

Sourdough Crampons: The History of Climbing Denali

Essential Question: How do people interact with Denali, historically and today?

Suggested Activities

Analyze an Object

Time: 20-30 minutes

Materials: Pictures of Sourdough crampons, paper, pencils, *Sourdough Crampons* handout

Directions:

- Show pictures of the Sourdough Crampons. Ask students to draw a picture or write a description of the object.
- Have students brainstorm questions they have about the crampons. This can be done individually, in small groups, or as a class.
 - See the *Thirteen Questions To Ask An Object* handout for examples.
- Share background information on the crampons and Sourdough Expedition (see handout). Ask students which questions of theirs were answered, and what other questions they have after learning more about the object.
- Discuss the following questions with your students:
 - What did you learn about the people who made and used the crampons?
 - What are some ways you could research your unanswered questions?
 - What could people in the future learn about you from objects you make and use?

Alaska History Content Standards: C. A student should develop the skills and processes of historical inquiry.

Alaska Anchor Standards English Language Arts: RI.1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking.

Compare and Contrast

Time: 15-30 minutes

Materials: Pictures of Sourdough crampons and contemporary crampons, pair of commercially-available crampons (if available)

Directions:

- Look at pictures of the Sourdough crampons and crampons used today. If you have a pair of crampons available, have students handle them and try them on.
- Make a list of similarities and differences between the two pairs of crampons. This can be done individually or as a group.
- Ask students to consider what the crampons reveal about how the experience of climbing Denali has changed since 1910.

Alaska Science Content Standards: E. A student should understand the relationships among science, technology, and society.

Alaska History Content Standards: A. A student should understand that history is a record of human experiences that links the past to the present and the future.

Create a Crampon Model

Time: 30-45 minutes

Materials: Pictures of Sourdough Crampons and contemporary crampons, variety of craft materials (pipecleaners, popsicle sticks, wooden dowels, felt pieces, string, wire, etc), *History of Crampons* handout, *Engineering Design Process* worksheet (optional)

Directions:

- Show students pictures of the Sourdough crampons and contemporary crampons. What is the problem crampons are designed to solve? (Refer to *History of Crampons* handout.)
- Brainstorm with students how they could construct their own crampon models.

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- Introduce the Engineering Design Process (see worksheet). Use the process to guide student progress.
 - *Optional:* Students can fill out the *Engineering Design Process* worksheet for each step.
- Have students make their own crampon models out of craft materials.
 - *Optional:* Students can draw pictures of their crampon designs before making them. Older students may want a wider variety of craft supplies.
- Discuss the following questions with your students:
 - What were the easiest and hardest parts of making your model?
 - Why do you think members of the Sourdough Expedition made their own crampons? What are the advantages and disadvantages of making your equipment?
 - How did the process of making a model help you to understand the experiences of the 1910 Sourdough Expedition members?

Alaska Science Content Standards: A. A student should understand and be able to apply the processes and applications of scientific inquiry.

Write a Journal Entry

Time: 30 minutes

Materials: Paper, pencils, *Sourdough Expedition* handout (optional)

Directions:

- Write a journal entry from the point of view of a member of the Sourdough Expedition as they are climbing Denali. Suggested prompts include: Why are you climbing the mountain? What is the weather like? What kind of supplies do you have? How do you feel (hungry, cold, excited, homesick, etc.)? What will you do after the expedition?
 - *Optional:* Use the *Sourdough Expedition* handout to give students more information on the expedition.
 - Younger students can draw a picture of the expedition instead of writing an entry.
- Have students share their journal entries with partners or the class.

Alaska History Content Standards: A. A student should understand that history is a record of human experiences that links the past to the present and the future.

Alaska Anchor Standards English Language Arts: W.3. Use narrative writing to develop real or imagined experiences or events using effective techniques, well-chosen details, and well-structured event sequences.

Prepare for Your Expedition

Time: 30-45 minutes

Materials: *Prepare For Your Expedition* handout, Photos of mountain climbing equipment (use the included cards or find your own)

Directions:

- Divide students into groups. Tell them they are members of an expedition planning to climb Denali. They need to make a list of all the equipment and supplies they need to take with them. Remind them to consider the weight of each item, how much safety equipment they need, and the weather forecast.
 - For younger students, provide pictures of items to choose from.
 - *Extension:* One group is climbing Denali in the year 1910. Another group is climbing Denali in the present day. How are their lists similar and different?
- Have each group present their list to the class.
- Ask students to reflect on what they have learned about the history of climbing Denali.

Alaska Anchor Standards English Language Arts: SL.1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

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Courtesy of Denali National Park and Preserve Museum Collection, DENA 405AB.



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Sourdough Crampons Information

This is a pair of crampons for climbing boots, with points on the bottom and slotted uprights for boot straps on top. They are made of galvanized sheet metal. The front and back sections are hinged to bend with the boot. Two rivets for the strip attaching front and back sections of the right crampon are missing.

The homemade crampons were left on the Muldrow Glacier on Denali (Mount McKinley) by members of the 1910 Sourdough Expedition. In 1932, the Lindley-Liek Expedition found and recovered them.

In November 1909, in Fairbanks, Alaska, four gold miners, Tom Lloyd, Peter Anderson, Charley McGonagall, and Bill Taylor, set out to be the first to climb Denali to win a bet, and to disprove explorer Frederick Cook's claim that he had summited Denali in 1906. The trip began in December 1909 as the group left Fairbanks with their horses, mule, and dog teams.

On April 3, 1910, the group, minus Lloyd, attempted to reach the summit. With a bag of doughnuts, three thermoses of hot chocolate, some caribou meat, and a 14-foot spruce pole, they became the first party to summit the 19,470-foot north peak of Denali. They became known as the Sourdough Expedition, and had met the challenge of climbing with what is considered rudimentary gear and no technical climbing experience. In 1913, the Stuck-Karstens climbing party saw the spruce pole when they reached the top of the south peak, and verified that the Sourdough Expedition had summited the north peak.

Information from National Park Service Centennial One Object Exhibit:

www.google.com/culturalinstitute/beta/exhibit/mwLSpGOXWnRSKw

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Thirteen Questions to Ask an Object

1. What are the object's **physical properties**?
 - Material(s)
 - Size
 - Weight
 - Number of parts
 - Is anything written or drawn on it?
2. What are the object's **sensory properties**?
 - Sight, Touch, Sound, Smell, Taste (use your imagination!)
3. Was the object **made or altered** by humans?
4. How do humans (or animals) **interact** with the object?
5. What is the object's **purpose**?
6. What **emotions, thoughts, or ideas** come to mind when you see the object?
7. **How** was the object made?
 - Was it handmade? Was it mass-produced?
 - What techniques did the maker use?
8. **Who made** the object?
9. **Who owned or used** the object over time?
10. What **other objects** relate to this one?
11. What is **special or distinctive** about this object?
12. What **personal meaning** or significance do you find in this object?
13. How would you **explain** this object to others?

Adapted from "Twenty Years, Twenty Questions to Ask an Object" by the Material Culture Caucus of the American Studies Association: networks.h-net.org/twenty-questions-ask-object-handout

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History of the Sourdough Expedition



Charlie McGonagall and Sourdough Expedition leader Tom Lloyd at the 16,000 foot camp on Mt. McKinley during their 1910 ascent of the North Peak. Courtesy Alaska State Library, ASL-P277-004-089.

The first people to climb Denali (Mount McKinley) did it to win a bet.

It all started when a group of guys were talking in a Fairbanks saloon one cold November in 1909. Dr. Frederick Cook had just published a book claiming he made it to the top of Denali. Those at the bar were all convinced the famous explorer was lying. Alaskans didn't believe some fancy man from the city could have done it. The bar owner said he didn't believe anyone could do it.

Tom Lloyd took the bait. He was a miner who had spent more time around the mountain than almost anyone. He bragged that he knew how to get to the top. The bar owner told Lloyd he was too old. Lloyd told him, "I may be, but I can find men who will do it." That settled it. The bar owner put up \$500 to prove Cook didn't make the climb.

Once the newspapers got hold of the story, there was no backing out.

The 50-year-old Lloyd got together a team of fellow miners: Billy Taylor, Charley McGonagall, and Peter Anderson, to tackle the mountain. This group had mined for gold at Kantishna at the base of the mountain. They knew the area as well as anybody. In December they left Fairbanks with four horses, a mule, and a dog team. They headed south toward the mountain. After the record cold November, temperatures had warmed to 40 degrees, setting record highs by mid-December.

By early February, they finally reached Kantishna. They set up a base of operations at the mouth of Cache Creek. From this spot at about 2,900 feet in elevation, they started scouting routes up the mountain. Based on his previous experience, Lloyd was convinced that the only way to make it up the mountain was to follow the Muldrow Glacier, which they called Wall Street Glacier because it had such high walls on each side.

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The climbers used no ropes or other climbing gear. The most technical equipment they had were snowshoes, handmade crampons, and long poles with steel hooks they thought would keep them from falling into crevasses on the glaciers. They wore bib overalls, wool long underwear, insulated rubber boots, mittens, shirts, and light parkas. They brought with them bacon, beans, flour, dried fruit and coffee. They caught fish and killed caribou at the lower camps and carried it up the mountain. They started out with a barometer to figure out their elevation, but they lost it. The only other equipment was a camera, a watch, and a thermometer.

They cut and burned firewood for cooking at the lower elevations. They planned to use a small oil stove on the climb. But they decided not to use oil and simply chopped wood into small blocks they could use in the stove. They also hauled a 14-foot spruce flagpole they wanted to plant at the summit to prove they made it to the top. In all, while they claimed they were traveling light, by today's standards they had a lot of heavy, bulky gear. The horse and mule helped them get the gear to Kantishna. Dogs helped them freight the load up the mountain.

"We had two caribou hides for beds and mattresses for four of us. Pete had a mountain sheep skin sleeping bag as well, and besides that we had three robes in all for the four of us, one of them was not much good, and a piece of canvas to throw under all. You want to be sure and keep the snow and ice from thawing underneath you. We had no discomfort in sleeping, none at all," Lloyd wrote in his journal.

By early March, Lloyd, McGonagall, and Anderson began heading up the Muldrow. Taylor had gone back to catch some fish. By March 11 he caught up with them. Storms slowed them down. But on March 18, they made it to about the 15,000 foot mark. Here they set up what they thought would be the final camp before making the summit. They spent the next two weeks carving steps in the snow and ice up the mountain, then coming back to camp. Lloyd went back to their main base camp for more supplies on March 29.

On April 1, the group made their first attempt to reach the summit. A storm turned them back. On April 3 they tried again. Carrying a bag of doughnuts, three thermos bottles of hot chocolate, some caribou meat and their 14-foot spruce pole, Taylor, Anderson and McGonagall headed to the summit. Taylor and Anderson reached the North Peak summit. They built a pyramid of rocks and used ropes to anchor the spruce pole to prove their victory. McGonagall did not feel the need to get to the top. He said he had finished his turn carrying the pole and so he rested for a while, and then headed back to camp.

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Some believe that Lloyd suffered altitude sickness and stayed back at the base operations while the others climbed to the summit. Unfortunately, he couldn't face his own failure. He claimed that he had been with the summit team. He fictionalized his journal account of the summit attempt. His lie made everyone question whether anyone had made the summit. He did tell the truth when he wrote, "I wish to state emphatically that I, personally, could never have got any place if it hadn't been for Pete Anderson, Charley McGonagall, and Bill Taylor. I wish to here publicly acknowledge that they were far superior to me in ability at any stage of the climb, up or down or on the level. They did the work, before and behind, and I kept camp."

Still, his lies caused doubt for years. Several attempts to prove or disprove the claim were made. In 1913, members of Hudson Stuck's expedition spotted the flagpole as they climbed to the South Peak and put to rest all doubt about the incredible feat of the hardy Sourdough climbers.

Sources:

The Sourdough Expedition: Stories of the Pioneer Alaskans Who Climbed Mount McKinley in 1910 edited by Terrence Cole, Alaska Northwest Publishing Company, 1985.

To the Top of Denali by Bill Sherwonit. Alaska Northwest Books, 1990.

Information from *Sourdough Climbers*:

www.alaskakids.org/index.cfm/know-alaska/Alaska-History/Sourdough-Climb

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History of Crampons

Late 19th century: Full-foot crampons become available, but did not become popular. Most climbers at the time used nailed boots, which had spikes built into their soles.

1908: Oscar Eckenstein, an English climber, designed what is generally considered the prototype for the modern-day crampon. He worked with a blacksmith to design a steel device with 10 long, sharp spikes. These crampons could be attached to regular hiking boots.

1910: Henry Grivel makes Eckenstein's design commercially available.

1913: Lieutenant Trémeau develops the first adjustable-length crampon.

1929: Laurent Grivel (Henry's son) adds two front points to the 10-point design, enabling climbers to tackle steep ice. The twelve-point crampon becomes the standard for mountaineering and glacier travel.

1967: Yvon Chouinard and Tom Frost develop rigid-frame crampons. Rigid crampons are designed to provide a stable platform to stand on, reducing fatigue and increasing precision.



10-point crampons designed by Oscar Eckenstein.
Scottish Mountain Heritage Collection: www.smhc.co.uk



12-point crampons designed by Laurent Grivel.
www.grivel.com/inc/read_more_crampons.php

Sources:

What's a Crampon?: www.gadventures.com/blog/whats-crampon-history-behind-cold-climate-trekking-essential/

History of Crampons Timeline: www.climbing.com/gear/history-of-crampons-timeline-no-226/

Choosing the Right Crampons: www.gearx.com/blog/2015/01/23/choosing-right-crampons/

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Examples of Contemporary Crampons



www.gooutdoors.co.uk/petzl-lynx-crampon-p279266



www.simond.com/makalu-crampons-strap-id_8320463



www.rei.com/product/100169/petzl-irvis-flexlock-crampons-pair

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Engineering Design Process

Engineers create solutions to our everyday needs. To create these solutions, engineers follow the Engineering Design Process. The image below was created by the *Engineering is Elementary* project at the Museum of Science, Boston. It lists five steps to achieving an engineering design challenge.

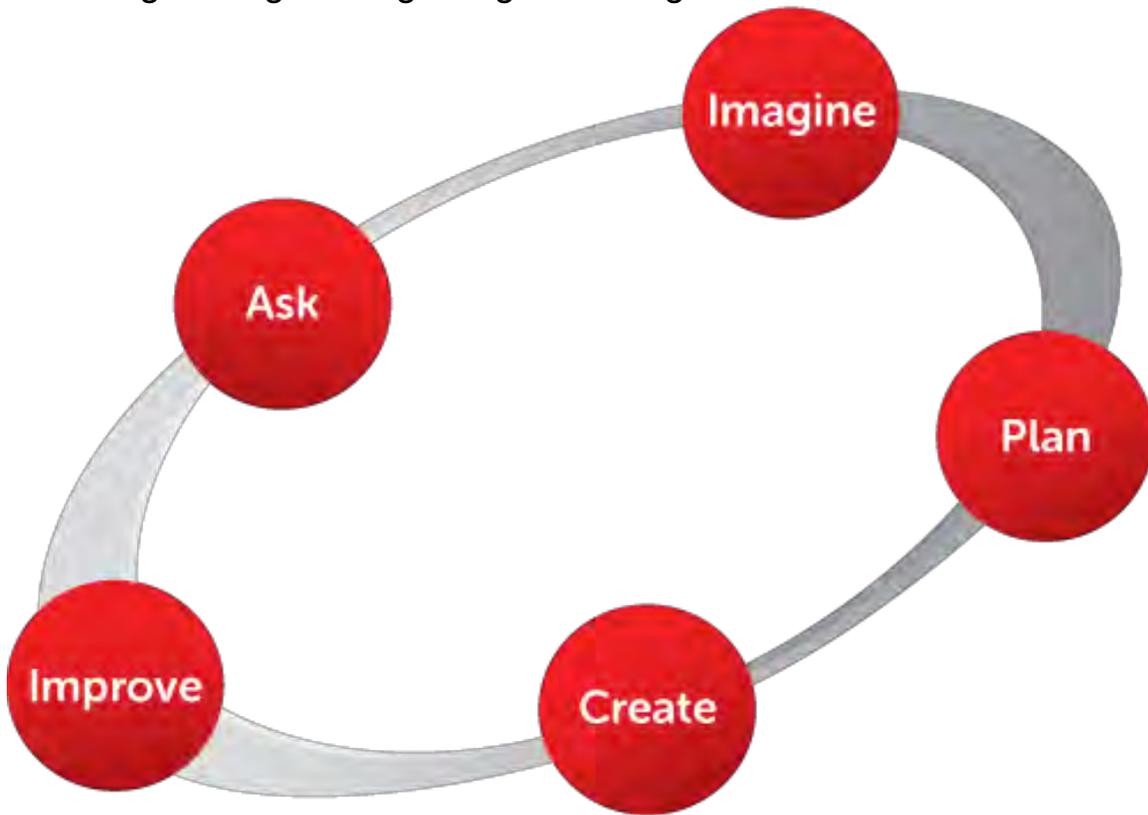


Image from Engineering is Elementary (Museum of Science, Boston)

Engineering is Elementary defines each step as follows:

ASK: What is the problem? How have others approached it? What are your constraints?

IMAGINE: What are some solutions? Brainstorm ideas. Choose the best one.

PLAN: Draw a diagram. Make lists of materials you will need.

CREATE: Follow your plan and create something. Test it out!

IMPROVE: What works? What doesn't? What could work better?

Modify your design to make it better. Test it out!

Source: *Engineering is Elementary*: www.eie.org/overview/engineering-design-process

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Engineering Design Process: Activities

Use the Engineering Design Process to guide students in the **Create a Crampon Model** activity.

Before starting the activity, introduce the Engineering Design Process. You may want to reinforce the steps by having an EDP Relay!

Engineering Design Process (EDP) Relay

Write each of the five steps (Ask, Imagine, Plan, Create, Improve) on a colored piece of paper. Make three sets of cards in three different colors. Place the cards at one end of a room (a gym is great!). Divide students into teams, and assign each team a color. One by one, team members run to grab a card and then run back to their team and tag the next person. While that person is getting a card, the rest of the team is getting the cards in order of the engineering design process. Teams aren't done until the process order is verified!

On the following pages are worksheets to use during an activity such as Create a Crampon Model. They can also be used as a basis for class discussion.

Team Progress Chart: Use during the activity. Have students fill out the chart for each step of the Engineering Design Process.

Student Reflection Questions: Use after the activity to guide students in reflecting on the Engineering Design Process.

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Engineering Design Process: Team Progress Chart

Student Name:

Team Name:

How did your team move through the Engineering Design Process steps?

Document each step by writing a short description of what you did. This will help your team stop, discuss, and decide what to do next. After you finalize your design, use this chart to help explain the steps you took to reach your solution. You may repeat steps!

Step Name	What did you do and why?

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Engineering Design Process: Student Reflection Questions

1. Describe three steps of the Engineering Design Process (EDP).
2. How did the EDP help with your design?
3. What was the most difficult problem your team had to solve? How did you solve it?
4. Which design worked best?
5. Which materials worked best?
6. What did not work well? What would you do differently next time?

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Prepare For Your Expedition: Equipment Cards



Skis
8 pounds



Snowshoes
4.5 pounds



Backpack
5 pounds



Shovel
1 pound



Duct Tape
1 pound



Tent
6.5 pounds

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Prepare For Your Expedition: Equipment Cards



Sleeping Bag
3.5 pounds



Boots
5 pounds for pair



Parka
3 pounds



Mittens
1 pound for pair



Goggles
0.5 pounds



First Aid Kit
1 pound

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Prepare For Your Expedition: Equipment Cards



Sewing Kit
0.25 pounds



Camera
1 pound



Stove
1.25 pounds



Rope
6.5 pounds



Crampons
2 pounds for pair



Ice Ax
1 pound

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Prepare For Your Expedition: Equipment Cards



Satellite Phone

0.5 pounds



Radio

0.75 pounds



Notebook

0.5 pounds



Food

at least 2 pounds per person per day



Cooking Pot

0.5 pounds



Water Purification Tablets

0.25 pounds