SCIENCE CAREER ADVENTURES

Teacher Prep: Creating Flubber

Each group will need about one cup of flubber to be their glacier. This recipe makes about six cups, which will be enough for 6 groups of students.

- Pour 2 1/4 cups of warm water and 3 cups white glue into 2 gallon sized bag or a bowl.
- Squeeze out extra air and then securely zipper baggies shut.
- Gently mix warm water and glue in baggie using your fingers. Continue mixing until the glue is runny with no clumps.
- Put 6 teaspoons of Borax into 1 1/2 cup of warm water.
- Mix Borax with water until all (or almost all) of the particles are dissolved (up to 5 minutes).
- Pour dissolved Borax mixture into baggie containing runny glue.
- Gently mix dissolved Borax mixture and runny glue mixture in baggie using your fingers. Continue mixing until the mixture is evenly gel-like (up to 3 minutes).
- Any extra liquid in the baggie can be allowed to flow out of the baggie and washed down a regular sink drain.
- Divide flubber into 6 baggies (one for each group).

Materials needed:

- 2 gallon sized bags for mixing ingredients
- 6 small plastic baggies to store flubber (one for each group)
- 3 3/4 cups warm water (optional: with 8 drops of blue food color added)
- 3 cups white glue
- 6 teaspoons Borax

SCIENCE CAREER ADVENTURES

Glaciers and Earth's Surface

Glaciers are powerful forces that can change the surface of the Earth.

When water runs off of glaciers, it typically enters a river. The river carves out a path through the landscape until it meets with a larger body of water, like a lake or ocean.

Valleys are formed when a glacier travels across and down a slope, carving the valley.

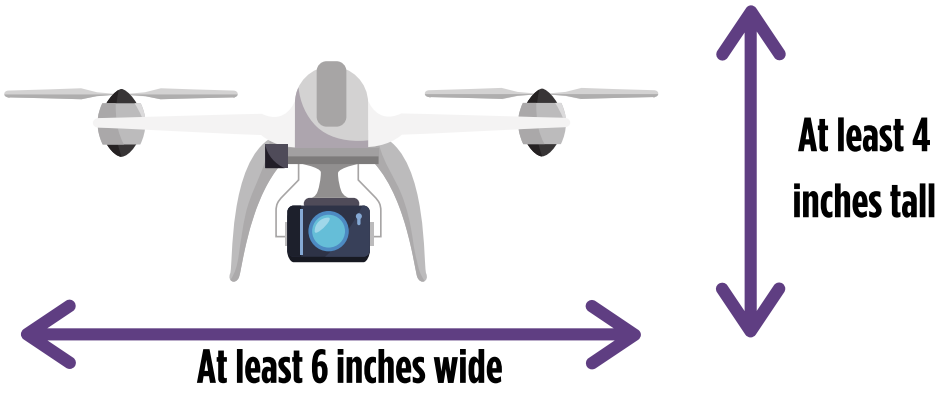
The way that glaciers move across the surface of the Earth can cause a shift of materials underneath the glacier. As the glacier moves the material, it can leave a large cavity in the ground that fills with water, creating a lake.

Creating a Drone

The drone that you create must meet the following requirements:

Requirement 1: Have Specific Dimensions:

- Must be at least 6 inches wide and 4 inches tall



Dock or Compartment for a Smartphone:

- You will be incorporating a smartphone into your drone design. The smartphone will take video of your glacier. You should make sure you build your drone to have a dock or compartment to hold the phone.
- When the smartphone is in the dock, the phone's buttons must be easily accessible so videos can be recorded.
- The charging port of your smartphone must be easily accessible. You will need to plug a charging cord into the phone and a power outlet to ensure that the battery doesn't die.

Preparing Glaciers

- You will be given a cup of flubber. This represents the glacier.
- You will also be given a handful of beads. The beads represent pieces of Earth that are "frozen" inside the glacier.

Follow the instructions below:

Note: You will work with another group while creating this simulation. While both groups should have identical set-ups, one group will end with their glacier under a heat source, and one will not.

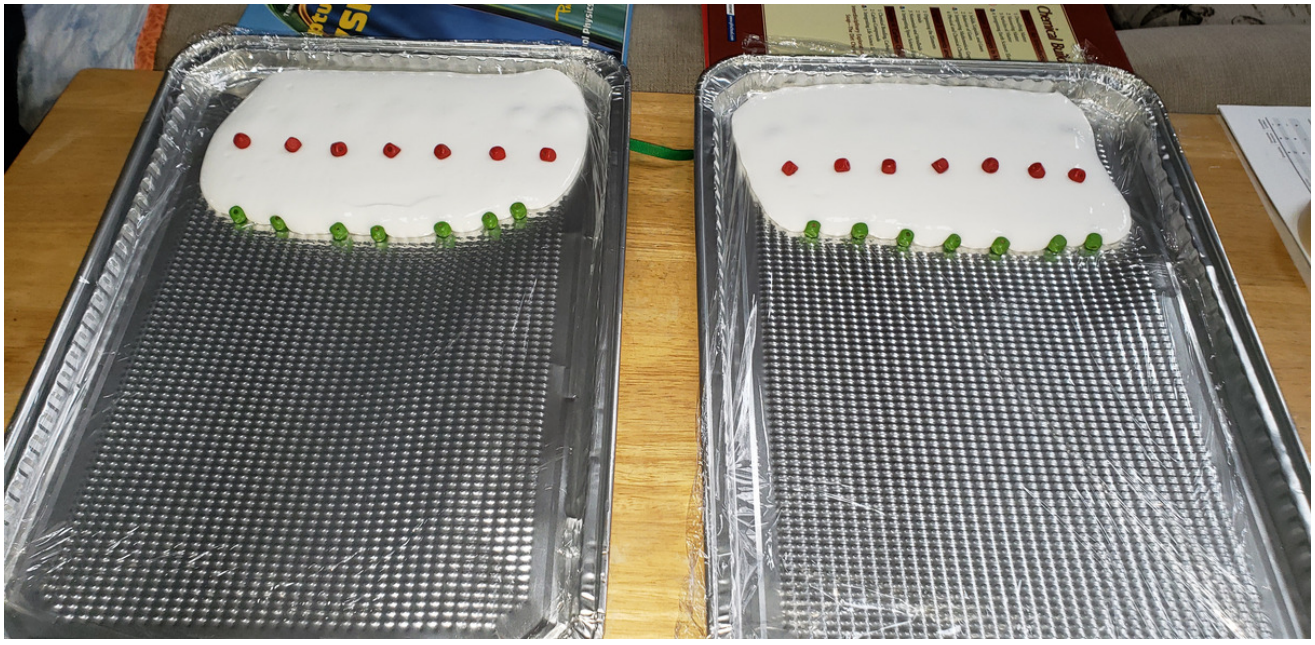
1. Line your cookie sheet with clear plastic wrap.

2. Place your flubber at one end of the cookie sheet.

3. Work with your partner group to form the pieces of flubber into similar shapes, as shown.

4. Add beads to flubber in a line across both glaciers at the same distance from the top as shown. This represents pieces of Earth stuck in this part of the glacier.

5. Flip the flubber over and add more beads in lines across the glacier at the same distance from the top. Add another row of beads at "snout" of the glacier. This is the end of the glacier. These beads represent pieces of Earth stuck in these parts of the glacier.



Capturing Data on How Glaciers Change

Overview

Your group's drone will capture data on how your glacier changes over the course of 2 hours. You will use the time lapse function on the smartphone to take video of your glacier to see how the glacier changes. The time lapse function will shorten the video so you can see how the glacier changes without having to watch all 2 hours of the video!

Step 1: Set Up Time-Lapse Mode on Smartphone

- On your smartphone, turn on the camera to the time-lapse mode.
- You might have to change the settings so that the screen doesn't automatically shut itself off. You should go to the settings section and locate the “auto-lock” function. Change the setting to “never” so that the screen doesn't lock.
- To test to make sure the time-lapse mode works, start a time lapse and let it record for about a minute.
- Play video back to make sure that the time lapse function worked properly. If your video played back correctly, tell your teacher you are ready to move on to the next step.
- Be sure to have your phone charger so it does not die while taking the video.

Step 2: Set Up Drone and Glacier

In this step, you will set up your group's drone and glacier so you can collect data.

- Find a place in the classroom that is near an outlet. Your glacier and drone set up must be located near an outlet because the smartphone will charge during data collection.
- Attach your smartphone to your drone. Plug your charging cord into your smartphone to make sure that your cord will reach the power outlet.

- Place drone above your group's glacier.
- Use books to tilt your glacier so that the end of the cookie sheet with the glacier is at the high end.
- Find out from your teacher if your group is using a heat lamp as part of data collection. If your group is not using a heat lamp, skip this step. If your group is using a heat lamp, place lamp directly over one tilted glacier model.. Note: Do not turn your heat lamp on yet! You should position the heat lamp so it is over the tilted edge of the glacier.

Step 3: Collect Data

You will now begin collecting data!

- If your group has a heat lamp, turn it on.
- Make sure your smartphone is plugged in to nearest outlet and is charging.
- Turn on your video and begin recording with the time-lapse function.
- Ask your teacher which group member is in charge of returning to the classroom in 2 hours to turn off the recording and save the video to the cloud.