

Trip Schedule

9:00 a.m.	Meet at Caledonia Furnace Parking Area, Route 30 and 233
9:05 a.m.	Depart
9:20 a.m.	Stop 1. PennDot Shed, U.S. Rte. 30, Cashtown, Metarhyolite
9:45 a.m.	Depart
10:00 a.m.	Stop 2. Buchcannon Valley Fire Department, Metabasalt, Phyllite
10:25 a.m.	Depart
10:40 a.m.	Stop 3. Paramount Senior Complex, Quartzite
11:00 a.m.	Depart
11:20 a.m.	Stop 4. Long Pine Run Reservoir, Water Resources
11:40 p.m.	Depart
12:00 p.m.	Stop 5. Rte. 997 Site, Sandstone, Limestone Valley and Wrap Up
12:30 p.m.	Depart. End of Trip

Stop 1. Penn Dot Shed, Rte. 30 East near Cashtown

Formation Name – Catoctin

Metarhyolite – Rhyolite is an igneous rock that was once lava. Its composition is like granite. The only difference is that granite forms into a rock inside the earth. This proves that volcanoes were in this area at one time. Rhyolitic lava represents volcanoes that formed on the continent. Rhyolite is composed of mostly quartz and feldspar. The letters “meta” is front of the title represents that this rock was changed by heat and pressure later in time when Africa and North America collided to help to form the supercontinent Pangaea.

Present at this site are vertical lines of the metarhyolite that are called slickensides. These were formed during the collision when other rock slid against the these rocks. We are standing on a major fault that parallels U.S. Rte. 30 through South Mountain that is known as the Carbaugh-Marsh Creek Fault.

Stop 2. Buchannon Valley Fire Company

Formation - Catoctin

Metasbasalt – Basalt is another igneous rock that was formed in the ocean. Our oceanic crusts around the world are composed of basalt. The rock is a greenish color due to its mineral chlorite and epidote. Again, the “meta” represents some change in the rock during the collision between Africa and North America.

Another rock found here is known as phyllite. Phyllite is a metamorphic rock that was once shale or in this case, being associated with volcanic rocks, was probably a volcanic shale. The silky appearance to this rock is created by the presence of small flakes of mica in the rock.

You may also find a rock that contains small squarish fragments glued together. This is an igneous rock known as a tuff. The tuff was originally volcanic ash that was naturally glued together and compressed into a rock.

Stop 3. Paramount Senior Complex

Formation – Weverton

Quartzite is a metamorphic rock that was originally sandstone. The presence of Weverton Formation quartzite represents a change of the environment from a volcanic area to a sea migration. The sandstone formed in a shallow ocean and the sand was later naturally cemented together with quartz (silica). During the African-North American collision, heat and pressure melted the quartz fragments into larger grains so this rock has a coarser texture. The brownish and yellowish colors are due to a small amount of iron oxide (better to you known as rust). Notice how the quartzite makes up hills here, meaning it is a fairly resistant rock to weathering and erosion.

Stop 4. Long Pine Run Reservoir

Formation – Harpers

This stop is dedicated more to our important water resources than a rock collecting stop. Have you ever thought about where does water come from? How much water does Earth contain? Is Earth producing water any longer? First, our planet is no longer producing water. Our water was produced very early in the history of the Earth and is now a part of the hydrologic cycle. So, the water we have is the water we have. Therefore we need to preserve and protect our water resources. Most of the stream that flow through South Mountain originate from springs, the intersection between water table and the surface. Sometimes springs develop along a fault, a fracture in the earth where the rocks have been shifted by forces.

A well is drilled into the ground to supply water for a house or business. How many of you have a well at home? A well having a yield of 3 gallons per minute is a minimal amount for a household. The driller finds an aquifer, which is a rock that stores or transmits water through it. Sandstone and limestone are good aquifers. Volcanic rocks are usually marginal. Because of the way the rocks lay in part of South Mountain, many of the wells used by the houses in the Laurel Lake area north of here have an artesian well. An artesian well allows the water to run down slope underground and out of the well without any pumping required.

This reservoir was built in the late 1960's by the Borough of Chambersburg for updating their water facilities. This reservoir contains pristine clear water and is 151 acres in size. The lake contains 1.78 billion gallons of water. Their old reservoir, known as the Birch Run Reservoir is located on the east side of Pa. Rte. 233 about 1.5 miles to our east. That reservoir has been destroyed and is returning back into a natural ecosystem.

Stop 5. Rte. 997 North Site

Formation – Antietam

Our final stop brings us the youngest rock found in South Mountain. This stop will allow the students to collect a sedimentary rock known as sandstone. The rock will have a sand paper feel to it and basically is composed of sand grains glued together with silica. The brownish and reddish color is due to a small amount of iron oxide in the rock. The sandstone represents a near-beach environment and some geologists even think the Antietam Formation represents barrier islands. In the nearby Mt. Cydonia Quarry on the south side of Rte. 30, huge ripple marks were found 30 years ago, telling geologists that those layers were formed at the beach.

Another reason we stopped here is that some of the sandstone contain a fossil known as *Skolithos linearis*. These are tube like structures that run perpendicular to the bedding (layering) of the rock. Geologists believe these were marine worm burrows, but the problem is that the worm has never been discovered. Without proof, we cannot say 100% that they were burrows.

Because of time, we are not able to do two other important stops but you may want to do these on your own:

Pond Bank Recreational Area is located on the east side of Pa. Rte. 997 several miles south of U.S. Rte. 30.

POND BANK IRON OPERATION: Formation(s) Involved: Antietam and Tomstown

1. Within South Mountain, iron ore in the form of goethite (aka limonite) has formed along the contact between the Antietam formation (sandstone and quartzite) and the Tomstown formation (limestone). The ore is formed in the soils overlying this area or found in a fault between the two rock formations.
2. With weathering and erosion, much rock has been transported off of South Mountain making what we call a residual deposit in which the iron was found.
3. Here was an 19th century operation known as Pond Bank. In those days, mines were known as banks.
4. This operation was worked in the mid 1800's for a short period (ore was only 36-53% metallic iron and not usually thick).
5. Bank covers about 2.25 acres with a depth at the north end of 35 feet. A dump of non-useable materials is found to the east of the pond. Little quality goethite is found lying on the dumps.
6. No machinery was available at this time. All of the work was conducted with a pick and shovel.
7. Ore was removed from the pit by horse and cart.
8. A railroad (later known as the Pennsylvania) ran went by the bank for transportation uses.
9. Dynamite was not used commercially until 1890. Black powder was used to blast the rock loose.
10. Small amount of pyrite was found here during mining.

11. In areas of iron mines were furnaces to produce the products. In South Mountain, four furnaces are found; Pine Grove, Maria, Mount Alto and Caledonia.

12. Three elements were needed to operate a furnace: iron ore, limestone (flux), and wood (charcoal).

13. Much wood was used to make the charcoal. Approximately 4 acres of woodlands were needed per week. Charcoal terraces are common throughout South Mountain.

14. Examine the small stream flowing on the north side of the pond. Notice the reddish color caused by iron residual lying on the bottom of the stream. The pH of the water is under a 4.

15. Workers in the banks were paid ~\$0.25 - \$1.25/week

Caledonia Furnace – Our meeting location this morning, has a wonderful loop trail that shows how an iron furnace operated and the history of this furnace. It was one of the few furnaces destroyed by the Confederates in 1863 as they passed through here on their way to Gettysburg. For more information on this, go to <http://explorepahistory.com/hmarker.php?markerId=1-A-1DE>.

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