Roper Mountain






2017 – 2018 Educator's Directory

Standards Based Learning Labs in Science and Social Studies

Registration deadline for on-site learning labs is September 4, 2017.

Roper Mountain Science Center

Roper Mountain Science Center

A 402 Roper Mountain Road
Greenville, SC 29615

P 864.355.8900 **F** 864.355.8948

RoperMountain.org

GREENVILLE COUNTY SCHOOLS
Where Enlightening Strikes!

Welcome!

Roper Mountain is a unique and special place that we are excited to share with you and your students! You will be amazed by our newly renovated world class Planetarium that now features a new 360° full immersion dome, 4K projection, state-of-the-art lighting, dynamic 5.1 surround sound, interactive lobby exhibits, expanded curriculum, new shows, and more. In addition, STEM offerings in our Symmes Hall of Science will be enhanced by our new "Explore Energy" exhibits. As always, students will enjoy stepping back in time on our Living History Farm.

As we continue to improve our facility, we will be renovating our Harrison Hall of Natural Science this year. Unfortunately, this will limit the offerings in Life and Natural Science as well as the number of classes we can see this year. We will accommodate as many requests as possible so please get them in early.

We know that we will provide an exceptional experience and setting that will give you and your students a memorable and standards-based field trip that cannot be duplicated.

We look forward to seeing you on the Mountain to *Search, Discover, Explore,* and *Create!*

Michael Weeks
Director

Roper Mountain Science Center

Roper Mountain is an educational facility of Greenville County Schools, South Carolina. The center is dedicated to providing educational opportunities that excite and motivate students and their teachers. The 60-acre complex offers learning labs to students on a daily basis. The Mountain's educators also travel to schools for outreach programs in science. Educational programs for the family are offered through Second Saturday public days, Friday night observatory/ planetarium shows and special events throughout the year. Call the Education Office at 864.355.8967 or visit RoperMountain.org for information on all of our services.

Standards-Based Learning Labs

Learning labs held at the center and in the schools are designed to support the South Carolina Curriculum Standards in science, social studies, and physical education. We recommend that Greenville County School teachers request their visit for the month after they have completed a science curriculum unit. Each learning lab includes the Essential Question (**EQ**) it will explore.

How To Schedule

- Teachers must submit a request form (see last page) by the deadline of September 4, 2017
- Submit request form by mail or fax 864.355.8950 or 8948.
- Requests received after September 4, 2017 will be scheduled last.
- Admission for learning labs is free for Greenville County Public, Private, and Home School students and teachers except for special engagement learning labs, outreach and virtual field trips. For students outside Greenville County and for charter schools, see the fees page.
- On the request form, rank the group (1st, 2nd, 3rd) or list the learning labs (4th — high school) you would like to attend.
- The form enables up to two teachers to schedule a visit on the same day so they can share a bus.
- Multiple classes may request to visit the same day if noted on your request prior to your being scheduled.
- For more information about learning labs contact the Education Office at 864.355.8967.

Roper Mountain Science Center

Inside This Guide

1ST

First Grade

First Grade Adventure Days

Please note that the renovation of the Harrison Hall of Science has effected this year's lab offerings in life science.

Adventures in Space Science

The First Grade Adventure allows you to choose between two exciting planetarium shows, "The Moon" or "The Little Star That Could."

The Moon Planetarium — 60 minutes

EQ: What properties can we use to describe the Moon?

The Moon is an engaging new planetarium show that allows students to actively interact with the instructor during the lesson. The large full-dome screen enables them to easily see and understand the following concepts:

- Compare the features of the day and night sky as it relates to the sun and moon.
- Observe properties of the moon and sun and patterns of rising and setting in the sky.
- Describe how the moon's appearance changes in a pattern over a month.

Science Standards: 1.E.3A.1, 1.E.3A.2

OR

The Little Star That Could Planetarium — 60 minutes

EQ: What patterns can we observe in the movement of the Sun and Moon?

An age-appropriate story about Little Star, an average yellow star in search of a planet of his own to protect and warm. Students will learn the importance of the Sun as a star that provides heat and light for Earth. Instructors will also demonstrate the daily patterns of the Sun and Moon including sunrise and sunset.

Science Standards: 1.E.3A.1, 1.E.3A.2

Choose one of the following two options:

Option A*

Arrive at 11:00am and view the 11:15am planetarium show. Afterwards, have lunch before returning to school.

Option B*

Arrive at 11:30am and have lunch upon arrival before viewing the 12:15pm show.

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2ND

Second Grade

Second Grade Explorations

An exciting day of learning awaits your students as they explore multiple immersive lessons! Besides taking part in two different 45-minute learning lab pairings of your choosing, students will experience two engaging planetarium shows as well

The Weather Planetarium **New!**

EQ: How can we use our senses to predict the weather? – 30 Minutes
The idea of weather forecasting will be covered in this colorful show on weather. Part 1 will help connect students to the weather around them by encouraging them to use their senses to observe weather. They will also be introduced to basic cloud types associated with specific weather conditions. Part 2 will help students describe and measure weather conditions. **Science Standards: 2.E.2A.1**

In addition, classes will experience **"Zula Patrol: Under the Weather", "The Molecularium: Riding Snowflakes",** or **"States of Matter."**

Choose one of the following two options:

Option A

Nature Quest/Life Cycles Natural Science Classroom

EQ: What are some ways animals and plants depend on each other for survival?
It takes cooperation to survive! Students will enjoy a guided nature walk with a naturalist to discover how the animals and plants in their environment rely upon each other as a source of nutrients and shelter. Emphasis will be placed on field safety and scientific observation. **Science Standard: 2.L.5B.1**
(NOTE: in the event of inclement weather, students will remain indoors and participate in a Life Cycles lesson)

Animal Explorations! Natural Science Classroom

EQ: What are some physical characteristics of the major animal groups (bird, reptile, mammal, amphibian, fish, and insect)?
Come explore the Animal Kingdom! Through classification, students will become familiar with the physical characteristics of animals belonging to six basic groups including: Mammals, Birds, Amphibians, Reptiles, Fish, and Insects. Hands-on time with a variety of live and mounted animals will make this an exciting learning experience. **Science Standard: 2.L.5A.1**

Option B

Weather Explorers! STEM Lab

EQ: What are some tools that can be used to measure and record weather conditions?
Students will examine thermometers, wind vanes, rain gauges, and wind socks to learn how these instruments are used to measure and record weather. From using thermometers to observing bubbles, this lab will blow you away! **Science Standards: 2.E.2A.1, 2.E.2A.2, 2.E.2A.3**

What's the Matter? STEM Lab

EQ: What are some properties of solids and liquids?
Be amazed at how carbon dioxide, a gas we breathe out, can go through physical and chemical changes. In a series of experiments, students will discover the properties of solids and liquids, then observe how changes in states of matter are related to temperature differences. **Science Standards: 2.P.3A.1, 2.P.3A.3**

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Third Grade

South Carolina In A Day

Social Studies and Science Experience
9:30am to 1:30pm

Up to four school classes rotate through four different 45-minute learning labs. Learning labs support both the Science and Social Studies state standards around the theme of our Palmetto State: South Carolina. Lunch will be scheduled as part of your visit. Not available in January.

S.C. Daily Life in the 1800's Living History Farm

EQ: How did backcountry farmers survive before the Civil War?

Travel back in time with your students as they discover what life was like for independent farmers who lived in the South Carolina backcountry during the early 1800's. By participating in the daily chores that were required in the barn, garden, farmhouse, and kitchen, students will learn how these families scratched out a living on the Carolina frontier and compare their lifestyle to those of other social classes living throughout the rest of the state. **Social Studies Standards: 3-1.3, 3-4.1**

African Influence and the Soul of S.C. Living History Farm

EQ: How did Africans affect the culture and economy of antebellum South Carolina?

Discover the cultural and economic impact of Africans upon South Carolina during the antebellum era by exploring our authentic local slave cabin for an eye-opening look at the living conditions of slaves and sharecroppers. Through participating in hands-on activities in our heirloom garden, students will evaluate the impact of the skills and knowledge utilized by slaves in successfully growing South Carolina's major cash crops of indigo, rice, and cotton. **Social Studies Standards: 3-1.3, 3-2.5**

Animal Adaptations Natural Science Classroom

EQ: How do special adaptations allow an animal to survive in its habitat?

Being able to adapt is a matter of life or death! Animals are specially designed for living in their particular habitat. Students will explore the adaptations of animals living in habitats where food is scarce, or where the climate is cold or hot. The students will also take a closer look at the form and function of some very unique adaptations. **Science Standards: 3.L.5B.2**

Fossils: Discover the Past Natural Science Classroom

EQ: What do fossils tell us about the past?

What are fossils? How can they tell stories about what life was like on Earth long before recorded history? Through discussion and examination of the center's fossil collection, students will explore the geological past and the evidence of its life forms. **Science Standards: 3.L.5B- 3.L.5B.3**

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4TH

Fourth Grade

A typical Fourth Grade visit (except for Universe In A Day — refer to next page for details about this program) will consist of two 90-minute learning labs, one at 9:30am and a second one at 11:45am Lunch will be scheduled as part of your visit.

Storm Chaser Engineering STEM Lab — 90 Minutes

EQ: How can data about weather conditions help predict tornadoes?
The students are storm-chasing meteorologists on a mission. They will learn about how we collect and analyze data about the conditions that lead to thunderstorms and tornadoes. They will use what they learn along with engineering practices to help solve the real-world problem of how to better predict tornadoes by designing a tornado probe. **Science Standards: 4.E.2B.1, 4.E.2B.2, 4.S.1A.2, 4.S.1B.1**

Light Saves the Day! STEM Lab — 90 Minutes

EQ: How can devices be engineered to use the properties of light energy?
Superhero Rohawk has been captured! Working in collaborative teams as members of The Guardians of Greenville, students will use special skills and gadgets to help the hero escape through the assistance of light energy. They will use their engineering expertise to design/modify devices and find solutions to problems by taking advantage of the properties, behaviors, and interactions of light. By exploring light and energy, the Guardians of Greenville will free the superhero and save the world! **Science Standards: 4.P.4A.1, 4.P.4A.2, 4.P.4A.4, 4.P.4A.5; 4.S.1A.2**

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Fourth Grade Continued

Continued from previous page.

A typical Fourth Grade visit (except for Universe In A Day — refer to next page for details about this program) will consist of two 90-minute learning labs, one at 9:30am and a second one at 11:45am Lunch will be scheduled as part of your visit.

American Revolutionaries Living History Farm & One-Room School — 90 Minutes

EQ: In what ways did the Revolution affect life in the American colonies?
By taking part in a reenactment, students will discover the hardships of military life as well as how the battle of Cowpens was part of the decisive turning point in our fight for freedom. Students will discover Revolutionary War spy techniques as they help to convey a secret message! Finally, they will learn about the significance of the Declaration of Independence and write with a quill pen. NOT available in January. **Social Studies Standard: 4-3.2, 4-3.3**

Sounds Dangerous! - Mystery on Mars STEM Lab — 90 Minutes

EQ: How can the properties of sound (volume and pitch) be analyzed to identify and control vibrations?
Students will work as a team of engineers as they travel in their rover to a new base on Mars. The team detects a dangerous vibration in the rover which could jeopardize the vehicle and crew. Using sound meters and oscilloscopes, student teams will locate the source and properties of the sound, including pitch and volume. Then they will work as a team to decrease the vibration. Will they fix the threatening sound in time? Join the mission and find out! **Science Standards: 4.P.4B.2; 4.S.1.A.6, 4.S.1.B.1**

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Fourth Grade Continued

Universe In A Day

9:30am to 1:30pm

Up to four classes rotate through five astronomy areas. Learning labs are standards-based and filled with inquiry activities for students working in cooperative groups. Using the unique labs and resources, students will cover 4th Grade astronomy performance indicators. Lunch will be scheduled as part of your visit.

Live Lesson by the Astronomer

The astronomer will use the unique, full-dome planetarium to illustrate specific and challenging 4th grade space science concepts including:

- Earth: axis, tilt, rotation, day and night, orbital revolution and seasonal pattern
- Moon: location, movement, phases and tidal effect on oceans
- Sun: properties, apparent path in the sky and effects on Earth

Science Standards: 4.E.3A.1; 4.E.3A.2.; 4.E.3B.1; 4.E.3B.2

And: "Earth, Moon & Sun" Planetarium Show

EQ: What is the relationship between the earth, moon and sun and other objects in our solar system?

Follow Coyote's quest for answers about what he sees in the night sky. This exciting show, inspired by American Indian oral traditions, will help students learn concepts about the Earth-Moon-Sun system. Learn the basics of solar energy and why the sun rises and sets. Examine the moon's orbit, craters, phases and eclipses. You'll even take a look at past and future space travel to our moon... and beyond!

Science Standards: 4.E.3A.1; 4.E.3A.2.; 4.E.3B.4

Then Your Group Rotates through Four Labs:

Continued on next page.

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Fourth Grade Continued

Continued from previous page.

Universe In A Day Labs:

Phases of the Moon Universe Classroom — 30 Minutes

EQ: Why do we see phases of the moon?
Using moon box models students will manipulate the position of the moon in its orbit around the Earth. They will use this data to describe the Moon Phase Cycle.
Science Standards: 4.E.3B.1.; S.1.A.2

Seasons Astronomy Classroom — 30 Minutes

EQ: Why do we have seasons?
Students will utilize Sun, Earth and moon models (Orrery) to explore the relationship between seasonal changes and the tilt, revolution and angle of sunlight on the Earth. **Science Standards: 4.E.3B.4; S.1.A.6**

Shadows of the Sun STEM Lab — 30 Minutes

EQ: How do shadows from the sun demonstrate Earth's rotation?
Students will use Earth and shadow models to explain why the Sun appears to move across the sky throughout the day. **Science Standards: 4.E.3B.3; S.1.A.6**

Observatory & Telescope Observatory — 30 Minutes

EQ: How can the use of telescopes aid in exploration?
Students will make a basic telescope to discover how they are designed. They will use small telescopes to observe objects to understand the significance of these tools in the study of objects in outer space. They will construct reasons to support the claim that telescopes aid in exploration. The center's historic telescope, one of the nation's largest, will be the backdrop for the lesson.
Science Standards: 4.E.3A.3.; S.1.A.6

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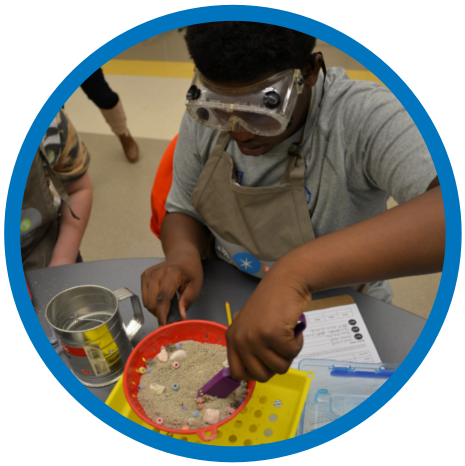
5TH

Fifth Grade



A typical Fifth Grade visit will consist of two 90-minute learning labs, one at 9:30am and a second one at 11:45am Lunch will be scheduled as part of your visit.

Owl Pellet Dissection Lab Natural Science Classrom — 90 Minutes

EQ: What role does a Barn Owl play in a food web?
Dissecting an owl pellet reveals the organisms in the owl's food web, as well as illustrating their niche in ecosystems. Unravel the secrets of the woods at night by dissecting the fuzzy clue of an owl pellet. Each student will keep their own dissected pellet for further investigation. **Science Standards: 5.L.4B**

A Challenging Mixture! Chemistry Lab — 90 Minutes

EQ: What are the characteristics of a mixture?
Students have been hired by RMSC Recycling Company! While on the job, they will learn how to recognize a mixture by its physical properties and then use methods such as filtration, sifting, magnetism, chromatography, and flotation to separate a mixture back into its original state. Working in teams, students will devise a plan and carry out the processes for separating a large mixture of common recyclable materials into their original components. At quitting time students will combine their efforts and total their earnings for a class paycheck! **Science Standard: 5.P.2B.6**

Reconstruction in South Carolina Living History Farm and One-Room School — 90 Minutes

EQ: How did Reconstruction affect the way of life in the South?
Students will visit historic cabins and the one-room schoolhouse to gain a better understanding of life after the Civil War. They will experience a one-room school lesson, work with cotton, and play a simulation game to become more familiar with sharecropping and the effects of Reconstruction on the South. **Social Studies Standard: 5-1.2, 5-1.4**

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Fifth Grade Continued

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A typical Fifth Grade visit will consist of two 90-minute learning labs, one at 9:30am and a second one at 11:45am Lunch will be scheduled as part of your visit.

Explorabotics — Exploring Speed! STEM Lab — 90 Minutes

EQ: How does position and speed affect the travel of an object?
The mission to Mars starts now! Students will work as international space agency teams to complete their mission to survive on Mars by exploring position, direction and speed. Using programmable LEGO robot technology, student teams will work collaboratively to collect and analyze data to program their rover to design a solution to complete their missions. Students will engage in hands-on problem-solving, computational thinking and the engineering process to complete their mission to survive on Mars!
Science Standards: 5.P.1A.5; 5.S.1A.5; 5.S.1B.1

Spy Academy: Unbalanced Forces STEM Lab — 90 Minutes

EQ: How can devices be engineered or modified to take advantage of changes in force, mass, or friction to change the motion of an object?
Calling all agents! The world's top spy, 00Roper, has gotten into some trouble while stealing Dr. Ollie's plan for world domination from his secret island laboratory. Students will take on the role of spy agents-in-training and have to work together to engineer, implement, and modify gadgets to save him. They will learn about the relationships between force, friction, and motion using robots (Spheros) and message-sending rockets. The agents will use what they learn to design a way to save the day! **Science Standards: 5.P.5A.3; 5.P.5A.4**

Low Ropes, High Adventure Outdoors — 90 Minutes (weather permitting)

***Waiver required**
Discover the importance of collaboration and creative problem solving as your students navigate their way through a series of highly interactive challenges that take place on our outdoor Low Ropes Adventure Course. Every element requires students to work cooperatively in small groups as they complete a series of physical activities while recognizing the positive attributes of themselves and others. **South Carolina Physical Activities Standards: 5-4.1, 5-4.3, 5-4.4, 5-4.5**

Made possible by: FLUOR®

6TH

Middle School Assembly Combinations

Schedule Up To 300 Students

9:30am to 12:30pm

Divide your classes into two groups (up to 150 students each) and attend two incredible shows back-to-back in the Auditorium and Hooper Planetarium and Giant Dome Theater. Greenville County students are free. Other students are $10 for the assembly combination.

6th Grade

I've got the Power! — Energy Transformations Hipp Auditorium — Symmes Hall of Science — 60 Minutes

EQ: How is energy transferred from one form to another?
This program will demonstrate the Law of Conservation of Energy, giving students a greater understanding of energy and its relation to the world we live in. Join us as we identify the sources of heat, solar, chemical, and electrical energy and how this energy can be transferred from one form to another. Then experience how powerful this transformation can be! Student volunteers will assist in the demonstrations.
Science Standards: 6.P.3A.1 , 6.P.3A.2

AND ONE of the Hooper Planetarium shows listed below

"Tales of the Maya Skies" Hooper Planetarium and Giant Dome Theater — 60 Minutes

EQ: How did the Maya people use celestial observation and recording to discern patterns used to predict and guide their civilization?
"Tales of the Maya Skies" tells the story of how the ancient Maya interwove astronomy and culture to create a stable society that spanned 2,000 years, from 500 BCE to 1500 CE. Mayan culture, life, architecture, and legends were intertwined with the ancient Maya's scientific observation and recording of planetary movements **Social Studies Standard: 6-4.3** Sponsored by: FLUOR

OR

"FORCE 5" Hooper Planetarium and Giant Dome Theater — 60 Minutes

EQ: What weather conditions are required to produce severe storms?
Extreme weather takes center stage in this full-dome animated show revealing images not seen by the naked eye due to their life-threatening nature. Using real movies and NASA based images, Force 5 offers the audience a vantage point that would never be safe in the real world, creating a sense of standing in the middle of a deadly storm. **Science Standards: 6.E.2B.2**

Both shows include "H2O Cycle"— 15 Minutes

EQ: What are the steps in the Water Cycle? – 15 Minutes
Using live action videography students will be immersed in the steps of the water cycle using the backdrop of the Upstate of South Carolina. The very popular review is set to "rap." You may find yourself humming it on the way back to school!
Science Standards: 6.E.2A.3

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Middle School Learning Labs

Schedule Up To 150 Students

9:30am to 1:30pm

6th Grade

Divide your classes into six groups to rotate through three different hands on STEM learning labs. Lunch will be scheduled as part of your day.

STEM Lab — The Power to Survive... Symmes Hall of Science — Three 60-minute learning labs

EQ: How can we transform energy to help us if the power goes out?

The power is out; communications are down: How will you survive? In this three-part STEM lab, students will engage in hands-on learning to explore energy transformations and conservation of energy. Can wind energy supply the electricity needs? Is solar energy an option? Student teams will analyze data, solve problems, and then design and create solutions for survival through exploring generators, electromagnets and circuits. The interactive labs will include real-time solar energy production. Do your students have what it takes to survive?

Science Standards: 6.P.3.A.1; 6.P.3A.3; 6.P.3A.4; 6.S.1A.2; 6.S.1A.4; 6.S.1A.6

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Middle School Assembly Combinations

Schedule Up To 300 Students

9:30am to 12:30pm

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7th Grade

Way Cool Science! — Physical and Chemical Changes in Matter

Hipp Auditorium — Symmes Hall of Science — 60 Minutes

EQ: How do physical changes compare to chemical changes that are the result of a chemical reaction?

Students will get an up close and personal view of changes in states of matter, the concept that matter is made up of moving atoms, and that matter can undergo both physical and chemical changes. Students will distinguish between acids and bases using indicators and will witness the effects of extreme temperatures on different states of matter. The interactive nature of the presentation enhances the exciting experiments. **Science Standard: 7.P.2B.4**

AND

"Habitat Earth" Living in a Connected World

Hooper Planetarium and Giant Dome Theater – 30 Minutes

EQ: How can do life forms connect in an ever changing world?

Living networks connect and support life forms large and small—from colonies of tiny microbes and populations of massive whales to ever-expanding human societies. Discover what it means to live in today's connected world. Dive below the ocean's surface to explore the dynamic relationships found in kelp forest ecosystems, travel beneath the forest floor to see how Earth's tallest trees rely on tiny fungi to survive, and journey to new heights to witness the intricate intersection between human and ecological networks.
Science Standards: 7.EC.5A.1, 7.ED.5B.1

Optional: Visual Tour of the Human Body Systems – 15 Minutes

EQ: How can the visualization of Human Body Systems help us better understand how systems function together.

Take a stunning visual tour of the of human body systems using the latest in 3D interactive simulations – Zygote Body. The following systems will be visualized: Skeletal, Muscular, Circulatory and Nervous systems. Major organs will be also visualized as time permits. **Science Standards: 7.L.3B.2**

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Schedule Up To 150 Students

9:30am to 1:30pm

7th Grade

Up to 150 students will divide into six groups to rotate through three different hands on forensics learning labs. Using a CSI case and their inquiry skills, students discover more about chemical reactions, genetics, and blood typing. Lunch will be scheduled as part of your day.

FORENSICS: Case of the Missing Chef Symmes Hall of Science — Three 60-minute learning labs

EQ: How can science be used to methodically establish identity?

Students are introduced to a case involving a missing chef. In three separate labs, students will act as forensic specialists, analyzing materials found at the crime scene. They will perform strawberry DNA extraction, evaluate DNA samples, determine blood type, and, in the chemistry component, analyze known and unknown materials found at the scene. At the end of the day, students will have enough information to argue a claim as to what happened to our missing chef!

Science Standards: 7.P.2B.3; 7.P.2B.4; 7.L.3B.1

8TH

Middle School Assembly Combinations

Schedule Up To 300 Students

9:30am to 12:30pm

Divide your classes into two groups (up to 150 students each) and attend two incredible shows back-to-back in the Auditorium and Hooper Planetarium and Giant Dome Theater. Greenville County students are free. Other students are $10 for the assembly combination.

8th Grade

The New Wave: A Fresh Look at Energy

Hipp Auditorium — 60 Minutes

EQ: What is the relationship between energy and the behaviors of waves?
Students will dive into waves that surround us everywhere while exploring wave behaviors and interactions with matter. Exciting demonstrations using light, sound, and electricity will help students understand the reality of the waves that impact every aspect of the world they know. Catch the wave and change students' perspective on energy. **Science Standards: 8.P.3A.1; 8.P.3A.3**

AND

"STARS" The Powerhouses of the Universe Hooper Planetarium and Giant Dome Theater — 30 Minutes

EQ: How can we describe the features of different celestial bodies in our universe?
Every star has a story. Stars release the energy that powers the universe. New stars are created every day, born of vast clouds of gas and dust. Journey to the farthest reaches of our galaxy and experience both the awesome beauty and destructive power of STARS. This dramatic program features the voice talent of Mark Hamill (A.K.A. Luke Skywalker). This program also features a short star-talk including the current evening sky. **Science Standards: 8-E.4A.1 and 2; 8.E.4B.1-6**

Earth's Place in the Universe – "Live Sky" Visualizations — 20 Minutes

EQ: Where is our Solar System's place in the Universe? - 20 Minutes
Using the latest in digital night sky simulation we will take a visual tour of the solar system and the Milky Way galaxy. Visuals will illustrate important concepts in astronomy and encourage students to observe the current night sky.
Science Standards: 8.E.4A.1, 8.E.4B.1, 8.E.4B.3, 8.E.4B.4

Optional: Plate Tectonics Visualized — 10 Minutes

EQ: Where is our Solar System's place in the Universe? 10 Minutes
We will visualize plate tectonics like never before using the latest in Earth Science Simulation software on the giant screen. "The Layered Earth" will help us support claims that plate tectonics account for earthquakes, volcanoes, mountains and other changes in landforms.
Science Standards: 8.E.5A.4, 8E.5A.5

Roper Mountain Science Center

A 402 Roper Mountain Road
Greenville, SC 29615

P 864.355.8900 **F** 864.355.8948

RoperMountain.org

GREENVILLE COUNTY SCHOOLS
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9-12

High School

Schedule Up To 50 Students
All Day

Low Ropes, High Adventure Outdoors — All Day (weather permitting)
***Waiver required**
Discover the importance of collaboration and creative problem solving as your students navigate their way through a series of highly interactive challenges that take place on our outdoor Low Ropes Adventure Course. Every element requires students to work cooperatively in small groups as they complete a series of physical activities while recognizing the positive attributes of themselves and others.
Class size limited to 50 students.
South Carolina Physical Activities Standards: 5-4.1, 5-4.3, 5-4.4, 5-4.5

Made possible by: FLUOR

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Virtual Field Trips

Virtual Field Trips

Give students the excitement of a field trip to Roper Mountain, even if you can't leave the school! Roper Mountain's dynamic instructors come directly to your classroom through two-way video conferencing technology. Each one hour lesson is unique, engaging and based on South Carolina and National standards.

Check our website for new offerings throughout the year.

Spies of the American Revolution (Grades 3, 4, and 8)

It's 1780 and the British have invaded South Carolina. The patriot and loyalist militias are fighting but they need your help! Support your cause by serving as a spy for the American resistance or for the British. Discover the techniques you'll need to relay vital information such as invisible ink, cipher wheels, letter masks, and more.

Wagons West (Grades 4 and 5)

Come with us on a journey to the Oregon Territory! We start with an auction where, your "family" will bid on necessary items for your trek west. The students will make all the decisions themselves before we set out on our trip and then, as we progress over the course of the hour, find out if they made wise choices. Using maps, a slide show and video clips, we will look at several landmarks along the way and calculate how far we have traveled. The students will find out what it was really like to travel across the Great Plain, rivers and mountains to finally arrive in Oregon City.

Westward by Rail (Grades 4 and 5)

All aboard! Come explore the technological advances made during the westward expansion of the 19th century and their impact on the history of the United States. Learn about the economics of railroad building, the challenges faced by both railroadcompanies, and see for yourself the lasting legacy of the Transcontinental Railroad.

To register for programs visit RoperMountain.org or contact Lorie Thibodeaux at lthibode@greenville.k12.sc.us or 864.355.8907.

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Outreach Assembly Programs

Bring Roper Mountain Science Center to your school! Our 60 minute standards-based assemblies are designed for up to 200 students per session. Please contact us if you'd like help choosing the best assembly for your venue at jromatelli@greenville.k12.sc.us or 864.355.8940.

Catch the Wave

60 minute version

EQ: What are some similarities and differences between how light and sound travel?
Note: This assembly requires a room that can be made nearly completely dark.
Compare the properties of light and sound in this exciting and interactive program.
Science Standards: 4.P.4A, 4.P.4B, 8.P.3A
Recommended Audience: Grade 4

45 minute version

EQ: How does light help us see?
Designed specifically for 1st grade, this shorter version of the program focuses on 1st grade standards for light and shadow. **Science Standards: 1.P.2**
Recommended Audience: Grade 1

Use the Force

EQ: How do forces affect objects in our everyday lives?
We'll really MOVE you as we explore the what's and why's of motion and forces!
Science Standards: 2.P.4A, 5.P.5A, 6P.3A, 8.P.2A
Recommended Audience: Grade 5, Grade 2

45 minute version

This shorter version of the program is best for younger students, or mixed grade audiences.
Recommended Audience: Grade 2, multigrade

Matter of Fact

EQ: What are the differences between solids, liquids and gases?
In this supercool program we will use liquid nitrogen to show how the three states of matter are affected by extreme changes in temperature.
Science Standards: 2.P.3A, 3.P.2A, 5.P.2A
Recommended Audience: Grade 5, Grade 3, Grade 2

45 minute version

This shorter version of the program is best for younger students, or mixed grade audiences.
Recommended Audience: Grade 2, multigrade

It's Electric!

EQ: What are some properties of electricity?
We'll use experiments to show how electric energy can be transformed into other types of energy and how electricity and magnets are related.
Science Standards: 3.P.3A, 3.P.3B
Recommended Audience: Grade 3

45 minute version

This shorter version of the program is best for mixed grade audiences.
Recommended Audience: multigrade

For more information visit our website for **Science on Wheels Assemblies.**
To register, **click here.**

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Outreach Starlab

Roper Mountain Science Center

A 402 Roper Mountain Road
Greenville, SC 29615

P 864.355.8900 **F** 864.355.8948

RoperMountain.org

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Grade 1 — The Sun and Moon

EQ: How do the sun and moon change in our sky over time?
The Starlab model sky allows students to see how the sun and moon change in the sky over an hour, a day, a week or a month, all in one 50-minute lesson. We will investigate the reasons for the changes students observe in the sky and lay the foundation for understanding the structure of our solar system. The lesson will end with a look at the constellations and how they make a map across our nighttime sky.
Science Standards: 1.E.3A
Recommended Audience: Grade 1

Grade 4 — The Solar System

EQ: How does the movement of objects in our solar system affect what we see in the sky?
Bring the beauty of a clear and dark night sky to your school. The Starlab allows us to see how the movement of the Earth, moon and planets in our solar system affects what we actually see in our sky from day to night, night to night, and season to season. Students will learn how to find their way around the night sky using well-known constellations, and to tell the difference between a planet and a star. Each class will make predictions about the position of objects in the sky over time due to Earth's rotation and revolution, and the movement of the Moon and planets in their own orbits.
Science Standards: 4.E.3A, 4.E.3B
Recommended Audience: Grade 4

Grade 8 — Our Place in Space

EQ: How can we use observations from Earth to learn about the movement and position of our planet and solar system in the galaxy and the universe?
This lesson takes us beyond the confines of the solar system to investigate our place in the larger scale of the galaxy and universe. We'll use observations of the night sky to aid in understanding of the scale of the universe. Students will learn how spectroscopy is used to determine the composition of gasses in stars and nebulae, then have a chance to use spectroscopes to observe spectra for themselves.
Science Standards: 8.E.4A, 8.E.4B
Recommended Audience: Grade 8

For more information visit our website for **Science on Wheels, Starlab.**
To register, **click here.**

Planning Information For Outreach

Capacity

Assemblies: 200 students per session.
Starlab: One class (maximum 30 students, 25 or fewer is recommended). One adult from the school is required to attend each session.

Start Time

Greenville County Schools — First program can start as early as 8:30am
Out of County Schools — Calculate the drive time from Roper Mountain Science Center to your school, then add that amount of time to 8:00 to determine your earliest program start time. For example, if it is a one hour drive from Roper Mountain to your school, add one hour to 8am and the earliest start time is 9am

Schedule

Assemblies: Assemblies are 45-60 minutes long. Sixty minutes is recommended. For multiple sessions of the same assembly, allow at least 15 minutes between sessions to reset equipment. For two different assemblies, schedule at least 90 minutes between sessions to allow for breakdown and setup. Setup is between 30 and 60 minutes depending on the assembly and breakdown is between 15 and 30 minutes.

Starlab: Sessions are 50 minutes long. Allow at least 10 minutes between sessions. For four sessions, there must be a lunch break of at least 30 minutes at some point during the day. Setup is approximately 45 minutes and breakdown is about 20 minutes.

Contact us if you need to work out other options.

Location in School

Assemblies: A space large enough to fit all of the students (seated on the floor or in chairs), teachers, two six-foot long tables, and about 10 feet in between the tables and the audience. Gyms, cafeterias, and auditoriums work well. For smaller groups, classrooms can sometimes be used. All assemblies require two six-foot long tables, access to electricity, and access to a deep sink near the presentation space.

Starlab: A large space with ceilings at least 12' high and floor space of at least 30' x 30'. Nothing can be hanging from the ceiling or projecting from the walls into that 30'x30'x12' area. Gyms tend to work best, but other spaces can be used (cafeteria, auditorium stage, media center). Nothing else can be scheduled in the space during the presentation times.

Payment

We accept checks or purchase orders from schools and PTA/O's. Payment is due within 30 days after the date of the program. Educator will leave an invoice on the day of the program. Educators CANNOT take payment. Please mail your payment to Roper Mountain or send by courier. We CANNOT accept credit card payments by phone.

Continued on next page.

Roper Mountain Science Center

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Planning Information For Outreach

Travel Area

We will travel to locations up to a 2.5 hour drive from Roper Mountain for a single day visit. There is a fee for out-of-district schools of 85 cents per mile of driving. We use Google Maps to calculate drive times and distances.

Fees: Assemblies

1 Assembly — $175
2 Sessions of the Same Assembly — $250
3 Sessions of the Same Assembly — $325
2 Different Assemblies on the same day — $300

Fees: Starlab

1 Session — $150
2 Sessions — $210
3 Sessions — $270
4 Sessions — $330

*A mileage fee of $0.85 per mile applies for all schools outside of Greenville County.

To register for a Science on Wheels Assembly visit, **click here.**
To register for a Science on Wheels Starlab visit, **click here.**

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GREENVILLE COUNTY SCHOOLS
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Public Events And Programs

Open Every Friday Night From January Through November

Planetarium Shows

Gates open 5:15pm. Purchase tickets online or in the planetarium. Tickets purchased are for ONE showtime ONLY.

6:00pm Showtime Includes:

Feature Show (changes quarterly)

- SpacePark 360 Virtual Rollercoaster
- Viewing in the Daniel Observatory (Observatory opens at 7:45pm)

7:15pm Showtime Includes:

Feature Show (changes quarterly)

- Upstate's Sky Tonight (live sky talk)
- SpacePark 360 Virtual Rollercoaster
- Viewing in the Daniel Observatory

8:45pm Showtime Includes:

Feature Show (changes quarterly)

- Upstate's Sky Tonight (live sky talk)
- SpacePark 360 Virtual Rollercoaster
- Viewing in the Daniel Observatory

Friday Starry Nights Admission

Cash • Check • Credit Cards

$6.00 Adults and Teens
$5.00 Children Ages 4-12
$5.00 Sr. Citizens 60 Years Plus
FREE School District Employee Pass and RMSC Membership Card

Pre-purchase tickets online at RoperMountain.org

- Early arrival strongly recommended

Public Events And Programs

2ND SAT

Second Saturday

On Select Second Saturdays From 9:00am to 3:00pm

Second Saturday is a great opportunity for the public to visit learning spaces throughout the science center and enjoy engaging experiences.

- The Living History Farm
- Giant Dome Theater and Hooper Planetarium
- Daniel Observatory
- Symmes STEM Center

Many Second Saturdays showcase special events or themes based on fascinating topics! For something new and exciting to do, mark your calendar and make Roper Mountain Science Center your destination for Second Saturday fun!

Second Saturdays Admission

Cash • Check • Credit • Debit • Visa • Mastercard • Discover

$8.00 Adults and Teens
$7.00 Children Ages 4-12
$7.00 Sr. Citizens 60 Years Plus
$7.00 Military
FREE School District Employee Pass and RMSC Membership Card

Pre-purchase tickets online at RoperMountain.org

Public Events And Programs

Holiday Lights

Begins Thanksgiving Night!

This Upstate Holiday Tradition for 26 years will illuminate Greenville nights between Thanksgiving and December 30, 2017 for the final time.

Start your visit by parking the car and strolling through Winter Wonderland. That's where you will find lighted walking trails, Santa Claus, a balloon artist, concessions, and giant holiday greeting cards created by local area students. After you have visited Winter Wonderland, it is easy to get back in your car and continue on to the 1.5 mile drive through the large displays including Candy Cane Lane, Santa's Sleigh, the Caterpillar, and many other family favorites.

The funds generated from Holiday Lights are used to distribute back to the Upstate community to benefit and brighten the lives of area children.

The success of the Roper Mountain Holiday Lights comes from an integrated partnership between the Upstate community, sponsoring organizations, the Rotary Club of Greenville and the Roper Mountain Science Center Association

Runs nightly 6:00pm to 10:00pm

Science P.L.U.S. Institute

Participatory Learning, Understanding, and Sharing

Our program is absolutely free for South Carolina public school teachers grades 1–12!

A free one-week course includes:

- **Free science materials**
- **Free housing for eligible participants**
- **Innovative ideas and hands-on activities taught by master science teachers** (30 hours of instruction)

Roper Mountain Science Center

A 402 Roper Mountain Road
Greenville, SC 29615

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RoperMountain.org

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Join us for this year's Science P.L.U.S. Institute!

Science P.L.U.S. is a professional development program for public SC Science Teachers. Each course is grade specific and focuses on providing hands-on classes emphasizing the SC Science Standards

Fall
Events hosted at RMSC and virtually around the state

Summer
Week-long hosted at the Roper Mountain Science Center

Housing, lunch, and materials are all provided to participants FREE of charge

How do I learn more?

Visit RoperMountain.org and click on the Science P.L.U.S. page under the Educators tab.

Planning Your Visit

Confirming Your Visit
Once scheduled we will mail you a "FIELD TRIP NOTIFICATION." It will list the date, times and learning labs you are assigned. If you are sharing a bus with a second teacher, you should make contact with her/him and be sure the date works around your school schedule. Contact the education office immediately at 864.355.8967 if it does not.

Planning and previsit information, inclement weather policy and a map of Roper Mountain Science Center may be accessed at RoperMountain.org. Click on 'Educators' tab, then 'Field Trips' tab, then under 'Preparing your students' (3rd paragraph) – click on 'Previsit Information.'

Schedule Your Bus
After obtaining permission for the field trip, it is important that you schedule a bus as soon as possible. RMSC does NOT schedule buses.

Reminder Notice
Several weeks before your field trip, you will be sent an additional "FIELD TRIP NOTIFICATION" as a reminder of your trip, listing the date of your field trip. Additional materials may be included along with a map of the center's facilities.

Arrival
Most learning labs begin at 9:30am. Please arrive 15 minutes before the learning lab starting time. Note: Some learning lab times may vary.

Picnicking
Classes will be assigned a picnic shelter. **The center provides no food service**. **Schools are responsible for bringing lunches.** Some picnic shelters are not heated.

Cancellation
If you must cancel a learning lab or visit, please contact the education office IMMEDIATELY at 355-8967. We will attempt to reschedule your visit, but it may not be possible.

Chaperones
We request that teachers bring one chaperone per class. Chaperones: please do not bring additional students not in the registered class.

Pre-visit
The educational value of your visit will be improved if you prepare your students in advance. We recommend you do the following:
- Explain the purpose of the field trip to students
- Describe the schedule of activities for the day.
- Review appropriate vocabulary.

Class Size
- Planetarium Programs: Max of 162 people (students and adults)
- All Other Learning labs: 1 Class ONLY (plus teacher and one chaperone)
- Teachers are not allowed to combine two classes into one learning lab.

Continued on next page.

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Planning Your Visit

Continued from previous page.

Special Education/Challenge Classes

All learning labs are available to all students in the grade levels shown in the guide. To assist our instructors in preparing for your class, please note the grade level at which your students work, as well as any special needs they may require.

Home Schools: Guidelines for Scheduling

Individual home schools must request a visit as a class through the **home school association** of which they are members. Home school association classes must have a minimum of 12 students and no more than 27 students, plus a teacher and appropriate number of chaperones. The home school association's teacher is responsible for coordinating the field trip and supervision of all students. Students must be **grade appropriate** to the learning labs being requested. Requests are subject to the deadline listed in this guide. The center cannot accept requests from individual home school parents, nor can we be responsible for organizing a class made up of home school students. Home schools who are members of associations outside of Greenville County will be charged the learning lab costs.

Roper Mountain Science Center Learning Lab Costs

Greenville County Schools — FREE
Public, Private, and Home School Associations
One or more Learning Labs — Free

Greenville County Charter Schools
****Two or more Learning Labs** — $12 per student
Middle School Assembly Combo — $10 per student

Schools Outside of Greenville County
Two or more Learning Labs — $12/student
Middle School Assembly Combo — $10/student

Teachers & Chaperones — FREE
Schools will be invoiced on the day of their visit. The center reserves the right to ask school classes outside of Greenville County to post a deposit for their scheduled learning labs. Deposits are refundable up to 20 business days before the visit.

We CANNOT accept credit card payments over the telephone.

Contact Information

Education Office 864.355.8967
Education Specialist 864.355.8931
Education Office Fax 864.355.8950 or 8948
Address 402 Roper Mountain Road Greenville, SC 29615

RoperMountain.org

Roper Mountain Science Center

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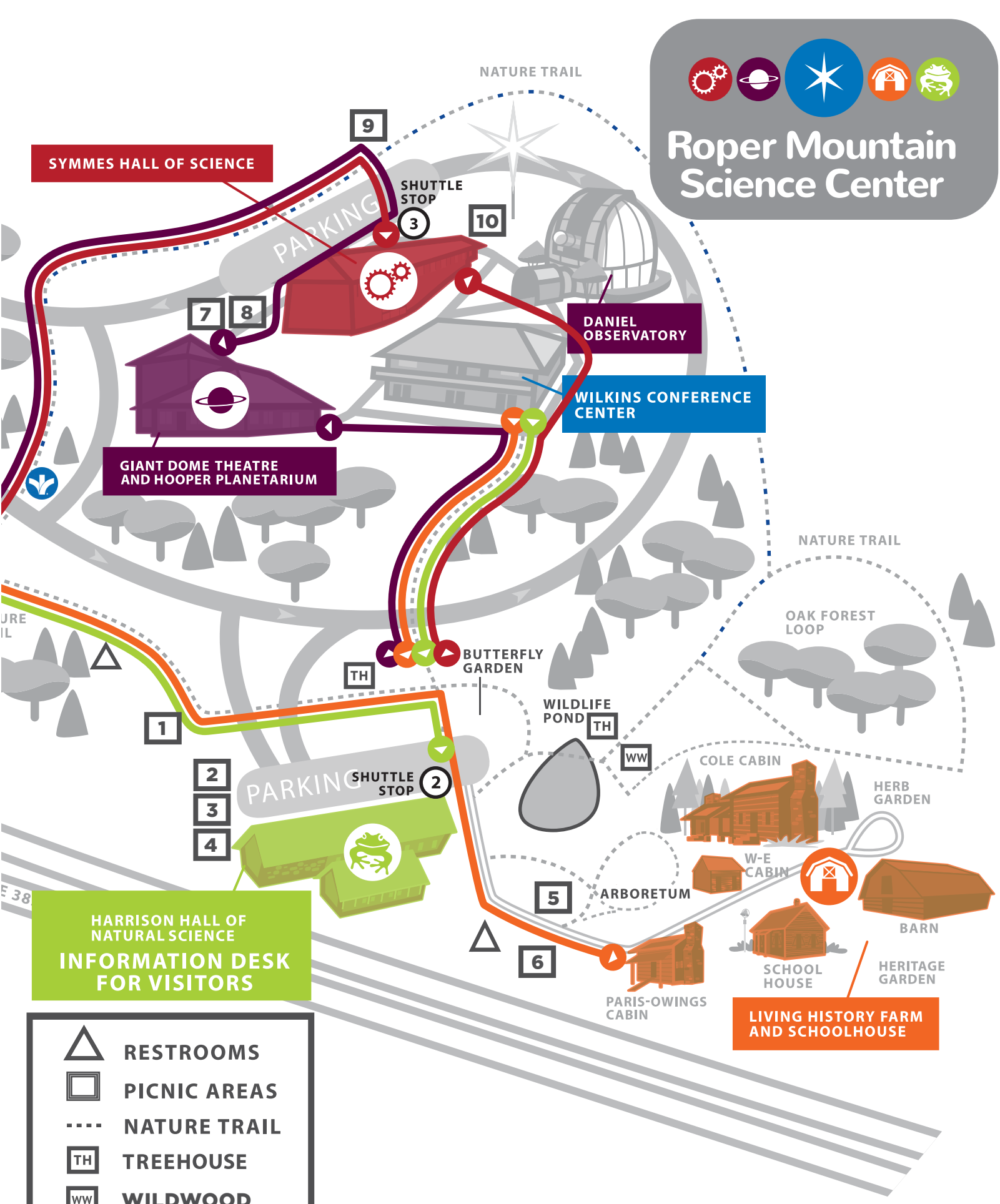
Roper Mountain Science Center
NATURE TRAIL
9
SYMMES HALL OF SCIENCE
SHUTTLE STOP
3
10
PARKING
7
8
DANIEL OBSERVATORY
WILKINS CONFERENCE CENTER
GIANT DOME THEATRE AND HOOPER PLANETARIUM
NATURE TRAIL
OAK FOREST LOOP
BUTTERFLY GARDEN
TH
WILDLIFE POND
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WW
COLE CABIN
HERB GARDEN
1
2
3
4
PARKING
SHUTTLE STOP
2
W-E CABIN
ARBORETUM
5
6
BARN
SCHOOL HOUSE
HERITAGE GARDEN
PARIS-OWINGS CABIN
LIVING HISTORY FARM AND SCHOOLHOUSE
HARRISON HALL OF NATURAL SCIENCE
INFORMATION DESK FOR VISITORS
RESTROOMS
PICNIC AREAS
NATURE TRAIL
TH TREEHOUSE
WW WILDWOOD
BON SECOURS BEWELL TRAIL

Roper Mountain Science Center
2017–2018 Scheduling Request Form

Please note:
For Grades 4 – 12 you will be scheduled for TWO learning labs/day unless you check HERE ___ indicating you only want one learning lab.

Mail form to:
Roper Mountain Science Center
Education Office
402 Roper Mountain Road, Greenville, SC 29615

Or fax form to:
864.355.8950 or 8948

Registration Deadline September 4, 2017

School: _____

District: If not Greenville County Public School _____

Mailing/Billing Address: Required if not Greenville County Public School _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Please rank (1-9) the months you prefer to visit. Do not rank months you are not willing to attend
___ Sept. ___ Oct. ___ Nov. ___ Dec. ___Jan. ___Feb. ___ Mar. ___Apr. __ May

Teacher One

Name: _____
first last

E-mail: Please print clearly _____

Grade: ____ # Students: ____ ❑ Check here for no picnic

First Grade
☐ Adventure Day

Second Grade (please rank)
☐ Option A OR ☐ Option B

Third Grade
☐ SC In A Day

Fourth – Twelfth (please rank)
List learning labs in YOUR grade level **(Grades 4 — 12)** you would like to attend in order of preference with 1 being your first choice. Please **do not** list learning labs you aren't willing to attend.

1. _____
2. _____
3. _____
4. _____

Special education teachers: Please list the instructional level of students and any special requirements. _____

_____

Teacher Two (sharing bus)

Name: _____
first last

E-mail: Please print clearly _____

Grade: ____ # Students: ____ ❑ Check here for no picnic

First Grade
☐ Adventure Day

Second Grade (please rank)
☐ Option A OR ☐ Option B

Third Grade
☐ SC In A Day

Fourth – Twelfth (please rank)
List learning labs in YOUR grade level **(Grades 4 — 12)** you would like to attend in order of preference with 1 being your first choice. Please **do not** list learning labs you aren't willing to attend.

1. _____
2. _____
3. _____
4. _____

Special education teachers: Please list the instructional level of students and any special requirements. _____

_____