

Everest Education Expedition Curriculum

Lesson 2: Meet Mount Everest



Created by Montana State University Extended University
and Montana NSF EPSCoR

<http://www.montana.edu/everest>

Lesson Overview:

Begin to unravel the layers of Mount Everest through geography and history. Learn where Mount Everest sits in relation to the world, to Asia, and to surrounding countries. Compare Mount Everest to the highest peak in your region. Trace the routes of the first Americans, and other mountaineers of the past, who summited this peak, and plot the routes this expedition took as you learn the history of the world's highest mountain.

Objectives:

Students will be able to:

1. Locate and identify Mount Everest including the two countries it straddles.
2. Locate and identify Granite Peak, the highest point in Montana (or the highest peak in your state or region).
3. Compare and contrast the geography and history of Mount Everest to Granite Peak (or the highest peak in your state or region).
4. Explain the route the first Americans took to summit Mount Everest.

Vocabulary:

base camp: a place used to store supplies and get ready for climbing located low on the mountain, safe from harsh weather, icefalls, avalanches and the effects of high altitude found higher on the mountain

col (coal): a low point on a ridge in between two peaks, also called a "saddle"

crevasse (kruh-VAS): a crack in a glacier's surface that can be very deep and covered by snow

elevation: the height of place measured from sea level

glacier: a massive river of ice that moves slowly downward from the high mountains

icefall: a steep, broken section of a glacier where there are many crevasses and falling blocks of ice

latitude: a measurement on a globe or map of a location north or south of the Equator in degrees, minutes, and seconds

longitude: a measurement on a globe or map of a location east or west of the Prime Meridian in degrees, minutes, and seconds

ridge: a long, narrow crest of land leading to a peak or connecting several hills or mountains

route: the course taken in getting from a starting point to a destination

Background Information:

Mount Everest, also called Sagarmatha by the Nepalese and Chomolungma by the Tibetans (meaning “Goddess mother of the world”) is the highest mountain in the world at 8,850 meters (29,035 feet). Everest is named after Sir George Everest (1790-1866) who was in charge of mapping the area as the chief of the Survey of India. He objected to this name, wanting Everest to be called by its native names. Though we traditionally pronounce Mount Everest as EVER-rest, George Everest pronounced his last name as EVE-rest.

Mount Everest was first explored by Europeans in 1921. Early attempts to climb Mount Everest took place in 1922 and 1924 by the British. Mount Everest was first summited by two members of a British team, Sir Edmund Hillary and Tenzing Norgay, on May 29, 1953. The first American team summited Mount Everest in 1963 and included Jim Whittaker and Nawang Gombu (who together summited first on May 1), Willi Unsoeld and Tom Hornbein (who together ascended via a new West Ridge route on May 22) and Lute Jerstad and Barry Bishop (who together followed the South Col route established by Edmund Hillary and Tenzing Norgay during their 1953 climb and summited on May 22).

People don't just climb straight up Mount Everest. Most attempts to reach the summit begin officially at Base Camp, the “home base” area where climbers set up camp for some time in order to adjust to the altitude. There are base camps on both the Tibetan side of Mount Everest and on the Nepalese side. No matter which side they start on, most climbers establish between four and six camps on the mountain above Base Camp where they rest, sleep, store supplies, and get used to the altitude. For weeks they take many trips back and forth between the camps before they attempt their final push to the summit. The most dangerous part of an Everest climb is typically the Khumbu (pronounced *KOOM-boo*) Ice Fall, an ancient glacier that can have ice as deep as a 12-story building.

Most Everest climbs happen in May, right before the monsoon season of June to September where violent snowstorms and winds of up to 285 km/hr (177 mph) ravage the mountain. That's like a Category 3 hurricane! It's also very cold; the top of Mount Everest never gets above freezing. The average temperature at the summit ranges from -36°C (-33°F) in January, the coldest month, to -19°C (-2°F) in July, the warmest month. Temperatures at Base Camp can be quite warm during the day, however, with climbers even hanging out in t-shirts and jeans.

Activity 1: What We Know

Length: 20 minutes

Materials:

- Student World Map worksheet (one per student) and/or globe
http://www.montana.edu/everest/resources/worksheets/Worksheet_MapWorld.pdf
 - Student Asia Map worksheet (one per student)
http://www.montana.edu/everest/resources/worksheets/Worksheet_MapAsia.pdf
 - Teacher copy of Student Asia Map worksheet
http://www.montana.edu/everest/resources/worksheets/Worksheet_TeacherKey_AsiaMap.pdf
 - Computer access with GoogleEarth (or an internet connection) and projection system
1. Explain to your students that in the last lesson, they met the climbers for the Everest Education Expedition. In this lesson they will be learning more about Mount Everest.
 2. With your students, locate the Himalayan Mountain Range and Mount Everest on a map of the world in your classroom or on the Student World Map. Ask your students to identify the continent that Mount Everest is on (Asia).
 3. After identifying Asia, show your students a map of Asia in your classroom. Help your students identify the countries surrounding Mount Everest. Introduce China (including the Tibetan region) and Nepal.
 4. Have your students mark the location of Mount Everest, the Himalayas and the country names on this Student Asia Map.
 5. Have one student identify Mount Everest's **latitude** on the Asia map and another student identify Mount Everest's **longitude**. (27°59'17"N, 86°55'31"E) As a class, compare its coordinates to your hometown and mark both Mount Everest and your hometown on the student World Map. Have your students study latitude to discover if Mount Everest is closer or further away from the Equator than your hometown.
 6. Tell your students that Mount Everest is the highest peak in the world. Explain that **elevation** measures the height of a point on the earth's surface by how tall it is compared to sea level. Tell your students that Mount Everest's elevation is 29,035 feet above sea level or 8,850 meters. Help your students understand this height by sharing the elevation of your hometown and the highest peak in your state or region. Explain to your students that Mount Everest's elevation is about the altitude that jet planes fly. Have the students write the elevations of Mount Everest, your home town, and the highest mountain in your state on their Student World Map.
 7. Explain to your students that they will get to travel to Mount Everest through a virtual tour
 - a. Allow students to explore the Mount Everest area using GoogleEarth independently, in partners or small groups, or as a class.
 - b. *Alternative: If you do not have access to GoogleEarth, you can show your students a video of someone navigating GoogleEarth for you by visiting:*
<http://www.youtube.com/watch?v=S5T3sfWnaGg>
 - c. *Alternative: You may show your students pictures of Mount Everest.*

Activity 2: Meet the Team!

Length: 10 minutes

Materials:

- *Mount Everest Expedition Routes Sketch Worksheet Teacher Copy*
http://www.montana.edu/everest/resources/worksheets/Worksheet_Expedition_route_sketch_key.pdf
 - *Mount Everest Expedition Routes Sketch Worksheet Student Copy (one per student)*
http://www.montana.edu/everest/resources/worksheets/Worksheet_Expedition_route_sketch.pdf
 - *Blue and red colored pencils*
 - *Sticky notes cut into the shapes of arrows or pointers in two different colors (one of each color per student)*
1. Tell your students that like all mountains, there are different ways to climb Mount Everest. Explain to your students that during this unit, they will be tracing the **routes** (or paths) taken by climbers up Mount Everest.
 2. Show your students the route taken by the expedition on the Mount Everest Expedition Routes Interactive illustration. (This can be viewed online at <http://www.montana.edu/everest/multimedia/>.) The Everest Education Expedition will honor the 1963 American expedition.
 3. As a class, lead your students as they individually plot the first American ascent routes of Mount Everest on their individual Everest maps. The team's standard Southeast Ridge route will be plotted in **blue**; the West Ridge route will be plotted in **red**.
 - a. Begin by plotting the Southeast Ridge route in blue.
 - i. Have all of your students find and label **Base Camp**. Explain to your students that Base Camp is a place used to store supplies and get ready for climbing located low on the mountain, safe from harsh weather, icefalls, avalanches and the effects of high altitude found higher on the mountain. Show the students that the team will travel occasionally travel across **glaciers**.
 - ii. Locate and label Camp I as a class and draw a line indicating the climbers' route between these two camps through the Khumbu Icefall. Explain to your students that an **icefall** is very dangerous part of a glacier full of **crevasses**.
 - iii. Continue this process until the entire route is drawn and labeled to the summit from Base Camp to the South **Col** and along the Southeast **Ridge** route. (See the Teacher copy of Everest map to see this route.)
 - iv. *Optional: Watch a video that shows this route using GoogleEarth by visiting: http://www.youtube.com/watch?v=_YZw5Qq09EU*
 - b. Follow this same process to plot the West Ridge route using a red colored pencil (also on the Teacher copy of the Everest map).
 4. Tell your students that they will retrace the 2012 Everest Education Expedition team along the route used to **ascend** Mount Everest. Provide each student with a sticky note cut into the shape of an arrow. The arrow will represent the team's location. (Additional arrows of both colors may be required if climbers split up.) Label these arrows with the

climbers' names and place them at Base Camp.

NOTE: During this exercise, help your students mark where the climbers are by moving the appropriate arrow around the mountain.

Activity 3: Walking in Climber's Boots

Length: 20 minutes

Materials:

- *"Historical Timeline" Worksheet (one per student)*
http://www.montana.edu/everest/resources/worksheets/Worksheet_HistoricalTimeline.pdf
 - *Scissors*
 - *Glue*
1. Explain to your students that the history of Mount Everest is rich with stories of exploration and first ascents, just like Granite Peak in Montana (or the highest peak in your state or region). The progression of finding, exploring and climbing to the top of these two mountains is similar in some ways and different in others. Tell your students that they will be making a timeline of the history of both of these peaks.
 2. Have your students cut out the events on the "Historical Timeline" Worksheet. (Please note: If you are using a peak other than Granite Peak in Montana, you will need to research events for your selected peak prior to this activity. Students may write your selected peak's events directly onto the worksheet.)
 3. After the timelines are complete, discuss as a class the similarities and differences between the exploration and climbing history of these two mountains. Ask your students which mountain was summited first and why.

Tying it All Together:

Use the following ongoing activities to check for student understanding of each lesson's concepts. Grade for completion, management of data collection, effort and participation throughout unit.

1. **"Mount Everest and Me" Worksheet**

http://www.montana.edu/everest/resources/worksheets/Worksheet_EverestandMe.pdf

This worksheet will be an ongoing activity for your students. In a table format, the "Mount Everest and Me" Worksheet compares Mount Everest, Granite Peak (the highest peak in Montana), and your hometown. Using comparisons, the worksheet reinforces the lesson's content while helping students put this knowledge into perspective by comparing their home state and hometown. Have your students fill in the correlating rows of the table after completing each lesson. This can be completed as a class or individually.

2. **Everest Education Expedition Vocabulary Crossword Puzzle**

http://www.montana.edu/everest/resources/worksheets/Worksheet_Lesson2Crossword.pdf

This crossword puzzle reinforces vocabulary presented in each lesson. Have your students fill in the correlating vocabulary words for each lesson's puzzle after each lesson.

Taking it Further:

Introducing Granite Peak

In a similar format to the Mount Everest introduction, familiarize your students with the highest peak in the state of Montana. Identify Granite Peak's latitude, longitude and elevation. Slowly "zoom in" on Granite Peak using a world map, North America map, and Montana map. Finish your introduction by "touring" Granite Peak using GoogleEarth, a series of photographs, or by watching the following "fly over" of Granite Peak (<http://www.youtube.com/watch?v=aY2075DP0m4>).

GRANITE PEAK

Granite Peak is the highest mountain in Montana. It rises 12,807 ft (3,904 m) above sea level. If you rank all of the **highest places** (http://en.wikipedia.org/wiki/List_of_U.S._states_by_elevation) in each state, Montana has the 10th highest in the nation. Granite Peak is considered to be one of the most difficult highest state points to climb and was the last one to be climbed. It was first climbed in 1923 after many other people had tried and failed. Climbers usually take two or three days to climb Granite Peak, although it has been done in one day.

Part of the Beartooth Mountain range, Granite Peak is located only 10 miles north of the Wyoming / Montana border. It can usually be seen from the famous Bearthooth Pass scenic highway that connects Red Lodge, Montana with the northeast entrance of Yellowstone National Park.

Many of the rocks that make up the Beartooth Mountains are over 2.5 billion years old (much older than those on Mount Everest). This mountain range got its name because it has some steep, jagged peaks that look like teeth. These rugged mountains and valleys that surround them were carved out by ancient glaciers and there are still around 400 glaciers and perennial snowfields there, about 35% of the total number in Montana.

Most of Montana, including the Granite Peak area, was once at the bottom of an inland sea that stretched north to south from the Gulf of Mexico to the Arctic Ocean during the Cretaceous Period, about 90 million years ago. During that time, large sea monster-like creatures called plesiosaurs lived in the inland sea and dinosaurs such as *Tyrannosaurus rex* and *Triceratops* roamed the land. Earth's tectonic plates began to push this region upward causing the sea to recede and dry out. At that time, this region was covered with marine sedimentary rocks. However, these rocks later mostly eroded after the Rocky Mountains were formed from the uplifting, folding and breaking of Earth's crust in that area – an event geologists call the Laramide orogeny. Eventually, the metamorphic rocks that were underlying the softer sedimentary rocks were exposed. They date from the Precambrian Archean (>2.5 billion years

old). The Beartooth Mountains are largely made up of metamorphic rocks like granite, gneiss and schist. There are also some intrusions of igneous rocks such as the Stillwater complex, which hosts significant deposits of palladium and other platinum group elements.

Topographic Maps

Strengthen your students' understanding of topographical maps by one or more of the following activities.

- "Contouring Spud Peak":
Trace thin slices of half of a potato ("Spud Peak") to create a topographic map from a 3D model of a landform.
<http://www.womeninmining.org/activities/SPUDPEAK.pdf>
- "Mapping Your Knuckles":
Draw contour lines around your knuckles while making a fist, and then flatten out your hand to reveal a topographic map.
http://www.classzone.com/science_book/mls_grade7_FL/212_215.pdf

Plot a "First" Ascent

Give your students a blank Everest Photograph Map and ask them to plot an additional "first" ascent route that interests them. This could be the first ascent by a different nation, the first female, first blind person, etc. Here is a list of some choices. Note they are almost all on the Southeast Ridge.

Southeast Ridge

First ascent of Everest	Tenzing Norgay and Sir Edmund Hillary	May 29, 1953
First American	Jim Whittaker	May 1, 1963
First woman	Junko Tabei	May 16, 1975
First American woman	Stacey Allison	Sept. 29, 1988
First blind person	Erik Weihenmayer	May 25, 2001
First ascent w/out oxygen	Reinhold Messner (Italy) & Peter Habeler (Austria)	May 8, 1978
Oldest person	76-year-old Min Bahadur Sherchan	May 25, 2008
First African American female	Sophia Danenberg	May 19, 2006
First disabled person	Tom Whittaker (has his right foot amputated)	May 27, 1998

Northeast Ridge

Youngest person	13-year-old Jordan Romero	May 22, 2010
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You can also have your students do research on their own to pick a route. You can also find route maps of different ways to climb Mount Everest at:

<http://www.mounteverest.net/story/stories/ChomolungmaNirvana-theRoutesofMountEverestMay292004.shtml>.

Have students share with each other what routes and “firsts” they mapped. See if they are surprised how many of them have mapped the Southeast Ridge Route. Ask them why so many firsts have occurred on that route.

Historical Timeline Worksheet

Materials:

- *Historical Timeline” Worksheet (one per student)*
http://www.montana.edu/everest/resources/worksheets/Worksheet_HistoricalTimeline.pdf

Cut out each historical event and glue it onto the appropriate spot on the timeline. Place the events for Mount Everest above the timeline, and the events for Granite Peak below the timeline.

The Worksheet is a blank timeline with dates. Above the line will be the title “Mount Everest” and below the line will be the title “Granite Peak.” Each event listed below will be a rectangle that students cut out on a different page of the activity. Everest events should look different graphically than Granite. Students will cut out the events and glue them in place on the worksheet, so we have to make sure there’s an appropriate amount of room for all the events included below. We also need to make a version with just Everest and blank spots for the other peak in case non-Montana students will be using this.