



Classroom at Crater Lake

Teacher Guide for Spring Snowshoe Adventures

For information call
Education Coordinator John Duwe, (541) 594-3092



Thank you for choosing to bring your students to Crater Lake National Park for a memorable learning experience!

Crater Lake National Park is always a great place to visit to witness inspirational landscapes and to commune with nature. If you can set aside some class time before and after the trip, we've designed some learning extensions that will augment your students' science education experience while at the park. Please read through this guide so that your students are best prepared for this adventure.



Table of Contents

Program overview, 3
Suggested schedule, 5
Getting to the park, 6
Important notes, 7
Packing list, 9
Chaperon responsibilities, 10

Program overview

Program Mission

The mission of Classroom at Crater Lake is to enhance local communities' understanding and appreciation of the natural and cultural histories of Crater Lake National Park. The mission is achieved by utilizing the park as a natural learning laboratory, providing teachers and students ranger-guided, place-based environmental education activities aligned with nation-wide science education standards and the mission of the National Park Service.

Program Goals

The goals of 2018 Spring Classroom at Crater Lake are:

- To engage students in the authentic, ongoing process of the scientific method through a citizen science project.
- To improve attitudes towards stewardship of our national parks, other public lands, and Earth as a whole.
- To introduce students to winter recreation and safe travel in the Oregon High Cascades.

Rationale

The 2018 Spring Classroom at Crater Lake program invites students to experience winter recreation at Crater Lake while taking the front seat in a citizen science project. Students will employ the scientific method to make observations, think of interesting questions, formulate hypotheses, develop testable predictions, gather data to test their predictions, and analyze a crowdsourced dataset looking for evidence to support or reject their hypotheses. They will also snowshoe, interact with park rangers, and explore immense natural beauty.

The program aligns with Next Generation Science Standards for the 4th and 5th grades. The focus on these standards combined with the authentic use of the scientific method provides an enriching science education experience appropriate for grades 4-8. The use of teacher-designed lesson extensions and adaptations will accommodate age groups outside of this range.

Students will give back to the park by providing park scientists with valuable phenology data that can be used to track environmental changes and inform future park management decisions. Citizen science is service learning in science education.

Program Sequence

- **Before the field trip:** Students complete the Student Study Guide and the Mountain Hemlock Phenology Project guide. In these guides, students will learn about the park and choose a testable prediction regarding mountain hemlock phenology before going out into the field. Students can also explore videos on Crater Lake's YouTube channel: *CraterLakeNPS*

- **During the field trip:** Students bring their knowledge and hypotheses to the rim of Crater Lake for a snowshoe adventure. Classes of chaperon-led small groups work with a park ranger to gather authentic snow depth and phenology data for use back at school. They also accompany the park ranger on an activity-filled snowshoe hike to explore and learn about how snow affects Crater Lake's living community.
- **After the field trip:** Students access an online dataset (to which they contributed) using a Geographical Information System (GIS). They analyze the data to complete the Crater Lake National Park - Natural Resources Report.

Student Learning Outcomes

Students who demonstrate understanding can:

- Employ each step of the scientific method to add to the scientific understanding of natural process at Crater Lake National Park.
- Predict relationships between snow depth and bud growth on mountain hemlock trees.
- Use authentic tools to assess bud growth and measure snow depth.
- Analyze phenology and snow depth data using GIS, finding evidence to support or reject their hypotheses.
- Evaluate how the condition of the snowpack affects the living communities in and around Crater Lake National Park.
- Travel safely off-trail using snowshoes.

2014 Oregon Science Standards (NGSS)

Focus Standard

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Supporting Standards

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

Background Information

Students will investigate interactions between the cryosphere (snowpack), and the biosphere (community of living things) at Crater Lake National Park. Snow covers the park's landscape for eight months of the year, creating a selective pressure so great that species living in the park year round inherit extreme winter adaptations to survive. In fact, many of the species at Crater Lake are so well adapted to cold, snowy winters that park scientists are concerned that their existence may be threatened by a warming climate.

When students visit the park in April or May, an average of five to ten feet of snow will cover the ground. At first glance, it's easy to assume that the ecosystem is in dormancy, waiting to thaw. The students will observe plant growth and evidence of animal activity to discover how energy and matter continue to flow through the ecosystem during the snowy months.

Phenology is the study of the timing of cyclic natural phenomenon, e.g. when leaves begin to develop on a tree, or when a bird begins to migrate. During the citizen science project, students will investigate how Crater Lake's legendary snow depth relates to the timing of needle and cone growth on mountain hemlock trees. Ideally, students will have already completed the Mountain Hemlock Phenology Project guide at school and have already chosen a hypothesis (a prediction of what they'll discover). When students return to the classroom after the field trip, they will be able to analyze all of the project's data using an online map to support or reject their hypotheses. This will allow students to observe their work, "complete" the scientific method, and get a taste for authentic field science.

This project is important to park scientists and managers because forests at Crater Lake are already showing impacts of climate change. The park wants to monitor the situa-

Suggested schedule

This schedule fits with most school days, however, if you need to arrive slightly earlier or later, just let us know and we can accommodate.

Time	Event
10:00 am	Groups arrive at the Crater Lake Rim and park in front of the Community House
10:20 am	Meet ranger in designated area to put on snowshoes. Please see the clothing list to ensure student safety.
10:45 am	Snowshoe activity begins
1:00 pm	Snowshoe activity ends. Students return to the bus area and remove their snowshoes.
1:15 pm	After students use the restrooms, either students eat lunch in the park, or buses depart and students eat on the bus.
1:40 pm	Board bus
1:45 pm	Bus leaves the rim of Crater Lake National Park

Getting to the park

Important notes

- The north entrance to the park will likely be closed during the spring. When planning your travel time, please allow extra time for alternate routes and be sure to check the park website or call before your trip if you are traveling from the north.
- Make sure to ask your bus barn about getting an experienced driver and a bus equipped with automatic chains in case of slippery driving conditions.

Directions

From the west (Medford) - Follow Hwy 62 to the park's West Entrance. Open year-round.

From the south (Klamath Falls) - Take Hwy 97 to Hwy 62 and the park's South Entrance. Open year-round.

From the north (Eugene, Portland) - Leave Interstate 5 just south of Eugene. Take Hwy 58 to Hwy 97 to Hwy 138. Follow Hwy 138 to the park's North Entrance. If the North Entrance is closed, enter either through the West Entrance or South Entrance. (From the junction of Hwy 97 and Hwy 138, it will take the same amount of time, either way you go.)

From the northwest (Roseburg) - Take Hwy 138 East from Interstate 5 and follow to the park's North Entrance. If the North Entrance is closed, enter either through the West Entrance or South Entrance. (From the junction of Hwy 97 and Hwy 138, it will take the same amount of time, either way you go.)

Planning

Snowy roads in the park will increase transportation time, so please plan accordingly. The best way to get an estimate on how long it will take to get to Rim Village is to use Google Maps for directions from your school to the "Rim Village Visitor Center." Note: Google Map's estimates are based on dry roads with no stops.

Arrival

The bus should go directly to Rim Village and NOT stop at the Visitor Center at Park Headquarters. Keep driving until you see rangers waving you down with coned-off bus parking. Buses will park in the center of the roadway between orange cones. A ranger will board the bus to welcome the group and give instructions

Bathrooms

Our recommendation is to require all students to use the restroom at school before leaving, and again upon arriving to the park. This minimizes the need to interrupt learning activities during the field trip.

Chaperons

We require a 5:1 student to chaperon ratio. Students should be pre-assigned to five small groups (5-7 students/group) with a chaperon assigned to each group. In the spring, laminated name tags on a string work much better than the stick-on type. Chaperons must be assigned to restrooms and work as crossing guards to monitor student safety during all transition times and lunch. Please see Chaperon Responsibilities on page 9.

Activity level

Our snowshoe adventures are strenuous. We attempt to keep the activity level appropriate for 3rd - 8th graders, which can be a difficult surprise to adult chaperons and teachers with health concerns. Please be sure that all adults attending the field trip are ready for over 2 hours of strenuous exercise in cold weather, snowshoeing over uneven terrain.

Students with mobility impairments

This year we are pleased to offer the use of an adaptive snow sled for students with mobility impairments. Please be sure to contact the education coordinator to set this up as it requires additional staff.

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Lunch

Most groups use the restroom, leave Rim Village about 1:15 pm, and eat lunch on the bus. Other schools with more flexible schedules use the restroom, eat lunch, take group photos, visit the gift shop, and enjoy the view! We request that no more than 10 students (and their chaperons) be in the gift shop at any one time. Students may eat near the bus, on the

bus, on a snow bank, or the top floor of the Rim Café and Gift Shop. Students on snow banks on the north side of the road (closest to the rim) must be accompanied by a chaperon at all times. Notice that students won't eat lunch until 1:15, and therefore will need to have a snack before and during the snowshoe adventure.

What should students carry while snowshoeing?

See the packing list on page 10 for a complete list of what to pack. When students are snowshoeing, they won't want to bring anything extra. If they choose to carry a backpack, it should only have a snack, water bottle, and extra layers. Students will be most comfortable without a pack, with a snack in their pocket.

Chaperon responsibilities

Thank you for volunteering to accompany the class to Crater Lake National Park. Your help and leadership are both critical to the success of the field trip! It's important that you are physically able to snowshoe off-trail on uneven terrain.

Please be sure to check the packing list and dress appropriately. Chaperones will be snowshoeing with the students and your comfort is important, too!

During this trip your assistance with the following elements will be greatly appreciated.

Safety First!

Make sure students are following all safety rules and the directions given by the ranger or group leader. Please assist students when crossing the road and remind them to not feed the animals. All trash and snack wrappers should be collected. The wind often picks up wrappers and takes them "over the rim wall." Please help to keep the students away from the rim of the lake. In the winter, the snow is very unstable and unpredictable. It is extremely dangerous.

This trip is all about student learning.

To make students feel comfortable in your group, try to learn their names. Students often get excited when they are at the park and may need a gentle reminder to listen and show respect to the ranger leading the group. Help them with small group activities and data sheets – but let the students do the thinking and the writing! Please let the students answer the ranger's questions.

Leaving the Group

Students may not be left unsupervised at any time during the field trip. Please remember the "rule of three" when needing to give special attention to a student (e.g. bathroom emergency, rolled ankle, etc.). The rule of three states that you should always be in a group of at least three people during school events, never allowing yourself to be alone, one on one, with a student. If the need to separate a student from the group arises, please ask another student (preferably someone the student in need is comfortable with) to join you to maintain a minimum of three people together.

No Smoking/No Cell Phones

Please refrain from smoking anywhere near the students, bus, or on any hikes. We also ask that you not take (or make) phone calls during the programs.

Have Fun!

Please take time to enjoy the beauty and wonder of Crater Lake National Park!

Packing list

Spring snowfall at Crater Lake makes it a beautiful place to visit and explore, but one must be prepared! Snowfall averages 533 inches annually and by early spring it is typical to have 10 to 12 feet of snow on the ground. Spring daytime temperatures can range from 32° to 50°F. The wind can be fierce and the weather can change very quickly at Crater Lake!

Many students do not own all these items. Please encourage your students to borrow clothing, if possible. **To ensure a safe and warm experience, students, teachers, and chaperons need the following clothing to protect them from the wind and snow:**

- warm hat (students should have a hat even if their jacket has a hood)
- gloves or mittens (water resistant, “slippery” gloves work much better than fabric)
- water resistant snow boots (rubber rain boots could work with double socks) *
- long pants (snow pants are best) **
- long-underwear
- long-sleeve shirt (turtle necks are great)
- fleece sweater
- warm jacket
- scarf
- two pairs of thick socks (wool or wool blend is best)
- extra pair of dry shoes for the ride home!
- sunglasses
- sunscreen
- water bottle
- lunch (a big, healthy lunch!)
- snacks (healthy choices)
- Optional: camera and binoculars.

It is best to have students **layer their clothing** and **bring dry clothing** to change into for the bus ride home! Also, students have more fun if they don't wear a backpack during the snowshoe activities. So a jacket with a pocket for snacks and gloves works great!

*If water-proof boots are not available, wear double socks and put plastic bags over socks inside of shoes. Bread bags work well!

**If snow pants are not available, try a pair of nylon wind pants or athletic warm-up pants over two pairs of sweatpants. Blue jeans are NOT a good choice.

Note for Teachers: Please bring extra clothing for students who might not be prepared and also bring a garbage bag to pack out waste generated during your visit.