WELCOME TO ALABAMA THE BEAUTIFUL!

LOCAL FIELD STUDY OF NORTH AND CENTRAL ALABAMA
BY: ROBERT KEITH GOLDEN

Photo: View of Downtown Birmingham from Vulcan Park atop Red Mountain. Photo by Keith Golden
Table of Contents:

1. Overview Maps:
   1. Relief Map
   2. Watershed Map

2. Introduction Section:
   
   General Information about North/Central Alabama
   Discovery: The Exploration of Alabama
   The Birth of the “Magic City”
   Engineered For the Future

   Introduction to the Geosciences of Alabama
   Meteorology vs. Climatology
   Climate of Alabama
   Climatic Regions
   Weather of Alabama
   Types of Weather
   Main Threats
   “Dixie Alley”

   Geologic Overview
   Physiographic Regions of Alabama
   Geologic Time in Alabama

   Astronomy
   Environmental Science and Impacts on Alabama
   Invasive Species
   Mining Concerns
   Gulf Oil Spill of 2010

3. Overview of Field Trip:

   Things to Consider Before Trip
   What to bring
   Possible Hazards
   Costs
   Overview Map of Daily Stop Locations
4. Itinerary:

**DAY 0:** Arrival at Birmingham-Shuttlesworth International Airport

**Day 1:**
1. Vulcan Park
2. US HWY 280 cut through Red Mountain
3. Ruffner Mountain Nature Center
4. Sloss Furnace

**Day 2:**
1. Noccalula Falls
2. Little River Canyon National Preserve
3. Cathedral Caverns State Park

**Day 3:**
U.S. Space and Rocket Center

**Day 4:**
1. I-65--Pottsville Formation (upper part of the Pennsylvanian)
2. Locust Fork of the Warrior River
3. Rickwood Caverns State Park

**Day 5:**
1. U.S. Hwy 78--Pottsville Formation (lower Pennsylvanian)
2. April 27, 2011 tornado damage path in Pleasant Grove/Pratt City
3. McWane Center

**Day 6:**
1. Anniston Museum of Natural History
2. Cheaha State Park

**Day 7:**
1. Sylacauga Marble Quarry
2. Wetumpka Meteor Crater
3. National Weather Service Office in Calera, AL

5. References Section

**All sourced material will be attributed in their respective sections.**

List of hotel stays and dining for each day

**Return to Table of Contents**
1. OVERVIEW MAPS:
Relief Map:

Map: Relief map of Alabama illustrating the varied topography of the state. From the swamps and tidal waters of the southwest through the coastal plains of the southern parts of the state, eventually rising up the foothills of the Appalachians ending at the Cumberland Plateau region of the north. Alabama has many different and exciting environments to explore. Map courtesy of Geology.com http://geology.com/store/wall-maps/alabama.shtml

**Return to Table of Contents **
Watershed Map:

Map: Alabama has a very vast and important river system and watershed that not only provides water for drinking and agriculture, but also serves for transportation of goods, recreation, and habitat for many migratory birds and protected and endangered species. Map courtesy of Geology.com http://geology.com/lakes-rivers-water/alabama.shtml

As the two maps of Alabama above illustrate, Alabama has a lot to offer in the way of different environments. From mountain and valleys, to winding rivers both large and small, Alabama is blessed to have such a wide array of land types with a diverse mix of mineral and wildlife to accompany it. Our trip will set out to explore some of the unique geology of North and Central Alabama, taking time to note some of the environmental concerns, weather phenomenon and history of the area, and touch on some of the aspects that makes Alabama a truly amazing place.

**Return to Table of Contents **
1. Introduction Section:
General Information about North/Central Alabama

The State of Alabama sits in the center of the Southeastern US. Once called the “Heart of Dixie” during the Civil War Era, now has turned into “Alabama the Beautiful”, which aptly describes the breathtaking sites that abound across the entirety of the state. From the white sand beaches in the south along the Gulf Coast to the rolling foothills of the Appalachian Mountains to the north and east, and the expansive watersheds of the central and west parts of the state, Alabama has much to offer to all outdoor enthusiasts. As we Alabamians like to say round here, “Come drop off your troubles on the porch, sit a spell, and let the world around you slow down while you enjoy the view!”

Discovery: The Exploration of Alabama

Alabama has been a place long treasured by the many people who have called this place home. Before the time of Columbus discovery of the Americans, Paleo-Native American cultures flourished in Alabama. After the discovery of the New World, many of the well known Indian tribes (Creek, Cherokee, Choctaw and Chickasaw) started to form along the river valleys of Alabama. Between the years of 1539-1541, the first major exploration of Alabama was undertaken by Hernando de Desoto. While exploring the state in search of treasure, Desoto discovered many of the natural resources of the state. The Desoto Trail stretches throughout the state, and many of the parks and landmarks of the state still to this day bare his name. Around the start of the 1800’s, the land that would become the state of Alabama would become the focal point of a rapid and sometimes violent accent from a land area, to a state, to the center of the Confederacy, and by the end of the 1800’s, a place for industrial revolution for the South. The history of Alabama is etched all around you as you travel along on this field trip; from the river valleys to the scarred landscapes that yielded the mineral wealth to turn a rural landscape based upon the growth of cotton into an industrial titan!
The Birth of the “Magic City”:

Birmingham is the largest city in the state of Alabama and is referred to as the “Magic City” by the residents of the city. But Birmingham was not always the biggest, in fact, when the location of the city was being determine; it was a simple cornfield in the Jones Valley area below Red Mountain. So what was the reason that the current location of the city was chosen, and what caused Birmingham to explode into the vast city it is today? The simple answer is GEOLOGY!
The city of Birmingham was the brainchild of a group of ten influential business men back after the conclusion of the Civil War. They formed the Elyton Land Company in 1871, and settled on the name of Birmingham after one of the company owners came back from a trip to visit Birmingham, England and was obviously impressed by (Myers, 2009). These men had vision, and after selling stock shares, they took the money and laid the city out. Their initial design had rail lines running through the center of the city, flanked on with side by roads and avenues in a standard block formation. They planned parks, churches, business districts, build a water works, and laid out areas for future sewer easements. The city was starting to take shape, but there was something missing, something that would be discovered soon to transform an idea into a bustling reality.

Birmingham had an enormity of natural mineral resources, but it was not known how valuable these resources could be until Levin Goodrich came to town and help to invent a pig iron-making process for red iron ore. Until Goodrich, no one knew that red iron ore could be produced and processed as cheaply as its brown ore counterpart. With a land grant from the Elyton Land Company, Goodrich and his partners James Sloss and Henry DeBardeleben established the first iron making facility in Birmingham by the name of Pratt Coal and Coke Company (Myers, 2009). Birmingham now flourished because the iron making industry could take full advantage of having the three elements needed to make cheap iron, and they were located in proximity to the city like nowhere else found in the world: iron ore, limestone, and coal.

The early history of the city saw rapid growth. In fact the growth was so fast that the locals called it the “Magic City” and the name stuck. Birmingham would suffer through many trials and tribulations over its early years. The Great Depression hit the area hard, coal mine strikes, and all the unrest associated with the Civil Rights Movement of the 1960’s highlighted some of the darker, evil undertones of the city and its residents. But, over the years, Birmingham, and Alabama as a whole, have grown up and become more of a unified community. There are still scars all around the city that may never heal completely---from the mines and quarries that dot the landscape and the environmental damage they wrought to the constant reminders of the days of the racial unrest. But today, Birmingham is moving forward together, blacks and whites, industry and environmental groups to make Birmingham a shining gem and a place to be proud of now and in the future.

REFERENCES:

Engineered For the Future:

In the Alabama of today, much like most places in the U.S., we are in the Post-Industrial Age. Alabama was hit hard after manufacturing and steel-related jobs started to vanish, especially the City of Birmingham and its western suburbs that were so intertwined with the steel manufacturing industry. What would rise up to help fill this void in the state? Alabama would have to go back to basics, go outdoors, go back to the lab, and even head for the stars above for the answers!

Alabama has always had an agricultural based background, and that has not changed. According to the latest data from the USDA, Alabama ranks 4th in the nation in poultry and poultry product production (USDA Fact Sheet, 2011). Alabama also has a thriving Forestry and Seafood industry that is still recovering from the Gulf Oil Spill (will be discussed in more detail in the Environmental Section). Like other states in the South, cotton is still a major export of the state, along with soybeans, cattle, and greenhouse grown plants and flowers. (USDA Fact Sheet, 2011).

Getting outdoors in Alabama also helps the state economically. Tourism is one of the leading economic sources for the state with over 9.3 billion dollars spent in the state in 2009. For every dollar spent in the state, $679 million is taken in as state and local taxes from tourism dollars, equating to a saving of $391.00 off residents state taxes paid per family for state services. (Economic Report, 2009). Below is a map showing the areas where tourist visit and how much they spent in 2009.

Once the jobs involved with the steel industry and heavy manufacturing left the state, workers needed other avenues to open to provide jobs. Alabama aggressively went after and secured automotive manufacturing plants to locate in the state. Mercedes Benz, Hyundai, and Toyota and just a few of the auto makers who made the investment to build in the state, bringing with them much needed jobs and associated manufacturing plants to provide parts for the plants. Birmingham, through the University of Alabama Birmingham (UAB), is on the forefront of cutting edge medical research, with some of the best doctors in the world practicing and teaching here in the state providing a booming bio-medical industry to the state. And last but not least is Hunstville, AL which through the working of the Marshall Space Center brought Alabama into the Space Age. With a working rocket test center, space exploration would not be possible without the work of the many scientists and engineers that call Alabama home. The future of Alabama was once defined by the might of a man’s back with toiling work in the mines and foundries. Now, the future of the state is defined only by the limits of the minds of those who chose to dream and invent a better tomorrow!

REFERENCES:


**Introduction to the Geosciences of Alabama:**

**Meteorology vs. Climatology:**

This field guide starts off with the weather and climate section as this will have the most immediate impact upon our journey, not only in what you will “feel” while we are traveling, but also in many of the things you will “see” as well. We Alabamians like to say, “If you don’t like the weather right now, just wait 15 minutes and it will change.” Although not entirely accurate, this section will hope to explain what makes the weather in Alabama what it is and the climate that fosters such a widespread range of climatic events here. The meteorology of Alabama focuses in on the day-to-day weather events, while climatology looks to focus in on the longer running trends that one may expect to experience during a certain timeframe or season while living or visiting a particular location. In this light, we will present the climate that you would expect to see along this trip during the June timeframe, and while on the trip, we will actually have daily weather discussions before heading out each day to prepare the group for any possible weather hazards we may encounter day-to-day. With that, let’s get started!

**Climate of Alabama:**

Climate is defined as: “The study of atmospheric conditions over periods of time measured in years or longer. It is concerned not only with the most frequently occurring types, the average weather, but the infrequent and unusual types as well.” *(Oliver/Hindore, 2002).* The science of Climatology and how we classify particular regions or areas was the focus of Wladimir Koppen. He, over a 70 year period, developed a system of rating climate based on a highly descriptive vegetation zonal scheme in which the boundaries are defined in relatively precise mathematical terms *(Oliver/Hindore, 2002).* In Alabama, we fall into the CFa climate as defined by the following classification:

- **C (Hot Moderate Climate)**
  - The 3 coldest months average a temperature between -3°C and 18°C
  - Hottest month average temperature > 10°C
  - The summer and winter seasons are well defined

- **F (Wet Climate)**
  - Rain occurs every month of the year
  - No dry seasons

- **a (Hot summer)**
  - Average temperature of the hottest month >22 degrees C
In general terms, Alabama experiences mild winters, short cool seasons in the spring and fall, and moderately hot summers. Although it does rain here year round, the majority of the rain that falls in Alabama occurs during the months of Dec-May due to the passage of polar air mass coldfronts and MCS’s (Mesoscale Convective Systems). Listed below is a depiction of the climatology as it pertains to rainfall and average temperature listed for Birmingham, AL (Birmingham was chosen for its central location in the state as well as mean altitude). As you can see, Alabama falls in one of the wettest portions of the entire U.S. and the temperature extremes are not too oppressive in either the hot or cold direction. The main reason for the moderate climate conditions for the state lies in our position relative to the Gulf of Mexico and our relative latitude in relation to the Westerlies. We will delve more into the interactions of the air masses in relation to Alabama in the later discussions in the weather section, but for the purpose of climate, Alabama is mainly dominated by the mT (maritime Tropical) air that is brought northward due to the rotation of the Bermuda High which helps funnel warm, moist air northward from the Gulf of Mexico over the state. This moisture laden air acts as an insulator of sorts keeping winter temps a little warmer and summer heat down by modifying the hot dry air coming off of the Mexican Plateau region (cT air).
Below is a map of the predominant air masses over the U.S. Take special note to the location of Alabama and the differing air masses that are close by. The cP air coming from the polar region colliding with the mT air from the Gulf of Mexico is one of the triggering mechanisms not only for the vast amount of rainfall that we experience in the state, but also the severe weather that we have including tornadoes, flash flooding, straight line wind events, and even the occasional hurricane.


**Return to Table of Contents**
**Climate Regions of Alabama:**

The Climate of any individual location of the state is dictated my two overlying factors: Location relative to the coast and Location relative to the mountains of the north and eastern parts of the state. Locations in southern Alabama fall under the influence of the Gulf of Mexico and the Land-Sea breezes dominate the general climate of the area, bringing stirring breezes and almost daily afternoon pulse type thunderstorm formation in relation to the sea breeze. To the north and east, there is more of a mountain breeze setup where differential heating of the valleys lends to air rising up the hills and mountains in the day time, and downward at night, moderating the areas. For the central portions of the state (west and northwest), these areas rely on frontal passages for climate modification, or as in the time frame of this field trip, convective type thunderstorms (pulse storms) that develop with the heating of the day. Our trip will be centered more in the mountain regions of Central and Northeastern Alabama.

**REFERENCES:**


---

**Weather of Alabama:**

**Types of Weather:**

Come to Alabama and stay a while, and you are very likely to see the full spectrum of nature's array of weather. Depending from what area of the country you come from, arriving Birmingham in June will definitely grab your attention. Stepping outside for the first time, you will definitely feel one very personal weather phenomenon right off the bat: The humidity! Due to the general upper level patterns over the Southeastern U.S., Alabama is in the heart of the warm, moist sector of the Bermuda Highs circulation that brings very humidity rich air off the Gulf of Mexico. The moisture over the state is ever present, therefore, it figures into the daily weather calculations year round in the state.

Besides the sometimes oppressive humidity, Alabama has its fair share of thunderstorms, winter weather surprises, tropical weather, and most damaging of all tornadoes. The next few sections will go over some of the weather threats, how they form, and how some of the more extreme weather events that this state have experienced stacks up nationally.

**Return to Table of Contents**
Main Threats:

Photos: Both photos above are of an EF-4 tornado that ripped through the community of Cordova, AL late in the afternoon of April 27, 2011. These storms were part of a system that eventually took the life of 243 lives across the state of Alabama and was part of the largest total tornado outbreak of long-track tornadoes in U.S. history. Photos by Keith Golden

As the above pictures illustrates, the main weather threat here in Alabama are tornadoes. There are two distinct tornado seasons for the state: Main season is from Late Feb through the early part of June; secondary tornado season occurs in November-December. What are the prevailing conditions that leads to this, and why does Alabama have two distinct seasons? Let’s take a look!

The main air masses (refer to Climate section for graphic) are constantly moving and bumping against each other, and their interaction between these air masses dictates the type weather any specific location might expect to see. Here in Alabama, during the spring months, cold cP air from Canada pushes southward on the lee side of the Rocky Mountains due to its cold, dense and dry characteristics. From the south, there is an influx of warm, moist air (mT) air from the Gulf or Mexico that is racing northward due to its buoyant nature and low-level steering currents. The point that these two contrasting air masses meet general leads to very violent weather if all conditions are present. The jet streams tend to be the guiding force for the upper level dynamics of the large air masses. The jet stream is a river of air that moves from east to west, moving much faster than the surrounding upper-level winds at the 200-300mb levels. The spring months are generally dictated by the polar jet placement with the tail end of the tornado season having the northward advancing southern jet coming into play. The southern jet generally stay up in the extreme Northern U.S summertime, leaving the Southeast U.S. under the influence of the Bermuda High and cT air mass highs that develop over the desert Southwestern U.S. Without the jet to enhance uplift of storms, and the interaction of contrasting cooler cP air masses with the mT air masses, tornado development goes to a minimum during the supper and early fall. As the end of fall arrives, the jet streams start their southward progression again, leading to enhanced uplift, contrasting air masses, and increased chances for tornadic weather during Nov-Dec timeframe.

More will be discussed on tornadoes in the next section, but more than tornadoes, Alabama also has many other weather hazards. Due to the tropical nature of the predominant air mass over the state, we experience most of our rainfall in short spans of time. Pulse type thunderstorms (popcorn type showers as they are referred to by the local media and weather service office), can drop upwards of 2 inches or rain in a small, localized spot in less than 45 minutes time. This leads to increased flash flooding potential in urban and low lying areas. These summer storms also produce a tremendous amount of cloud-to-ground lightning which is of major concern since they happen during the summertime when people are outdoors and less aware of the weather threats. Straight line wind damage is also of concern with these pulse storms, causing damage to homes and the timber industry of the state.

The last two weather threats are on opposite ends of the spectrum: Hurricanes and winter weather. Alabama is positioned along roughly just east of center of the Gulf of Mexico basin, which lends it to be hit either directly or indirectly by hurricanes that form in the Gulf Basin from time-to-time. The last decade of storms has led to Alabama being effected by Hurricanes Ivan, Opal, Erin, Gustov, and Katrina just to name a few. Most of the damage occurs on the coastal areas, but to give example to their staying power, Hurricane Ivan was still a Category I hurricane when it passed over Birmingham in 2004 (over 250 miles north of the coast), causing widespread damage across the central part of the state. Hurricanes also cause widespread erosion problems for the state, as in the case of Gustov, where without even making landfall managed to erode over 75 feet of the beachfront along Gulf Shores State Park in Baldwin County in 2008.
Winter weather forecasting in Alabama can make even the best meteorologist blush with humility over a busted forecast. With our position close to the coast, along with other Mesoscale interactions that can not all be accounted for, winter weather in Alabama is always a time for anticipation, and great profits if you are in the bread making or dairy farming business! The last comment was for the wild rush to the grocery stores across the state at the mention of the evil four letter word everyone here either loves or dreads: SNOW! We average less than 1 inch of snow a year, but there are times, few and far between mind you that we do manage to have a winter wonderland here in Dixie. The Blizzard of 1993 is a prime example that the Deep South can have major winter storms, but on average, we generally get a dusting of snow. This dusting does not stay long before it turns into the reason why the South virtually stops in its tracks during winter weather events---ICE! Winter weather threats are rare, but when they do happen, they tend to be crippling in nature for days at a time.

**Return to Table of Contents **

“Dixie Alley”:

Now we discuss in a little more depth on the tornado alley that runs through Alabama named “Dixie Alley.” Although not as well defined or as well known as the Tornado Alley of the Midwest, Dixie Alley is responsible for some of the most damaging and deadly tornadoes in U.S history.

---

**Graphics:** Left Side: Although there is no true defined “Dixie Alley”, a look at the areas that are more vulnerable for tornado deaths relates nicely to the areas it exists (graphic courtesy of http://www.srh.noaa.gov/media/jan/Newsletter/The_Arklamiss_%20Observer_spring2010.pdf). Right Side: Enhanced graphic showing the areas of most concern for tornadoes in Alabama’s part of Dixie Alley. GOOGLE EARTH (2011 EUROPA TECHNOLOGIES, annotated by Keith Golden)
The vulnerability mentioned in the above graphic for fatalities comes from many factors. In Alabama in particular, the main contributing factors are: a majority rural population, a high average of home owners living in manufactured housing or substandard homes, a majority of tornado events happening in the later evening hours and in the cool season (Nov-Dec secondary season) when people are out and about with holiday preparations and not in tune with developing weather events, and the terrain in Alabama not conducive to tracking and confirming tornadoes due to trees and hills. Many more studies to the validity of the defining of Dixie Alley needs to be done in the future, but the data so far lends that there is a maximum of tornadoes and tornado deaths in the Southeastern U.S. to assert that there is indeed a separate if not equal tornado alley equal to the one in the Midwestern U.S.

**Return to Table of Contents**

**Geologic Overview:**

Alabama is home to many wondrous and abounding geologic diverse locations. We will touch on some of these and how they came to be in this section and add onto this knowledge with the stops that we make along our field trip studies. From beautiful sand dunes, to majestic peaks, to lazy rivers, to cascading waterfalls, Alabama is brimming with geology just waiting to be discovered!
Physiographic Regions of Alabama:

The five physiography provinces are: East Gulf Coastal Plains, Piedmont Upland, Alabama Valley and Ridge, Cumberland Plateau, and the Highland Rim area. These provinces are the first subdivisions from the larger physiographic regions that make up the U.S. The U.S. has 8 physiographic regions, three of which can be found in the state including: The Atlantic Plain, Appalachian Highlands, and the Interior Plains. Alabama does experience some earthquake activity generally set along the fall lines between the differing provinces where the differing rock types meet together. The largest earthquake in Alabama recorded history occurred on October 18, 1916 in the city of Irondale (just east of Birmingham), registering in at 5.1 on the Richter scale. Even though there are no major faults in the state, Alabama is still under the influence of the New Madrid seismic zone and would experience the effects if another major earthquake were to occur along the New Madrid Fault (Geology of Alabama, 2011).
The Piedmont Upland Province is a plateau that slopes from north to south and has an elevation from between 100 and 500 feet until it reaches the East Gulf Coastal Plain section.

The Alabama Valley Ridge Province is a system of numerous zigzagging, steeply sided ridges defined by the Coosa River Valley as well as other rivers on its western flanks.

The Cumberland Plateau Province is a relatively flat upland region that is cut through by river valleys running northeast to southwest. A majority of Alabama’s vast coal reserves are in this area.

The Highland Rim Province has two east to west valleys that formed when limestone was eroded, leaving the more durable sandstone behind.

East Gulf Coastal Plain Province is flat in places but also has areas of rolling hills, flatwoods, and the flood plains of the Alabama and Black Warrior Rivers as they head south to the Gulf of Mexico (Physiographic Sections, 2007).

Alabama as a whole is loaded with marine and sedimentary deposits originating from the millions of years that the state was the waters of the varied shallow seas that covered the North American Continent. This allowed for the formation of some of the world’s purest limestone deposits found in Shelby County, whitest and most beautiful marble deposits anywhere in Sylacauga, and plenty of gravel and sand deposits that Alabama exports nation and worldwide for building and road construction. It also helped create of the most diverse river and wetland basins where life flourished in the past leading to the massive coal deposits present in the state. Today, the wetland of the state provides valuable recreational areas for humans to enjoy and breeding grounds for migratory birds from all over North America.

RESOURCES:


The geology of Alabama is complex, but yet simple in the fact that most of Alabama’s history is one of being underneath a shallow sea. Below are listed some of the major geologic events in Alabama.

**Precambrian:**
There is little know in Alabama during the Precambrian time in Alabama due to erosion and metamorphosis and the lack of any fossils needed to date the rocks correctly.

**The Paleozoic Era:**
During this period between 440 and 248 million years ago, Alabama was lying within the tropics, and covered be a warm shallow sea. Evidence of this can be found all over the state in the rich limestone deposits found across the state, especially in Shelby County just south of Birmingham. Shelby County has some of the purest and whitest limestone in the entire world. The City of Alabaster got its name from the white limestone formations that run beneath the area. Towards the end of the Ordovician Period, the Taconic Orogeny occurred where mountains rose out of the shallow seas, and
then eroded depositing sediment into the seas. This cycle continued well into the Silurian which would eventually lead to the formation of Alabama’s iron rich hematite deposits in the central part of the state. These deposits would in the early 1900’s propel Alabama rapidly into the industrial age along with the limestone deposits from earlier and the soon to form rich coal basins (Paleontology Portal, 2011).

During the Devonian Period, deep waters formed in the Gulf region leading to very few fossils from this era being found due to the inhospitable conditions of most marine life in the area. Moving into the Early Carboniferous with the Mississippian Period saw a return to favorable sea conditions and the explosion of lowland swamps and large coastal stretches of ferns. These swamps and coastal plains would eventually fill and be covered over with silt and sand in the Pennsylvanian Period transforming these deposits into bituminous coal seams stretching over the northern half of Alabama. There are not very many deposits from the Permian Period as it was a mainly erosion as the main geologic process over the state (Paleontology Portal, 2011).

**The Mesozoic Era:**
Towards the end of the Paleozoic Era, the Alleghany and Ouachita Orogenies were ramping up, raising the north and central portions of the state out of the seas once and for all (USGS, 2004). This also signaled the rifting and separation of Laurasia from Gondwanaland, opening up the Gulf of Mexico and the deposition of yet another of the sates vast resources—petroleum reserves in the south and present day coastal regions. What was not covered by water was lush rainforest across the state as the state was still in a tropical environment (Paleontology Portal, 2011).

**The Cenozoic Era:**
Erosion from the Appalachian Mountains was still occurring at a rapid pace, leading to the development of ever expansive coastal plains to the south that now supported near-tropical species of plants near the coastal regions. Then, during the Quaternary Period (Pleistocene), Alabama’s climate would dramatically and forever be altered. Although the state did not have glaciers reach the area of the state, the fossil records indicate that mastodons, mammoths and giant ground sloths freely roamed across the state and the vegetation turned to an evergreen conifer type trees (Paleontology Portal, 2011).

**RESOURCES:**


**Return to Table of Contents **
Astronomy:

We are extremely fortunate on our field trip through Alabama to have such a vast knowledge repository of astronomical information and treasures based at the Marshall Space and Flight Center in Huntsville, AL (Day 3). More specifics on space and planetary sciences will be discussed during the trip to the Space Center, but there are some basic planetary science principles and concepts that can be experienced anywhere that we will discuss now. Since the dawn of man, we have always looked to the heavens with awe and wonderment. Early man would gaze upon the stars and see images of gods and animals, calculated the movement of the heavens to predict heavenly occurrences, and discovered and validated the laws of physics that govern all matter in the universe. Not bad for a few thousand years of star gazing.

Today’s planetary sciences: Building and maintaining an international space station, sending robot rovers to the surface of Mars, to seeing out to the edges of the Universe with the Hubble Space Telescope would have been considered by most as science fiction just a few decades ago. With so much “Big Astronomy” going on all around us in the news these days, there are still a few basic things that we can do in our own backyards to experience the wonders of the heavens, some old school ways, and some new and interesting. Below are a few of the things that we will be able to do along the trip in the evenings, and can also easily be done from your home locations with the right outside lighting conditions.


In the left photo above, you can see a picture of the location of the viewable constellations in the Northern Hemisphere during the month of June. The only thing that is required is a clear sky, an area to view from with little to no light pollution, and a little bit of imagination. The movement of the constellations through the night sky is a product of the Earth’s rotation around the Sun and the angle on inclination of the axis. Easily visible will be Ursa Major and Ursa Minor (the Big and Little Dippers). From these two
constellations, you are able to reference the other constellations in the night sky. Depending on the time of year, it might also be possible to see some of the planets either with the naked eye or with the aid of a small telescope. For more detail on what planets are available for viewing on your specific day, please go to [http://www.wwu.edu/depts/skywise/planets.html](http://www.wwu.edu/depts/skywise/planets.html) for more information. In the right side photo, there is a picture of the globe with a depiction of the International Space Station (ISS) on it. This is a very neat activity to do as a group or with your kids. There is a listing on the following website for viewing times and location in the sky to view the passage of the space station at your current location: [http://spaceflight1.nasa.gov/realdata/sightings](http://spaceflight1.nasa.gov/realdata/sightings). This site allows you to pick your location, and it will tell you the date, time, and duration of your viewing opportunities.

Planetary astronomy effect us all in our day-to-day lives, and without it, life as we now know it would not exist on the Earth. Below is a chart that explains the tilt and seasons on the Earth. The tilt of the Earth’s axis allows for differential heating of the planets surface. This uneven heating sets up convection currents of air and ocean currents that traverse the globe in order to transport warm air and water from the equatorial regions northward towards the poles and cold polar air and water southward. This movement of cold and warm water and air enables weather and climate regions on the Earth to develop which helps different types of life to flourish. The tilt also decreases or increases the amount of solar radiation that any particular location receives in a 24 hour period. Summer in the Northern Hemisphere has longer days and hence more incoming solar radiation and heat due to the Sun angles coming in higher in the sky. With less atmosphere for the sun’s radiation to travel through to get to the surface, allowing for more heating, leading to summer type conditions in the mid-latitudes and constant sunlight at the areas above the Artic Circle. The reverse is true for the Southern Hemisphere which is experiencing winter at the same time as the Northern Hemisphere is experiencing summer. At the Equinoxes, the day length is the same in both hemispheres due to the sun shining down directly on the equator. This constant movement of the sun across the sky in relation to the tilt angle of the Earth allows for seasons to occur, distribution of heat and moisture, and for the modification of climates which makes living conditions more temperate and tolerable for the species that inhabit the planet.
Environmental Science and Impacts on Alabama:

Visit Alabama and you will see the diverse environments around you, and you can see how protecting the environment can be a huge challenge. From mining and the impacts on the watershed, coastal concerns with the exploration and drilling of oil, and the protection of endangered and protected species and the containment of invasive species of plants and animals, Alabama has a lot on its plate when dealing with environmental concerns. The following section will try and address some of those concerns.

Invasive Species:

There are listed over 90 species of invasive plants in the state, so we will narrow that down to two of the most invasive of them. When traveling in the south, just look out your window as you drive through and you will not go far without looking at the scourge of the South---Kudzu! Brought to the Southern U.S. during 1800’s as a means to control soil erosion, has taken root and is sometimes referred to as “The vine that ate the South!” What makes it an invasive species is that kudzu has no predators or disease local in the U.S. that can keep it in check, which allows for the vine to growth at almost a foot per day under certain conditions. If allowed to spread, to chokes out the native vegetations and completely takes over the environment it is growing in. Burning, cutting, spraying with herbicide, and animal grazing are all control methods, but they are not able to eradicate kudzu completely due to its ability to grow just about anywhere in the state and the root crowns have to be cut or pulled from the ground to truly kill kudzu. Studies have been done into using kudzu for biofuels and animal feed, which may eventually lead to relief from the plants onslaught of the South.
Another invasive plant is the Chinese Privet. Used as a privacy shrub for their full bodies and rapid growth. The problem with the privet is that they produce many fruit (small green or purple bulbs) that are eaten by birds and spread in the bird’s droppings. The Chinese Privet takes root quickly growing tall and can grow more plants from its spreading roots. The plants are so thick that they block out sunlight beneath their canopy, thereby killing other vegetation that try to grow in and around the privets. The seeds are also poisonous to some forms of livestock (especially horses). With no disease to keep their spread in check, they take over all the surrounding area, especially on the sides of roads and along the edges of forested areas. The only way to get rid of the plant is to remove the roots out of the ground and dispose of it (usually by burning it). Leave any portion of the root or stump in the ground, and it is guaranteed to sprout back rapidly.

When it comes to true invasive pests, just step outside and walk off the paved path in Alabama, and you will probably encounter the fire ant. There are two species of fire ants, the black fire ant (1918) and red fire ant (1933-1941), though to have been brought to the state on a boat shipping goods to the state from South American via the Port of Mobile. The ants are aggressive, leave a painful whelp if they bite you, and build very large mounds that are damaging to farm and lawn care equipment. Once the ants were introduced to the U.S., they spread rapidly across the country and can be found as far away as California. Control methods are varied: pesticide applied to the mounds, other species of ants will attack the fire ants and keep them at bay, and in an extreme measure, the State of Alabama has introduced three species of parasitic flies that they hope will attack and contain the fire ant population throughout the state. (Flanders, 2008)
Whether bringing in a species with the best of intentions as in the case of kudzu, or inadvertently as in the case of fire ants, species not local to the environment can have devastating consequences to the local habitat they are introduced into. Special care and great costs then have to be used to mitigate and/or eradicate these invasive species once they have been established into the local environment.

**Return to Table of Contents **

**Mining Concerns:**

Alabama is home to many mineral resources, and the land bears witness to this in the many mines and quarries that dot the landscape of the state. Strip Mining in Alabama poses one of the greatest environmental risks due to the manner in which the coal is extracted from the ground. The following image is of an active strip mine complex in Northern Jefferson County, AL. Image size is roughly 10 miles by 7 miles, and you can see by the scope of the mine just how much land is involved to extract coal from the Warrior Coal Basin that runs through this area. This is just one of many active or former mine sites in the Walker, Jefferson, Blount county area, all of which coincide with the Warrior River watershed.
The leaching of metals into the watershed areas around mines, such as iron and mercury and the excessive sedimentation runoff from the disturbed clays and slate disturbed in the mining process. This impacts the wildlife of the river, sometimes causing irreversible damage it the ecosystems supported by the nearby rivers. The State of Alabama requires that all mines post a reclamation bond before the mining permit can be signed off upwards in the order of tens of millions of dollars. Once the bond has been established, mining operations begin. The mines are open for decades before the mines exhaust the easily attainable coal, then they are suppose to be set back as they were before the mining process began, with the filling of quarries, planting of grasses and tress to stabilize the hills, and cutting access to roads to allow for the growth of plants and animals. The larger mine operations in Alabama have done a responsible job of this reclamation in the recent past, but there is still problems with the smaller mining operations that come in, strip the land, then default on their bond as soon as the mine closes, leaving the state to foot the bill and the cleanup work which might take decades to complete. It is an issue that will confront the state for many years to come as three of the largest coal-fired power plants are here in the State of Alabama and the need for coal is higher today than ever.
Right: Example of sediment runoff into the Warrior River near Bayview due to development and up river mining. Photos courtesy of Nelson Brooke, 2006 [http://blackwarriorriver.org/siltation-sedimentation.html](http://blackwarriorriver.org/siltation-sedimentation.html)

**Return to Table of Contents**
Gulf Oil Spill of 2010:

No other disaster in recent history aside from Hurricane Katrina has rocked the Gulf States like the Deepwater Horizon explosion did on April 20, 2010. While trying to seal off a deep oil well over 5000 feet below the surface of the Gulf of Mexico, an explosion occurred which started a fire and the eventual collapse of the rig, leaving the well head to gush millions of barrels of oil into the waters of the Gulf. No one had ever seen a disaster unfolding on this scale, and in hindsight, the government of the U.S. and BP which owned the rig were no prepared to handle this ecological disaster in a quick and decisive manner. Oil and gas exploration is a way of life along the Gulf Coast of the U.S. due to the vast quantities of these energy deposits. Since most of the easily extractible deposits in shallow waters have already been exhausted, oil exploration companies have opted to move farther offshore into the deeper waters in order to claim these dwindling resources. With deeper drilling comes greater risks and this along with other factors help set the stage for the Deepwater Horizon incident to occur.

The costs of the disaster were enormous. Not just in the costs of lost income to local fishermen, oil workers, local beach tourism and costs of cleanup, but in the environmental costs of destroyed wetlands and estuaries. The delta region of LA, MS, and AL were especially hard hit. These wetlands provide a habitat for marine creature to hatch and grow through their early development along the protected waters of the delta and marshes that they support. The grasses that grow here help protect the coast against wave action erosion and stabilize the near coastal regions when hurricanes and other tropical systems lash out in the later parts of the summer. Oil that washed into these areas effectively kill the grasses and poisons the environment where breeding areas once would be and drastically effects the entire marine food chain of the Gulf.
Although the complete scope of the damage to the Gulf Coast may not be known for years to come, there are issues now that will be hard to overcome. Seafood, which is a mainstay of the local economy, has to be subjected to endless testing to ensure safe food supply. There are the hidden effects of the dispersant used to break up the oil that have yet to be discovered and at what levels is it safe in the water and how long will it remain in the waters. And lastly, the lost revenue from tourist that are skeptical about dirty beaches and health concerns about returning to their former vacation spots.

Only time will tell how the final impact of the Deepwater Oil Spill will be written in the pages of history. The lessons and technologies learned from this disaster will undoubtedly help to mitigate such disasters in the future. Truly though, until we as a nation get away from dependency on fossil fuels, there is always a risk of a repeat of this disaster just around the corner.

REFERENCES:


**Return to Table of Contents**
3. Overview of Field Trip:

**What to Bring:**

For a trip to Alabama in the summer time, you definitely will want to bring plenty of sunscreen and mosquito repellent! Many of the activities will be outdoors in the wilderness, so protecting oneself from the bugs and sun is a must. Light clothing such as cargo shorts and tee shirts are always good for trekking through the woods and over rocks. A good pair of walking or hiking shoes will be needed for the numerous trails as this field trip has a lot of walking involved.

Extras that you might consider for the trip are as follows: Camera (waterproof camera if you want to take shots at the base of waterfalls); backpack (to carry water and snacks along the way); pen and paper for notes; pair of water shoes (can find at Wal-Mart with the rubber soles for times that we walk into streams and for the trip on the Locust Fork River); zip-lock bags for rock specimens along the trip (and to protect valuables while near water); and last but not least, a state map (can be purchased on first day of trip to keep up with locations traveled. Found this invaluable on my own past field trips to know where I was going and where I have been). If you have a handheld temperature scale and/or anemometer, this too would be good to bring along as we will be exploring the weather and pointing out weather related phenomenon along the trip.

**Possible Hazards:**

As with any trip into the wild, there is always the possibility of encounters with the local wildlife, and in Alabama, there is no exception to this rule! The greatest risk is seeing a snake in Alabama of all the possible wildlife out there. Below are pictures of snakes you might encounter in Alabama while on the trip. Other animals in the areas that we will be traveling through include Black Bears, Coyotes, and the occasional deer that have been known to charge if you disturb or startle them. Insect wise, there are mosquitoes, biting flies, spiders, and ticks. Don’t let all of the critters get you down though, with a little precaution and common sense, most if not all of these encounters can be mitigated or avoided.

To avoid snakes, you must know where they tend to be. Avoid stepping over fallen trees if you cannot safely see the other side where you are going to place you feet. Be careful when in rocky places since that is where rattlesnakes tend to den down. When near the water, make sure to look near the waters edge, especially up in low hanging branches for cottonmouths as they tend to drop onto their intended prey from the branches. For copperheads, you just to watch you steps well as they tend to hide under fallen vegetation. There are only two poisonous spiders in Alabama, the Brown Recluse and the Black Widow. Both favor cool, dark and damp places like under rocks and in old buildings, so watch out for them as you explore old sites.
We will be in and near rocky and watery environments, so there is always a chance of a slip or fall, so make sure to bring shoes with good traction for times when hiking or in the water.

**Return to Table of Contents**

Costs:

The individual costs for the stops are listed on each stop. In an effort to make sure you get the total experience of visiting Alabama without totally expending your pocketbook, there is a mixture of stops that require no money to enjoy along with the ones that charge admission. Lodging (when available), will be focused around the last stop of the day where either a Holiday Inn Express or Comfort Inn is available to not only allow for affordable lodging, but these hotels provide free breakfasts each morning as part of your stay. Food will be the biggest expense outside of the transportation cost to Birmingham. For this trip, we plan to eat breakfast at the hotel in the morning, eat along the route each day for lunch at places like McDonalds, Subway, etc, with reserving the end of the day dinners at some of the nicer Southern type restaurants along the way. Southern eatery is not for those who strive to count every calorie, but there is always something on the menu that appeals to everyone! A list of each days stops and dining will be provided at the end of this guide.

**Return to Table of Contents**
Overview Map of Daily Stop Locations:

Photo: Overview map of stops for field trip. Each day is color coded differently to allow for ease of looking at area of stops. If you have Google Earth, you can double click on the below KMZ file and it will open inside of Google Earth allowing for you to fly to and navigate through all of the stops in greater detail. Map courtesy of Google Earth, 2011.

**Return to Table of Contents**
FIELD TRIP:

4. Itinerary:

DAY 0: Arrival at Birmingham-Shuttlesworth International Airport

If you plan on flying into Birmingham, you can get many flights into and out of the Birmingham-Shuttlesworth International Airport. The airport is a hub for Delta and Southwest regional flights. There are plenty of car and van rental agencies located at the airport as well if you need transportation from the airport. For more information on flights and links to air carriers, please use the provided links below.

http://flybirmingham.com/
http://flybirmingham.com/schedules-airlines.html

**Return to Table of Contents**

Day 1: Vulcan Park:

Photo: Left: Vulcan as he stands today. Photo by Keith Golden  Right: Vulcan as he stood in the early 1960’s. Photo by O.V. Hunt, Courtesy of the Birmingham Public Library
Our first stop on our field trip starts at the towering figure of the Vulcan statue that sits high atop Red Mountain in Birmingham, AL. Vulcan was the Roman god of the Forge, which aptly fits the theme of Birmingham. As mythology state, Vulcan was the child of the supreme ruler of the universe Jupiter and Juno. He was off of Mt Olympus because he was considered ugly by the god’s standards, and fell for an entire day until he landed upon the island of Lemnos in the Aegean Sea. Once on Earth, he toiled away making weapons of war for the god’s using a volcano as his forge.

Today, Vulcan stands as a beloved symbol for the entire region, representing how Birmingham was forged out of the wilderness by the power of the Industrial Revolution. Listed as the largest iron statue in the world, Vulcan was designed by Italian artist Giuseppe Moretti in the early 1900’s. His work was cast locally, using iron from Red Mountain for his form. The statue made his grand debut at the 1904 World’s Fair in St. Louis, where he won the grand prize and medals for sculptor and foundry. At the end of the fair, he was shipped back to Alabama where he was put on display for over 30 years at the Alabama Fairgrounds. Between 1930 and the mid 1960’s, Vulcan sat atop a marble pedestal on the peek of Red Mountain, at which time his spear in his right hand would be replaced with everything from a Coke bottle, advertisements for pickles, to a lamp that would herald to the city below when there had been a traffic fatality in the city. In the late 1960’s, it was decided to raise Vulcan high into the skies above Birmingham by constructing a new pedestal and observation deck so as to see the statue from all points in the city to correspond with the 100th anniversary of the founding of Birmingham in 1971.

Photo: Left: Vulcan admiring spear just forged. Right: Vulcan Center with sandstone columns. Photo credit: Keith Golden

With the upgrades to his pedestal, the local groups heading up the restoration of the park wanted something else local to showcase Vulcan with and they didn’t have to go far for it. The new pedestal, which rises a towering 128 feet from the top of the mountain, was constructed with sandstone quarried from the local area. The marble finished entry to the pedestal still remains in tact, and adds a beautiful scene upon entering the structure.
The statue was placed atop the new pedestal and painted back iron red to reflect the mountain from which he came from. In 1999, as Vulcan was getting close to his 100th birthday, a major restoration was needed to protect and preserve him for years to come. The local community started the Vulcan Park Foundation. Over 15.5 million dollars was raised in order to restore the statue back to its original condition as envisioned by Moretti. Today’s Vulcan Park is a testament to the love from the community for one of the nation’s true gems and pride in all that Vulcan represents.

There are many things to do at the park other that admire the breathtaking view from the observation deck. The Vulcan Center is a learning facility that walks you through the birth of Birmingham, from its start as a large cornfield to the largest city in the state. The people who risked everything to develop the city and its industrial might are honored with pictures and audio/visual displays that chronicle the lives of the rich and the poor alike. There is also a section that addresses the city’s ugly past sins of discrimination, and how far Birmingham has come to where we are today. After touring the Vulcan Center, take a walk along the many trails that traverse the mountain and see the many types of trees, animals, and geology that makes up the mountain. There are plenty of displays chronicling the rise of iron and coal mining in Central Alabama with reference points to look across the city and see the vast expanse of post and modern history in front of you.

**General Info on Vulcan Park:**

**ADMISSION:** $6 Adults; $5 seniors, $4 Children 5-12 (plus tax on all prices), Ages 4 and under free. Group rates are available for groups of 12 or more.

**Parking:** Free, park also has free wi-fi and picnic areas available.

**Park Hours:**
- Park Grounds: 7a.m. – 10 p.m.
- Vulcan Center Museum: Mon-Sat 10 a.m. – 6 p.m. Sun 1-6 p.m.
- Observation Tower: Mon-Sat 10 a.m. – 6 p.m. Sun 1-10 p.m.

**Address:** 1701 Valley View Drive, Birmingham, AL 35209

For more information, call (205) 933-1409, email at info@visitvulcan.com or log onto www.visitvulcan.com

**Return to Table of Contents**
US HWY 280 cut through Red Mountain:


After the breathtaking views provided from Vulcan, we head off to explore what lead to the rise of the industry that sparked Birmingham and the South into the Industrial Revolution---Iron Ore! The cut though the heart of Red Mountain was completed in 1970. The opening of the expressway through the mountain was part of an economic plan to link Birmingham more efficiently to its southern suburbs. The cut though the mountain illustrates in detail the various strata layers that make up the mountain.

The layers of the mountain were laid down horizontally and then tilted up into the vertical as the formation of the Appalachian Mobile Belt started to rise out of the prehistoric ocean and formed the Appalachian Mountains. There are various layers of Shale, sandstones and two distinct layers of red iron ore in the mountain. The height of the cut is roughly 260 feet tall. The lower layer iron ore seam is called the Irondale ore seam, and is divided from the Big Seam by a shallow layer of shale and sandstone that has embedded water worn pebbles illustrating the movement of water nearby coming off the newly forming highlands. The Big Seam is approximately 17 feet thick and has a layer of ferruginous sandstone that has mixed with it yellow shale and quartz pebbles. The main seam dips down to the southeast of the mountain underneath the Cahaba coal fields.

There are many things to discover while looking around the mountain. The old tourist trail was closed back in 1994 due to instability of the upper levels of the cut possibly dropping rocks on visitors below. The base of the cut is still accessible, and there are numerous marine fossils that can be found in and along the base of the mountainside. While construction of the expressway was being conducted, a new species or trilobite was discovered from the Lower Silurian Period and named Acaste birminghamensis in honor of the City of Birmingham.
**General Info on Red Mountain Cut:**
The cut is located along the side of the Red Mountain Expressway (U.S. Hwy 31/280). From Vulcan Park, turn right and go straight until you reach the expressway and turn left to access expressway. Before you get to the end of the entrance ramp, pull over into the grass and walk about 200 feet to the base of the cut. You will be able to see the western side in full detail, and still collect samples from the eastern side of the cut. Care needs to be exercised with traffic and to watch out for loose and falling rocks while at base of mountain, and when re-entering the road to head to next stop location.

**REFERENCES:**


**Sloss Furnace:**

Photo: Historic Sloss water tower with Blast Furnace #1 in the background. Photo by Keith Golden
Welcome to the home of steel making in Birmingham---Sloss Furnaces. Sloss was originally opened on April 12, 1882 and remained operational until 1971. In 1976, a group of concerned citizens rallied to save Sloss from demolition, and their efforts led to not only Sloss Furnaces being renovated as a tourist attraction, but also being recognized as a National Historic Landmark in 1981 (Sloss Story, 2011). There are many things to explore within Sloss from how Iron was produced, learning about a lost way of life, to the ghosts that are rumored to still haunt the furnaces to this very day!

Photo: Example of the process of how the blast furnace was feed and iron produced. More details of this process will be listed in next paragraph. Photo of display sign at Sloss Furnaces by Keith Golden

The process of making iron is a very complex, and as in the early days of making iron on an industrial scale, extremely dangerous. The basic method is as follows: First you get your basic raw materials of iron ore, limestone, and coal. Coal by itself has too many impurities to use effectively, so it is cooked in an oven absent of air flow at around 2000 degrees to reduce the sulfur and water content and remove ash. This process is referred to as “Coking” and produces coke that will be used in the furnace for combustion (Coke, 2011). Next, you load your materials into the top of the furnace. Iron ore makes iron metal, but you need to remove the iron oxide impurities from the ore to produce quality iron (which quality iron is needed as the base ingredient for quality steel in a separate process).

The limestone is used to help purify the molten iron mixture, and the coke is added to burn with the aid of high pressure and temperature gases that are scrubbed clean from the coking process to be used in the blasting process. The coke vaporizes in the furnace, releasing carbon monoxide which helps to further remove impurities from the iron. After about 4 hours, a fire clay plug at the base of the furnace is broken open, allowing the molten iron to pour out into a transfer bucket for casting into “pig iron” as the ingots of iron are referred to. The remaining contents of the furnace are waste gases and slag (impurities of the blasting process), and each are evacuated from the furnace while it is being reloaded for another blasting process. This process was repeated 24 hours a day/365 days a year for almost 90 years continuous at Sloss.
Now that you now a little about the process, you will be able to understand the enormity of the labor that went into making iron ingots at the dawn of the 20th Century. Many men painstaking labored, were maimed, and even died in this process. Not until two very different events came about to improve the plight of those who toiled at the furnaces: Excise taxes on southern steel by U.S. Steel of Pittsburg and the movement of blacks from the South to the Northern States seeking better pay and equality. Although different avenues, the leaving of the blacks (which worked at a 5:1 ratio in the iron and steel industry of the South in the 1920’s), coupled with the unfair excise taxes led Sloss to mechanize and upgrade to the furnaces that you see before you today. This led to less deaths, better working wages and conditions for the employees, and almost a 400% increase in output to a maximum output of 400 tons of pig iron a day (Myers, 2009).
Many educational outreach programs can be found at Sloss. The landmark hosts educational forums for school age children, metal arts working classes, as well in depth history discussion based on the plights of Blacks and immigrant workers in the city’s past. Along with this, Sloss host a wide variety of social events from Shakespearean plays, music concerts, to the yearly Sloss Fright Furnaces Haunted House which raises money for continued restoration efforts at the park and goes on the entire month of October. What scarier place than an abandoned blast furnace where many a man died to host a haunted house? None better than Sloss Furnaces!

As you tour around the site, there are relics of a time gone by around each corner. Things that you will see are: Old steam shovels, an antique train, and of course, all the inner working of the last and oldest working blast furnace in Birmingham. Recent enhancements added to improve the experience at Sloss are signs instructing visitors to use their cell phones to call numbers along the path that will give you a full description of the area you are standing in, and they are located throughout the park.

**General Info on Sloss Furnaces:**

- **Admission:** Free
- **Park Hours:** Tues-Sat 10 a.m. – 4 p.m. Sun 12-4 p.m.
- **Sloss Museum Store:** Same as park
- **Address:** Twenty 32nd St North, Birmingham, AL 35222
- **Directions:** From our stop at the cut through Red Mountain, take Hwy 280 west to the 1st Ave N exit, turn right onto 1st Ave at bottom of ramp, left onto 34th Street, left at stop sign and go two blocks to entrance.

For more information, call (205) 324-1911, or log on to [www.slossfurnaces.com](http://www.slossfurnaces.com) for more information.

**REFERENCES:**


**Return to Table of Contents **
Ruffner Mountain Nature Center:

Photo: View from the quarry at Ruffner Mountain Nature Center. The skyline of Birmingham can be seen in the background. This quarry was used to mine limestone that was used in the blast furnaces of Birmingham to purify iron ore in the blasting process. Photo courtesy of G-S-H
http://www.flickr.com/photos/g2223060/5211702415/in/pool-ruffner_mountain

Our last stop of Day 1 of our field trip ends at a true gem nestled in the urban rough of Birmingham---Ruffner Mountain Nature Center. This stop will involve a lot of hiking, but the rewards for these hikes will be well worth the exertion. The park is located on the east side of the city, this 1011 acre site lets you look back into the industrial past of the city with the numerous mines and abandoned equipment scattered throughout the park while enjoying the last undeveloped stretch of Red Mountain left in the Birmingham. Since the Nature Center was first opened in 1976, over 12 unique hikes have been developed along with the Nature Center in the center of the park that is completely Eco-Friendly engineered. Ruffner Mountain is a tribute to all of those that want to conserve the beauty of the land and educate those young and old on the value of the environment.

There are several distinct trails offered at Ruffner Mountain, with varying scales of difficulty and specific emphasis of an environmental aspect. There are trails that like the Wetlands Trail that highlight a wetland environment; the Hollow Tree and Trillium trails that showcase the trees and fauna of the mountain; and the Quarry Trail and Mine Hike that will lead you into the geology of the mountain in great detail. All though the trails are the chance to see beautiful overlooks of the hills and valleys of Birmingham, the beauty of the local fauna, endangered species like the Mole Kingsnake, Cooper’s Hawk and the Little Brown Bat just to name a few. Also, invasive species can be seen all over the part: Chinese Privet (Environmental Section---Chinese Privet), Japanese Honeysuckle, English Ivy, and a southern invasive staple, Kudzu (Environmental Section—Kudzu). Plenty of choices for the group to explore while at the nature center to appeal to most any Geoscience interest.
The hikes are worth it to get to some of the most spectacular views of the area, and there is plenty to see along the way. Back in the late 1800’s/early 1900’s, Ruffner Mountain was buzzing with the mining of limestone and iron ore to feed the ever growing steel industry of Birmingham. Mines dot the entire landscape, and care should be taken to stay on the trail as some of these mineshafs are covered over with vegetation. Call ahead and a Ruffner guide will take the group on the Mine Hike and allow entrance into one of the mineshafs, showing up close the tight and austere conditions that the miners faced in order to mine ore from the sandstone and limestone mountain beneath your feet. Included below is a map and link to view the detailed description of all of Ruffner’s trails.

Photos: Left: One of the many antique industrial ruins located along the mountain trails. Photo courtesy of digitalchaos  [http://www.flickr.com/photos/digitizedchaos/5523569213/sizes/z/in/pool-1607269@N2](http://www.flickr.com/photos/digitizedchaos/5523569213/sizes/z/in/pool-1607269@N2)
Right Side: Overlook of the limestone quarry along the Quarry Trail. Photo courtesy of G-S-H [http://www.flickr.com/photos/g2223060/5138334646/in/pool-ruffner_mountain](http://www.flickr.com/photos/g2223060/5138334646/in/pool-ruffner_mountain)

Photo: Trail map and description of all trails for Ruffner Mountain. Map courtesy of [http://ruffnermountain.org/visitors/trail-maps.html](http://ruffnermountain.org/visitors/trail-maps.html)
There are many things to explore on Ruffner Mountain website before heading out on the trip. There are separate guides for animals, trails, endangered species, reptiles etc, all of which can be downloaded as a PDF to your computer or to your smart phone. With the volume of guides they have to offer, which is more than this simple guide has space to place in, simply log into www.ruffnermountain.org and follow the tabs across the top of the page and then click the “Conservation” tab, then scroll down to “Species Guides” for more detailed information that you desire to look for while on your hike.

General Info on Ruffner Mountain Nature Center:

**ADMISSION:** No admission cost, but a donation of $2.00 is greatly appreciated to help with park operating cost. Groups of 10 or more please call ahead so that the park staff can accommodate your group and improve your experience.

**Parking:** Free, Hours same as park hours, gates locked promptly at 5 p.m.

**Park Hours:** Park Trails: Dawn to Dusk year round weather permitting.
Welcome Center: Tues-Sat 9 a.m. – 5 p.m. Sun 1-5 p.m.

**Address:** 1214 81st St South, Birmingham, AL 35206

For more information, call (205) 833-8264, email at info@ruffnermountain.org or log onto www.ruffnermountain.org

**Directions:** From Sloss, turn left out of parking area then straight to 3rd Ave South and turn right. Go straight until; you reach ramp for U.S. Hwy 280. Take Hwy 280 west to 159/20 North. From I-59, take exit 132 and bear right at bottom of ramp onto 1st Ave North. First traffic light (83rd St), take a right and continue onto Rugby St. Turn left at 81st Street South and Ruffner will be at end of street.

**RESOURCES:**


**Return to Table of Contents **
Day 2:
Noccalula Falls:

Photo: Young boy playing at base of Noccalula Falls. Photo courtesy of Nancy Swinney

As we head northward out of Birmingham, our first start day at a place steeped in as much lore as it has natural beauty. Located along the western end of the Lookout Mountain chain, Noccalula Falls is a majestic waterfall occurring along the Black Creek north of the city of Gadsden, AL. Whether it is the Indian folklore surrounding the naming of the falls, or as some believe a crafty marketing ploy set about by the city founders, Noccalula Falls has much to offer regardless.

The legend behind Noccalula Falls was written by the author Anne Mathilde Bilbro, who was also a known a well respected song writer of her era in Alabama. According to Bilbro, "long ago, on a mountain summit within sight and sound of a rushing waterfall, lived a great Indian Chief whose young daughter, Noccalula, was famed far and wide for her beauty and loveliness of character." Many Indian braves vied for her affections, but she had already given her heart to one special brave. Her father the Chieftain, forbid her to marry her lover, and instead ordered her to marry the son of a rival tribe for reasons of wealth and power and not of love. Noccalula stayed silent until the day of her wedding, suffering in her own pain. After being dressed in full wedding attire, she ran to the edge of the falls and leaped unto her death amidst the spray from the water and rocks below. In the late 1960’s, area school children were asked to donate their pennies in order to commemorate the Legend of Noccalula. The pennies gathered were smelted down and used to make a copper statue of Noccalula that stands today perched on the ledge of the falls, leaping to her grief stricken death.
While visiting the falls, we will see a prime example of a fall line. A fall line is a geographic area where two distinct areas of soil/rocks types meet. In the case of rivers, the fall line is generally marked with the presence of waterfalls. In the pioneering era of Alabama, these falls presented a logistical problem for barges and steamboats trying to head inland due to the elevation change and the normally rocky conditions. Towns and cities were prime settlements for reasons of areas to transfer goods off southern barges to load them onto other transports heading for locations above the fall line. A tell-tale sign of this is the shape of the waterfall itself. If the waterfall has a “C” shape to the rim, this is indicative of a fall line type waterfall and it will recede in the upstream direction and eventually cut a steep wall valley below the falls. This is the case at Noccalula Falls. We will study the aspects of the fall, and the park enables you not only to walk along the river valley below the falls and see the work of erosion at the falls, but to also walk behind and underneath the falls for some truly breathtaking views.
General Info on Noccalula Falls:

**ADMISSION:** $6 Adults; $4 seniors, $3 Children 4-12, Ages 4 and under free. Group rates are available for groups of 25 or more.

**Admission includes:** Entry to the park, Botanical Gardens, Unlimited Train Rides, Pioneer Village, and Habitat Area.

**Park Hours:**
- March 1 to June 5: 9 a.m. to 5 p.m. (Weather Permitting)
- June 6 to August 28: 9 a.m. to 7 p.m.
- August 29 to October 9: 9 a.m. to 5 p.m.
- October 10 to October 30: 10 a.m. to 4 p.m.

**Park closed October 31 to February 28**

**Address:** 1500 Noccalula Road, Gadsden, AL 35904

**Directions:** From Birmingham, take I-59 North to the Reece City Exit and turn right onto Noccalula Road (Alabama Hwy 211). Go approximately 2.5 miles and turn right onto Mann Drive to enter park.

For more information, call (256) 549-4663 or log on to [http://noccfalls.homestead.com/index.html](http://noccfalls.homestead.com/index.html) for more info.

**REFERENCES:**


**Return to Table of Contents**
Little River Canyon National Preserve:

Photo: Little River Falls during summertime. This waterfall drops 45 feet and is surrounded by weathered sandstone and shale of the Pennsylvanian and Bangor Limestone of the Upper Mississippian Periods. Photos courtesy of [http://www.nps.gov/liri/planyourvisit/little-river-falls.htm](http://www.nps.gov/liri/planyourvisit/little-river-falls.htm)

Starting at Lookout Mountain in Chattanooga, TN and running the length of the mountain, the Little River winds and cuts its way through TN, GA, and well into Alabama. The Little River Canyon in Alabama was designated a National Park in 1992 by the U.S. Park Service for its rustic and rugged nature and to protect the regions from further development in order to preserve one of the cleanest rivers in the South.

Little River Canyon is the largest and deepest canyon east of the Mississippi River. You can think of this as a visit to the Grand Canyon, just with trees everywhere! We will explore millions of years of rocks in the walls of the canyon as we trek through, and fossils from the Late Mississippian and Pennsylvanian Periods. Although access to the canyon can be difficult, there are many areas to explore via your car. The park has several overlooks that we will explore and hike to the base of the canyon below the falls area. The canyon has a road that circles the rim of the canyon, allowing you to stop along the way and explore the many diverse habitats in, around, and above Little River Canyon.

Photo: Mushroom Rock was set to be demolished during the initial construction phase of the park. When workers refuse to demolish the unique Sandstone formation, the decision was made to pave around it. Photo courtesy of NPS [http://www.nps.gov/liri/planyourvisit/mushroom-rock.htm](http://www.nps.gov/liri/planyourvisit/mushroom-rock.htm)
We will discuss along the way the aspects of river valley formation, protection issues for animals and plants and the debate over public lands use versus public needs (ex. having a wildlife refuge versus damming the river for hydroelectric power and water needs). There are over 100 endangered species that reside within the boundaries of the refuge, both plant and animal varieties. Also, we can discuss the history of the canyon. This was a key battleground during the Civil War for both the North and the South, and was a key staging area for Sherman before his historic march on Atlanta that would eventually lead to an end of the Civil War (Little River History, 2011).

General Info on Little River Canyon National Preserve:

**ADMISSION:** No Fee to drive and stop at overviews, explore areas.

**Park Hours:**
- Little River Canyon Center: 10 a.m. to 4 p.m. Daily
- Scenic Drive and Little River Falls: Dawn to Dusk Daily

**Directions:** From Noccalula Falls, go back to I-59 North and drive north to Exit 218. Turn right at the bottom of ramp then turn left onto U.S. Hwy 11. Go 1 mile then turn right onto AL 35 and then bear left to follow Hwy 35. Go 7.2 miles and turn left at sign for Park. If you pass over the AL Hwy 35 Bridge over the canyon, you have gone too far!

**Address:** 4322 Little River Trail NE, Fort Payne, AL 35967

For more info, please call (256) 845-9605 or visit them on the web at [http://www.nps.gov/liri/index.htm](http://www.nps.gov/liri/index.htm)

**RESOURCES:**


**Return to Table of Contents**
Cathedral Caverns State Park:

A trip that started with a majestic waterfall full of Indian lore at Noccalula Falls, then a trip across Lookout Mountain to see the wonder and beauty of Little River Canyon started this day of exploring off. Now, after a short drive over the top of Sand Mountain and across beautiful Lake Guntersville led us to the finale, and what a finale it is---Cathedral Caverns State Park. Nestled in the northeast part of Marshall County, AL, this massive cave is the product of millions of years of undisturbed carving by the same agent of geologic change that we have been exploring all day, WATER! The property was originally purchased in 1955 by Jay Gurley. After taking his wife into the cave for the first time, she was amazed by one of the rooms in the cavern that she said looked like a cathedral. Jay thought it over, and thought that Cathedral Caverns sounded much better than the original name of Bat Cave, and hence the name (Brandau, 2011). The State of Alabama purchased the cave in 1987 and reopened it as a state park in 2000.

Right upon entering the massive cave, you run into your first fossil: a sharks tooth embedded into the ceiling of the cave, a true testament to the area once being under the power of the sea. Not long after, one of the most inspiring formations of the cave will become evident, Goliath! This incredible stalagmite formation comes in at a goliath sized 45 feet tall and over 243 feet in circumference (Ress, 2010). In contrast, there is also another stalagmite formation in the cave that is over 35 feet tall and only 3 inches in circumference, talk about extremes! Also, beneath your feet, there is a river running through the cave. The river has been named the Mystery River, because after many years of searching, the source of and exit location of the river have yet to be discovered, but yet it flows, carving new areas of the cave yet to be discovered (Outdoor Alabama, 2011).
Photos: Top Left: A view of Cathedral Caverns through the Bolder Room. Top Right: The Frozen Waterfall, calcified rocks formed by the constant dripping of water that has carbon dioxide mixed in that helps to dissolve the limestone and redeposit it in the form of these flowstones. Bottom: Goliath stalagmite formation. This formation by scientific estimates may have taken billions of years to form this large. Photos courtesy of: Alabama State Parks [http://www.alapark.com/CathedralCaverns/AdditionalPhotos](http://www.alapark.com/CathedralCaverns/AdditionalPhotos)

Cathedral Caverns is a living cave with many stalagmite and stalactite formations throughout the cave, with one of these formation sets resembling a forest scene. The journey though the cave will inspire, and lead to fanciful thoughts as there is many interpretive formations in the cave. One such stalagmatic formation resembles the 16th President of the U.S., and hence the room it resides in is aptly named the Lincoln Room. The walk takes a little over an hour to explore the wonders of the cave, and is not a hard trip as it is in some other caves. As our second day ends, we can reflect on the true power of water and just how powerful and amazing it is as a geologic agent of change.
General Info on Little River Canyon National Preserve:

**ADMISSION:** Adults-$12.00 Children 6-12-$6.00, Children under 5 Free with Parent or Guardian.

**Park Hours:** Welcome Center and Picnic Area: 9 a.m. to 5 p.m. Daily  
Cavern Tours: March 15-August 31: 10:15 a.m. with last tour starting at 4 p.m.  
September 1-March 14: 10 a.m. with last tour starting at 4 p.m.

**Directions:** From Little River Canyon, Take AL Hwy 35 north. After about 35 miles, merge onto U.S. Hwy 72 West and travel 14.1 miles. Turn left onto Co Rd 6 1.3 miles to Cathedral Caverns Rd and turn left. Travel 3.1 miles and Cave Rd will be on your left.

**Address:** 637 Cave Road, Woodville, AL 35776

For more info, please call (256) 728-8193 or visit them on the web at  
http://www.alapark.com/CathedralCaverns

**RESOURCES:**

Brandau, Jean. "Cathedral Caverns in Grant, Alabama - Huntsville Day Trips." Huntsville Alabama - City of Huntsville - Things to do in Huntsville AL.  


Alabama Department of Conservation and Natural Resources. "OutdoorAlabama.com Video Player." Alabama Department of Conservation and Natural Resources.  

**Return to Table of Contents**
**Day 3:**

**U.S. Space and Rocket Center:**

Have you ever looked up at the heavens and wished as a kid that you were an astronaut? Well, you may never be an astronaut, but a visit to the U.S. Space and Rocket Center in Huntsville, AL is about as close to the real thing that you can get without all the rigors of the U.S. Astronaut Program. The Space Center is the product of a vision that Dr Wernher von Braun had in 1950 when he came to the sleepy little town of Huntsville, AL. He and his team of scientists set out to turn the “Watercress Capitol of the World” into the “Space Capitol of the World” (History, 2011). Space exploration has been a source of pride in American ever since the first manned mission to space was attempted with John Glenn in the 1960’s, and Huntsville has been a key player in each of this country’s space innovations ever since. The Space Center is a tribute to all the men and women who have dedicated their lives in the pursuit of expanding human knowledge of the Universe, and the people of the world who crave knowledge of space.

Upon arrival, you cannot help but be impressed by all of the displays that surround you and these are not replicas, these are the actual rockets that powered the U.S space programs. In addition to the rockets that abound throughout the museum, there are mock-up simulators to allow visitors the opportunity to experience what it is like to travel in space. From blasting off at 4 G’s to a height of 140 feet on the Space Shot or climbing behind the controls of the Apollo Training Capsule, or just enjoying “Space Food”, there are many experiences to be had to make you feel like a true astronaut.
Photos: Left: The newest addition to the Space Center is the Davidson Center for Space Exploration that greets visitors to the wonders of space. Right: A full-sized Saturn V rocket fully restored and elevated to allow visitors to fully appreciate the size of the machine that rocketed man into space. Photos courtesy of USSRC [http://www.spacecamp.com/gallery/index.php?cat=7](http://www.spacecamp.com/gallery/index.php?cat=7)

With our studies in Astronomy and the Universe while at Mississippi State, we spent a great amount of time discussing the planets and conditions on hostile alien worlds of our Solar System. The Space Center is on the cutting edge of research to send a manned mission to Mars, and some of the science of this endeavor is discussed at the Discovery Theater. There is also a Mars Climbing Wall to allow those to experience what it would be like to trek across the hills and walls of the Red Planet and experience the feel of gravity on Mars (Attractions, 2011). There are also many documents available to view in the vast repository the museum maintains on the space program in general.

This stop on the trip is a full day involved with the study of space and discussions of our past, present, and future aspirations to reach the stars and beyond. We will have a reflective time at the base of the Space Shuttle display on where the current space program is at, how a viable space program is important to us as a country, and reflect on possibilities of our future possibilities in space from going to Mars to the study of space intercept of planet killing asteroids in order to save the planet and the sciences behind that. More than just a stroll though relics of the past, the Space Center is a living testament to the ingenuity of a nation when it sets its feet on the path of discovery in the name of science for all mankind. No better place in the entire park to do this than at the Shuttle display as the Shuttle fleet has recently flown its very last flight!
General Info on U.S. Space and Rocket Center:

**ADMISSION:** General Museum Admission Prices:
Adult Admission: $20.00  Child Admission: $15.00  Child 3 and under: free

Movies:  Digital 3D Theater Adult: $8.00  Digital 3D Theater Child: $7.00
IMAX Theater Adult: $8.00  IMAX Theater Child: $7.00

Combo Packages:
Stars Combo Adult (Admission + 1 movie): $24.95
Stars Combo Child (Admission + 1 movie): $19.95
Cosmic Combo Adult (Admission + 2 movies) $29.95
Cosmic Combo Child (Admission + 2 movies) $24.95

Discounts:
$3.00 off the Stars Combination Ticket
Stars Combo Adult (Admission + 1 movie): $21.95
Stars Combo Child (Admission + 1 movie): $16.95

•Seniors- 55 and over
•Active Duty Military and their dependents
•AAA
•Retired Military and their dependents

**Park Hours:** The Center is open 9 a.m. to 5 p.m. everyday.

**Directions:** From Scottsboro, Take AL Hwy 279 to U.S. Hwy 72 West and drive to I-565. Stay on I-565 to exit 15 and follow the signs to the Space Center.

**Address:** One Tranquility Base, Huntsville, AL 35805

For more info, please call (256) 837-3400 or visit them on the web at www.ussrc.com

**RESOURCES:**

"History | U.S. Space & Rocket Center." U.S. Space & Rocket Center | U.S. Space & Rocket Center.

"Museum Attractions | U.S. Space & Rocket Center." U.S. Space & Rocket Center | U.S. Space & Rocket Center.

**Return to Table of Contents **
Day 4:

**Pottsville Formation (upper part of the Pennsylvanian):**

![Photo of road cut exposing slate rock formation along I-65 by Keith Golden](image)

Continuing on our trip, we stop on the side of Interstate 65 to observe a cut that has exposed millions of years of deposition of slate. Slate is foliated rock on the low end of the metamorphic grade scale and is formed from clays, micas and chlorites. This particular formation formed during the upper part of the Pennsylvanian Period. Careful inspection of the various layering of the sediment deposits reveal cyclic layers of Slate, siltstone, sandstone, and thin layers of coal. The Pennsylvanian Period (318-299 mya) is part of the late Paleozoic Era and these particular rocks were laid down during the Absaroka Sequence. The thickest deposits are closest to the Appalachian Chain thinning out as they head west.

What stands out as you look through the lower portions of the formation, is the horizontal alignment of the deposit. This horizontal arrangement of the layers indicates that these deposits were lain down in a calm water/swamp environment over millions of years and also shown no evidence of uplift. Also evident, is the various layering that is due to rhythmic and repetitive sediment deposition called cyclothems. This location is right on the western edge of the Appalachian Foothills and Plateau region, where successive transgressions and regression sequences were a common occurrence during the later part of the Paleozoic Era. This slate deposit overlays a thick layer of Mississippian Period limestone that formed when the entire area was covered with a shallow warm sea. With the regressing seas, delta formations formed from the massive watershed eroding the Appalachians to the east, adding silt and clay particles that would form the siltstone and slate. The coal layers formed due to the area being swampy along the craton edges at the base of the mountains and sea interface. The farther west you travel, the more this is evident in the amounts of coal deposits in Central and Northwestern Alabama.
Some fossils can be found when scouring through the talus piles at the base of the cut, some of which include fern imprints and trace fossils of amphibians and reptiles. This period was occurred during the rise of the reptiles and the first appearance of eggs being laid out of water. With the ease of fracture of the slate and siltstone, a little exploration could lead to valuable fossil finds!

As we leave this stop, we can see all around us hills and valleys and the effects of erosion on the environment over a vast period of time. Our next stop will take us to an active erosion location that is shaping the landscape of tomorrow.

**STOP LOCATION:** From Decatur, head south along Interstate 65 and formation is on the right hand side of the road between mile marker 299 and 298 just south of Dodge City, AL. Special care needs to be taken when stopping to watch for traffic, but there is ample room to pull off the roadway and the cut location is protected by a guardrail.
Environment in motion, that’s what you will see while visiting the locust fork of the Warrior River. One of the last free flowing rivers left in Alabama, a trip along the river is like taking a step back in time. Not only looking back on geologic time in the rock walls and boulders along the route, but also a look back to early Alabama as the explorers and settlers first saw it---with wild, untamed rivers full of life. This stop has a little geology along the way, but the main focus of exploring the Locust Fork is one of natural beauty and of environmental impacts. When does the need of the many outweigh the needs of the environment? We shall look into that very question while enjoying the river.
The Locust Fork is a feeder river to the main Black Warrior River in Alabama. The Warrior River Basin as a whole is a vital watershed not only for the water resources it provides to the population centers, but also to the environment it provides for numerous species of wildlife and the mineral resources that abound around its meandering paths through the center of the state. This same river basin though also shares space with the larger Warrior Coal and Plateau Coal Basins of Central Alabama. This leads to the ever constant tension between those who want to protect the river and its waters, and those that literally want to strip mine the surrounding areas for coal right up to its very banks.

![Graphic: Coal resources of Alabama courtesy of the Dept of Geography, College of Arts and Sciences, University of Alabama](http://alabamamaps.ua.edu/contemporarymaps/alabama/physical/coalresources.jpg)

What our trip will highlight is some of the beauty that is the Locust Folk River, from the rushing rapids, to the limestone and shale cliffs and boulders you pass by, to looking for some of the endangered species that call the river home. It takes about as long to float down the river as it does to walk its banks, either method will be available for those that do not want to get into the boats. The river is a rafting river, with rapids from 1-3 on the rafting scale (1-5 scale with 5 being the most dangerous/difficult rapids) of difficulty. Below is a map of the part of the river we are planning to journey down. Boat rentals can be secured from the Friends of the Locust fork by contacting Joe Still @ 205-965-4565 or email @ stillphoto0p@aol.com.
Some of the issues that affect the river as mentioned earlier are strip mining of coal near its banks producing sedimentation and acid runoff leaching form the mines. The number one environmental concern for life any river system is sedimentation. Excessive runoff of silt and soils into the river pollutes and causes life to suffer in the river. Acid runoff also pollutes by poisoning the river by placing heavy metal particles in the water and changing the pH levels of the water, tipping the scales on those organisms that have delicate environmental tolerances. Some of this runoff from the nearby Rosa Mines will be able to be seen from our launch point at the Covered Bridge Road launch. (Friends of Locust Fork, 2011)
Besides the above stated mining issues, the City of Birmingham has fought for years to dam the Locust Fork as a supplement to its water needs for the city. As to date, the City of Birmingham has purchased over 2600 acres of land near Hayden Alabama to dam the river, but has lost every court battle and zoning hearing to go forth with the plan. The pristine beauty of the river would be lost forever if this plan ever proceeds as the city plans. The proposed dam location is at our end location along County Hwy 13. All of the photos of the river in this presentation are taken along the path of the river that would be affected by such a dam project.

While floating down the river, you will see the plant life of red and silver maples, southern pines, elm and oak trees all around the waters edge. The geology of the area was formed in the late part of the Pennsylvanian Period. Bluffs of limestone and shale surround you with little traces of exposed coal that can be seen throughout the rock face. As you lazily float by, you are peering back in time, not just the exposed geologic history of the walls of the river, but in human time to a time when all the rivers ran wild throughout the state, just as they were when the first people that inhabited the state would have seen it.
**General Info about Locust Fork Trip:**

No cost for admission. Group will be dropped off at the Covered Bridge Road launch area and picked up at the Blount County Hwy 13 Bridge. The float is approx 4.75 miles and will take roughly 4-5 hours to complete depending on water levels. For information about obtaining rafts, contact Joe Still @ 205-965-4565.

**RESOURCES:**

Rickwood Caverns State Park:

Photo Credits: Left side top and bottom: Various Stalactites and stalagmite formations; Top Right: Whale’s Mouth formation; Bottom Left: Mineral panning outside of Gift Shop/Cave Entrance. Photos courtesy of Keith Golden
Rickwood Caverns State Park is nestled in the southwest corner of Blount County, AL between Birmingham and Cullman. The park consists of hiking trails, an Olympic sized pool, and meeting facilities, but the true wonder of the park is the cave that runs underneath the park. Rickwood Caverns is referred to as the “Miracle Mile”, referring to the over mile long underground cave that formed over 260 million years ago during the late Paleozoic Era (Mississippian/Pennsylvanian Periods) when most of Alabama was either under water or swampy in nature.

The cave has many wonderful nuances to explore. As you start you decent into the caverns, you are met with fallout shelter signs, hailing back to an era going by when caves and underground shelters were set up back in the 1950’s and 1960’s for refuge in the event of a nuclear war. Provisions were kept at Rickwood Caverns to feed 3000 individuals for up to 14 days. Although the threat is passed for nuclear obliteration, the food remains tucked away in the bowels in the cavern. Once into the first opening into the cave, you are greeted by a stalactite flowing down from the ceiling. This area of the cave is referred to as the Bridal Room, and hosted the first ‘underground’ wedding in Alabama back in July 1958.

Photo of Bridal Room by Keith Golden
There are natural bridges, tight squeezes, steep inclines to climb, and of course water! The cave formed by water erosion, and throughout the length of the caverns. Millions of years of transgressing and regressing seas over this area deposited the beds of calcium carbonate which compounded in layers to form the limestone that the caves are inside of. Movement of underground rivers of water, rising and lowering ground water levels, and dissolved carbon dioxide in rainwater which forms carbonic acid which helped to hollow out the caverns. Present day water levels in the cave are very low, with water only accessible from one location along the main tour area. What looks like a simple puddle, is crystal clear water with a depth of over 65 feet deep in places. The swimming pool at the park uses this water to fill the swimming pool with daily. Of note, filling the entire Olympic size pool full only drops the water level of the cave by 2 inches! The pipe below appears bent due to the refraction of light through the clear water of the cave. The brace under the pipe in the below picture is at a depth of 8 feet under the surface.

After a trip through the cave, you come back up to the wonderfully hot and humid weather of Alabama in the summertime. While in the cave, the year round temperature is 60 degrees, outside the cave, average summertime temperatures can be as high as the upper 90’s. So, while you readjust to the outside temperatures, you can by a bag of panning sand from the gift shop and try your luck finding gems and minerals in your bag. All bags have a mix of different types of minerals from various types of quartz, jasper, copper, and pyrite. This is a great activity for kids to experience after going through the cave, and can allow for further discussion on minerals and how they form.

General Info on Rickwood Caverns State Park:

**ADMISSION:**
- Park Grounds: $1 per person
- Cave Admission: $12 Adults and Children over 12; $6 Children 6-12, Ages 6 and under free.
- Group rates are available for groups of 25 or more.

**Parking:** Free, park also has picnic areas available.

**Address:** 370 Rickwood Park Rd, Warrior, AL 35180

**Park Hours:**
- Park Grounds: Sunrise – Sunset.
- Cave Operating Hours: 10 a.m. – 5 p.m. (Closed Nov-Feb)
- Pool hours: 10 a.m. – 6 p.m. $4.00 per person.

For more information, call (205) 647-9692 or on the internet at http://www.alapark.com/RickwoodCaverns/

**Return to Table of Contents**
Day 5:
U.S. Hwy 78--Pottsville Formation (lower Pennsylvanian):

What makes this seam unique as opposed to the earlier stop on Day 4 is this is a lower exposure in the rock record of the Pennsylvanian Period. Where the last stop should extensive slate and sandstones with little seams of coal with extensive fracturing of the rock face, this stop is unique in a different way. They were both laid down during the Pennsylvanian, but this one is at the start, and can be evidenced by the large coal seam approx 15 inches thick in the photos above. The slate rock is a precursor rock that mining companies look for in their exploration of coal seams in Alabama. The coal seams are from the mid to late Mississippian Period when this area was covered with swamps and marshes associated with the Black Warrior River Basin and ancient shorelines as the prehistoric seas regressed away from Central Alabama.
Careful examination of the rock face and you can see layering of coal followed by clays, slate and siltstone in alternating fashions as you go up through the rock record. There is also mixed in small rounded river pebbles and conglomerates which allow us to use the Principle of Inclusion in these horizontally laid sediments to discuss the dating of the rocks and formation of the exposed rock formation. The top layers are loose clays and dirt, and it is possible to find some fossilized plants near the edges of the coal seam if you are attentive to the area around you.

**Stop Location Information:** Although there are numerous outcrops along this stretch of Old U.S. Hwy 78, most have been overgrown with trees and other vegetation since the time the highway was initially cut. This particular exposed cut is between mile markers 146-147, or 1 mile west of the access ramp to the new I-22 (X-Corridor as it is called by the locals). There is plenty of safe room to pull off at this location, and the rocks are well off the side of the highway. Special care needs to be taken to watch out for snakes and black widows in the loose piles of rocks at the base of the cut.

**Return to Table of Contents**
April 27, 2011 tornado damage path in Pleasant Grove/Pratt City:

April 27, 2011 will be remembered in weather history as one of the deadliest tornado days ever for the State of Alabama. There were a total of 268 reported tornadoes that day, 30 of which struck Central Alabama and one of the largest of these tornadoes (EF-4 Tuscaloosa-Birmingham Tornado) touched down in the western and northwest suburbs of Pleasant Grove and Pratt City. Our stop though the area will show how two communities are dealing with the aftermath of absolute destruction and discuss some of the weather science behind how this happened and illustrate in vivid detail the destruction capability of a killer tornado.

Graphic: Statewide tornado paths and counts for April 27, 2011. Tornado 46 in this photo was the Tuscaloosa-Birmingham Tornado that struck Pleasant Grove. Photo courtesy of NWS Birmingham http://www.srh.noaa.gov/bmx/?n=event_04272011
The overall weather conditions were ripe for a major destructive tornado outbreak over the South starting on the April 26th. A very powerful springtime meso-cyclone was developing over the Midwestern U.S. Warm moist air was rushing northward from the Gulf of Mexico ahead of the approaching cold front plowing towards the Southeastern U.S. In conjunction with this, the jet stream winds were helping to amplify the trough, bringing about highly unstable atmospheric conditions and would enhance any supercell thunderstorms that formed during the event. This enhancement pointed directly to the formation of supercell thunderstorms capable of developing and maintains long-lived, long-track violent tornadoes throughout the South (especially in Alabama).

With most severe indices off the charts leading up to the event, the Storm Prediction Center in Norman, OK placed “High Risk” for violent tornadoes over Alabama for April 27th. Below is the Day One Outlook that was issued at 7 a.m. April 27th. Look at the map of the confirmed tornado tracks and match it to the outlined area in the Day One Outlook to see just how close the two correlate.

Graphic: Day One Outlook for April 27, 2011. Graphic courtesy of SPC
http://www.spc.noaa.gov/products/outlook/archive/2011/day1otlk_20110427_1200.html
There was a tremendous loss of life once the tornado event took place. This one tornado was on the ground for over 80 miles, peak winds in excess of 190 mph and was almost 1.5 miles wide during its destructive journey. There were 1000 injuries and 65 deaths with just this one individual tornado; and over 243 confirmed deaths in Alabama on April 27th (Historic Outbreak, 2011). Why in the age of the internet, smart phones, and 24-hour news coverage could so many people perish? One may jump initially to the conclusion that there is a large majority of people in Alabama that live in manufactured homes and sub-standard houses and you would be partially correct. The biggest reason for the large loss of life was the storms that came through early in the morning of April 27th that cut power to tens of thousands and took out several weather service radio transmitter towers roughly 10 hours before the main storm event. This early morning blow delivered to the state left hundreds of thousands of Alabamians without power or information, helping to increase the tragedy of the tornadoes.

The National Weather Service surveyed all the storm tracks using the Enhanced Fujita Scale (or EF-Scale) as a guide to determine the strength of the tornadoes. The scale, which was first developed by Dr Ted Fujita, determines the strength of a tornado winds by observing what structures it damages and to what degree that damage occurs. I have included a copy of the EF-Scale at the end of this section so that you can use it when on site of the damage. Although a lot of cleanup has been done to the areas we will be visiting on the field trip, there are some places that will not have been cleaned. Scars will remain for many years to come from the tornadoes of April 27th, 2011: Not just on the landscape, but in the minds and hearts of Alabamians as well.
Enhanced F Scale for Tornado Damage

An update to the original F-scale by a team of meteorologists and wind engineers, to be implemented in the U.S. on 1 February 2007.

<table>
<thead>
<tr>
<th>FUJITA SCALE</th>
<th>DERIVED EF SCALE</th>
<th>OPERATIONAL EF SCALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>F Number</td>
<td>Fastest 1/4-mile (mph)</td>
<td>3 Second Gust (mph)</td>
</tr>
<tr>
<td>0</td>
<td>40-72</td>
<td>45-78</td>
</tr>
<tr>
<td>1</td>
<td>73-112</td>
<td>79-117</td>
</tr>
<tr>
<td>2</td>
<td>115-157</td>
<td>118-161</td>
</tr>
<tr>
<td>3</td>
<td>158-207</td>
<td>162-209</td>
</tr>
<tr>
<td>4</td>
<td>268-300</td>
<td>262-317</td>
</tr>
<tr>
<td>5</td>
<td>264-318</td>
<td>262-318</td>
</tr>
</tbody>
</table>

***IMPORTANT NOTE ABOUT ENHANCED F-SCALE WINDS:*** The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage. To assign these wind gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 18 indicators listed below. These estimates vary with height and exposure. Important: The 3 second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, "one minute mile" speed.

Graphic: Chart showing old and new Fujita scales for determining tornado strength. Graphic courtesy of SPC/NOAA [http://www.spc.noaa.gov/faq/tornado/ef-scale.html](http://www.spc.noaa.gov/faq/tornado/ef-scale.html)

**Directions:**

From last stop, continue east on U.S. 78 for approximately 6 miles to Pratt City (along the highway 2 miles west of I-20/59 Junction with Hwy 78). Pull off anywhere because you cannot miss the path as it was ¾ miles wide and crossed the highway perpendicular to the traffic flow. To get to Pleasant Grove, get back on Hwy 78 E and then take I-20/59 S towards Tuscaloosa. Go to Valley Rd exit and merge into Valley road heading west. Turn right on Garywood Dr, then right again onto Forest Rd/ 5th Ave. Go about 2 miles and you will see the destruction path in front of you everywhere as Pleasant Grove was over 70 % destroyed.

**RESOURCES:**


**Return to Table of Contents**
The last stop of Day 6 has us getting out of the wet heat of an Alabama summer’s day and into the classroom so to speak. The McWane Center is a state of the art science museum located in the heart of the Downtown Birmingham Historic District. Formed after the closure of the Red Mountain Museum with funding from some of the largest corporations in the city, the museum is a repository of science training for ages 5 to 85. This stop is as much to refresh ourselves on some of the basic principles of Earth and Life Science, fossil formation and methods of fossilization, and environmental concerns and habitat creation as well as helping you as a teacher relay these concepts to your classrooms.

Created in a building created by a 1950’s era department store, McWane Center has made the most of the ample space they have. With 4 floors of exhibits that span from the introductory to the advanced, science lovers of all ages can appreciate the exhibits that abound throughout the museum. There is a working full sized Tesla coil in the Rushton Science Theater to instruct on the principles of lightning and how electrical currents work. The theater exhibit also has shows demonstrating various scientific concepts of combustion, principles of physics and gravity, and a very interactive show on atmospheric gases and how they respond to heat and compression. All are excellent teaching tools to take back to your classrooms!

Alabama is blessed with numerous rivers and world renowned beaches. The main problem with visiting such places is the expense and logistics of the trip and when you get there, you basically only see things from the surface of the water up. Well, McWane solved that problem with its own aquarium! There is a Cahaba River display showing the native fish and reptiles of the Cahaba River which are typical of most rivers in the state. Being able to see what is going on beneath the water is a powerful tool to realize that what is dumped into the water greatly affects wildlife, even when you cannot see it in the wild, it is still there. There is also a display tank with living sharks and rays that allows you to touch and even feed them. An entire section of the museum is dedicated to the vast ecological diversity and uses of the water resources of the state and how what goes on in the water affects us all (Exhibits, 2011).
If fossils are your thing, then you are in store for a treat at the McWane Center. When the old Red Mountain Museum closed in the late 1980’s, the extensive fossil collection they had recovered from the cut through Red Mountain and surrounding quarries and fossil beds were no longer available. One of the first exhibits opened was the fossil exhibits, to revive interest in the local fossil record of Alabama. Alabama has a state fossil, the Basilosaurus cetoides, which was a prehistoric predatory whale that inhabited the shallow seas that covered the state during the Eocene Epoch (Basilosaurus, 2007). One of the fossilized remains can be found at the museum along with over 300 other specimen for you to discover.

Some of the other science displays to explore include: Meteorology, rock and mineral identification, fault zones and how they work, the light spectrum, and the properties of water just to name a few. There are also numerous hands on classes instructed by the staff that is great for the teaching of people of all ages in every aspect of science to be had.

Before leaving the museum, take a good look over the listing for the IMAX movies on tap at the McWane Center. McWane is home to the largest and most dynamic IMAX Theater in the state. Whether the film is about climbing a mountain, chasing a tornado, flying a jet in the Air Force, or exploring the oceans deep, the IMAX is the way seeing science film documentaries were meant to be shown. This stop can be a valuable asset long after you leave the trip as well, with the McWane Centers commitment to science excellence for schools. With a simple form, you can coordinate a live teleconference for your classroom after you return home through the McWane Centers Teacher Outreach Programs. A truly valuable and amazing resource available to you and your classroom no matter where you are in the country!
**General Info on McWane Science Center:**

**ADMISSION:**
- **Museum:** $12 Adults ($17 w/IMAX); Kids 2-12 $9 ($13 w/IMAX)
- **Parking:** $5.00

**Museum Hours:** Open 7 days a week
- Mon-Fri: 9 a.m. to 6 p.m.
- Sat 10 a.m. to 6 p.m. and Sun 12 p.m. to 6 p.m.

For more information, call (877) 4-MCWANE or on the internet at http://www.mcwane.org

**Address:** 200 19th Street North, Birmingham, AL 35203

**Directions:**
From Pleasant Grove, get back on I-20/59 and drive east to 19th St N exit. Turn right onto 19th street and go straight until you reach the corner of 19th St and 2nd Ave N. Turn right and parking deck/museum on your right.

**RESOURCES:**


**Return to Table of Contents **
Day 6: 
Anniston Museum of Natural History:

During our trips so far, we have seen mountains, mines, weather disaster aftermaths, rocks and wildlife of the State of Alabama. Today’s trip is not simply a stroll through a stuff museum full of dusty artifacts; this will be a walk through the entire state and beyond. The Anniston Museum of Natural History is nestled in the foothills of the Appalachian Mountains in Anniston, AL. There are eight themed and unique display areas to explore and many unique things not only to Alabama, but in natural processes in wildlife as well.

Starting our trek through the museum means taking a stroll through Alabama, literally all of Alabama! One of the most popular permanent displays at the museum is Alabama: Sands to Cedars; a trail showing the diversity of the state from the shores of the Gulf Coast to the Mountains of the northeast and every environment in between. The environmental and biodiversity of the state is highlighted in detail, showing why Alabama is the 4th most biologically diverse state in the nation (Exhibit Hall, 2011). There is also an aquarium showcasing local species of fish and a 12 foot live alligator which is common to the southern parts of the state.

Other displays for viewing include: Dynamic Earth, a study of what makes geology alive on planet Earth; a birds exhibit which includes specimen that date back to 1860; a trip through the savannas of Africa; and a trip through the relics of Ancient Egypt. There are also garden exhibits on the grounds of the museum that showcase the beautiful flora of the region. This is a very informative stop, and will shed light onto the diversity of the state while sneaking in a little history of the world at large along the way.
Photos: Left: Replica of a full sized elephant in the Environments of Africa exhibit. Right: The museum has two actual Egyptian Mummies that are on permanent display in the Ancient Egypt display. Photos courtesy of Alabama Bureau of Tourism and Travel  

http://www.encyclopediaofalabama.org/face/Article.jsp?id=h-1889

**General Info on Anniston Museum of Natural History:**

**ADMISSION:**

**Cost:** $6 Adults  Kids 4-17 $5  

**Museum Hours:** Mon-Sat: 10 a.m. to 5 p.m.  
Sun 1 p.m. to 5 p.m.

For more information, call (256) 237-6766 or on the internet at  

http://www.annistonmuseum.org

**Address:** 800 Museum Drive, Anniston, AL  36206

**Directions:** From Birmingham, Take I-20 E towards Atlanta. Take exit 185 (Anniston/Oxford exit) and turn left onto AL Hwy 21 N and go 6 miles to the intersection of AL Hwy 21 and Lagarde Park and turn right into park. At first stop sign, take a left and museum will be ahead on your left.

**RESOURCES:**

"Exhibit Halls | Anniston Museum of Natural History," Welcome | Anniston Museum of Natural History.  

**Return to Table of Contents **
Alabama’s highest point at an elevation of 2407 feet resides atop of one of the most picturesque places in the entire state, Cheaha State Park. The park was originally created under President Franklin D. Roosevelt’s “New Deal” plan which helped to put people to work during the Great Depression by working on grand public works projects. The Civilian Conservation Corps, or CCC for short, started to work on developing the park in the early 1930’s. Much of their works are still evident at the park in the form of handcrafted rock cabins, the marker and observation deck for the highest point, and Cheaha Lake. Cheaha Lake is a 3 acre lake at the base of the mountain that was hand dug by the men of the CCC (Ress, 2010). Try getting something like that done in the 21st Century by hand and you will be waiting forever for work to begin!

Our trip here to Cheaha will serve two purposes: Exploration of some of the rocks and how the mountains of this region formed; and a fortunate product of staying in the park overnight, stargazing and working our astronomy knowledge. Cheaha is far enough from the urban centers of Atlanta to the east and Birmingham to the west to allow for very little light pollution. This will give the viewer the opportunity to not only see the constellations easier, by allow for naked eye viewing of the inner planets of Mercury, Venus, and Mars, but to also see Jupiter and Saturn. With the aid of a small telescope, we should be able to also view Saturn’s rings and the Great Red Spot on Jupiter, weather permitting.
The Rock Garden Trail is one of the more difficult hiking trails in the entire park. This trail can either be taken from the base of the mountain where you have to climb up almost 800 feet in elevation surrounded by thick forests and numerous large granite and sandstone boulders sterns across the trail. The other method is to start at the parking area for people who drive to the summit of the mountain as opposed to hiking to it. Although it is a strenuous hike, it is well worth it with ever widening overviews as you ascend the trail, and numerous weathered outcropping to explore along the way. One of these outcrops is called the “Pulpit Rock” because of the open expanse and view from the rock appears as if you are preaching a sermon to the masses. There are also numerous mountain streams and waterfalls to explore along with shear bluffs and rock climbers abounding all around you testing their climbing skills.

Well worth the trip after almost a week of darting here and there across the state, a slow day of seeing nature undisturbed except for the handmade trails and cabins that were literally cut right from the mountain by the CCC. Enjoy the view of the valleys, soak in a beautiful sunset and then watch in amazement as the sky twinkles with more stars than most people ever get to see in a lifetime. Sounds like a perfect way to wrap up the day on top of Alabama!
General Info on Cheaha State Park:

ADMISSION:

Cost: $3 to access the park and trails

Park Hours: 7 a.m. to sunset daily

For more information, call (800) ALA-PARK or on the internet at http://www.alapark.com/CheahaResort

Address: 19644 Hwy 281, Delta, AL 36258

Directions: From Anniston, Take I-20 E towards Atlanta. Take exit 191 and turn right onto AL Hwy 1/U.S. Hwy 431 S. Go approximately 4 miles and turn right onto County Rd 131, then turn left onto Al Hwy 281 S (Skyway Mountain Way) and drive 13 miles to park.

RESOURCES:


**Return to Table of Contents**
Day 7:  
Sylacauga Marble Quarry:

Photo: The Alabama Marble Quarry near Sylacauga, AL. Look on the left hand side of the water and note the pickup truck for a size reference of just how large the quarry is. Photo courtesy of BradlyA http://www.flickr.com/photos/bradleya/4287601020/sizes/z/in/photostream

We have along the field trip seen many unique facets of geology in Alabama along the way: Largest canyon east of the Mississippi river at Little River Canyon, largest opening to a commercial cave in Cathedral Caverns, and red iron ore at Red Mountain. Today’s trip takes us to see the state rock of Alabama, Marble. Named for the town of Sylacauga, AL, The Sylacauga Marble seam is an impressive rock formation at 1 mile wide and over 32 miles long and up to 200 feet thick at spots. Outcrops of the prized stone can be found literally coming up through the soil all over this area of Alabama, but we will go to the source of the largest calcium carbonate (CaCO3) mining operation in the world currently, The Alabama Marble Company (Alabama Marble, 2005).

As most of you have probably seen somewhere in travels or even in daily life the beauty to marble, do you know how it is formed and just exactly what it is that makes marble such a unique stone? Well, as the calcium components of sea creatures shells fell over many millions of years to the sea floor or precipitated out of the water column, they accumulated and compacted to form limestone and dolomite formations. Both of these calcium carbonate type rocks are subject to erosion (as seen in the caves we have already visited on this trip). Take this same calcium carbonate rock though, and subject it to extreme pressure and heat, and you get a very hard, resistance stone afterwards, in this case marble. Besides being very resistant to erosion, marble breaks along seams in large blocks which allows for it to be easily cut for building purposes and also possesses a translucent property that when polished allows for light to shimmer off its surface. These two properties make marble a prized building stone in the construction of monuments and statues the world over.
Sylacauga Formation marble has been called some of the whitest marble in the world (Alabama Marble, 2005). Its beauty can be seen today in some of the United States most revered buildings like the Lincoln Memorial and the Supreme Court Buildings in Washington D.C (Alabama Marble Quarry, 2008). The marble formed during the collision of tectonic plates during the Permian Period when the Appalachian Mountains were being formed and the deformation zone between the mountains and coastal plates near Sylacauga metamorphosed the limestone and dolomite into marble.

Marble is used for so much more than just decorative stone these days. The uses for calcium carbonate (CaCO3) these days seem endless, and I bet that you have at least one product that has used this resource for its creation on your person right now. Marble can be crushed and used to enhance other everyday products. Here is a short listing of just a few of its varied used in everyday life: Cosmetics, chewing gum, wire insulation, paper manufacturing, printing inks, paint, and crayons for starters (Marble Industry, 2011). Marble touches the lives of us all, even if we have never really realized it!

While at the quarry, we will not only get to see the marble being quarried, but we can explore the many facets of the stones processing and marketing. Marble blocks are knocked loose in huge blocks, some as large as 300 tons then transported to saws that cut the rock into the desired size. Nothing is wasted because the remnant pieces are crushed and used in the various products listed above. This stop should be a very informative and enlightening experience for us all.
General Info on Sylacauga Marble Quarry:

**Address:** 301 County Road 9, Sylacauga, AL 35151

**Directions:** From Cheaha State Park, take U.S 281 N, then turn right onto AL Hwy go approx 25 miles to AL Hwy 148 and follow around to the right. After driving approximately 35 miles to reach Sylacauga, when Hwy 148 ends in Sylacauga, take a left onto Broadway Ave. At 3rd light, take a right onto County Road 2/34 and drive approx 6 miles to Marble Valley Road and take a left. Follow signs into quarry from there and report to quarry office for tour.

For more info, call (256) 245-9868 or on the internet at [www.alabamamarblequarry.us](http://www.alabamamarblequarry.us)

**RESOURCES:**


**Return to Table of Contents**
Wetumpka Meteor Crater:

Located at the southern most portion of our field trip, Wetumpka, AL has something of a rarity that one might not expect to see in Alabama or really any place on the Earth---A Meteor Crater! Approximately 84 million years ago, a roughly 1000 foot wide meteor fell from space and collided with the Earth at the location of present-day Wetumpka (Impact Crater). At the time, Wetumpka would have been just off the coast of the Appalachian Mountains. The resulting impact would have killed all life within forty miles of the impact crater, and dramatically altering the rocks that would normally be in the horizontal dramatically into the vertical.

The abnormality was first noted back as early as 1891, while State Geologist Eugene Allan Smith was surveying the rocks in the area. For many years, the area was listed as “Structurally disturbed” on geologic maps. It wasn’t until 1972 when yet again the area was surveyed and documentation of the rock outcrops were properly identified. Debate still abounded over the subject of an impact crater in Wetumpka until a scientific team lead by Dr. David T King Jr., Professor of Geology at nearby Auburn University drilled for cores deep into the bedrock at the crater site. The core samples revealed shocked quartz, which can only form from big impact events. Validation of these findings would come in 1999 when two professors, one from Brown University and one from the University of Vienna validated the samples. The crater was fully acknowledged in 2002 by the international community as an impact crater site. With its location in approximately 100 m of water, it makes it the best preserved marine crater in the world! (Impact Crater, 2010)

Photos: Left: graphic illustration to show where the impact location was in relation to the land mass that was above sea-level in the late Cretaceous Period. Right: Enhanced photo of the impact crater with the City of Wetumpka and proposed future exhibit site to capitalize on the tourism draw of the crater for the city. Photos courtesy of the City of Wetumpka http://www.wetumpkalibrary.com/Default.asp?ID=145
Besides seeing evidence of shocked quartz all around the crater area, there are numerous spots around the crater where the rocks are violently tilted (some as much as 50 degrees into the vertical). Schist and gneiss rocks which are two types of metamorphic bedrock can be observed around the edges of the over 4.5 mile crater rim with the center of the crater filled with disturbed sedimentary strata that formed sandstone after impact as they filled the crater basin (King, Impact Crater). The Coosa River runs along the western edge of the crater and along with the weather over the last 80 million years have greatly eroded the crater. There is plenty of the crater rim left though to explore on our field trip so never fear!

Right: Close up view of rocks uplifted along the craters western wall. Photo courtesy [http://www.auburnastro.org/wetu.htm](http://www.auburnastro.org/wetu.htm)

**General Info on Wetumpka Crater:**

**ADMISSION:** No Admission Charge

**Parking:** Parking will be along US 231 on the east side of the city of Wetumpka.

**Address:**

For more information, call (334) 567-4811 or on the internet at [www.wetumpkachamber.org](http://www.wetumpkachamber.org)

**RESOURCES:**


**Return to Table of Contents**
Our last stop of the field trip concludes at the National Weather Service office in Calera, AL. This weather service office is located at the Shelby County Airport, and is responsible for the Central Alabama Region weather forecasting and warning issuance. This trip was geared for the later part of the afternoon in order to watch the weather balloon launch that occurs each day at 0000 GMT time (6 p.m. CDT). There are many things to explore, from how the radar specialist uses WSD-88 radar to determine the strength and direction of storms, to just what goes into making a weather forecast possible.

Not only is the local weather service charged with issuing forecasts and warnings, but they are an integral part of the post storm damage assessment and rating of tornado and flood damage for the area. In the image below, the ratings and storm tracks of the historic April 27, 2011 are illustrated. Many hours of hands-on assessments by the weather service office went into the making of the final damage assessment, and by the sheer number of damage tracks it is no wonder why. Along with this, the weather service is constantly training the public through storm spotter education courses, conducting seminars, and working with local and state emergency management agencies to better prepare for severe and threatening weather events.

During our tour of the weather office, we will be able to see the processes that are used in taking weather readings, how a weather balloon is launched and tracked, the principles of radar meteorology and how they are applied, and just how the weather service gets information out to the public. The men and women at the Birmingham weather office are some of the most knowledgeable and friendly in the business!
**Historic Tornado Outbreak**

**April 27, 2011**

Photo: Coverage area of the BMX weather office symbolized in counties in dark green with overlay of tornado tracks in the BMX coverage area from the historic April 27, 2011 tornado outbreak. Photo courtesy of NWS Birmingham  
http://www.srh.noaa.gov/bmx/?n=event_04272011

General Info on NWS Office Birmingham:

**Directions:** Take I-65 North to Exit 234 and take left back over interstate. Take right at first stop sign and drive about 1 mile, you will see weather office on left along runway of Shelby County Airport.

**Address:** 465 Weathervane Dr, Calera, AL 35040

For more information, contact Laura Sanchez @ (205) 664-3010 or log onto http://www.srh.noaa.gov/bmx

**Return to Table of Contents**
REFERENCES SECTION:

List of hotel stays and dining for each day:

Here is a list of proposed lodging and eateries that we hope to utilize while on the field trip. This information contained is subject to price and availability changes and should be used as a guide. All breakfasts will be served at hotel as part of the nights stay unless otherwise specified and lunch will be of the fast food type (i.e. McDonalds, Subway, Wendy’s etc), with dinner at a local and unique restaurant unless timing of the days stop or location dictates otherwise. All rooms will be double occupancy unless otherwise noted.

Day 0: Arrival Day:
**Dinner:** Sweet Bones Alabama just off Hwy 280 in Cahaba Heights, AL. This fine dining restaurant serves plenty of Southern cuisine, but is best known for their Fried Banana Pudding Dessert! For a look at the menu and more information on prices: [http://sweetbonesalabama.com](http://sweetbonesalabama.com)

**Lodging:** Holiday Inn Express, 156 Resource Center Pkwy, Birmingham, AL 35242 (800) 345-8082. Cost per night approx $85-100 night/2 people

Day 1: Birmingham:
**Dinner:** The Irondale Café. Made famous by Alabama actress Fannie Flagg in the movie Fried Green Tomatoes, the Irondale Café is a classic Meat-and-Three restaurant with the specialty being, well, Fried Green Tomatoes. For more info and menu: [http://www.irondalecafe.com](http://www.irondalecafe.com)

**Lodging:** Holiday Inn Express, 156 Resource Center Pkwy, Birmingham, AL 35242 (800) 345-8082. Cost per night approx $85-100 night/2 people

Day 2: Scottsboro
**Dinner:** The Docks Restaurant on the shores of Lakes Guntersville offered the best of local fish and steaks and high quality Gulf Seafood that is shipped in daily. Dinner with a beautiful view of the setting sun over the lake is a must see, must eat location! For more info and menu: [http://www.goosepond.org/dine-the-docks](http://www.goosepond.org/dine-the-docks)

**Lodging:** Comfort Inns & Suites, 25775 John T. Reid Pkwy, Scottsboro, AL 35768 (256) 259-8700. Cost per night approx $89 night/2 people

Day 3: Huntsville:
**Dinner:** Tim’s Cajun Kitchen is a local restaurant with Cajun flair. The owner makes his specialty dishes with original Cajun recipes, and there is a wide selection of seafood and steaks to please any and all appetites. For more info and menu: [http://exploreamerica.com/timscajunkitchen/Default.htm](http://exploreamerica.com/timscajunkitchen/Default.htm)

**Lodging:** Holiday Inn Express, 3808 University Dr NW, Huntsville, AL 35816 (800) 345-8082. Cost per night approx $85-100 night/2 people

Day 4: Gardendale:
**Dinner:** The Cracker Barrel is a place where you can get a great meal day or night. Their specialty is homemade breakfast items, which can be ordered all day long and an old fashioned general store in the waiting area where you can pick up all sorts of country type souvenirs. For more info and menu: [http://crackerbarrel.com](http://crackerbarrel.com)

**Lodging:** Best Western Plus, 842 Thompson St, Gardendale, AL 35071 (205) 631-1181. Cost per night approx $89 night/2 people
**DAY 5: Birmingham:**

*Dinner:* Dreamland BBQ on the south side of Birmingham is a southern legend and an absolute must to eat at whenever in town. The menu includes their world famous ribs, with various other barbequed meats and vegetables available. For more info and menu: [http://www.dreamlandbbq.com/Restaurants](http://www.dreamlandbbq.com/Restaurants)

*Lodging:* Comfort Inns & Suites, 1951 Village Dr, Leeds, AL 35094  (205) 640-6600. Cost per night approx $85 night/2 people

**DAY 6: Cheaha State Park:**

*Dinner:* Cheaha Mountain Restaurant overlooks the beautiful hills and valleys that make up the park. There are many choices to pick from Steaks, seafood, and burgers. For more info and menu: [http://www.alapark.com/CheahaResort/%20Restaurant](http://www.alapark.com/CheahaResort/%20Restaurant)

*Lodging:* Cheaha Park Hotel, 19644 Hwy 281, Delta, AL 36258 (800) ALA-PARK. Cost per night approx $74 night/2 people

**DAY 7: Sylacauga/Calera:**

*Lunch:* The Buttermilk Hill Restaurant in Sylacauga is an Old South original restaurant with their very special take on Southern cuisine. Their specialty is Strawberry Shortcake where the cake is replaced with sweet cornbread and homemade cream! Lunch is reasonably priced, and for this treat you must call ahead and make a reservation! For more info and menu: [http://www.buttermilkhillrestaurant.com/id16.html](http://www.buttermilkhillrestaurant.com/id16.html)

*Dinner:* Milo’s Hamburger’s is a Birmingham area original hamburger restaurant. They are best known locally for their sweet tea and their hamburgers that are dipped in their own special sauce. A great place to end our field trip with a great burger that you can only get one place---in Alabama! For more info and menu: [http://miloshamburgers.com](http://miloshamburgers.com)

*Lodging:* Best Western Plus, 140 State Farm Pkwy, Birmingham, AL 35209  (205) 940-9990. Cost per night approx $105-110 night/2 people

**The last stay of the night will place us just outside of Birmingham about 15 minutes from the Birmingham Airport. Arrangements will be made to transport you back to the airport by the tour guide, and you are free to leave after we finish Day 7, or stay overnight and leave out in the morning. We should be back to Birmingham roughly around 6 p.m. on the 7th day, so you can make your return flights accordingly. If special needs arrive during any portion of the field trip, arrangements will be made to get you back earlier if the need arises.**

**Return to Table of Contents**