



Making the Mountains

4-6th Grade

Preparing for your Distance Learning Program





Table of Contents

Welcome and Need to Know Information	Dear Teacher	3
	What is Distance Learning?.....	3
Park Background	Background Information on Glacier National Park.....	4
Program Information	Lesson Overview.....	5
	Essential Questions.....	5
	Vocabulary.....	5
	Next Generation Science Standards.....	5
	Lesson Objectives.....	5
Suggested Lesson Sequence	Pre-Program Lesson.....	6
	During the Program.....	6
	Post-Program Lesson.....	6
Pre-Program Lesson	“Geologic Timeline”	6
During the Program	Time.....	7
	Getting Ready.....	7
	Procedure.....	7
Post-Program Lesson	“Glacier Slide”	7



Welcome and Need to Know Information

Dear Teacher,

This packet contains all the information you will need to prepare your students for a “Making the Mountains” Distance Learning program with Glacier National Park.

The lesson plans and resources on pages 5-7 should answer most questions about program logistics, objectives, and schedules.

The rest of the lessons are meant to prepare students for the concepts and vocabulary highlighted during the program. Each activity can serve as a pre-visit introduction or a post-visit assessment/extension.

Be sure to confirm the date(s) and times for your Distance Learning program (received via email) are correct. There is no cost for this program.

The education ranger assigned to your group will email you before the program to arrange for a test call and answer any questions. You can also reach them at 406-888-7899.

Finally, this project and many other critical projects would not be possible without your donations to the Glacier Conservancy.

Glacier National Park
Education Staff



What is Distance Learning?

Glacier National Park protects some of our nation’s greatest treasures, and hosts nearly 3 million visitors a year. While its pristine location in the mountains of Northwest Montana provides spectacular scenery, it also proves tricky to visit; often requiring a long drive or flight.

Glacier’s Distance Learning Program strives to bring the experience and learning opportunities of this special place to classrooms around the country, providing interactive, curriculum based education programs to students of any age!





Background on Glacier National Park

Established in 1910, Glacier National Park is located in northwest Montana and is often referred to as the jewel of the Crown of the Continent ecosystem. Known to Native Americans as the “Shining Mountains” and the “Backbone of the World”, Glacier National Park preserves more than a million acres of forests, alpine meadows, lakes, rugged peaks and glacial-carved valleys in the Northern Rocky Mountains. Its diverse habitats are home to nearly 70 species of mammals including the grizzly bear, wolverine, gray wolf and lynx. Over 270 species of birds visit or reside in the park, including such varied species as harlequin ducks, dippers and golden eagles. The landscape is a hiker’s paradise that is traversed by more than 740 miles of maintained trails. Glacier’s location at the headwaters of the Pacific, Atlantic and Hudson Bay drainages, in addition to its climate influences, have given rise to an incredible variety of plants and animals.

The park is named for its prominent glacier-carved terrain and remnant glaciers descended from the ice ages of 10,000 years past. Bedrock and deposited materials exposed by receding glaciers tell a story of ancient seas, geologic faults, and uplifting. Ripple marks, mudcracks, and stromatolites, unique features and fossils found in Glacier’s rock, bring the story of the Belt Sea to life. 1.6 billion years ago Glacier was covered by a shallow inland sea, where sediment started to collect to form the rocks we see today. Subsequent mountain building and faulting created the prominent peaks we see throughout the park. The glaciers themselves were the final step in the geologic construction of the park. The result of these combined forces is some of the most spectacular scenery on the planet.





Program Information

Lesson Overview

Glacier's mountainous landscape tells the tale of the powerful geologic forces that have shaped the land over time. In this program, students will investigate the many geologic forces that have sculpted the mountains of Glacier by learning about the four main stages of the park's geologic formations; silt, tilt, slide, and glide. Through hands on activities and discussion, students will become immersed in the geologic story of Glacier National Park

Major geologic concepts that this program addresses include, deposition, sedimentation, lithification, faulting, superposition, and glaciation. Students will work with a ranger throughout the program to build a geologic timeline to see where the major geologic events in Glacier National Park's history fit in with Earth's history.

The last five to ten minutes of the program will be set aside to answer any questions students may have about geology or Glacier National Park.

Essential Questions

How do National Parks serve the people of the US?
What forces shaped Glacier National Park?
How do we know that the landscape has changed?

Vocabulary

Arete, Cirque, Deposition, Fault, Horn, Lithification, Moraine, Plate Tectonics, Sedimentation, Stromatolite, Superposition

Next Generation Science Standards

4-ESS3-1 Earth's Place in the Universe: Identify evidence from patterns in rock formations and fossils in rock to support an explanations for changes in a landscape over time.

MS-ESS1-4 Earth's Place in the Universe: Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6 billion-year-old history.

MS-ESS2-2 Earth's Systems: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spacial scales.

Lesson Objectives

At the end of this program, students will be able to:
Define lithification and deposition.
Describe the different forces that shaped Glacier National Park.
Arrange the major geologic events that occurred in Glacier National Park in chronological order on a geologic timeline.



Suggested Lesson Sequence

Pre-Program Lesson Construct a geologic timeline of events that occurred during Earth's 4.6 billion year history.

During the Program Ranger-led discussions, and students placing Glacier-specific events on the geologic timeline.

Post-Program Lesson Conduct the Mini Glacier activity as a class to gain a better understanding of how glaciers shape a landscape



Pre-Program Lesson

Geologic Timeline

Time 60 minutes

Materials String, Glacier geological timeline cards, Paper clips

Procedure As a class, you will construct a geologic timeline of relevant events that occurred in Earth's past. To do so, follow the proceeding steps:

1. Cut a piece of string to be 4.6 meters long. This will represent the 4.6 billion years of Earth's history.
2. Print and cut out the Glacier geologic timeline cards. Set aside the timeline cards labeled, silt, tilt, slide, and glide in the top right hand corner.
3. Have a discussion about Earth's history and place the remaining events along the string (attaching with paper clips) in chronological order.
4. Save the silt, tilt, slide, and glide cards for the distance learning program. Working with the ranger, students will place these cards along their timeline during the program.

If students are learning remotely, have them draw their own timeline cards on index cards or small pieces of paper.





During the Distance Learning Program

Making the Mountains

Time 45-60 minutes

Getting Ready Student Volunteers: Students will interact with the ranger during the program, but the ranger will rely on you to call on students directly.

Establish video conference connection: Prior to the program, you and the ranger will decide who is hosting the program. If you are the host, please email the connection link at least 15 minutes ahead of time. If the ranger is hosting, we will email a connection link at least 15 minutes prior to the program. Make sure your connection is up and running before beginning the session with the education ranger.

Procedure Orient your students:
Before connecting, show students the set-up and go over any standards of behavior that students should follow during the session. Remind them that the ranger may not be able to see everyone in the classroom, so they should look to you as an intermediary when they want to make a comment or ask a question.

Connect with Glacier:
At the designated time, use video conferencing software to connect with the education staff. The program is designed for 45-60 minutes, but can go a little longer if students have questions and you have time.

Let the communication begin!
Please be available to the education staff during the entire length of the program. At the end of the program be ready to help facilitate questions.

After the program:
Take some time after the program for students to discuss and provide feedback about their experience. Let them know that if they have further questions for the education staff, they can contact us at:
glac_education@nps.gov

Post-Program Lesson

Mini Glaciers

Time 45 minutes

Materials ice cube tray, water, baking sheets, cooking spray, water, gravel (optional)

Procedure Before the lesson, make ice cubes. Optional: place gravel in trays before freezing to mimic glacial till. During the lesson, give each group a greased baking sheet and about 2 cups of flour. Instruct students to sprinkle flour evenly over baking sheet. Each student can use an ice cube to push across the baking sheet. Remove ice cube and discuss the features that form. Challenge students to make glacial landforms discussed in the distance learning