2 WIND, STORM AND CYCLONES

INTRODUCTION :

When a place gets heated by the sun, the air above it also gets heated, when air is heated, it expands and becomes lighter.

The warmer, lighter air rises and cooler, denser air blows in from the neighbouring areas. The movement of air is what we call wind. When air moves gently (low speed). it is called a breeze.

When it moves violently (high speed), it is called a storm. Storms are classified in many ways and given different names. But they have one thing in common-high-speed winds.

AIR PRESSURE :

The air surrounding the earth exerts a pressure on its surface. Like temperature and humidity, air pressure also determines the weather of a place on any particular day. It is measured by an instrument called a barometer and it determines whether a day is going to be calm or stormy.

There is a close link between (air) pressure and wind. We can say that winds blow from regions of high pressure to regions of low pressure.

The greater the difference in pressure, the greater is the speed of the wind.

Note :

(i) High speed wind is accompanied by a reduced air pressure.

(ii) The instrument used to measure atomspheric pressure is called as barometre.

WIND CURRENTS :

Wind currents are formed due to uneven heating of the earth. Two situations may arise :

1. Uneven heating between the equator and the pole

The equator, which receives the direct rays of the sun throughout the year, is the hottest part of the earth. The air above the equator gets heated (hence, becomes lighter) and rises.

This makes cooler, denser air from the tropical belts blow in towards the equator from the north to south. These permanent winds are called the north-east and south-east trade winds.

The rotation of the earth makes these winds blow in an eastern direction rather than straight north and south. Wind flow pattern due to uneven heating between the equator and the pole.

2. Uneven heating of land and water :

Originally, the seasonal winds that bring rain to India and the other countries of South Asia between June and September are called monsoon.

The word monsoon was derived from the Arabic word 'mausam' which means weather. In summer, the landmass of northern India becomes much hotter than the surrounding seas.

The hot air rises and moist air blows in from the Arabian Sea and Bay of Bengal. These moisture-laden winds bring heavy rainfall in most parts of India, are called the summer monsoon.

In winter, the direction of the wind flow gets reversed, it flows from the land to the ocean. These winds are called the winter monsoon. They pick up moisture as they blow over the Bay of Bengal and bring rainfall to coastal Tamil Nadu.

TYPE OF STORMS :

There are different types of storms. Some arise over land, others develop over seas. Some are accompanied by thunder, lightning and heavy rain. Others are dry dust storms. We will discuss three broad types of storms-thunderstorms, tornadoes and cyclones.

THUNDERSTORMS :

As the air near the land gets heated, it becomes light and rises. The pressure under the rising air column drops.

If the air carries enough moisture, the moisture condenses when it comes in contact with colder air, and eventually, the raindrops become heavy enough to start falling. Then the air at the top of the column cools and spreads out.

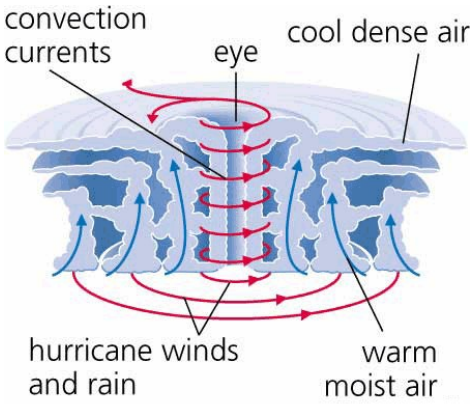
The pressure above the column is high, so the cold air flows downwards. The upward movement of hot air and the downward movement of cold air and raindrop leads to stormy winds accompanied by heavy rain, lightning and thunder, which are typical characteristics of thunderstrom.

TORNADOES :

A tornado is a dark funnel shaped cloud that reaches from the sky to the ground. The funnel sucks dust, debris and everything near it at the base due to low pressure and throws them out near the top.

The diameter of tornado can be as small as few kilometers a violent tornado can travel at a speed of about 300 km/hr. Tornadoes, are also called **twisters or whirl winds**. A tornado over the sea is called a **waterspout** because it sucks up a huge column of water.

CYCLONES :



A cyclone is a storm that develops over the sea. The distinctive feature about a cyclone is high-speed winds swirling around a low-pressure centre. This low-pressure centre is a region of calm, called the eye of the storm or storm centre.

Cyclones develop over tropical seas. Air heated by the warm sun rises, creating a region of low pressure. Cold air rushes in, forcing up more hot air. This brings in more cold air and so on, setting up a cycle or current of air. The rotation of the earth drags this air current around the region of low pressure.

Note: This is how the winds whirl around the centre. They whirl anticlockwise in the northern hemisphere and clockwise in the southern hemisphere.

Cyclones in the western Atlantic and eastern Pacific are called **hurricanes**. While those in the western Pacific are called **typhoons**.

Those developing over the Indian Ocean, Bay of Bengal and Arabian sea are simply called **cyclones.**

IMPACT OF STORMS :

Every year, storms cause great damage across the world. Cyclones are the worst in this respect because they last longer and affect a wider area. The wind speeds are also greater, reaching up to 300 km/h.

As they travel over the sea, they gather a lot of moisture. So when they hit a coast, they bring heavy rainfall. High waves hit the coast and flood vast areas.

Towns and villages get submerged. Trees get uprooted. Telephone and electric lines snap. Buildings, bridges and other man-made structures get damaged.

The extent of damage is usually much less in a thunderstorm. However, when counted over the whole world, more people are killed by lighting (accompanying thunderstorms) than by cyclones.

Tornadoes are far more destructive than thunderstorms. The core of low pressure creates a suction which can blow off roofs and make houses collapse.

All storms uproot trees and kill wildlife. Cyclones also affect marine life, and coral reefs, in particular. The rushing in of sea water has another harmful effect. It turns soil saline and unfit for cultivation. (i.e. **cylclone reduces the fertility of soil)**

EFFECTIVE SAFETY MEASURES :

1. A cyclone forecast and warning service
2. Rapid communication of warnings to the government agencies, fishermen, ships and to the general public.
3. Construction of cyclone shelters in the cyclone prone areas and administrative arrangements for moving people fast to safer places.

Action on the part of the people :

1. People living in cyclone-prone areas should always listen to the weather forecast.
2. If there is a warning, they should make arrangements to shift the essential household goods, domestic animals, vehicles etc. to safer places.

Advanced technology for forecasting cyclone :

Using satellites and radar technology, a cyclone alert or Cyclone warning is issued 24 hrs in advance.

EXTENDED LEARNING - ACTIVITIES AND PROJECTS

1. To show that air exerts pressure :

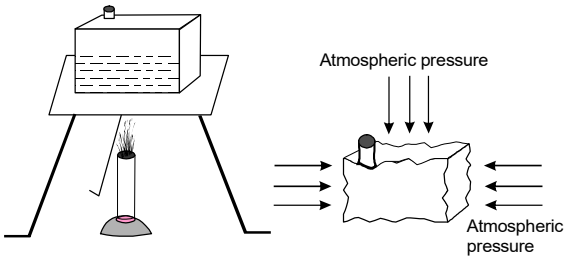
Take a tin can with a lid and fill it two-thirds with water.

• Heat the water on a burner till the water starts boiling.

• Now put off the burner, cover the mouth of the can with its lid tightly and pour cold water on the hot can as shown in figure.

You will observe that the tin loses its shape.

When the water in the can is heated, it changes into vapour form. When cold water runs over the tin can containtng hot water, some of the steam in the can turns back to its liquid state, reducing the amount of air inside. This reduces the air pressure inside the can compared to the air pressure outside. As a result, the can gets compressed or deshaped.



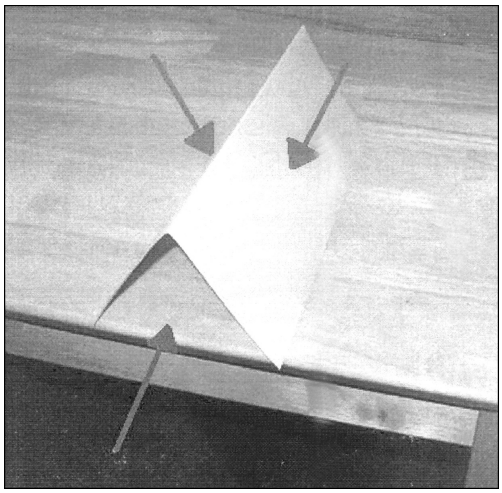
2. Pumping of the air :

We use air pump to fill the air into cycle tires and some times football. In pumping,air inside the pump cylinder get pressed by the moving the piston down and subsequently forced inside the cycle tire tube or football through a valve.If we just close the out let of pump with a finger,then it is very difficult to move the piston rod further down to other end as pressed air has no where to go and exert pressure on the piston thus preventing its further down movement.

3. Wind Speed is accompanied by reduced air pressure :

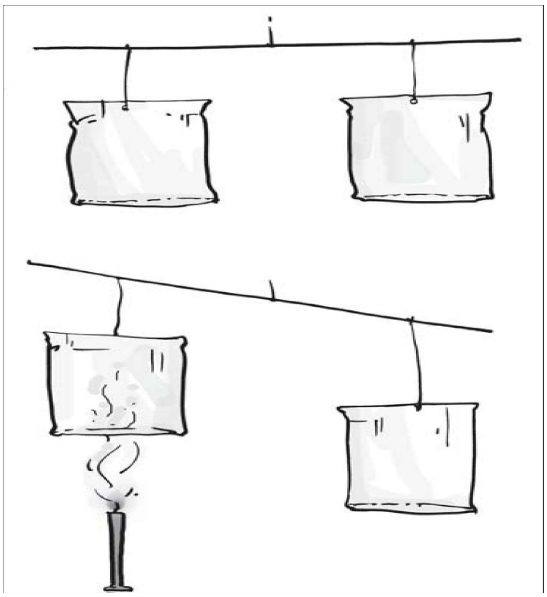
Fold the piece of the paper in half. Then place it on the very edge of a table, as shown . Stick your face down near the opening to paper tunnel. Start to blow in the centre of paper tunnel. Your will observe the paper is bending down towards the table. What is happening here ? When you blow air though the paper tunnel. You are changing the air pressure inside the tunnel. The air pressure inside and outside the tunnel previously the same. But when you blow, it becomes lower than outside air pressure. The outside air pressure pushes down on the paper and the paper flattens.

We see that, the increased wind speed is, indeed, accompanied by a reduced air pressure.



4. Air Expands on Heating :

Take two paper bags or empty paper cups of the same size. Hang the two bags on the rod which is balanced as shown in the figure. Then glow a candle below one of the bags. As the warm air rises up,it pushes the bag above the candle.The disturbance of the balance suggest that the warm air is lighter than the cold air.



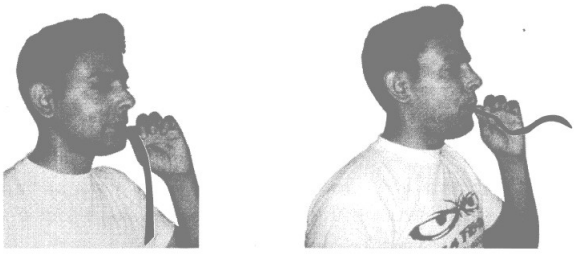
Also, it is important to remember that on heating the air expands and occupies more space. When the same thing occupies more space, it becomes lighter.The warm air is, therefore, lighter than the cold air. That is the reason that the smoke goes up.

In nature there are several situations,where warm air rises at a place. The air pressure at that place is lowered. The cold air from the surrounding areas rushes in to fill its place. This sets up convection in air.

5. To show that high speed wind lifts and blows off articles :

- Take a strip of paper about 15 cm long and 3 cm wide.
- Hold it firmly with your thumb and finger as shown in figure.
- Now blow hard over the paper strip.

You will observe that the other end of the paper strip rises up which was earlier hanging down. When you blew over the paper strip, the increased wind speed reduced the air pressure on top. The pressure below the paper strip was higher and lifted it up.



6. To show that air expands on heating :

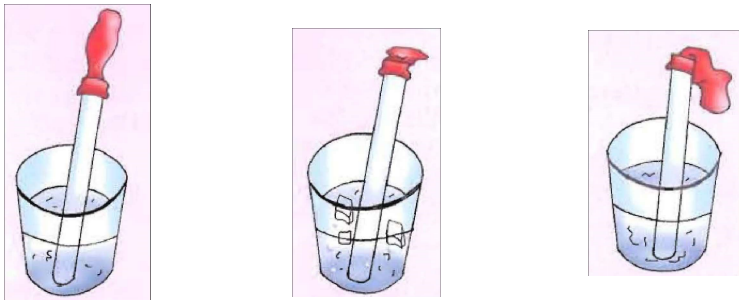
• Take a test tube and stretch a balloon over its open end tightly with the help of cellotape.

• Now take a beaker containing hot water and put the test tube into it [figure (a)].

• Observe the balloon after a few minutes. Why has it inflated a bit?

• Now take out the test tube from the boiling hot water beaker. Cool it a bit and put it into a beaker containing crushed ice [figure(b)]. Do you observe any change in the balloon after a few minutes? Why has it deflated? • Now again take out the test tube from the beaker containing crushed ice and put it in a beaker containing water at room temperature [figure (c)].

The size of the balloon remains the same when the test tube is kept at normal room temperature [figure (c)] whereas it gets inflated at high temperature [figure (a)] and deflated at low temperature [figure (b)]. The inference we draw from this activity is that heating expands air, while cooling contracts it.



(a) Hot water (b) Ice-cold water (c) Water at normal temperature

Figure Change in the shape of ballon

7. To prove that hot air is light and rises :

• Take two empty paper cups of the same size and hang them in an inverted position on the two ends of a stick.

• Tie a piece of thread in the middle of the stick and hang it so that the two cups are in balanced position.

• Now put a burning candle just below one of the hanging cups and observe the change.

You will observe that the balancing of the two cups is disturbed. The cup under which the candle is lit moves up. The lig-hted candle warms the surrounding air. As a result, the air becomes light and rises and pushes the paper cup up.

LET US RECAPITULATE

1. **Wind:** Moving air is called the wind. Winds that move from east to west are called trade winds. Winds that move from west to east are called westerlies. Horse latitudes are the areas of calm or no wind.
2. Air exerts pressure. It is the pressure which helps the leaves of trees, banners or flags to flutter when the wind is blowing.
3. Increased wind speed is accompanied by a reduced air pressure.
4. Air moves from the region where the air pressure is high to the region where the air pressure is low.
5. Greater the difference in pressure, the faster the air moves.
6. On heating, the air expands and become lighter.
7. Warm air rises up, where as the cool air tends to ink toward the earth's surface.
8. Wind currents are generated due to uneven heating of the earth, for example:
   (i) uneven heating between the equator and the poles.
   (ii) uneven heating of land and water.
9. The winds from ocean carry water and bring rain. These are monsoon winds.
10. Formation of clouds, storms and cyclone is shown in the following flow chart:

Difference of temperature between two regions
↓
Sets convection in air
↓
Warm air rises, creating a low pressure area
↓
Cool air converges to the 1ow pressure area
↓
Warm air rises, cool and the water vapour condenses to form clouds
↓
The bigger water drops in the cloud fall to the ground as rain, hail or snow
↓
Falling water droplet and rising air move vigorously to produce thunderstorm (lightning with sound)
↓
Under certain weather condition storm may develop into cyclones

11. A man-made object that orbits around the earth, the moon or any other celestial body is called satellite. Cyclone detecting radar can locate and track the approaching tropical cyclone within a range of 400 km. Satellites are also useful for monitoring the cyclones.

12. **Effective safety measures:** (Low pressure region with high speed winds around it). A cyclone can be very destructive in its effect. It causes tremendous loss of life and property. Therefore, we should have effective safety measures.
   (i) It has become easier to monitor cyclones with the help of advance technology like satellites and radars.
   (ii) Self help is the best help. Therefore, it is better to plan in advance and be ready with defence against any approaching cyclone.

KEYWORDS

1. **Anemometer:** The instrument that measures the speed of wind is called as -anemometer.

2. **Cyclone:** A very low pressure system with a very high speed winds that revolves around is called a cyclone.

3. Tropical cyclones are called hurricanes in American continent and Typhoon in Japan and Philippines.

4. **Lightning:** When two clouds with unlike charges approach each other, charges start moving with high speed through the air in between. When this happens lightning strikes and intense spark of electricity travels in air.

5. **Low pressure:** Increased wind-speed, is accompanied by a reduced pressure. Also warm air rises up causing low pressure.

6. **Monsoon winds:** The winds from the oceans carry water and bring rain known as monsoon winds.

7. **Thunderstorm:** In hot and humid area, the rising temperature produces strong upward rising winds. These winds carry water droplets upwards, where they freeze and fall down again. The swift movement of the falling water droplets along with the rising air create lightning and sound. This event is called a thunderstorm.

8. **Tornadoes:** A tornado is a dark funnel shaped cloud that reaches from the sky to the ground.

9. **Wind flow pattern:** In summers winds flow from the oceans towards the land. In winters winds flow from land to oceans.

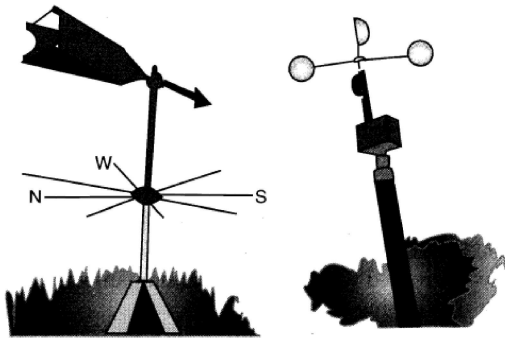
CONCEPT APPLICATION LEVEL - I [NCERT Questions]

Q. 1 Fill the missing word in the blank spaces in the following statements:
(a) Wind is ..... air.
(b) Winds are generated due to ... . heating on the earth.
(c) Near the earth's surface ..... air rises up whereas ..... . air comes down.
(d) Air moves from a region of ..... pressure to a region of ..... . pressure.

Ans. (a) moving (b) uneven (c) warm, comparatively cooler (d) high air, low air

Q. 2 Suggest two methods to find out wind direction at a given place.

Ans. Two methods to find out wind directions are:
(i) using weather cock.
(ii) one simple method used by common people is to hold some dust and release in the air. Dust will fly in the direction of air.



Anemometer

Q. 3 State two experiences that made you think that air exerts pressure (other than those given in the text).

Ans. **Experiment 1:** When 'we fill air in a balloon it in flattens due to pressure exerted by air. Also when it is overfilled with air it bursts due to excess air pressure

Experiment 2: When we hang a banner in a place of moving fast air, it tears due to the pressure exerted by the air.

Q.4 You want to buy a house. Would you like to buy a house having windows but no ventilators? Explain your answer.

Ans. No, we would not like to buy a house having windows but no ventilators. We know that warm air rises upward and cool air comes downward. So to make a stream of cool and fresh air to flow in continuation inside the house through the windows, there must be some ventilators in the upper parts of the walls.

Q. 5. Explain why holes are made in hanging banners and hoardings.

Ans. We know that air exerts pressure. If there are no holes in the banners and hoardings they will be damaged. To make them safe, holes are made to give the air safe passage.

Q. 6 How will you help your neighbours in case cyclone approaches your village town?
Ans. We will cooperate and help our neighbours, by:
(i) making necessary arrangements to shift the essential household goods, domestic animals and vehicles, etc., to safer places.
(ii) not pressurising the rescue force by making undue demands.
(iii) asking them:
• avoid driving on roads with standing water as floods may have damaged the roads.
• do not drink water that could be contaminated.
• do not touch wet switches and fallen power lines.
• do not go out just for the sake of fun.

Q.7 You want to buy a house. Would you like to buy a house having windows but no ventilators? Explain your answer.
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• do not drink water that could be contaminated.
• do not touch wet switches and fallen power lines.
• do not go out just for the sake of fun.

Q.10 What planning is required in advance to deal with the situation created by a cyclone?
Ans. To deal with the situation created by a cyclone we must do the following planning in advance. On the part of the government:
(i) Rapid communication of warnings to the government agencies, the ports, fishermen, ships and to the general public must be ensured.
(ii) There must be the construction of cyclone shelters in cyclone prone area and administrative arrangements for moving people fast to safer places
On the part of the public following actions must be taken:
(i) keep ready the phone numbers of all emergency services like police, fire brigade and medical centres.
(ii) make necessary arrangements to shift the essential household goods, domestic animals and vehicles, etc., to safer places.

Q.11 Which one of the following place is unlikely to be affected by a cyclone?
(i) Chennai (ii) Mangaluru (Mangalore) (iii) Amritsar (iv) Puri
Ans. (iii) Amritsar

Q.12 Which of the statements given below is correct?
(i) In winter the winds flow from the land to the ocean.
(ii) In summer the winds flow from the land towards the ocean.
(iii) A cyclone is formed by a very high-pressure system with very high-speed winds revolving around it.
(iv) The coastline of India is not vulnerable to cyclones.
Ans. (i) In winter the winds flow from the land to the ocean.

CONCEPT APPLICATION LEVEL - II

Air Exerts Pressure :

Q. 1 What is wind?

Ans. A large scale movement of air is called the wind.

Q. 2 Why the leaves of trees, banners or flags flutter when the wind is blowing?

Ans. Due to the pressure exerted by the air.

Q. 3 Give two instances in your daily life which shows that air exerts pressure.

Ans. (i) It is air pressure that causes flags to flutter when the wind blows.
(ii) It is difficult to ride a bicycle against the wind, but easier in the direction of the wind.

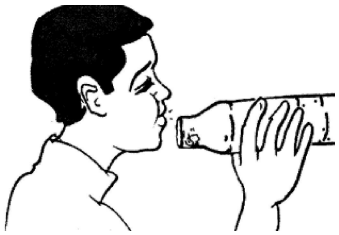
High Speed Winds are Accompanied By Reduced Air Pressure :

Q.1 How does the difference in the pressure at two places determine the movement of air?

Ans. Air moves from the high pressure region to the low pressure region.

Q.2 Give an experiment to show that increased wind speed is accompanied by a reduced air pressure.

Ans. Crumple a small piece of paper into a ball of a size, that remains smaller than the mouth of an empty bottle. Hold the empty bottle from its side and place the paper ball just inside its mouth. Now try to blow on the ball to force it into the bottle.
When we blow into the mouth of the bottle, the air near the mouth has higher speed. This decreases the pressure there. The air pressure inside the bottle is higher than near the mouth. The air inside the bottle pushes the ball out.



Q. 3 Explain why if we blow air between the balloons of nearly equal size hanging 8-10 cm apart, they come towards each other.

Ans. We know that increased wind speed is accompanied by a reduced air pressure. When we blow air between the two balloons, the pressure between them is reduced The pressure outside the balloons would then push them towards each other.

Q.4 What will happen, if high speed winds blow over the roofs of tin house?

Ans. The high speed wind travels over the roof creates an area of low pressure directly above the roof. If the roof of the house is weak, the higher pressure from below will lift up the roof of the tin house and it can be blown away by the fast winds.

Air Expands On Heating :

Q.1 What is the effect of heat on air?

Ans. On heating, the air expands and becomes lighter.

Q.2 Explain, why hot air goes up?

Ans. On heating the air expands and occupies more space. When the same amount of air occupies more space, it becomes lighter. The warm air therefore, become lighter than the cold air. That is the reason why hot air goes up.

Q.3 Discuss the situation that causes convection in air.

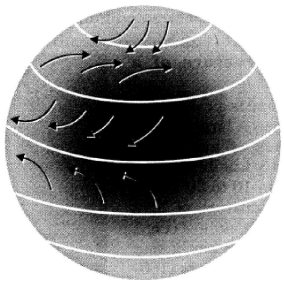
Ans. Convection is caused by the dispersing of heat or circulating. Once hot air has begun to move, it pushes rest of the air, therefore making that air at same temperature. This cycle goes on and on. The circulating flow of air resulting from temperature differences is called a convection current.

Wind Currents are Generated due to uneven heating on the Earth :

Q.1 Discuss in brief that how uneven heating between the equator and the poles generates wind current.

Ans. We know that the region close to the equator gets maximum heat from the sun. This makes the air warm which rises up into the air. The air from that regions to 0-30 degrees latitude belt on either side of the equator, moves in. These winds blow from the north and the south towards the equators.

On the other hand in winters, at the poles, the air is colder than at latitudes about 60 degree. The warm air at these latitudes rises up and the cold wind from the poles rushes in. In this way wind circulation is set up from the poles to the warmer latitudes.



Q.2 What is the main cause of wind movements on earth?

Ans. Wind currents are generated due to the uneven heating on the earth.

Q. 3 Explain the formation of monsoon.

Ans. In summer, the land warms up faster near the equator, and most of the time the temperature of the land is higher than that of water in the oceans. The air over the land gets heated and rises. This causes the winds to flow from the oceans towards the land. These are monsoon winds. In winter, the direction of the wind flow gets reversed; it flows from lands to oceans.

The winds from the oceans carry water and results in bringing rain. It is also a part of the water cycle.

Thunderstorms and cyclones :

Q.1 In which type of climate does the thunderstorms develop very frequently?

Ans. Thunderstorms develop in hot and humid tropical areas like India, where it is frequent.

Q.2 What is a thunderstorm? How does it develop?

Ans. Thunderstorms develop in hot and humid tropical areas. The temperature when rises, it produces strong upward rising winds. These winds carry water droplets upwards where they freeze and fall down again. The swift movement of the falling water droplets along with the rising air create lightning and sound. This event is called thunderstorm.

Q.3 What is a cyclone?

Ans. Cyclone is a very low pressure system with very high speed winds revolving around it.

Q.4 How is a cyclone formed?

Ans. Water heats up because of atmospheric heat and turns into vapour. When this water vapour gets condensed, it changes back into liquid as raindrops.

The heat released from the atmosphere warms the air around. The air tends to rise and causes a drop in pressure. More air rushes to the centre of the storm. This cycle is repeated. The chain of events ends with the formation of a very low pressure system with very high speed winds revolving around it. It is this weather condition that we call a cyclone. Factors like wind speed, wind direction, temperature and humidity contribute to the development of cyclones.

Q.5 Describe the structure of a cyclone using a model.

Ans. The centre of a cyclone is a calm area. It is called the eye of the storm. A large cyclone is a violently rotating mass of air in the atmosphere around 10 to 15 km high. The diameter of the eye varies from 10 to 30 km. It is a cloud free region with a mixture of light wind in it. Around this calm and clear eye, there is a cloud region of about 150 km in size. In this region there are high-speed winds (150–250. km/h) and thick clouds with heavy rain. Away from this region, the wind speed gradually decreases. The formation of a cyclone is a very complex process.

Q.6 Why is lightning dangerous?

Ans. Lightning is dangerous because it is a giant electric spark. When it strikes the earth, it can kill people and also can cause damage to buildings.

Destruction caused by cyclones :

Q.1 Explain in brief the destruction caused by cyclones.

Ans. Cyclones can be very destructive. Strong winds push water towards the shore even if the storm is hundreds of kilometres away. These are the first indications of an approaching cyclone. The water waves produced by the wind are so powerful that a person cannot overcome them.

The low pressure in the eye lifts water surface in the centre. The rising water may be as high as 3-12 metres. It appears like a water-wall moving towards the shore. As a result, the seawater enters the low-lying coastal areas, causing severe loss of life and property. It also reduces the fertility of the soil.

Continuous heavy rainfall may further worsen the flood situation.

High-speed winds accompanying a cyclone can damage houses, telephones and other communication systems, trees, etc., causing tremendous loss of life and property.

Q.2 What are the other names of cyclones?

Ans. Cyclones are called:

(i) Hurricane in the American continent.

(ii) Typhoon in Philippines and Japan.

Effective safety measures :

Q.1 Write a note on the disaster management in respect to cyclones.

Ans. Cyclones can be very destructive when the low pressure in the eye lifts water from the surface layer in the centre. The rising water may be as high as 3-12 metres. It appears like a water-wall moving towards the shore. As a result, the seawater enters the low-lying coastal areas, causing severe loss of life and property. It also reduces the fertility of the soil.

The disaster management of a cyclone involves:

(A) Action on the part of the Government :

(i) A cyclone forecast and warning service.

(ii) Rapid communication of warning to the government agencies, the ports, fishermen, ships and to the general public.

(iii) Construction of cyclone shelters in the cyclone prone areas and administrative arrangements for moving people fast to safer places.

(B) Action on the part of the People :

(i) We should not ignore the warnings issued by the meteorological department through media like TV, radio or newspapers.

(ii) We should

- make necessary arrangements to shift the essential household goods, domestic animals and vehicle etc., to safer places;
- avoid driving on roads through standing water, as floods may have damaged the roads; and
- keep ready the phone numbers of all emergency services like police, fire brigade and medical centre.

(C) Some other precautions if you are staying in a cyclone prone area :

- Do not drink water that could be contaminated. Always store drinking water for emergencies.
- Do not touch wet electric switches and fallen powerlines.
- Do not pressures the rescue force by making undue demands.
- Cooperate and help your neighbours and friends.

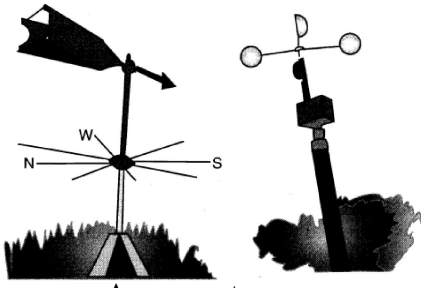
Q.2 What precautions would you take if you are facing a storm with lightning?

Ans. If a storm is accompanied by lightning, we must take the following precautions:

- Do not take shelter under an isolated tree. If you are in a forest, take shelter under a small tree. Do not lie on the ground.
- Do not take shelter under an umbrella with a metallic end.
- Do not sit near a window, open garages, storage sheds and metal sheds are not the safe place to take shelter.
- A car or a bus is a safe place to take shelter.
- If you are in water, get out of it and go inside a building.

Q.3 What is an anemometer? Draw its structure.

Ans. The instrument that measures wind speed is called an anemometer. Wind speed plays an important role in the formation of storms. The anemometer becomes useful to predict the cyclones or storms in cyclone prone areas.



Anemometer

CONCEPT APPLICATION LEVEL - III

Section–A

Q.1 Match the items given under Column I with those given in Column II:

Column I	Column I
(i) Wind	(a) Dark funnel shaped cloud
(ii) Monsoon	(b) Very low pressure system with very high speed winds revolving around it
(ii) Thunderstorm	(c) measures the speed of wind
(iv) Cyclone	(d) develops in India very frequently
(v) Tornado	(e) Moving air
(vi) Anemometer	(f) Winds carrying water

Section–B

Q.2 Fill in the blank space in the following statements:

(i) Moving ..... is called a wind.

(ii) Air exerts ..... .

(iii) Increased wind speed is accompanied by ..... air pressure.

(iv) The warm air is .... than cold air.

(v) Wind currents are generated due to ..... heating on the earth.

(vi) Very ..... pressure system with very ..... speed winds revolving around it is called a cyclone.

(vii) A dark funnel shaped ..... that reaches from the sky to the ground is called a tornado.

(viii) ..... and ..... have made possible to issue a cyclone alert, i.e., 48 hours in advance.

Section–C

Q.3 Choose the true and false statements from the following:

(i) Air around us exerts pressure.

(ii) Air contracts on heating and expand on cooling.

(iii) As cool air rises air pressure at that place is reduced and the warmer air moves to that place.

(iv) Winds carrying water vapours bring rains.

(v) High speed winds and air pressure differences can cause cyclones.

(vi) Cyclones are beneficials to the people living in coastal areas.

(vii) Tornadoes are very frequent in our country.

(viii) It has become easier to monitor cyclones with the help of advance technology like satellites and radars.

Section–D

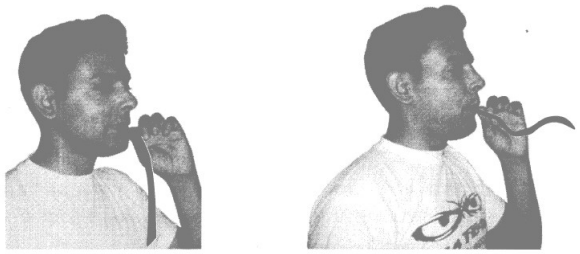
Choose the correct option in the following:

Q.1 In which year did Orissa was hit by a cyclone?

(A) 1999 (B) 2000 (C) 2001 (D) 2004

Q.2 Leaves of trees, banner or flags flutter when wind is blowing. Why?
(A) Air occupies space
(B) Air is a mixture of gases
(C) Air exerts pressure
(D) Air is colourless

Q.3 When we blow over a paper strip it goes upward as shown in the figure given below. Why?



(A) Blowing over the paper reduces the air pressure above the strip
(B) Blowing over the paper increases the air pressure above the strip
(C) None of these is a correct reason
(D) The strip will not go upward at all

Q.4 When we blow between the two balloons as shown in the Fig. 8.7, what will happen?
(A) Balloons will move towards each other
(B) Balloons will move away from each other
(C) Balloons will remain on their original position
(D) Cannot say

Q.5 Air moves from
(A) the region of high pressure to low pressure
(B) the region of low pressure to high pressure
(C) does not depend upon the pressure
(D) air does not move

Q.6 The winds from oceans carry water and bring rain. These winds are called
(A) typhoon (B) monsoon (C) cyclone (D) none of these

Q.7 What is a cyclone?
(A) Winds from the oceans carrying water
(B) Very low pressure system with very high speed winds revolving around it
(C) Dark funnel shaped cloud that reaches from the sky to the ground
(D) None of these

Q.8 Pick the odd one out
(A) Cyclone (B) Hurricane (C) Monsoon (D) Typhoon

Q.9 A cyclone warning can be issued
(A) 48 hours in advance
(B) 12 hours in advance
(C) 6 hours in advance
(D) 24 hours in advance

Q.10 The factor which contribute (s) to the development of cyclones is/are
(i) Wind speed (ii) Temperature (iii) Humidity
(A) (i) only (B) (ii) & (iii) only (C) (i) & (iii) only (D) All of these

Q.11 Match the columns and select the correct option from the codes given below.

	Column -I		**Column-II**
(a)	Wind carrying water	(i)	Thunderstorms
(b)	Dark funnel shaped cloud	(ii)	Tornado
(c)	Moving air	(iii)	Monsoon
(d)	Develop in India very frequency	(iv)	Wind

(A) a-(iii), b-(ii), c-(iv), d-(i) (B) a-(ii), b-(iv), c-(i), d-(iii)
(C) a-(iv), b-(i), c-(iii), d-(i) (D) a-(i), b-(ii), c-(iii), d-(iv)

Q.12 How does cyclone decrease the fertility of the soil in the coastal areas ?
(A) By flooding the land with saline water
(B) By dissolving soil and rocks
(C) By increasing the water table of the place
(D) By decreasing the water table of the place

Q.13 The factor which contribute to the development of cyclones is/are
(i) Wind speed (ii) Temperature (iii) Humidity
(A) (i) only (B) (ii) and (iii) only (C) (i) and (iii) only (D) All of these

Q.14 Following are the precautions one must take in the case a storm is accompanied by lightning. Which one of the following statements is not correct ?
(A) Do not take shelter under a tall tree (B) Do not take shelter inside a closed car
(C) Do not take shelter under an umbrella (D) Do not take shelter under an open garage

Q.15 During the formation of rain, when water vapours change back to liquid in the form of rain drops, ___
(A) Heat is absorbed
(B) Heat is released
(C) Heat is first absorbed, and then released
(D) There is no exchange of heat

ANSWER KEY

CONCEPT APPLICATION LEVEL - III

Section–A

Q.1 Match the items in Column I with Column II:

Column I	Column I
(i) Wind	(e) Moving air
(ii) Monsoon	(f) Winds carrying water
(ii) Thunderstorm	(d) develops in India very frequently
(iv) Cyclone	(b) Very low pressure system with very high speed winds revolving around it
(v) Tornado	(a) Dark funnel shaped cloud
(vi) Anemometer	(c) measures the speed of wind

Section–B

Q.2 Fill in the blanks:

(i) air (ii) pressure (iii) reduced (iv) lighter (v) uneven
(vi) low, high (vii) cloud (viii) Satellites, radars

Section–C

Q.3 TruelFalse:

(i) True (ii) False (iii) False (iv) True (v) True
(vi) False (vii) False (viii) True

Section–D

Q.1	A	Q.2	C	Q.3	A	Q.4	A	Q.5	A	Q.6	B	Q.7	B
Q.8	C	Q.9	D	Q.10	D	Q.11	A	Q.12	A	Q.13	D	Q.14	B
Q.15	B												