

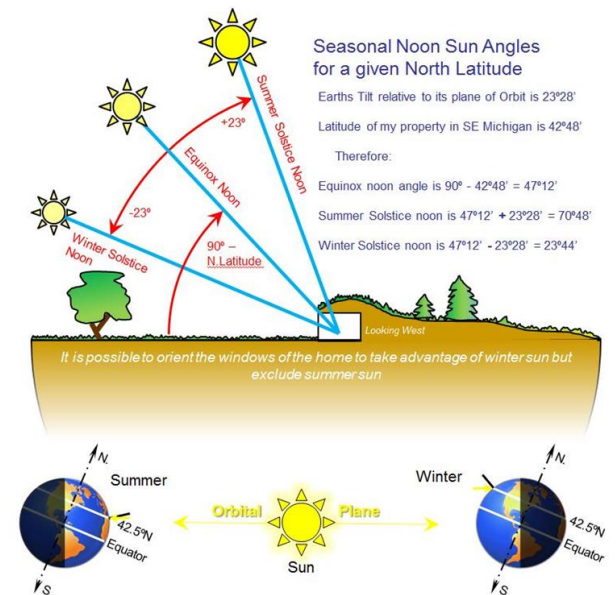


# What Causes Different Weather?



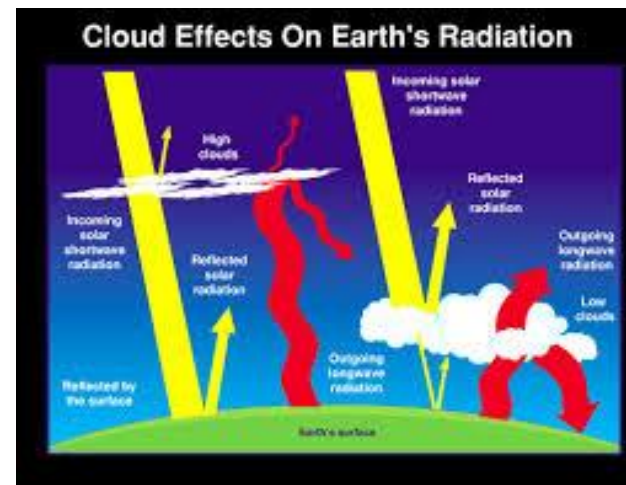
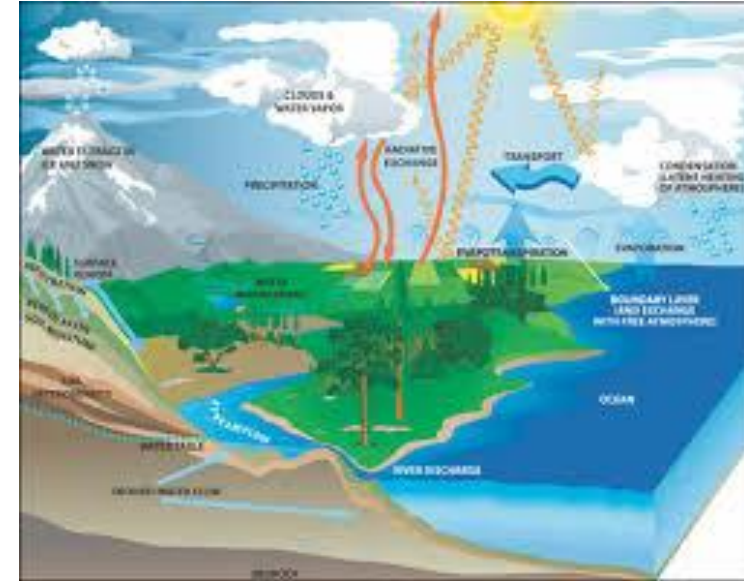
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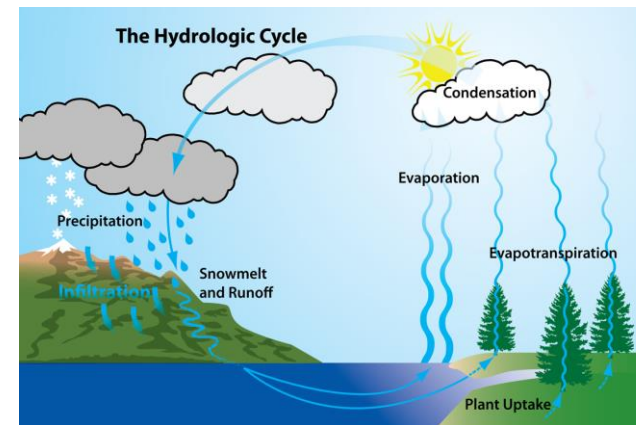
# What causes weather?

- The sun heats up the Earth, and most of the Earth is covered by oceans. Water heats up and some of it turns into vapor. The water vapor rises in the air to form clouds. The clouds both trap and reflect some heat. They also form some rain or snow storms. The sunny areas and cloudy areas create pockets of cold air and hot air around the Earth. The hot air rises and cold air sinks. This movement of air creates different air pressures. The differences in air pressure and temperature create wind. The wind blows the clouds around the planet and makes different weather.



# What causes it to rain or snow?

- Heat from the sun and sometimes heat from inside the Earth causes water particles to evaporate. The water vapor rises high into the sky. The temperature cools down as it gets higher in the atmosphere. The water vapor starts to condense and forms into clouds. If the clouds can't hold any more water vapor, then it turns into water droplets or snow depending on the temperature and falls back to Earth.
- Sometimes, the wet clouds blow over a dry area. The lower air below the clouds is too dry and the rain evaporates before it hits the ground. That is called virga.



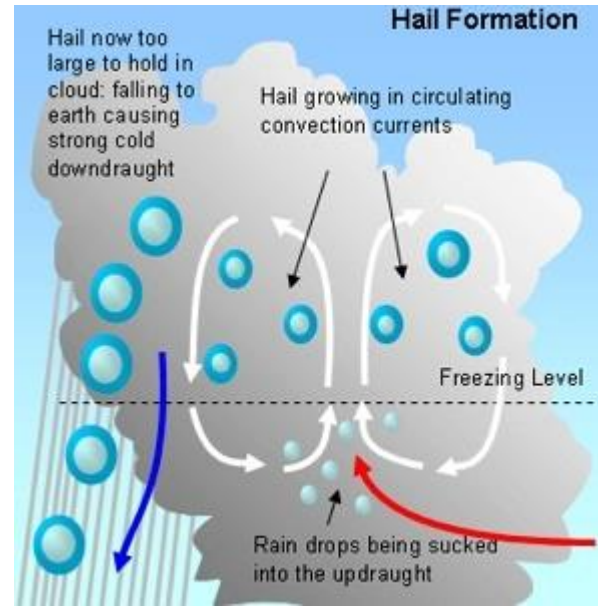
# What causes flooding?



- If the clouds drop too much water in a short amount of time on land, then this can cause serious flooding. Rushing water has a lot of weight and force and can dramatically change the land in a short time.
- The canyons and mountain can drain all the rain and melted snow from a large area into small channel of water. Flash floods can be a very serious danger in and around the canyons and mountains.
- Eventually all this water has to go somewhere. Rivers can significantly rise far way from where the initial water fell or melted. This can cause flooding over a long section of land.

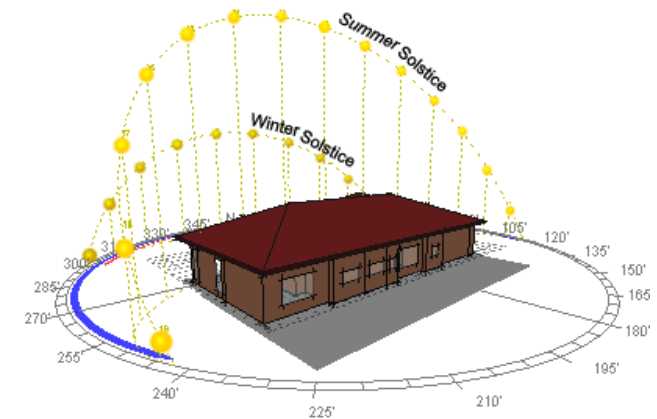
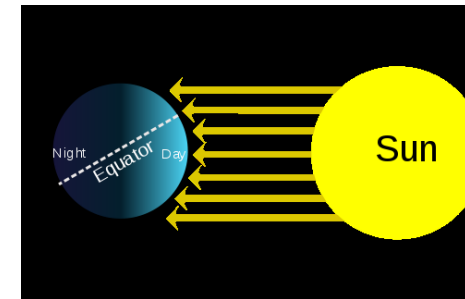
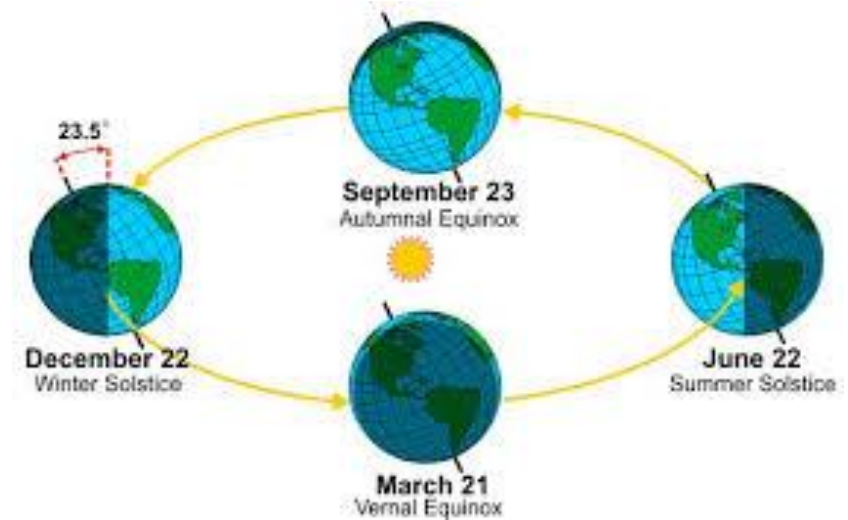
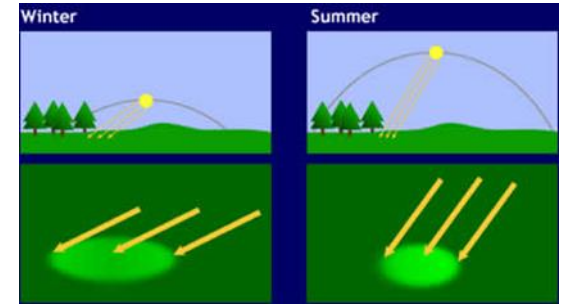
# What causes hail?

- Hail can form in tall strong storm clouds. Lots of circling winds within the clouds blow chunks of ice around high into the colder atmosphere. Gradually they freeze more water around them and get larger and larger. They can get from pea-sized hail all the way up to softball-sized hail. Once they escape the circling winds, they fall to the ground and can cause considerable damage and injuries.

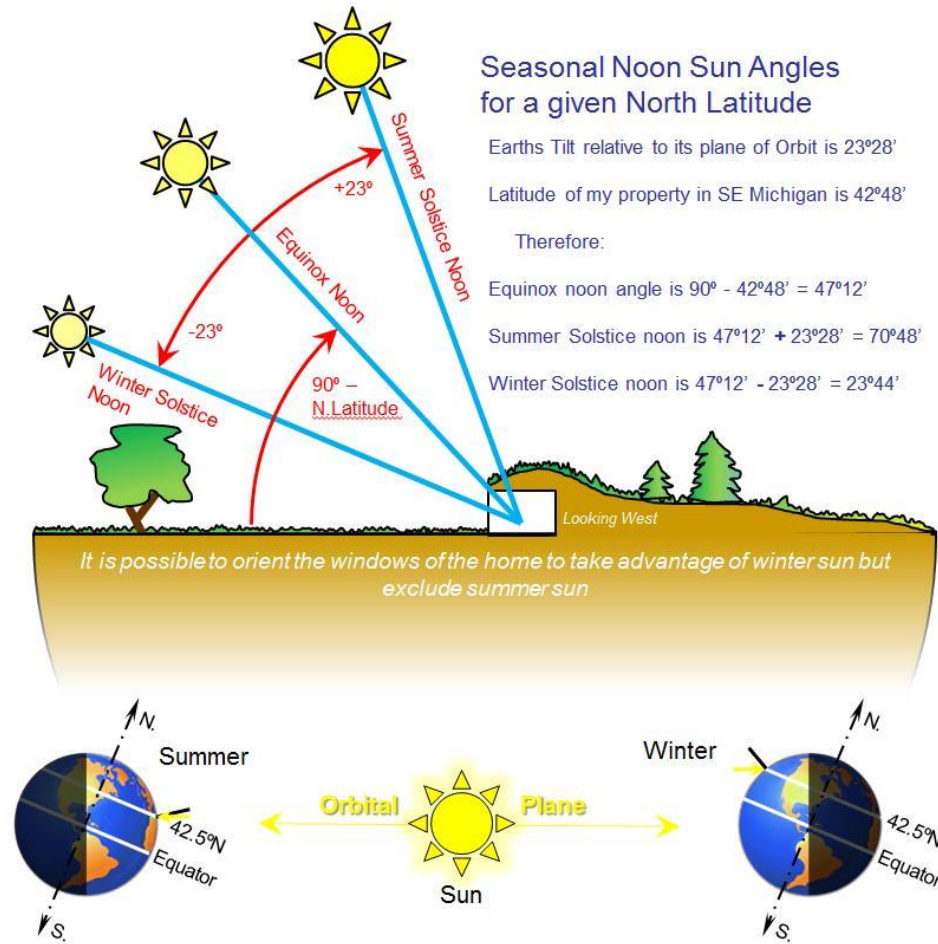


# What causes the seasons? (part 1)

- The seasons are caused by the orbit of the Earth around the sun and the tilt of the Earth on its axis. The tilt causes the sun to shine at different angles in the sky through the year in the northern hemisphere and southern hemisphere as the Earth orbits around the sun. The higher and more direct in the sky that sun is, the warmer the weather is. When it is winter in the northern hemisphere, it is summer in the southern hemisphere and vice versa.



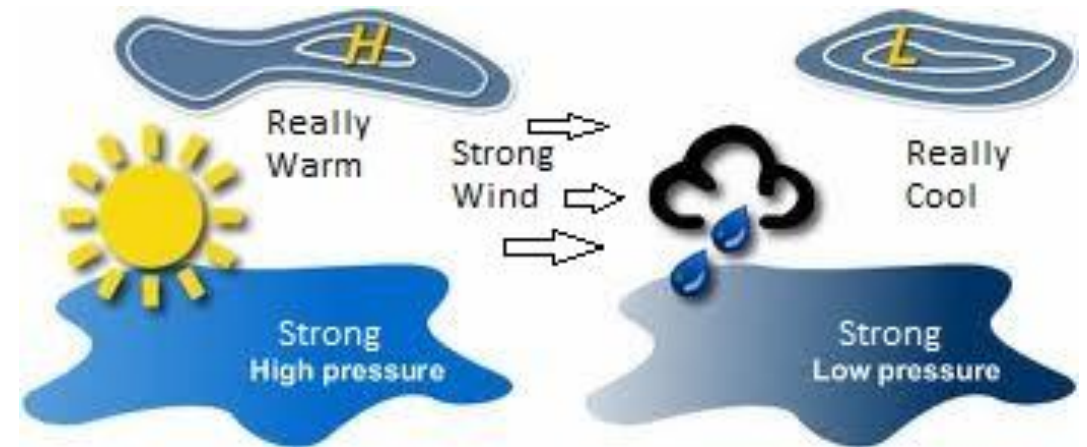
# What causes the seasons? (part 2)



- Amazingly, the northern hemisphere is closer to the sun in winter than in summer. That shows how important the angle of the sun is in the sky.
- The sun stays in a relatively high position in the sky all year round near the equator. Thus, it is warm all year round and does not have the seasons like further north and further south from the equator.

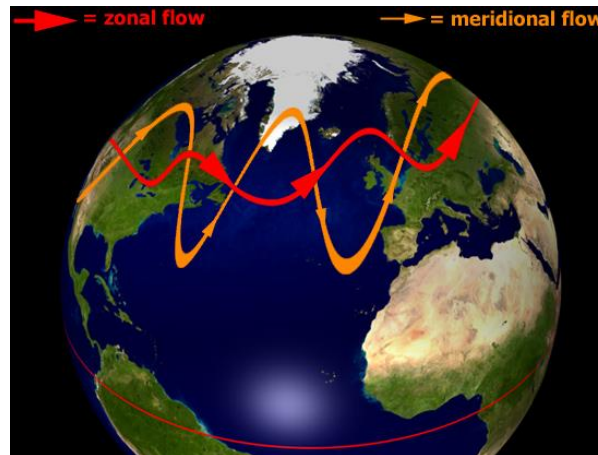
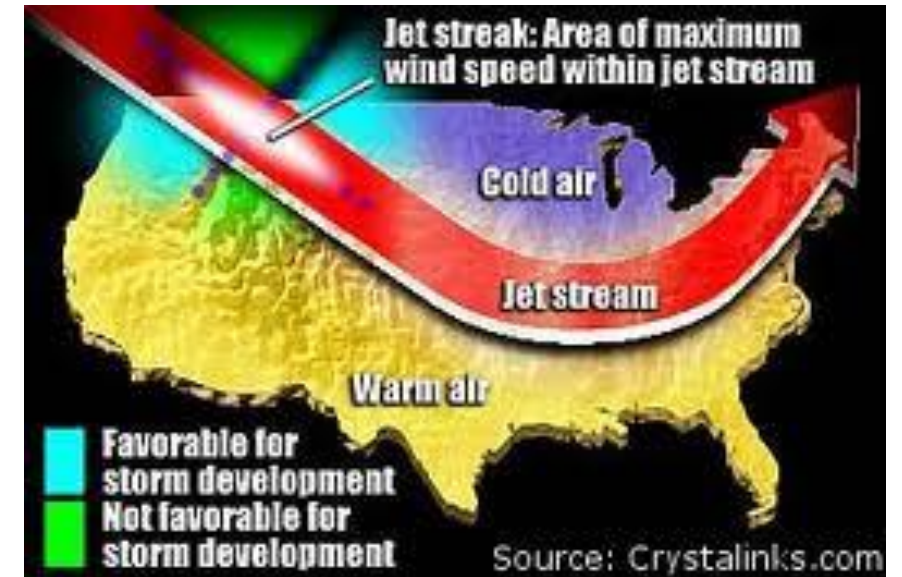
# What causes strong winds? (part 1)

- Strong wind is caused at the edge of air masses. One air mass is really warm and the other is really cool. It also happens when there is a strong high air pressure front right by a really low air pressure front.



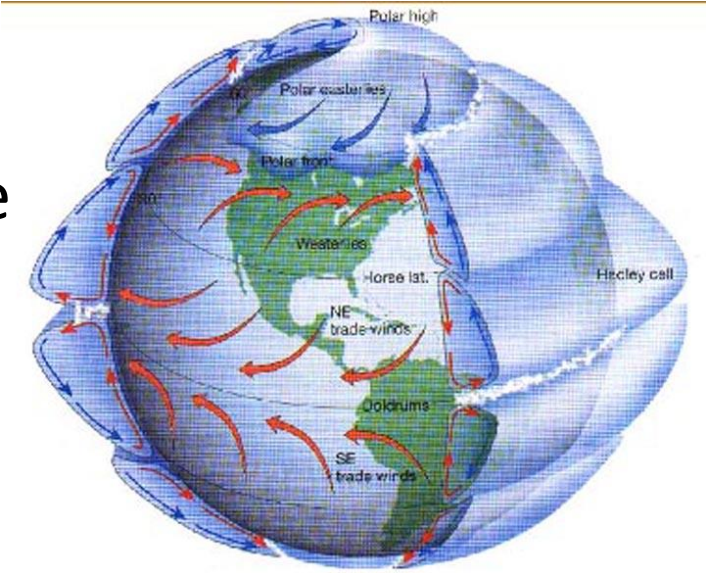
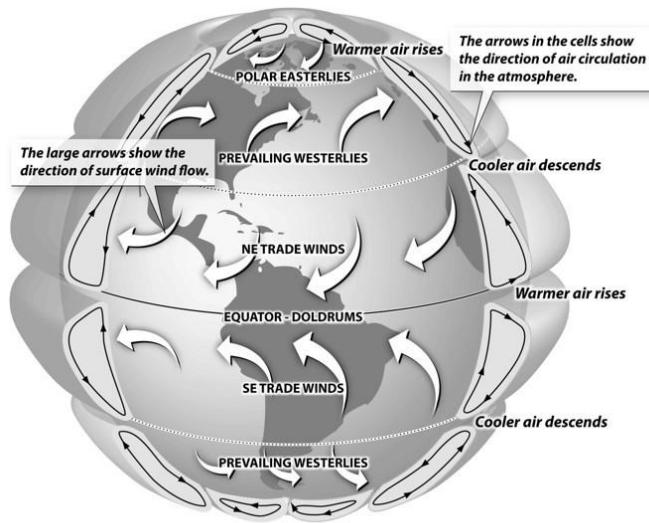
# What causes strong wind? (part 2)

- High in the atmosphere, there is a super fast highway of air called the jet stream. Sometimes that can cause very windy weather if you are in its path. It zigs and zags depending on the different air pressure systems.



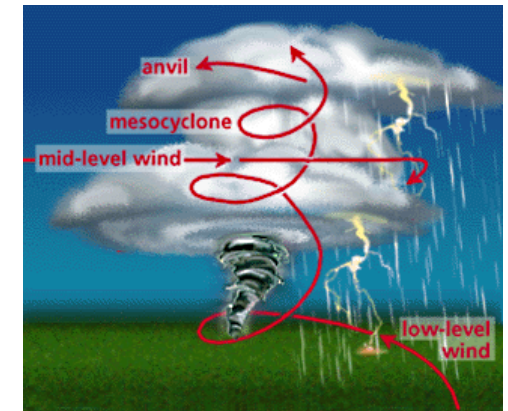
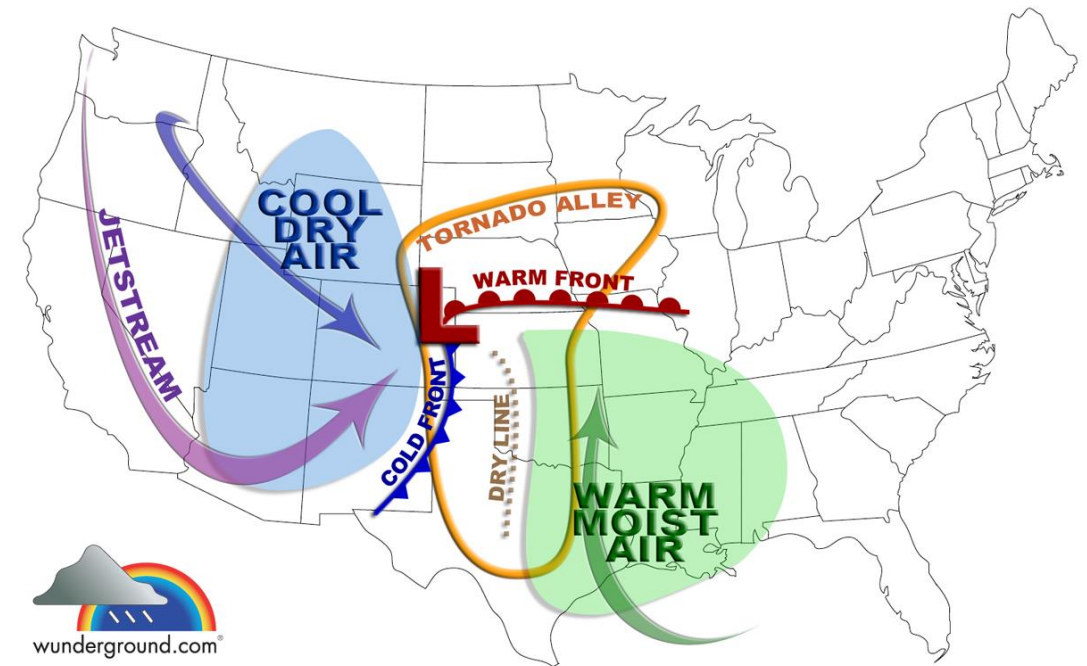
# Does wind blow the same direction everywhere on Earth?

- Wind blows in different directions around the planet. Around the equator, it blows from the east to the west. A little further north and south of the equator, it blows from the west and to the east. By the polar regions, it blows from the east and to the west. In each zone there are also pillars of swirling air. All this different air movement can create lots of different and complex weather patterns.



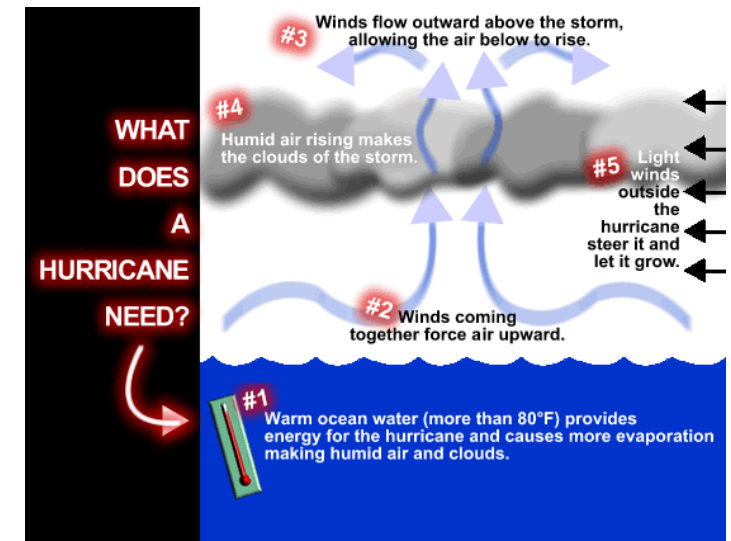
# What causes tornadoes?

- A strong cold dry air mass flows down from the Rocky Mountains and on to the Great Plains. Wet warm air flows up from the Gulf of Mexico. When the two air flows meet, they create strong swirling winds and thunderstorms. Sometimes the swirling winds are strong enough to turn vertical out of the clouds and create tornadoes.



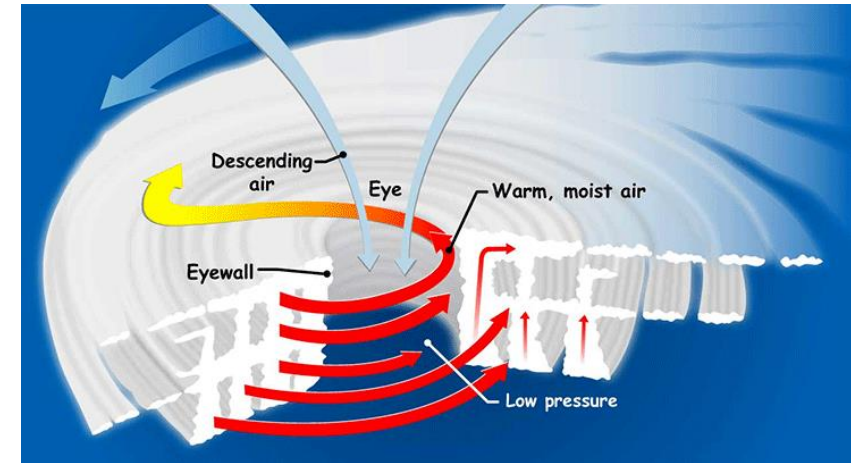
# What causes hurricanes?

- Warm air off the coast of Africa heats up and sends lots of water vapor into the air. The water vapor turns into large storm clouds and can create an area of very low air pressure. The storm begins to circle around the area of low pressure and blows west with the winds around the equator. The strong circular storms gain strength as they travel west across the Atlantic Ocean. Eventually they hit the warmer Gulf of Mexico and gain more strength. Hurricanes hit the southeastern United States, Mexico, and Central America in the form of a giant swirling storm with fierce winds, lots of rain, and large storm surge waves from the ocean.

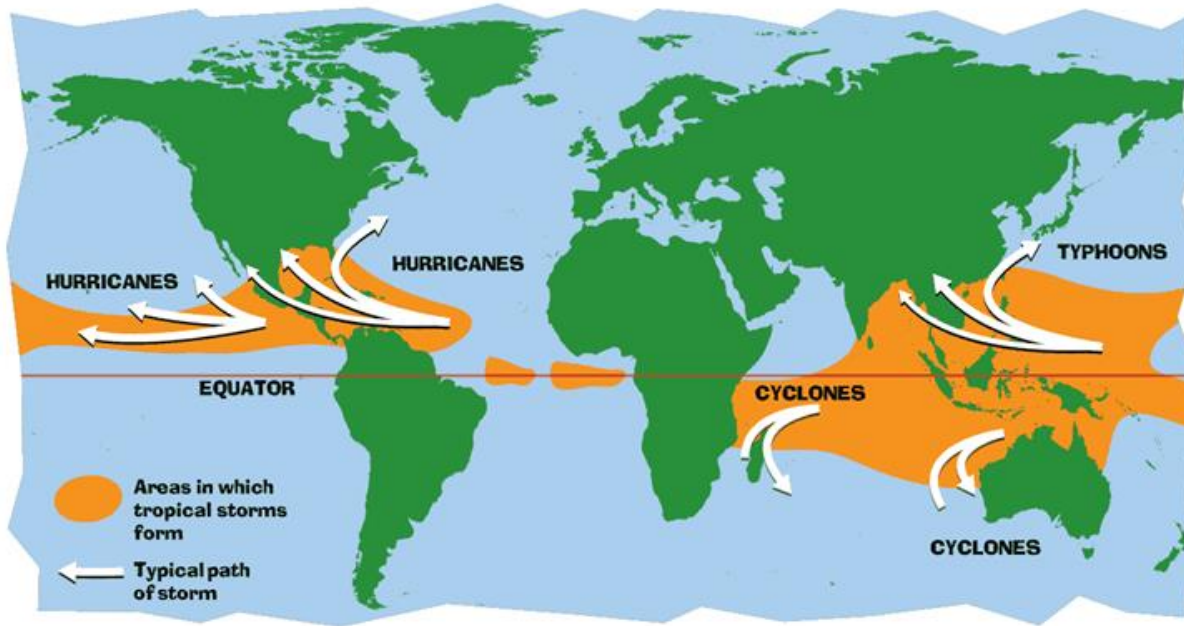


# What is the eye of a hurricane?

- The eye of the hurricane is the very center of the hurricane. It has extremely low air pressure. The eye is very calm and possibly sunny. But, don't let that fool you, the second half of the storm is still coming. A hurricane also has bands of rain clouds around the edges. That is what can be so cruel about a hurricane, it can seem like it stops then hits you over and over again.



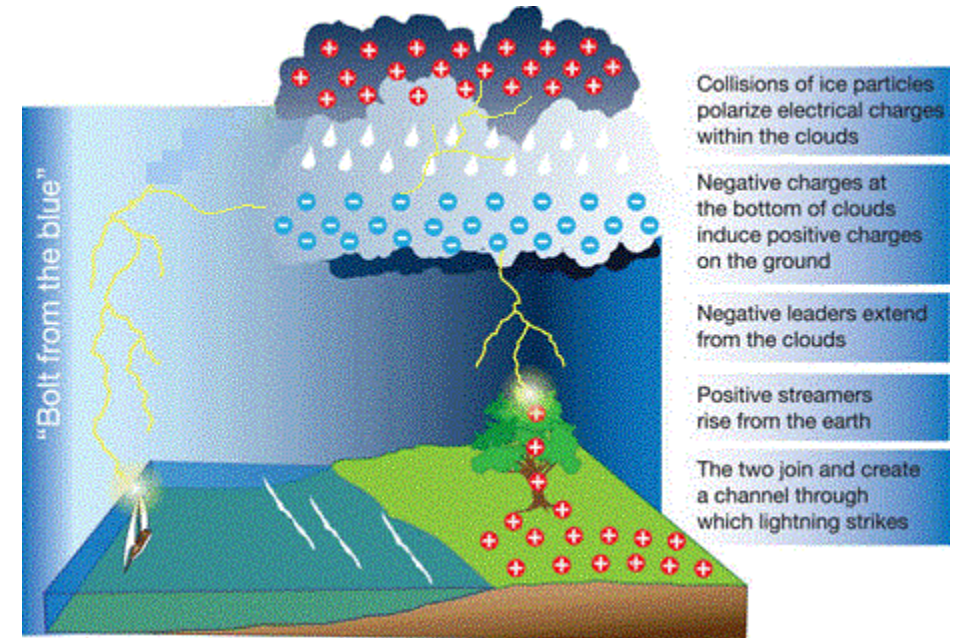
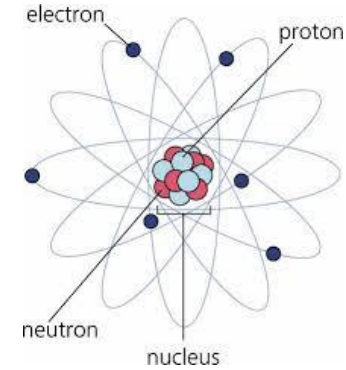
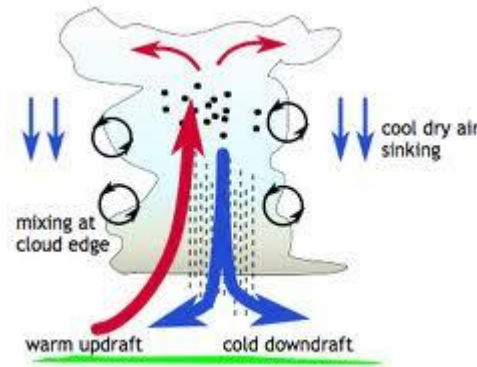
# What are typhoons and cyclones?



- Typhoons and cyclones are the same thing as hurricanes. Only, they are what people name them in different parts of the world. Most all of the storms start over warm ocean water around the equator and blow west. Cyclones are the storms that form over the Indian Ocean. Typhoons are the storms that form over the Pacific Ocean and head towards Asia and the islands near it.

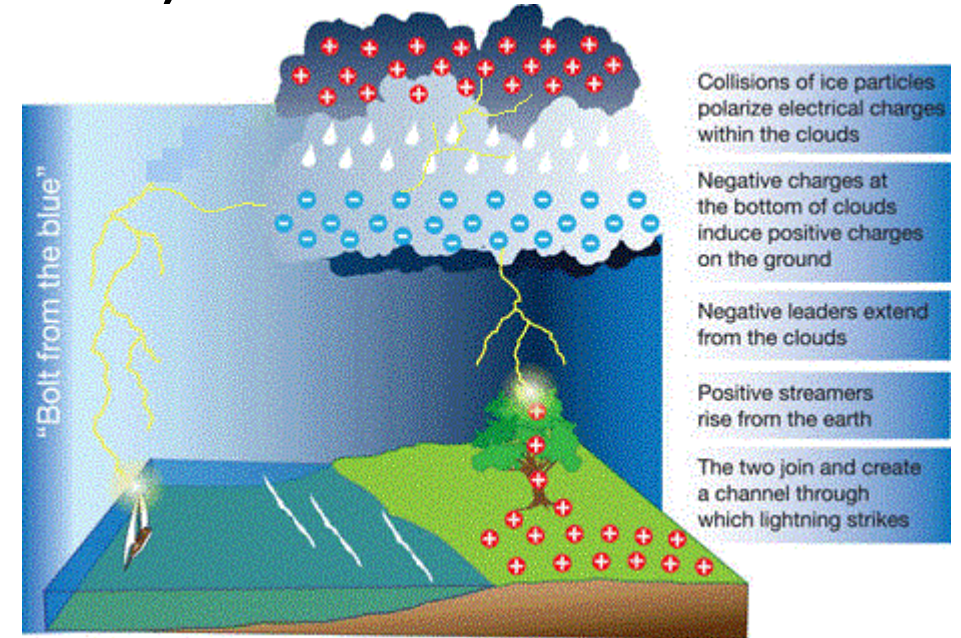
# What causes lightning? (part 1)

- Little ice and water particles in the clouds swirl and rub against each other causing friction in large storm clouds. The friction knocks off the electrons from some of the atoms and creates an electric charge. The top of the cloud gets a positive charge and the bottom of the cloud gets a negative charge. Eventually enough of an electric charge builds up and releases in the form of lightning. When the charges connect, it is so hot that it creates a bright flash of light.

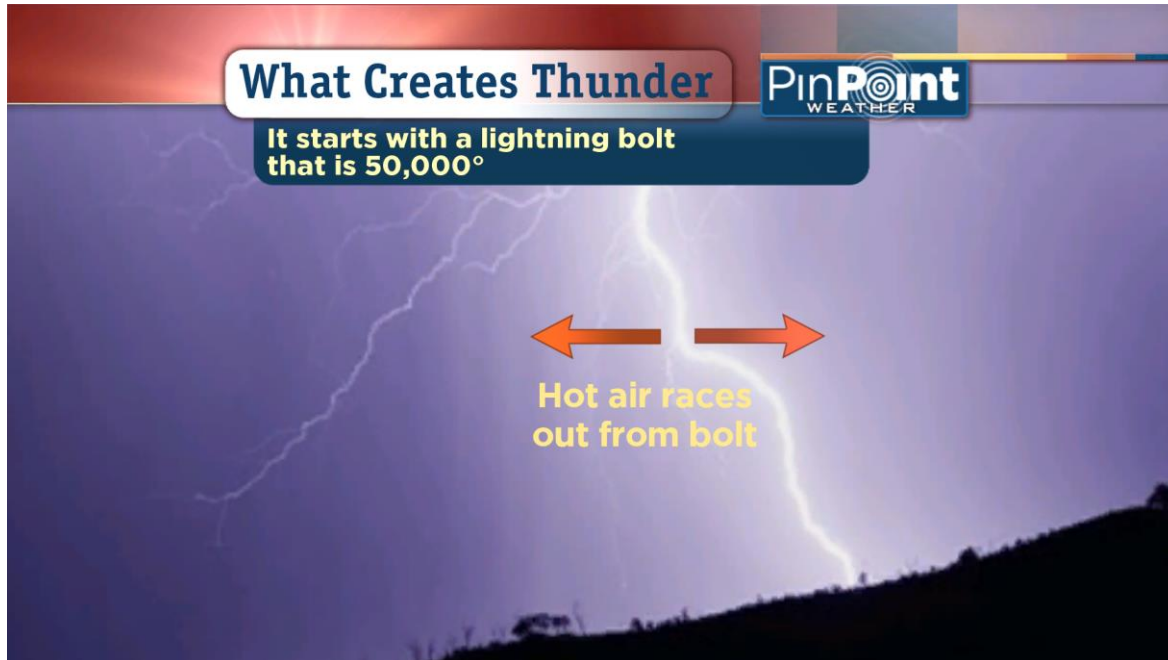
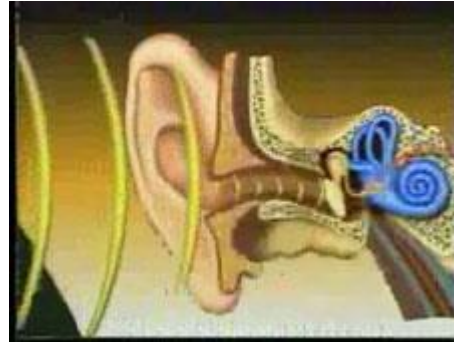
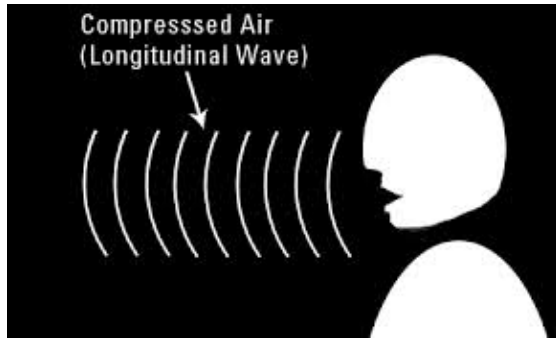


# What causes lightning? (part 2)

- Sometimes the positive and negative inside the clouds connect and form cloud to cloud lightning. Other times, the positive charge from the ground and negative charge from the bottom of the cloud connect and form cloud to ground lightning. Lightning can sometimes strike a little ways away from the cloud.



# What causes thunder?



- Sound is really a series of pulses or waves of air. The electricity from the lightning is super hot and rapidly heats up the air around it. Lightning can get 50,000 degrees Fahrenheit. The heat causes the air to expand rapidly and forms a strong pulse of air. We hear the strong pulse of air as thunder.

# What causes rainbows?

- Sunlight or white light is made up of a combination of many different wavelengths. When each wavelength is separated so it is on its own, each different wavelength of light shines a different color. When sunlight travels through water droplets in the air, the water refracts or bends the white light and splits the wavelengths apart to shine all the colors of the rainbow. It works just like a glass prism.
- These are the colors of the rainbow. ROY G BIV: red, orange, yellow, green, blue, indigo, and violet.

