

Weather

EARTH'S ATMOSPHERE

- ◆ Composition of the atmosphere - Earth's atmosphere consists of nitrogen (_____%), oxygen (_____%), small amounts of carbon dioxide, methane, argon, krypton, ozone, neon and other gases such as water _____.
- ◆ During the day, the atmosphere regulates the amount of solar radiation reaching the earth and filter out much of the harmful _____ rays.

During the night, the atmosphere, particularly water vapour, absorbs heat radiated from the earth which helps to keep us warm.

- ◆ Layers of the atmosphere
 1. T_____ - This layer reaches from sea level to about 10 000 metres above earth and contains much of the weather.
 2. S_____ - This stretches from 10 000 metres to 50 000 metres above earth and contains the ozone layer that absorbs much of the solar radiation to warm the planet.
 3. M_____ - This layer reaches from 50 000 metres to 80 000 metres and is much cooler than the lower layers.
 4. Thermosphere - This layer stretches from 80 000 metres to about 350 000 metres and contains rarified air that is very hot (about 1000°C).

ATMOSPHERIC PRESSURE

- ◆ Atmospheric pressure - The pressure or the 'weight' of the air _____ from place to place depending on _____, humidity and altitude.
- ◆ Hectopascal - unit of measurement of atmospheric pressure. Equal to 1000 newtons per square metre
- ◆ Average atmospheric pressure at sea level - At sea level, the average atmospheric pressure is _____ hPa, but this varies according to _____ and water _____.
- ◆ High atmospheric pressure - Cold dry air is _____ than other air so it remains close to the earth, giving _____ weather.

- ◆ Low atmospheric pressure - Hot moist air is _____ than other air so it rises, giving cloudy or _____ weather.

SEASONAL TEMPERATURES

- ◆ The sun shines at different angles on different parts of the earth. It is directly in line with the _____ which has the highest temperatures, whereas further away from the equator the earth becomes _____.

WATER IN THE AIR

- ◆ Water cycle - The water cycle is the movement of water to different locations on earth. The parts of the water cycle which relate to weather are:
 1. E _____ - the movement of ocean, river and lake water into the atmosphere
 2. C _____ - the process where by clouds form from the evaporated water vapour
 3. P _____ - falling rain, snow, sleet, hail, fog, mist, dew or frost
- ◆ Dew-point - the temperature at which water vapour present in the air changes back to _____ water
- ◆ Saturated air - air containing the maximum possible amount of water _____ before _____ begins
- ◆ Humidity - the measure of the amount of _____ in the air
- ◆ Relative humidity - the amount of water vapour the air contains compared with the amount it would need to become saturated at a given temperature (e.g. If the air needs 4 grams of water per cubic metre to become saturated at 20°C, and the air only contains 2 grams of water, then its relative humidity is 50%.)

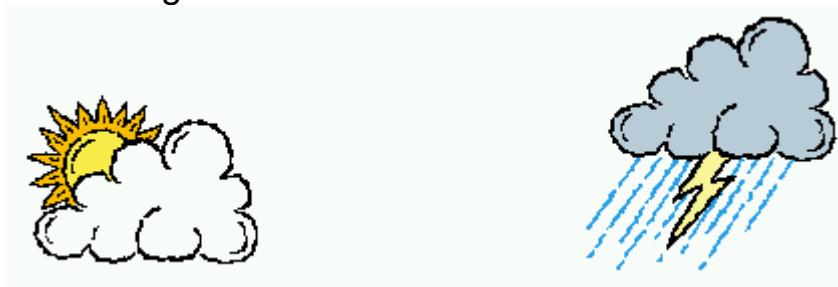
WINDS

- ◆ Wind is moving _____.
- ◆ Winds blow because of differences in air pressures. Air will always move from a region of _____ pressure to a region of low pressure to attempt to equalise the pressures.
- ◆ Pressure gradient - the rate at which the pressure changes in any direction
- ◆ Wind direction - Wind direction is taken as the direction from which the wind is blowing (e.g. If the wind is blowing from the west, it is a _____ wind.)

- ◆ Wind speed - The greater the pressure gradient, the greater will be the wind speed.
- ◆ Knot - the unit of measure of wind speed. Equal to 1 nautical mile per hour, or 1.852 kilometres per hour

LAND AND SEA BREEZES

- ◆ Land (soil, rocks etc) heats up rapidly during the day but cools off quickly at night. However water can hold its heat.
- ◆ Land breezes - Land breezes blow from the land out to _____. They are strongest on winter mornings.
- ◆ Sea breezes - Sea breezes blow from the sea to the _____. They are strongest on summer afternoons.



CLOUDS

- ◆ Cloud formation - Water is constantly evaporating from sea and land. The higher the temperature, the greater is the _____. Also the higher the temperature, the more water vapour held by the air. Moist air _____ up to cooler areas where it condenses onto tiny specks of dust in the air. These droplets combine to form larger _____ which become visible as _____.
- ◆ Cloud types - Clouds are usually named for their _____ such as 'cirrus'='curly', 'cumulus'='wedge-shaped', 'stratus'='spread out', and 'nimbus'='cloud'.

Low clouds

1. S _____ - a thin, stretched-out layer of cloud with no rain
2. C _____ - lumpy white cloud with no rain
3. Large Cumulus - large lumpy whitish cloud with some showers

Middle level clouds

1. Altostratus - a sheet of bluish-grey cloud with light rain
2. Altocumulus - Similar to cirrocumulus but lower in the sky and grey with no rain
3. Nimbostratus - a very thick layer of dark grey cloud with heavy to flood rain

High clouds

1. C _____ - extremely high and pure white because they are made of tiny ice crystals
2. Cirrostratus - thin, stretched-out layer of very white cloud with no rain
3. Cirrocumulus - thin lumpy clouds in rows with no rain

PRECIPITATION

- ◆ Rain - As water droplets _____ and join together to each other in warmer areas or to ice particles in colder areas, they attain diameters of 0.5 to 3 millimetres, which are no longer able to be supported by the air. They fall as rain.
- ◆ Snow and sleet - If water particles that attach to ice particles in the clouds do not melt while falling, they will fall as snow. Sleet is a combination of both _____ and _____.
- ◆ Hail - If water droplets are caught in updraughts, they rise higher to cooler areas and freeze in temperatures of -10°C . The more times they are lifted to the freezing heights by the updraughts of wind, the larger they become. When they can no longer be supported by the air, they fall as ice.
- ◆ Fog and smog - Fog is regarded as very low cloud. At night, the earth's surface cools. Air containing moisture may be cooled by contact with the cool earth. Near the sea, fog is usually the result of warm moist air moving over cold sea water. Smog is mixing of fog with industrial or car pollutants in the air.
- ◆ Dew and frost - At night, the earth cools down. When water vapour comes in contact with very _____ objects such as grass or windscreens, it condenses to form dew or frost if it is very cold.

FRONTS

- ◆ Cold front - This occurs when a moving mass of cold or cool air moves _____ a still mass of warm air. It is usually associated with sudden rain and _____ and a wind change from north to south.
- ◆ Warm front - This occurs when a moving mass of warm air move _____ a still mass of cold or cool air. It is usually associated with days of _____ rain and is not common in Australia.

CYCLONES

- ◆ Tropical cyclones are vast whirlpools of warm, moist air with very _____ pressure systems which are usually 100 kilometres across.
- ◆ They form over _____ in the tropics, because it involves the rapid rise of hot moist air. The water temperature must be at least 26°C.
- ◆ As the hot moist air rises, it spirals leaving a _____ centre called the eye. There is no wind or rain in the eye of a cyclone.
- ◆ Winds may reach 300km/h.
- ◆ Cumulonimbus clouds bring torrential rain, formed when the rising hot moist air cools.
- ◆ Storm surges where the ocean is lifted beneath the eye cause flooding to low-lying areas as the sea may rise a further 2 metres above the normal tide height.
- ◆ Because of the earth's rotation, in the southern hemisphere, cyclones rotate _____. In the northern hemisphere, they rotate anti-clockwise. They are called _____ over the north Pacific Ocean and hurricanes over the North Atlantic Ocean.
- ◆ Cyclones become less intense as they travel over land or to cooler latitudes.

TORNADOES

- ◆ A tornado is the ultimate concentration of cyclonic spinning winds. It is a violent concentrated whirlpool of low pressure air with a _____-shaped cloud hanging from huge cumulonimbus clouds.
- ◆ The base of a tornado is 100 metres but its destructiveness can extend up to several kilometres.
- ◆ Winds can be 400km/h.
- ◆ Tornadoes are common in the eastern USA but uncommon in Australia.

ANTI-CYCLONES

- ◆ Anti-cyclones are high pressure systems associated with fine _____ weather.
- ◆ They rotate slowly anti-clockwise and cause no damage.

WEATHER-MEASURING DEVICES

- ◆ A _____ - a device for measuring wind speed and direction
- ◆ Aneroid B _____ - a device for measuring air pressure
- ◆ Hydrograph - an instrument that measures the amount of water vapour in the air
- ◆ Thermograph - a device for measuring temperature on rolling graph paper
- ◆ Wet and Dry Bulb T _____ - a device for measuring relative humidity; consists of two thermometers with a wet cloth wrapped around one
- ◆ Wind V _____ - an instrument for measuring wind direction

SYNOPTIC CHARTS OR WEATHER MAPS

- ◆ Synoptic chart - a map showing weather information observed over a large area at the same time, and prepared every three hours by the Bureau of _____ in Australia
- ◆ Isobar - the lines drawn on a weather map that join areas of equal _____
- ◆ High winds - These occur where the isobars showing different air pressure areas are _____ together, and the wind blows from high to low pressure areas.
- ◆ Slow winds - These occur where the isobars are spaced further apart.
- ◆ Fine weather - usually associated with higher pressure areas over _____ hPa
- ◆ Showers or rain - usually associated with lower pressure areas under 1013 hPa
- ◆ Some synoptic chart symbols
 - High pressure system - H
 - Low pressure system or Depressions - L
 - Tropical c _____ - T.C.
 - Cold _____ - a bold line with shaded triangles on one side
 - Warm front - a bold line with shaded semi-circles on one side
 - T _____ - an elongated region of low pressure where showers or rain may occur; symbol is a bold dotted line