Thunderstorms are storms that form when heat at the surface rapidly rises upwards into the atmosphere. This upward motion transports moisture, creating tall cloud formations or cumulonimbus clouds. Thunderstorms contain thunder and lightning, and oftentimes heavy rainfall. Thunderstorms can be solo storms or cells, or they can organize into more of a line or cluster.

NOT ALL THUNDERSTORMS ARE SEVERE.

For a storm to b e categorized as severe, it must produce one of the following:

58 mph Wind Gusts or Higher

Quarter-Sized Hail or Larger

Tornado(s)

Whether you find yourself in a severe or non-severe thunderstorm, it is important to be inside as lightning alone creates a big danger to your safety. Find shelter in a sturdy building or structure and **avoid windows.**

Lightning One of the dangerous elements that thunderstorms create is lightning. Lightning occurs when large amounts of energy collect inside of a storm. This large spark of energy between the clouds, the air, or the ground rapidly expands, leading to a loud popping sound known as thunder. Lightning can strike up to 10 miles from the main area of the thunderstorm. Lightning can create fires over the area it strikes and can also be deadly so don't forget:

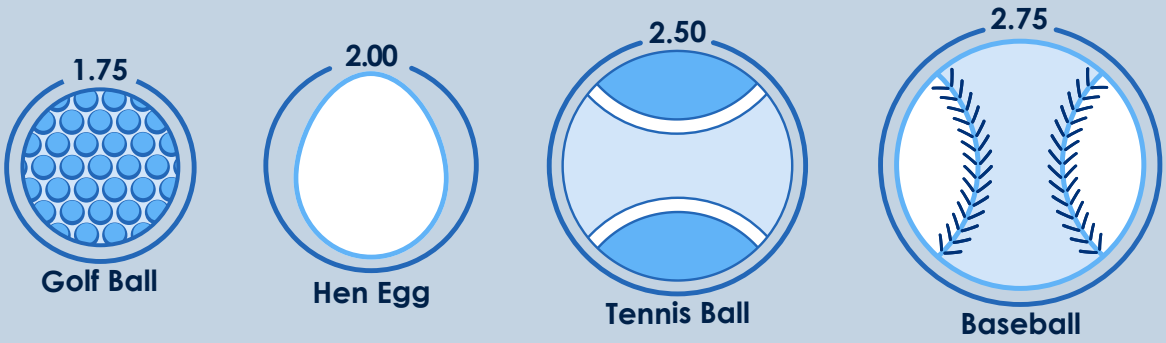
WHEN THUNDER ROARS, GO INDOORS.

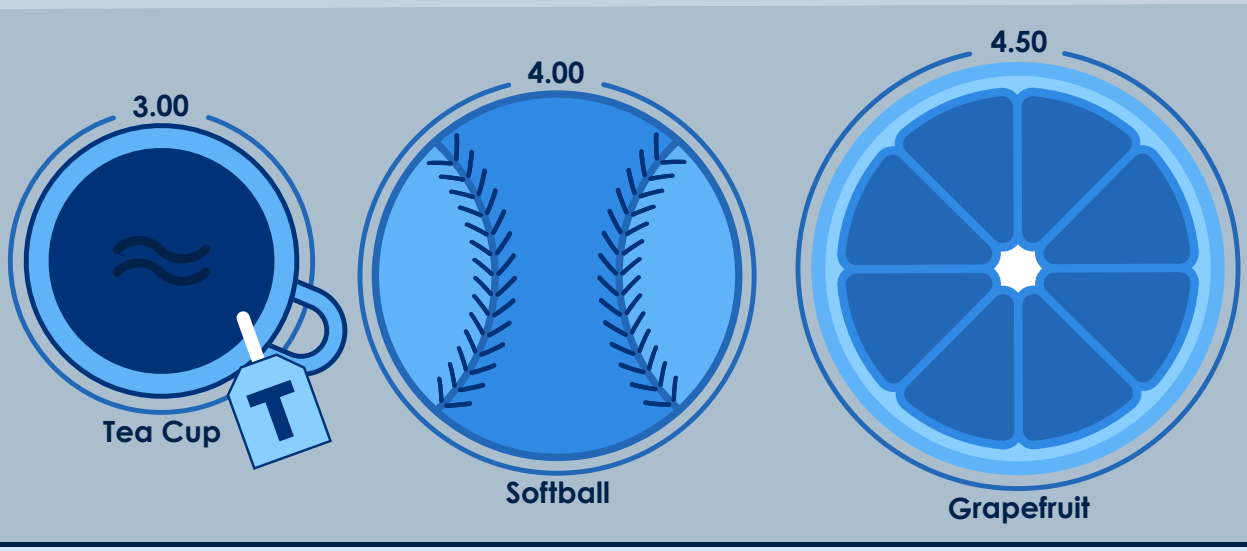
The **Jet Stream** is the river of strong winds that flow several thousand feet above the ground. These winds usually direct clouds and storms across the world. The jet stream is formed because of the uneven heating of the earth's surface. Colder at the poles, warmer toward the equator, this temperature difference creates a pressure difference, which leads to changes in wind direction and speed. Most jet stream winds blow generally from west to east across the world.

Hail is a chunk of ice that forms inside of some thunderstorms. When tiny droplets of water that make up a cloud is forced upward where temperatures are below freezing, a piece of ice develops. This small hailstone can bounce around inside of the storm and begin to grow many layers and get larger. When a hailstone gets large enough, it can fall to the ground. Sometimes the wind inside of a thunderstorm will blow a hailstone to the ground.

HAIL SIZE (IN.) Object Analog Reported

Most hail is very small. Occasionally, though, hail grow to be very large. Hail is considered severe when it is the size of quarters or larger. Here are the most common ways to describe hail sizes:





When hail is moving into your neighborhood, you should go inside immediately. Be on the lowest level of your home, school, or other building and stay away from windows until the storm passes.

Tornadoes occur when the lowest part of a thunderstorm begins to lower to the ground a rotate. Usually, tornadoes form on the part of a storm called a wall cloud. When a funnel cloud develops off this wall cloud and touches the ground, it is called a tornado. The winds can be spinning up to 200 mph in the most violent tornadoes!

Most tornadoes do not last very long and are weak, with wind speeds less than 80 mph.

Tornado strength is measured on a scale called the **"Enhanced Fujita Scale"**

EF SCALE	
EF Rating	**3 Second Gust (mph)**
0	65 - 85
1	86 - 110
2	111 - 135
3	136 - 165
4	166 - 200
5	Over 200

If a tornado is threatening your neighborhood, you should **seek shelter immediately.** Go to the lowest level of your home, school, or other building you find yourself in. Keep away from windows and walls that face the exterior. An example of a room you may want to go is a bathroom, laundry room or utility closet.

Flash Flooding Whenever it rains heavily in one area over a short amount of time, flash flooding is possible. Flash flooding occurs when rainwater overwhelms storm drains and leads to water covering roadways and other surfaces. The water usually is moving in a rapid current.

Flash floods are dangerous because it does not take much more than 1 to 2 feet of moving water to float a vehicle and send it downstream. Drivers can quickly find themselves in a dangerous situation and drown. Flash flooding is the number one severe weather killer in the United States.

Whenever there is water covering the road and you can't tell how deep it is, a good phrase to remember is **"Turn Around, Don't Drown"**.

The Atmosphere is a relatively thin layer of air that surrounds the earth. This layer is where weather occurs. The atmosphere is made up of many gases including nitrogen, oxygen, argon, carbon dioxide, and water vapor. The amount of these gases in the atmosphere can be broken down as:

Seasons Throughout the course of a year, we experience 4 different seasons: winter, spring, summer, and fall. These seasons are caused from the earth's tilt on its axis. (Earth sits at a 23.5° tilt.) Because of this tilt, we receive different amounts of sunshine or energy as the earth revolves around the sun. So during the winter, we in North America are facing away from the sun. Meanwhile, during the summer months, our side of the globe is facing the sun most directly. This impacts the amount of daylight we receive during each season and it impacts our temperatures.

The scientific name for the first day of each season is:

WINTER - Winter Solstice
SPRING - Vernal Equinox
SUMMER - Summer Solstice
FALL - Autumnal Equinox