rock to the area being a saltwater sea shore. In more modern times, the effects of the ice ages giving us the beautiful Dalles of the St. Croix that we have today.

CLASS TIME:

1. Eleven hundred million years ago huge stresses on, what we now know as North America, were pulling outward to the east and west coasts. These, stresses, caused large cracks in the earth's crust known as volcanic vents. These vents opened up from Canada down to Kansas. Magma flowed upward through these cracks and cooled into the grey, hard, basalt rock that we have today. There are seven layers of basalt from the bottom of the river to the tops of the cliffs and the rock is between one and seven miles deep.

2. Many events occurred from the formation of the basalt until Minnesota became an ocean state. However, much of the evidence was destroyed by later events.

During the Cambrian Era, Minnesota was a salt water seashore. The sea approached and receded many times before it left the area. The farthest north the seas traveled was near Grantsburg, Wisconsin. The pounding of the waves from huge storms at sea caused sandstone to be formed. The sandstone in this area is known as Franconia sandstone, named for the small community of Franconia in this area. In the sandstone, fossils can still be found. These fossils are trilobites and primary mollusks which were considered to be the most advanced life form

during that time period. When the large waves of the Cambrian seas hit the outcropping of the basalt rock it broke up the rock and encased the ancient rock in Cambrian sand. This is known as conglomerate and considered some of the rarest in the world

3. Minnesota was covered with ice several times. The last ice age was about 100,000 years ago and known as the Wisconsin ice age due to its impact on the state of Wisconsin.

Ice was formed from snow piling up, when it was deep enough the pressure from the weight of the snow created ice. This ice sheet was one mile thick. As the glacier moved it made many changes to this area.

4. As the glacier melted, Glacial Lake Duluth, (present day Lake Superior) also was in the process of being formed. Glacial Lake Duluth rose up 800 feet higher than it is today due to the portion of the glacier near, Sioux Saint Marie, Michigan, which had not yet melted. This portion of the glacier created a barrier preventing the water from flowing to the Atlantic Ocean. As it overflowed it carved out the present day Brule and St. Croix Rivers on its way to the Mississippi river and then on to the gulf of Mexico. During the melting process the glacial St. Croix River was 200 feet higher than it is today and between three and five miles wide. Many consider it to be the largest river in the world at the time.

When the river hit the basalt rock in this area huge whirlpools were formed. These whirlpools picked up pieces of rock known as grinders that drilled these large, deep holes in the rock. The Minnesota Interstate State Park has the largest collection of glacial kettles in the world. The largest glacial kettle is known as the Bottomless Pit and is 60 feet deep and 20 feet in diameter and is inside the Interstate Park.

These glacial kettles were eventually discovered by a Swiss geologist just prior to 1895. Since these kettles were filled with rock and sediment they were not visible to the untrained eye. Many of these have been excavated and are available for your inspection.

DISCUSSION QUESTIONS:

1. How can you tell when one layer of basalt rock ends and the next begins?
2. Why are we unable to tell what happened in the area between the time the rock was formed and present day?
3. If the glacial kettles are formed by whirlpools, why do they have different shapes?

STUDENT' REVIEW QUESTIONS:

Name _____

Date _____

1. What is the name of the boat you are riding on? _____
2. Name three rock formations that you have seen on the Scenic Boat Tour.

3. What is the Captain's name? _____
4. What river are you traveling on? _____
5. What two states are you going between? _____
6. What is the name of the grey colored rock? _____
7. What is the brown colored rock? _____
8. What do you call the hard grey rock encased in Cambrian sand? _____
9. Why does the pothole "Bottomless Pit" have its name? _____
10. Name a mineral that is commonly present in the basalt rock? _____
11. What are vesicles? Geology speaking. _____
12. Name a fossil present in the sandstone? _____