Education Mission

In partnership with the university community, UCAR creates, catalyzes, and supports world-class science education programs, resources, and communities.

Our Goals

- To develop, deliver, and promote resources, programs, and activities that enhance scientific understanding, skills, and abilities and support education and training from pre-K through post-graduate levels.
- To develop and support inspiring resources and programs about the Earth-Sun system to advance public science literacy and decisionmaking.
- To broaden participation by diverse and historically under-represented populations in our geoscience education programs.

The Field Trip Planning Guide Includes:

I. How to Schedule Your Field Trip
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II. General Information
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III. Science Learning Labs & Individualized Visits
   a. Preschool and Primary Labs
   b. Upper Elementary
   c. Middle School
   d. High School and Post Secondary
RESERVATIONS

Phone: 303.497.2401   Email: spark@ucar.edu

Before Making Your Reservation
Make sure to have the following information before calling to schedule your field trip:

☐ A selection of three preferred field trip dates and times
☐ Ages/Grade and number of students
☐ Number of teachers and chaperones participating
☐ Method of transportation to NCAR
☐ Any individuals with disabilities or needing special accommodations
☐ Science Discovery Lab selection (see page 5)
☐ Your school phone number and cell phone number (for use on the field-trip date if necessary)
☐ School or organization phone & mailing address
☐ Field trip lunch plans
☐ Email where a field-trip packet and confirmation can be sent

Making Your Reservation
We recommend calling at least six months in advance to schedule a visit so that your desired field-trip dates are more likely available.

Confirmation of Your Reservation
After making your reservation, we will email a confirmation and pre-visit packet that includes directions, bus parking and student drop-off instructions, and other pertinent information. Ideally, you should receive an email within one week’s time from scheduling.

Cancellations
To cancel a confirmed field trip, please call at least two weeks in advance. If a last minute cancellation is necessary, please contact us by phone as soon as possible.

Exhibits at the NCAR Mesa Lab Visitor Center engage students in exploring the atmospheric sciences, Earth’s climate system, supercomputing, and NCAR research. Field trip options are offered year round for school, camp, club, home-school, and other interested groups.
**General Information**

**Location & Directions**

1850 Table Mesa Drive, Boulder, Colorado

NCAR's Visitor Center is located in Boulder, Colorado at the far west end of Table Mesa Drive in the south end of town. The building, designed by world renowned architect I.M. Pei, sits approximately 500 feet above the city of Boulder nestled against its famed majestic Flatirons and the foothills to the Rocky Mountains.

**Student Unloading and Parking**

Teachers will be sent a parking map in their pre-visit packet after scheduling their field trip. Drivers will easily find a parking space among the many provided in the NCAR parking lot. Bus drivers are asked to drop students off in the designated unloading area, then park their bus at the far northeast end of the parking lot. The detailed map emailed to you will highlight these areas. The parking map is also available to review and download on our Website at http://spark.ucar.edu/visit/field-trips-ncar. After unloading, groups should proceed up the center sidewalk into the Visitor Center. Because a set of stairs must be climbed to enter via the center sidewalk, adults pushing a stroller or any kind of wheeled vehicle are advised to enter the building via the sidewalk next to the road that leads to the NCAR front driveway and Visitor Center entrance.

**Arrival Procedure**

Please plan to arrive at NCAR at least 15 minutes before your scheduled program to allow for parking, unloading, a brief up-hill walk to the NCAR Visitor Center entrance, check-in, and orientation. Students are asked to wait quietly outside or in the entry area as teachers and/or group leaders check in with the NCAR front-desk staff. A member of the field trip program will greet you in the entrance area upon your arrival and review the day’s itinerary, behavioral expectations and logistical considerations with group members, plus answer any initial questions the group may have. If you need to depart at a specific time, please make sure to tell your field trip guide at the beginning of your visit to allow for any needed adjustments to be made.

**Accessibility**

We ask that you make arrangements at the time of scheduling for front-door access to NCAR should your group have any participants in wheelchairs or others who might have difficulty climbing the stairs and walking from NCAR’s parking area. A handicapped parking area is also available at the rear of the building next to an alternative entrance into the facility. Inside, NCAR is fully accessible to those in wheelchairs. There is also a handicapped-accessible restroom on the second floor for the convenience of our guests, and an elevator lift that allows for easy access onto the NCAR Tree Plaza. The Tree Plaza is where most groups enjoy their lunch.
Field Trip Duration
Field trips can be scheduled weekdays during the hours of 9 a.m. to 5 p.m. Most field trips last from two to four hours and include a classroom or outside Discovery Lab, a facility tour, and time with NCAR exhibits. Many groups also include lunch at NCAR and an exploration of the quarter-mile Walter Orr Roberts Weather Trail. Field trip programs for our youngest pre-school visitors typically last a maximum of one hour with an NCAR educator followed by free time, while more extensive offerings are available for our K-12 and post secondary visitors.

Allowable number of Participants
In order to schedule a field trip, we request that groups include a minimum of ten participants. The maximum number of individuals we can accommodate at one time will vary depending on staffing, but we’ve found that field trips are most successful when they include 60 or fewer participants. Larger groups are encouraged to schedule on two consecutive days.

Chaperone to Student Ratios
We suggest the following student to chaperone ratios:
- Preschool through 2nd grade: 4 to 1 ratio
- 3rd through 8th grade: 6 to 1 ratio
- High school and above: 10 to 1 ratio

Field Trip Costs
Admittance to NCAR is always free. There are no costs for field trip or tour programs.

Lunch Accommodations
Field trip participants are encouraged to enjoy their lunches on the NCAR Tree Plaza, weather permitting. During inclement weather, tables will be reserved in the NCAR cafeteria. Teachers, field-trip planners, and chaperones are free to buy their lunch in the cafeteria if desired. Lunch accommodations can be made for field trip groups at the time of scheduling.

Storage
We ask that students leave their backpacks in the vehicles in which they travel to NCAR. Lunches can be stored in bins inside the building at the start of the field trip. Please bring lunches into the building when you arrive. A coat rack is also available for students’ coats, sweaters, gloves, and other attire.
Preschool and Primary Grades

**Air Air Everywhere** -- Just because we can’t see air doesn’t mean that it doesn’t exist! It can be difficult to imagine that air is matter in the same way that a solid or liquid object is matter. During Air Air Everywhere, students find evidence for air’s existence and conduct a guided experiment to prove that air does indeed take up space.

**Convection Connection** -- Students are challenged to make balloons and bubbles grow simply by changing air temperature. This module is designed to help students prove to themselves that “Hot plus cold makes weather bold!”

**Go Green Games** -- In support of the No Child Left Inside Act, Go Green Games reminds us all that science discovery is definitely not confined to a classroom or lab. Students will simultaneously learn and laugh as they participate in a series of fun nature games that teach about carrying capacity, recycling, nature, the value of teamwork, and so much more! Come prepared to play!

**Sun Fun** -- Have fun learning about the Sun and Sun safety. Make a bracelet that will alert you to harmful ultraviolet sunrays that cause sunburn, or slip on our groovy diffraction glasses to see the true colors of light. When we’re done, we’ll end Sun Fun with a zany Sun savvy relay!

**The Story Clouds Tell** -- Did you know that every cloud has a story? Join us as we share a few of our favorites with you, then observe and identify different types of clouds using NCAR’s Cloudviewer on the Walter Orr Roberts Weather Trail.

**Weather Trail Wonders** -- We’ll be walking, talking, looking for and learning about the wonders that exist in NCAR’s backyard. From the majestic Boulder Flatirons to lichen on rocks, wildlife roaming, trees blowing, and flowering plants growing, we’ll embark on a treasure hunt to discover these wonders and see firsthand how weather impacts them and their habitat.

Upper Elementary

**Get Your Game On** -- Whoever said that learning can’t be fun! We’ll definitely “Get Our Game On” and take Go Green Games (noted above) to a greener, more advanced level.

**In a New Light: The Color of Weather and Climate** -- Students explore space weather, the electromagnetic spectrum, colors in the sky, light’s impact on Earth’s diverse weather and changing climate, and the role of spectroscopy in both atmospheric and space science research. Students’ understanding of many of the world’s most pressing environmental problems (climate change, ozone depletion and pollution, environmental degradation) is dependent upon a strong understanding of the energy we receive from the Sun. This Learning Lab provides an engaging introduction to help students begin to connect the dots. (Recommended for 5th grade and up.)

Teachers and other field trip planners are always welcome to request a Learning Lab that has been uniquely created to meet the needs of their particular students and the content they are currently studying. Please make such requests at the time of scheduling.
Light and Lenses -- From concave to convex, from refraction to reflection, from focal length to real or virtual images, students cover the world of optics and gain a powerful understanding of one of our greatest tools for understanding our place in the universe -- the telescope. From the days of Galileo to the era of powerful space telescopes, we'll see where we've been and where optical tools are currently taking us.

Sun Savvy -- Students learn a truth about sunlight -- there's more to it than meets the eye, or the skin as the case may be! Students test the effectiveness of various products believed to provide protection from the Sun's harmful ultraviolet rays, from sunscreens to sunglasses. After examining their own skin for signs of sun damage, students will then race to display what they've learned about being Sun Savvy.

Simply Shocking! -- What would you do if you found yourself far from shelter during a lightning-producing thunderstorm? Students enjoy learning about lightning safety and electricity from Mr. and Ms. Vandegraff. They'll have a shockingly fun time generating static electricity that lights up neon tubes and makes Ms. Vandegraff's hair stand on end. Best of all, they'll know what to do next time thunder roars overhead!

Under Pressure: Hurricane Season -- Relive the historic 2005 and 2012 Atlantic hurricane season with its many named storms, devastation, and hurricanes Katrina, Wilma, and Sandy. Find out how air pressure and ocean temperatures impact hurricanes, and if climate change is affecting their intensity and/or frequency.

In the Know with H2O -- Students cycle through locations where water is found on Earth, then learn about the percentage and distribution of salt versus fresh water today as compared to millions of years ago. Students leave with a new found appreciation for water, one of the most essential natural ingredients for life to thrive and survive.

Weather Forecasting -- From warm fronts to cold fronts and from highs to lows, students learn the necessary skills for forecasting weather and earning their junior meteorologist certificate. But first, students must work in teams to demonstrate that they have what it takes to be able to successfully predict weather under various conditions found in locations around the United States. In addition, students will learn about the history of weather forecasting and the tools that have been used in the past and those that are relied upon today.

Middle School

Climate Connections -- The Sun and climate; energy and climate; oceans and climate; extreme weather and climate; health and climate; ecosystems and climate; you, me, and other human beings and climate.... As John Muir wisely said, "When we try to pick anything out by itself, we find it hitched to everything else in the universe." Students will discuss the full weight of climate change and its potential impact on numerous Earth systems. A final connection will also be discussed -- the future and climate. Students will realize that the connection between climate and Earth’s future depends on everyone collectively and individually, and the choices we each make today.

Energy Enigma -- In this Discovery Learning Lab, students play a team guessing game and put on their detective hats to uncover the mysteries of major renewable and non-renewable energy sources. Students will leave with an understanding of the most available and viable forms of energy today.
Pole to Pole, Means to Extremes -- Annual sea ice minimum and maximum at the poles, carbon dioxide levels in the atmosphere, annual global mean temperatures.... Students will investigate the data that documents Earth’s changing climate and look for evidence that human activities have contributed to the problem. We’ll end with a look at proposed ideas to reverse the upward temperature trend and how our own lifestyles can help bring about a solution.

Scientific Modeling and 3D Visualizations -- How do scientific models differ from other models such as blueprints of a home or a model airplane? Learn about NCAR’s role in building the most popular weather forecasting model in existence today and the collaborative nature of our complex Community Earth System Model that predicts future climate change. We’ll also venture into NCAR’s state-of-the-art 3D Visualization Laboratory to see how mathematical models can be given form, studied, and used to convey complex data.

Please refer to the description under “Upper Elementary” for these field-trip offerings that have been adapted for use with middle-school students

• Simply Shocking!
• Weather Forecasting
• Under Pressure! Hurricane Season

• Radar and Weather: The Two Go Together
• In a New Light: The Color of Weather and Climate

High School and Post Secondary (We welcome individualized program requests.)

Careers in the Atmospheric Sciences -- Have your questions answered regarding a career in the atmospheric sciences? Learn about valuable programs at NCAR for high school, college, and post secondary students interested in or actively pursuing a science, technology, engineering or mathematical degree. Review Websites designed to aid prospective students in finding just what they need when they need it. When possible, staff scientists will be be made available to answer your specific questions and answers.

Climate Conundrum -- Interested in learning more about the state of Earth’s climate and how we study its past, present, and future or the likelihood of various impacts commonly discussed? Join us for a scientific study of this complex problem and the myriad of paths to a global solution.

Computational and Information Systems Laboratory (CISL) -- Meet with staff from NCAR’s CISL division to learn about supercomputing at the NCAR Wyoming Supercomputing Center in Cheyenne, Wyoming and Boulder and the variety of research projects around the world that NCAR’s supercomputers support.

Energy Enigma -- Please refer to the description listed under “Middle School.”

Disaster Dynamics - Natural Hazard Management --
In a realistic role playing game, students step into the shoes of natural hazard managers, residents, professionals, and politicians on a hypothetical island in the Gulf of Mexico. Collectively the town residents discuss and vote on various legislation that expend hard earned and limited tax dollars on everything from road construction to hurricane preparation measures that place demands on the island’s limited resources. Students will see the consequences of their resource management decisions when a hurricane hypothetically hits the island. Do you have what it takes to be in Natural Hazard Management?

Scientific Modeling and 3D Visualizations -- Please refer to the description listed under “Middle School.”