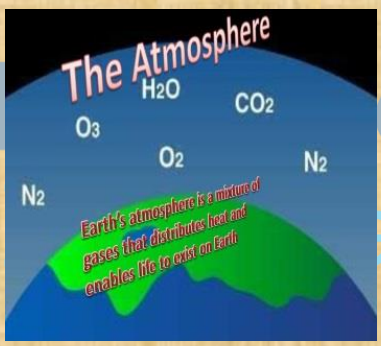
CHAPTER 08

AIR, WINDS AND CYCLONES

AIR AND WIND:

Air, we find it everywhere but we cannot see it. Once breathe in the air around you and you feel relaxed. We all know about the atmosphere. The atmosphere is like a thin blanket of air covering the earth. Air is like a chemical solution containing a mixture of gases.

It consists of oxygen and carbon dioxide, which are essential to us. We breathe in oxygen and breathe out carbon dioxide. Plants do the opposite. They take up carbon dioxide and release oxygen. Nitrogen is the most abundant and three quarters of the air is nitrogen. Other gases like hydrogen, argon, and neon are present in small amounts.



Air is made of matter and has weight. Air exerts pressure. The particles of air push in all directions and the force that exerted are called air pressure. Air can heat up or cool down and thus can become denser and less dense.

The wind is the movement of air due to the pressure difference between two places. In areas, air under high-pressure moves towards the areas of low pressure. Wind speed is measured by using anemometer.

The difference in temperature is also one of the causes of wind.

It is a way of distributing heat throughout the atmosphere. The areas near the equator get much more sunlight energy than polar areas. At the equator, the hot air rises, and at the poles, the cool air sinks.

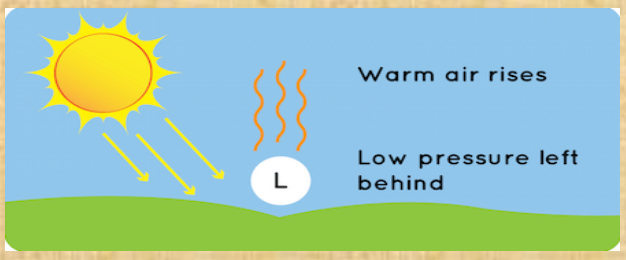
Why does the wind move at all? Why do we get these pressure differences?

It is due to the rising and sinking of the air in the atmosphere. We all know that the hot air rises and cold air sinks. Hot air is lighter than cold air. The areas where the air is rising have lower pressure and where it is sinking has higher pressure.

Why does hot air rise and cold air sink?

Again, it all starts with the sun. Whenever sunlight strikes the Earth, it heats things unevenly. The energy transfers from the Sun to soil, rocks, and trees in the form of heat. This heat causes the air molecules near the earth's surface to move faster. As they do, they spread out – the air becomes less dense. The less-dense hot air rises up and denser cold air rushes in to fill the void it leaves behind. That rising and rushing is wind. Because the sun creates hotter and cooler regions, the wind creates whenever there are gases in the atmosphere. Wind distributes the heat equally around the world.

Wind blowing at a certain speed is called breeze. When it is soothing, we call it a breeze and when it is harsh, we call it wind.



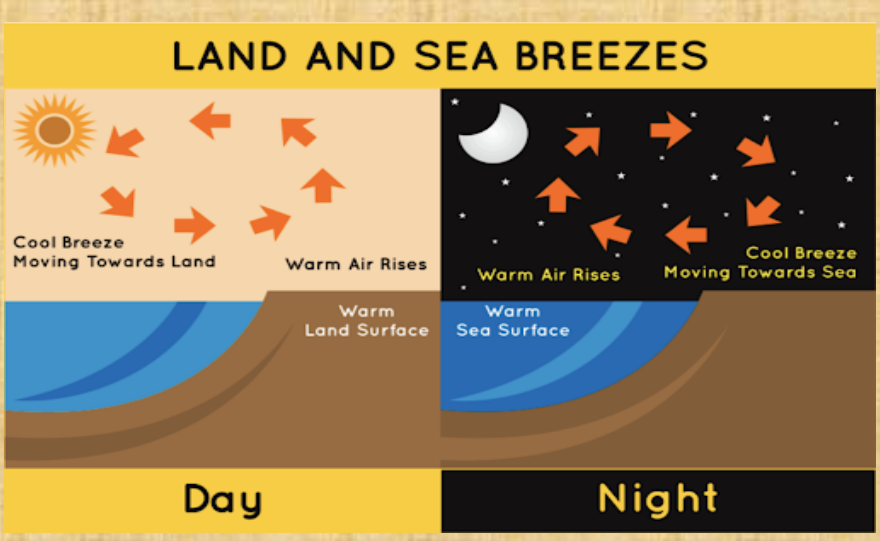
Land breeze and Sea breeze:

Sun heats the land and water. The land heats up and cools down quickly than the water. Sea heats up and cools down slowly compared to land. This

differential heating and cooling of land and sea give rise to a gentle to a moderate wind, termed as breeze.

It is of two types depending on the direction of flow. They are Land breeze and Sea breeze.

Now we know that land heats up quickly than the sea and after the sunset, land releases heat quickly than the sea. It creates a high pressure over the land and low pressure over the sea. So the air rushes from high-pressure area (land) to low pressure area (sea) creating a breeze known as Land breeze. The land breeze blows at night because the land loses heat quickly whereas the water takes more time to cool down.



When the sun is up, the land gets heat up quickly and the temperature of the air above land increases. Then the warm air rises and low pressure is maintained on land. On the other hand, over the sea high-pressure zone creates. Then the air rushes from high-pressure area (sea) to low pressure area (land) creating a sea breeze. The sea breeze blows during the day because the sea is much cooler than the land during the day.

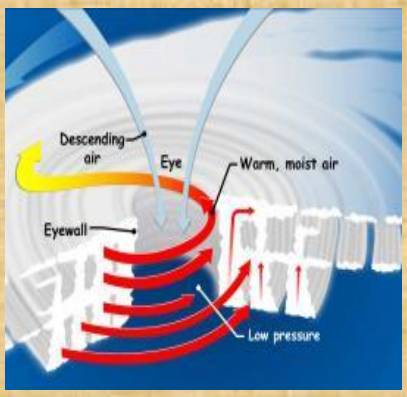
In this way, Sun is the driving force for wind and breeze by creating differences in temperature and air pressures.

Cyclones:

Do you know the destruction cyclone can bring? Certain changes in the air pressure can make a calm and clear sky into a one full of threatening clouds. Fierce wind, heavy rain and lightning are the things we experience during severe weather. High and lower pressure air interacts to bring about cyclones.

How do cyclones get started?

Air pressure differences over the ocean can cause fast, spinning winds. The winds swirl around in a circle and form only over warm, tropical water. They can last for days or weeks.



Its wind and spin that forms a cyclone. The warm air rises, cools and condenses to form clouds. When the warm air over the ocean rises superfast, the cool air moves in to replace it, then an extremely lower pressure area results. This pressure difference makes winds get stronger. The larger the pressure difference, the faster the winds blow. As winds continue to build, they begin to spin. Finally, they spiral around the lower pressure area at the center called as ‘eye’ and the ring around the eye is eye wall.

The heavy rains and strong winds are the main effects of cyclones. Strong winds can pull up the trees by their roots, rip the roofs off houses and floods entire cities. A storm surge – a huge flow of water on to land can also cause serious flooding. In some areas like America, cyclones are referred as Hurricanes.

Once the source of warm, moist air is cut off the storm dies out. Nature is peaceful again. After ‘all clear’ the people and government pay attention to things like roads, transport management, power supply, pure drinking water, sewage lines and any epidemic spread in the area.

SUMMARY:

- Air is a mixture of gases. It consists of oxygen and carbon dioxide, which are essential to us.
- Air is made of matter and has weight. It does take up space.
- Air can heat up or cool down and thus can become denser and less dense.
- Wind is the movement of air due to the pressure difference between two places.
- At the equator, the hot air rises and at the poles the cool air sinks.
- Whenever sunlight strikes the Earth, it heats things unevenly.
- Wind distributes the heat equally around the world.
- Wind blowing at a certain speed is called breeze.
- This differential heating and cooling of land and sea give rise to a gentle to a moderate wind, termed as breeze.
- The air rushes from high-pressure area (land) to low pressure area (sea) creating a breeze known as Land breeze.
- The air rushes from high-pressure area (sea) to low pressure area (land) to create a sea breeze.
- Air pressure differences over the ocean can cause fast, spinning winds.
- The heavy rains and strong winds are the main effects of cyclones.

GLOSSARY:

- **Anemometer** – A device used for measuring wind speed.
- **Cyclone** – Massive storms that combine heavy rains, strong winds and storm surge.
- **Expansion** – The action of become larger and broader.
- **High pressure** – Air pressure at a location high compared to other locations.
- **Low pressure** – Air pressure is low at a location compared to other locations.
- **Wind** – The natural movement of air due to the pressure differences between areas