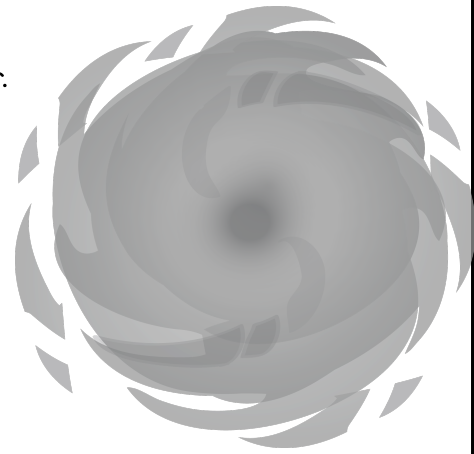


HURRICANES

Hurricanes form over warm ocean water near the equator.

They cause strong winds (up to 200 miles per hour) and can be up to 600 miles wide. Hurricanes can last longer than a week and can cause extreme damage with heavy rain, strong winds, and large waves. They rotate in a counter-clockwise direction in the Northern Hemisphere and the opposite direction in the Southern Hemisphere. Hurricanes gain strength from heat and contact with warm ocean water. They have an "eye", which is the center of the storm and the calmest part. The most common time for hurricanes to form is during the Atlantic hurricane season, which is June 1st to November 30th or the Eastern Pacific hurricane season, which is May 15th to November 30th. Hurricanes are given a name that comes from six different lists that alternate every year. If a hurricane has caused significant damage, they retire its name and replace it with another.



Scientists use a variety of tools, data, and approaches to study hurricanes.

They look at the surface temperature of the ocean, the radar to locate precipitation, and computer models that look at current and past weather patterns. They also use aircraft that are called "hurricane hunters". These airplanes are designed to fly into hurricanes and measure maximum wind speed.

Category	Sustained Winds	Types of Damage
1	74 - 95 miles per hour	Dangerous winds that will produce some damage
2	96 - 110 miles per hour	Roof and siding damage, power outages
3	111 - 129 miles per hour	Damage to roof, electricity and water will be unavailable for days to weeks
4	130 - 156 miles per hour	Destruction to roof and/or some exterior walls, power outages will last weeks or months
5	157 miles per hour or more	Framed homes will be destroyed, fallen trees, power outages will last for weeks to months

VOLCANOES

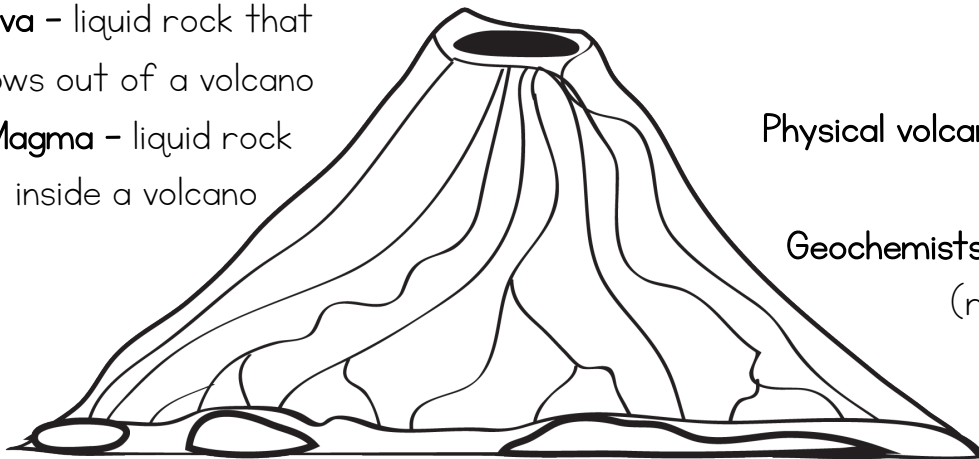
Volcanoes have molten rock below the surface of the earth. Eruptions occur when the pressure builds up and gases and rock come up through the opening of the earth. It will spill over or fill the air with lava. Volcanoes erupt because mantle rock melts. The Earth's mantle may melt if the temperature rises, pressure lowers, or water is added. Then, magma from the Earth's upper mantle comes up to the surface. It erupts to form lava flows and ash deposits. When the volcano continues to erupt, it will get bigger and bigger over time. These eruptions can cause lava flows, hot ash flows, falling ash, mudslides, avalanches, and floods. Volcanoes can also trigger tsunamis, flash floods, earthquakes, mudflows, and rock falls.

Scientists created three main categories for stages of volcanoes: active, dormant, and extinct. Active volcanoes are ones that have recently erupted and there is a chance that it may erupt soon. A dormant volcano has not erupted in a long time, but there is still a possibility it can erupt in the future. An extinct volcano is one that has erupted thousands of years ago and they don't believe there's a possibility of eruption again.

Volcanic Explosivity Index	Eruption Classification	Description
0	Hawaiian	Outpouring of lava on the ground
1	Hawaiian/Strombolian	Gentle; low-level; small to medium volume
2	Strombolian/Vulcanian	Explosive; dense cloud of ash and gases with volcanic bombs
3	Volcanian/Peleian	Severe; glowing avalanche of hot ash
4	Peleian/Plinian	Cataclysmic; columns of gas and ash; extends to the stratosphere
5	Plinian	Sudden and violent
6	Plinian/Ultra-Plinian	Colossal
7	Ultra-Plinian	Super-colossal
8	Supervolcanic	Mega-colossal

Lava - liquid rock that flows out of a volcano

Magma - liquid rock inside a volcano



Physical volcanologists: study seismology

Geochemists: study volcanic products (rocks, gas, lava)

TORNADOES

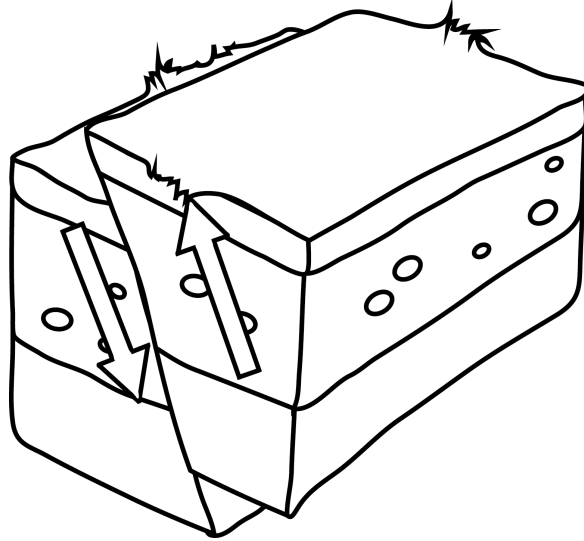
Tornadoes are violently rotating columns of air that extend from the base of a thunderstorm down to the surface of the earth. They can occur at any time of day or night and at any time of the year. There are two tornado alerts that are issued by the National Weather Service: Tornado watches and Tornado warnings. A tornado watch just means to be prepared. The weather conditions are perfect for a tornado to form. On the other hand, a tornado warning means to take immediate action. There has been a tornado sighted or indicated by the weather radar. This is when you should move inside to the lowest floor and go to the most interior room. You should move away from windows and be prepared to protect yourself from potential damage. Tornadoes develop in large thunderstorms. When warm, humid air rises and cool air sinks, the air currents can begin to spin inside the cloud. This spinning becomes a tornado. If a tornado occurs over water, it's called a waterspout. Tornadoes can last for just a few minutes or up to several hours.



Enhanced Fujita Scale	Wind Speeds	Description
EF-0	65- 85 miles per hour	Light damage; peels off some roofs, damage to gutters or siding, branches broken off trees
EF-1	86 - 110 miles per hour	Moderate damage; roofs severely damaged, doors off houses torn off, windows and glass broken
EF-2	111 - 135 miles per hour	Considerable damage; roofs torn off, large trees snapped, light objects flying through air, cars lifted off ground
EF-3	136 - 165 miles per hour	Severe damage; heavy cars lifted off ground and thrown, trains overturned, houses damaged
EF-4	166 - 200 miles per hour	Devastating damage; houses completely damaged; cars thrown through air
EF-5	above 200 miles per hour	Incredible damage; houses swept away, cars flying through the air, incredible phenomena will occur

EARTHQUAKES

Earthquakes feel like the earth's surface is shaking. There are 20 tectonic plates along the surface of the earth that move continuously. Sometimes the tectonic plates collide and one side rides over the other, which causes earthquakes and volcanoes. The area between the moving places are called fault surfaces. There are three main types of faults that can cause earthquakes: normal, reverse, and strike-slip. This just means that the plates may be sliding past each other, going above, or below the other. Most earthquakes create small tremors which cause little to no damage, although there are some that can cause massive damage. A foreshock is an earthquake that occurs before a larger earthquake, which is called the mainshock. An aftershock is an earthquake that occurs after the mainshock. During an earthquake, you want to stay indoors until the shaking stops. You want to drop low, stay away from windows, and protect your head in case something above you falls down.



Richter Magnitude	Earthquake Effects
0 - 2	Not felt by people
2 - 3	Felt little by people
3 - 4	Ceiling lights swing
4 - 5	Walls crack
5 - 6	Furniture moves
6 - 7	Some buildings collapse
7 - 8	Many buildings destroyed
8 - up	Total destruction of buildings, bridges, and roads

WILDFIRES

Wildfires is an uncontrolled fire that burns in a forest, grassland, or low populated area. About 90 percent of wildfires are started by people. These fires are started by campfires, cigarettes, or other careless behavior. The remaining 10 percent of wildfires are started by lightning or lava from volcanoes. Wildfires usually happen in the summer because it is hot and often dry. Without much rain, the trees, grass, leaves, and branches are dry. Wildfires are spread when there's a drought, high temperatures, and strong winds.

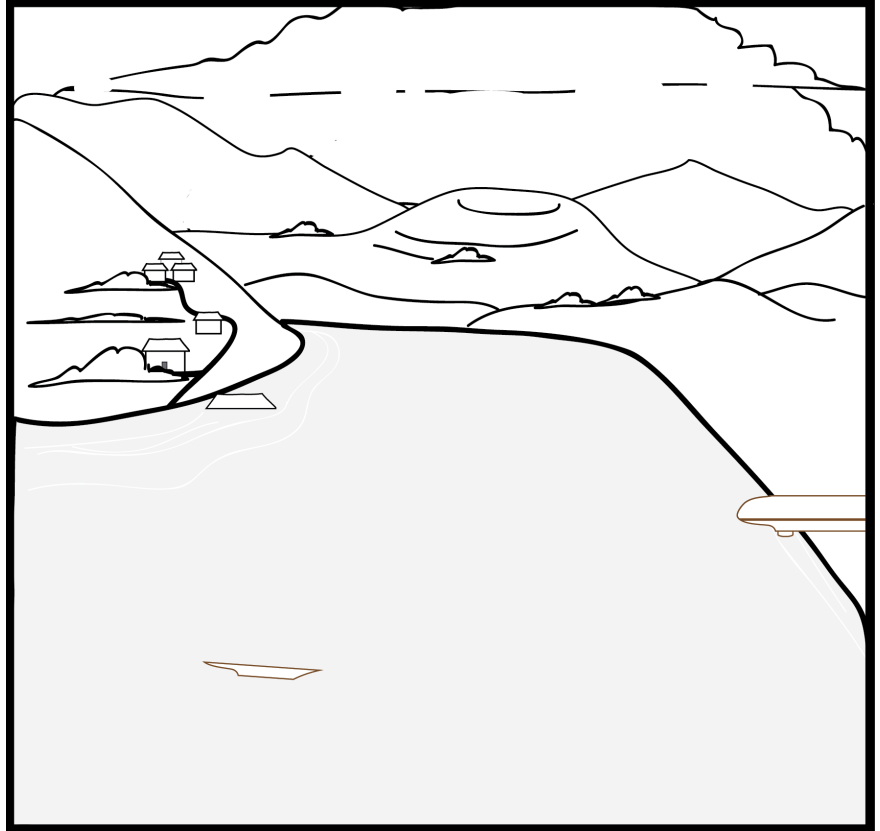
In order to fight wildfires, there are a variety of techniques. Aircraft is often used to dump water or chemicals that can slow down or contain wildfires. The pink, fire-retardant chemical is called sky jello. They often use airplanes and helicopters to move people away from the fires.



Class	Size of Wildfire
A	1/4 acre or less
B	1/4 acre to 9 acres
C	10 to 99 acres
D	100 to 299 acres
E	300 to 999 acres
F	1,000 to 4,999 acres
G	5,000 acres or more

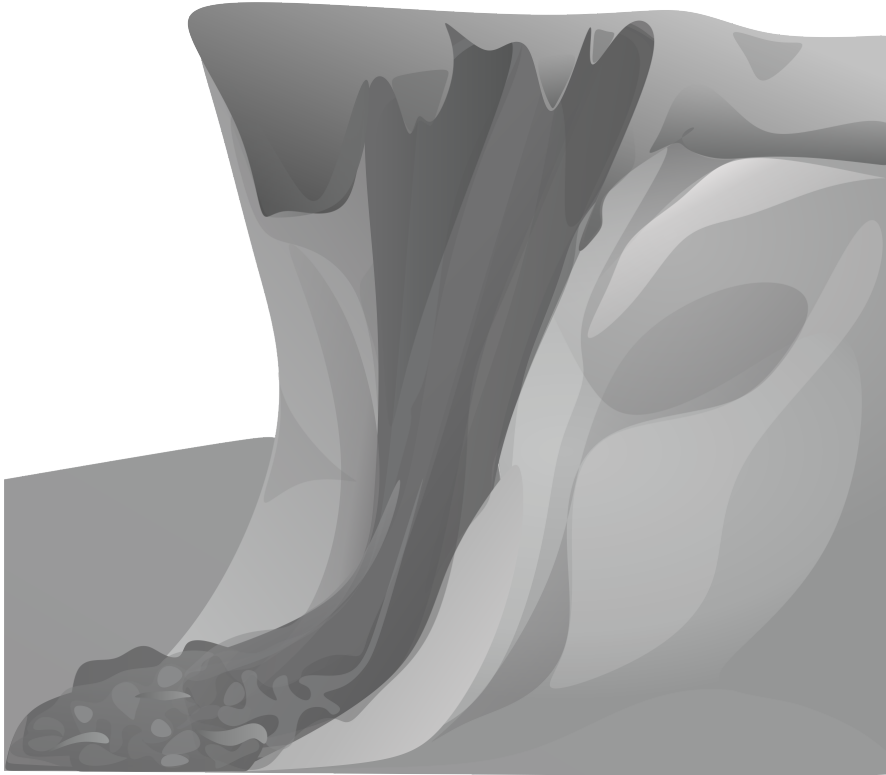
FLOODS

Flooding occurs after days of heavy rain and/or melting snow. The rivers often will rise and cause floods to occur. Some floods are considered flash floods because it occurs rapidly with no warning. Flash floods often happen after intense rainfall from a slow moving thunderstorm. Flash floods are the number one weather-related killer in the United States. Floods can come in all depths and it depends on the conditions as to how much flooding occurs.



Depth	Measurement in Inches	Road Accessibility
Gutter	8	Passable to all types of vehicles
Half Knee	10	Passable to all types of vehicles
Half Tire	13	Not passable to light vehicles
Knee	19	Not passable to light vehicles
Tires	26	Not passable to all types of vehicles
Waist	37	Not passable to all types of vehicles
Chest	45	Not passable to all types of vehicles

LANDSLIDES



Landslides are natural disasters where masses of rock, earth, or debris move down a slope. Most of the time gravity is the main cause for a landslide. There are other contributing reasons for a landslide to occur: earthquakes, excess weight from snow or rain, volcanic eruptions, or erosion by rivers, glaciers, or ocean waves. Landslides can occur anywhere; any area that has weak materials resting on a steep slope can experience landslides. Some landslides move at 10 miles per hour, but there have been some that exceed 35 miles per hour. In the United States, landslides result in 25-50 deaths every year. The rapidly moving water and debris can lead to trauma and the broken electrical, water, gas, and sewage lines can also result in injury. Landslides can also cause major damage to roads and buildings. In the United States, landslides have caused roughly \$3.5 billion in damage.

Scientists will record the length and width of the landslide and will show the changes on topographic maps. Measuring the depth of the material moved is important because it will help assess the distance of continuing or future landslides in the same location. They will use physical measurements with measuring tapes, the average weight of the material that moved, and will even use nearby buildings or trees to estimate the size.