

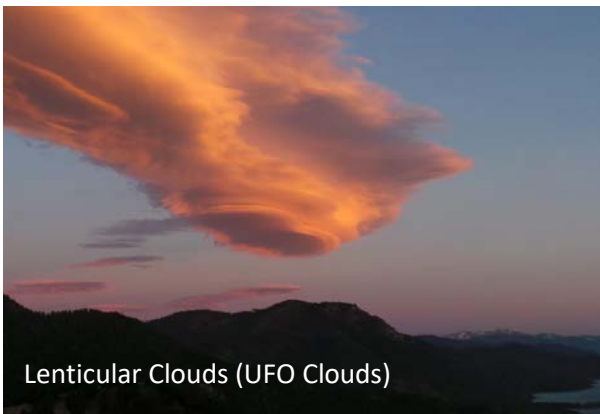
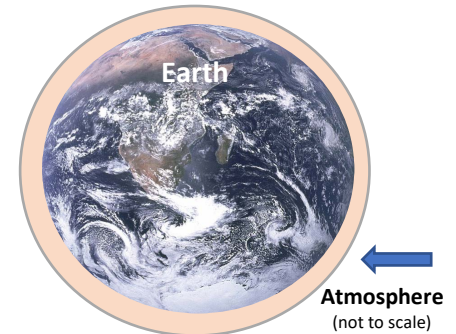
TaHome Nature Education: Tahoe Skies

Grades 3-5



Reading: Cloudy, Clear, and Colorful Skies

During the day, our skies are filled by the sun, clouds, tiny pieces of dust and debris, and invisible gasses. The gasses form a thin layer around the earth called the **atmosphere**. The atmosphere gives us air to breathe and keeps the earth warm by trapping heat like a blanket. One gas in our atmosphere, called water vapor, becomes visible when it turns to water or ice, forming clouds. We might see all kinds of different clouds, from white and fluffy to dark and stormy.



Lenticular Clouds (UFO Clouds)

Around Tahoe, we often see clouds over the mountains that look like UFOs. Clouds can float in the sky even when they are very heavy because warm air rises from the Earth and lifts them up. Clouds form at different heights in the sky. The highest clouds can be 16,000 feet higher than Tahoe and because it is so cold up there, high clouds are made up of ice crystals. Because of gravity, when the **water vapor** (water in the form of gas) in clouds collects and becomes too heavy to float, it starts to fall as rain, snow, or hail.

Have you ever noticed dust in the air when the sun shines brightly? All this dust, as well as the invisible gases in the air, blocks the sun's direct light, and scatters it into a rainbow of colors of light. If you use a special crystal called a prism, you can see the rainbow of colors hidden in the sun's light.

Sometimes rain drops act like a **prism**. When sunlight hits them, they show all the colors hidden in the white sunlight, making a rainbow. That is why you see rainbows when it is both sunny and rainy.

All light travels in waves called light wavelengths. Blue light travels in short waves, which easily get stuck bouncing off gasses and dust. During the day we see a blue sky, but at sunset and sunrise, the light from the sun has to travel through more atmosphere to get to our eyes. More blue light gets stuck in the atmosphere before it reaches our eyes, and instead we see the light that travels in longer waves like red, pink, orange, and yellow.



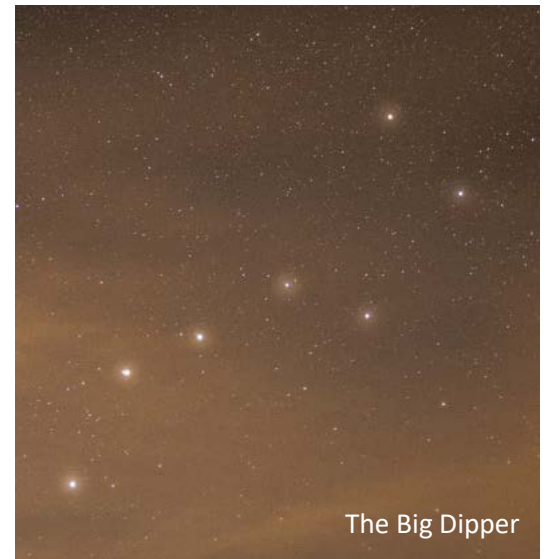


Looking up into Tahoe's night sky we can see stars, planets, clouds, and the moon. Stars, including the sun, make their own light. The moon and **planets** can't make their own light, but we can see them because they reflect light from the sun. Venus has been very big and bright in the western sky each evening. Have you seen it lately?

Ancient groups of people looked for patterns in the night sky by connecting stars. These patterns may be shaped like people, animals, or objects and are called **constellations**. People created stories about how constellations came to be.

We see different constellations in our night sky based on the season and where we are on Earth. Some of the constellations that can be seen during Spring at Tahoe include Leo (the lion) and Hydra (the snake). All winter we have been able to see Orion, but soon it will disappear for the summer.

Often, we can't see the stars from where we are on Earth because of light pollution. Before electricity and artificial light, people could look up on a clear night and see the whole Milky Way galaxy without leaving the city. We are lucky to have very little light pollution in the Tahoe region. In places where many people live, outdoor lights from street lights, homes, and stores create glare. All of these lights across a town or city combine to create skyglow, which blocks their view of the stars. Light pollution can also harm animals, exposing some to their predators at night, interfering with the daily schedules of breeding frogs and birds, confusing insects, and causing migrating birds to lose their way.



The Big Dipper



Light Pollution



Sierran Tree Frog

Activities for Grade 3-5



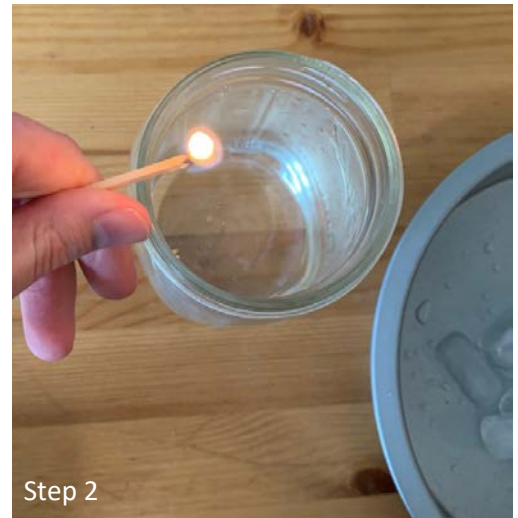
Create a Cloud

First, collect these materials:

- A tall, clear glass jar or cup
- Warm water
- Metal tray filled with ice or frozen ice pack
- A match or a lighter and small, thin, dry stick

Next, read all of the instructions below before you begin your experiment.

1. Fill your glass or jar with a couple inches of the warm water. This water will form water vapor like in the atmosphere on earth.
2. With an adult helper, light a match or small stick. Blow out the flame, but quickly drop the match into the jar while it is smoking. Smoke from the match will create gasses and dust like those in Earth's atmosphere. These are what water vapor attach themselves to when it turns to liquid water.
3. Cover the whole top of the jar with your tray of ice or ice pack, and try to make a tight seal. This makes the air at the top of the jar cold, like the air at high elevations.
4. Watch the jar carefully, especially near the top.
5. After a minute, look at the top of the jar and lift the ice tray or pack off just a little bit. What do you see coming out of the jar?
6. Next take the ice all the way off and watch what comes out of the jar.



Write down your answers to these questions:

1. Describe what happened in the jar with the ice on top.
2. Describe what happened when you lifted the ice off of the top.
3. Why do you think the water had to be warm?
4. Do you think a cloud would form if you did not use the match?

If you would like to learn more, try this experiment again, but change one or two parts to see if you get different results. Use cold water instead of warm, don't use the match, or try it without ice in your metal tray.

Track the Sky

Would you rather track stars and planets or clouds and rainbows out your window? Choose whether you want to do this activity during the day or at night.

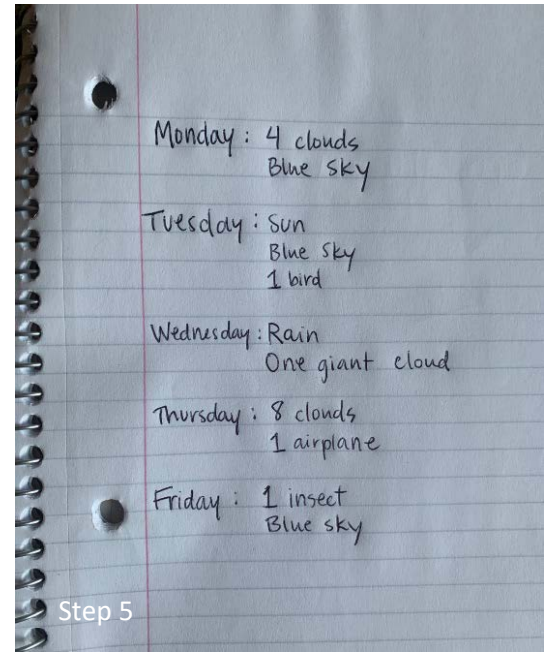
1. Cut out or tape together a frame from a piece of paper or old cereal box. You can also create a frame with masking tape.
2. Find a window in your home that has a view of the sky. Tape your frame to the window so that when you look through the frame you see as much sky as possible.



- Choose a time of day that you will look through your frame each day for the next five days, like right after dinner.
- Make some predictions about what you will see through your frame. Do you think you will see a rainbow, blue sky, birds, or the moon? Tell a family member **three** predictions.
- For five days, record what you see in the sky inside your frame. Do you see clouds or stars? How many? Write down what you see each day.

After five days of looking through the frame, talk about these questions with a family member:

- What did you see the most of?
- What was the most surprising thing you saw?
- Was there anything you thought you might see that you didn't?
- How did the weather affect what you saw?
- If you looked through your frame at a different time of day what different things might you see?



If you would like to learn more, try this activity again at a different time of day or in a different window.

Watch the Sunset

Watch a sunset with a family member. At Tahoe, the crest of the Sierra Nevada can block much of the sunset, so the best views can be had from the east side of Lake Tahoe or Truckee. The time of Tahoe's sunset changes each day as the earth revolves around the sun throughout the year. Look up the [time of sunset](#) in your town for the night. Go out and begin to watch the sky around the setting sun at least 20 minutes before the sunset time. Be careful to not look directly at the sun while it is still high in the sky, as that can hurt your eyes! Watch until ten minutes past the setting of the sun. As you watch, answer these questions with your family member:



- What colors are closest to the horizon?
- What colors are furthest from the horizon?
- Are the colors changing as you watch?
- Are any clouds reflecting light from the sunset? What colors are on these clouds?
- Carefully look at the direction of the sun without looking at it directly. In which direction does the sun set?
- Do you notice any animals or animal sounds around you during the sunset?

Use what art supplies you have to paint, draw, or build the sunset you saw.

TINS 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.



Constellation Experiment

First, collect these materials:

- A box with a lid, such as a cardboard shoe box. Or cut out one side of a cardboard box to use as a lid.
- Marker or pen
- A small screwdriver or something else that can poke holes through your lid
- A flashlight or the flashlight on a cell phone



Follow these instructions:

1. On the lid of your box, draw your own constellation, or learn about a real constellation that you want to draw. Think of a shape you want your constellation to be, like your favorite animal. Draw that animal on the lid. Then, draw dots on the outline of your drawing, every inch or two around your drawing. These dots are like the stars that make up a constellation.
2. With adult help, poke a hole all the way through the lid on each dot of your constellation.
3. Place a lit flashlight inside the box, facing up. Put the lid on the box.
4. In a dark room, turn off all of the lights and observe your constellation.
5. After a minute in the dark, turn the lights back on. Can you see your constellation now?

After your experiment, talk about these questions with a family member:

1. Was it easier to see the starlight from your constellation with the lights on or off?
2. Do you think you would see more stars outside your house with your outdoor lights on or off? If you are curious, try this out at your house tonight.
3. Do you think you would see more stars if you were in a city or camping in the mountains?



Bonus Activity: Night Sky Scavenger Hunt

Ask your parents if you can stay up late one night until it gets dark out. Head outside with your family to find as many of the things below as you can:

- The moon
- A planet (you can tell it is a planet because its light DOES NOT twinkle). Try and find Venus!
- The Big Dipper Constellation
- Find Orion before it's gone for the summer
- A star (you can tell it is a star because it DOES twinkle)
- A moth (Hint: nocturnal insects are often attracted to porch lights)
- Any other nocturnal animal



Words to Know: Glossary

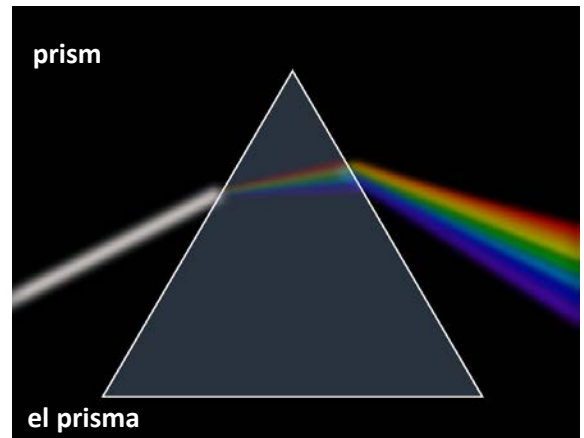
atmosphere: a mass of gases surrounding a planet

water vapor: water after it boils or evaporates to become gas in the air

prism: a glass or crystal in a special 3-Dimensional shape

constellation: a group of stars that form a shape or pattern

planet: something in space that goes around the sun



Palabras para conocer

la atmósfera: el aire sobre una planeta

el vapor de agua: agua que es un gas en el aire

el prisma: cuerpo geometrico de cristal

la constelación: un grupo de estrellas

la planeta: cuerpo celeste que gira alrededor del sol



Further Learning

- Watch [this video](#) to learn more about light waves and why the sky is blue.
- [Learn about the names](#) of different kinds of clouds.
- Conduct this [raincloud experiment](#).
- Watch [this video](#) for more information on why the sunset is so colorful.
- Learn how to make [your own rainbow](#).
- Download a [night sky app](#) to find the constellations and various stars are in your sky.
- [Read](#) the legends of constellations.
- Learn more about light pollution and how to reduce yours by exploring [this website](#).



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