



TaHome Nature Education: Spring Snow

Grades 3-5

Reading: How Snow Affects Spring

Ice, snow, and water are extremely powerful forces of nature. Without the annual snowfall of winters at Tahoe and the subsequent snowmelt of spring, the environment in the Sierra Nevada mountains would be very different. In fact, forces of precipitation and runoff affect landscapes around the whole world.

Snow is important for helping to cool the Earth, particularly in the spring. Snow has a high **albedo**, meaning that it reflects lots of sunlight back into space (80-90%), and this helps keep the planet cool. That reflective power of snow is also why you need lots of sunscreen on a sunny day playing in the snow. While other things in nature, such as trees and soil, can also reflect sunlight and help cool Earth, snow has a higher albedo and reflects much more than any of these.

At the same time that snow reflects sunlight and heat, it also acts like a warm winter coat to insulate the Earth. You may notice that on a cold, snowless night the windows of your car freeze over with ice. That ice requires lots of scraping to clear the window so you can safely drive. However, if it snows all night, you can sometimes brush the snow off easily without much ice to scrape at all! This is because snow is **insulating**. Like your winter coat, heat is trapped beneath the snow. If you have ever become sweaty in your winter coat, you know that insulation can also trap moisture. The soil underneath snow can store water and is better able to absorb water from melting snow.

Annual snowfall in Tahoe mountains provides water throughout the year to people, plants, and animals in California and Nevada. You may have noticed that rivers and creeks run faster and fuller in the spring time than in the summer, fall, or winter. Time of day can also change the flow of water, with faster, higher water running in the warmth of the afternoon. That rush of spring water is a result of the melting winter **snowpack**. This water will fill rivers and reservoirs to bring water to all kinds of life forms downstream. Spring snowmelt is also very important to a healthy summer and fall in Tahoe. The melted snow provides water to grow food and other crops, water for humans to drink and use in our homes, and moisture that helps protect us during fire season.

Often, melting snow causes **erosion** by moving dirt and rocks, even if only a barely noticeable bit each spring. Erosion from snowmelt shapes land in Tahoe and around the world. Ancient glaciers around Lake Tahoe and in Truckee created large U-shaped valleys, such as those at Emerald Bay and Donner Lake, as massive fields of ice pushed and shaped the land over thousands of years. Even though these glaciers disappeared long ago, they left behind eroded valleys and built up the mountains and hills around them with that eroded dirt and rock. Rivers also consistently erode away land to create V-shaped valleys that snake through the mountains, such as along the Truckee River between Tahoe City and Truckee.

Rushing creeks, eroding riverbanks, and melting snow are all signs that spring is upon us! But these are only the beginning. What other sign of spring do you expect to see soon?

How is snow like a winter coat?



Activities for Grades 3-5

Create Glaciers and Rivers

Model how glaciers and rivers move and shape land in the following experiment. You will need these materials:

- Paper cup or similar container
- Dirt, sand, or gravel,
- Water
- Freezer
- Cooking spray
- Flour
- A baking sheet
- A water pitcher

Follow these instructions:

1. Fill your paper cup or container with a mixture of dirt, sand, or gravel. Cover these materials in water in the cup and put your cup in the freezer overnight or until it is frozen solid. This will represent your “glacier”. You can make one or multiple glaciers.
2. After your glacier is frozen solid, take it from the freezer. Remove the glacier from the cup or container.
3. On a baking sheet sprayed with cooking spray, cover the sheet with a layer of flour. This flour represents your landscape, so pile up some mountains of flour as well to represent the mountains of Tahoe.
4. Line up your glaciers at one end of the baking sheet. Push them almost all the way to the opposite end of the sheet. Lift the glaciers to represent how they have retreated and melted in Tahoe.
5. Finally, on the side of one of your flour mountains, use the water pitcher to slowly pour a river of water down the mountain. Make sure to keep the water falling from the same spot the whole time you pour. An adult may be able to help you with this part.



Now, make some observations about what happened in your model.

1. What happened to the land (flour) where your glacier passed through? What happened to the land on the sides of the glaciers? What happened to the land at the end of the glaciers path?
2. What happened to the land where the river of water passed through? What happened to the land around the river?
3. What similarities are there between how the glacier shaped the land and how the river shaped the land? What differences are there?



Martis Creek 3/3/2021



Martis Creek 3/10/2021

Photo Time Lapse

Subtle differences in slope, aspect (what direction a slope faces), and protection from sun and wind can have large impacts on both where snow builds up and how long snow can linger. Use photos to watch the snow change through the spring. Find a snowy spot near your home, or a view of snowcapped mountains. Start taking weekly photos of this decided area from the same spot each week. Try doing this for at least four weeks, or try all season long and into the summer!

After you have at least four weeks of photos, view each photo next to each other in order of when you took them. Answer these questions about what you see with a friend or family member:

1. What do you notice about the snow in the first photo? Is there a lot? Are there any spots where there is noticeably more or less snow? Is your snow in a sunny or shady spot? How do you think the position of this snow will affect how quickly or slowly it melts?
2. Look at each photo in order. Which week had the largest change from one photo to the next?
3. Compare your first photo with the last photo you took. What differences in the snow do you see?
4. Sometimes spring snow will add to the snowpack rather than make it smaller. Is there anything in your photo time lapse that surprises you?

Running Water Observations

1. Walk along a creek, river, or visit a waterfall near your home two different times, once in the morning and once in the late afternoon. These walks could be on the same spring day, or two different days close together.
2. Each time you walk, take a journal or piece of paper and make these observations:
 - a. What is the weather like? What is the temperature?
 - b. On a scale of 1-10, how fast is the speed of the water?
 - c. On a scale of 1-10, how high is the water level?
 - d. How loud is the sound of the running water? Compare the noise in a sentence, "The running water is as loud as a _____."



After you have made both observation creek walks, discuss these questions with a family member:

1. What did you notice was different about the water during the morning and afternoon? What was the same?
2. Which time of day did you observe faster and higher water?
3. Which time of day was the water loudest?
4. If you had observed a lake instead of a river, creek, or waterfall do you think you would have noticed the same differences from morning to afternoon?

First Signs of Spring Predictions

Changes to snow is only one of the signs of spring in Tahoe. Create a chart with each of these signs of spring, and any others you think you might start to see soon in Tahoe. Next to each sign, **predict the date** that you will first see that sign. It may help your predictions to think back on previous years and when you noticed these signs then. Be on the lookout for these signs and note the **actual date** that you first spot each sign of spring. Was it close to the date you predicted?

- Wildflowers growing among Aspens or Willows
- A melting pond
- Sounds of frogs
- The mating song of the Chickadee, “Cheeseburger!”
- Woodpeckers drumming on trees and snags
- Buttercups blooming
- Birds migrating overhead
- Bright buds on the tip of tree branches
- A rushing creek

Once you have observed at least half of these signs of spring, draw or paint one of the signs of spring that you observed and make sure to label it with the date you first found it. Send your art to a family member in another town or state to tell them about the first signs of spring in Tahoe.

TINS also wants to see your art! Have your parent post a photo of your art project to Facebook and tag Tahoe Institute for Natural Science. You could also email the photo to us at kendal@tinsweb.org.



Words to Know

Albedo: the amount of light reflected by an object

Insulating: preventing the loss of heat by covering it in some material

Snowpack: the mass of accumulated snow

Erosion: the movement of broken-down dirt and rock

Palabras para conocer

Albedo

Aislante

Manto de nieve

Erosión

Further Learning

Learn more about glaciers in [this video](#).

Watch another version of a snow melt time lapse in [this video](#).

[Check](#) the flow of the Truckee River over the past few days.

