LEARNING OBJECTIVES -

1. Concepts of air pressure.
2. Few examples depicting the same.
3. High speed winds are accompanied by reduced air pressure.
4. Air expands on heating.

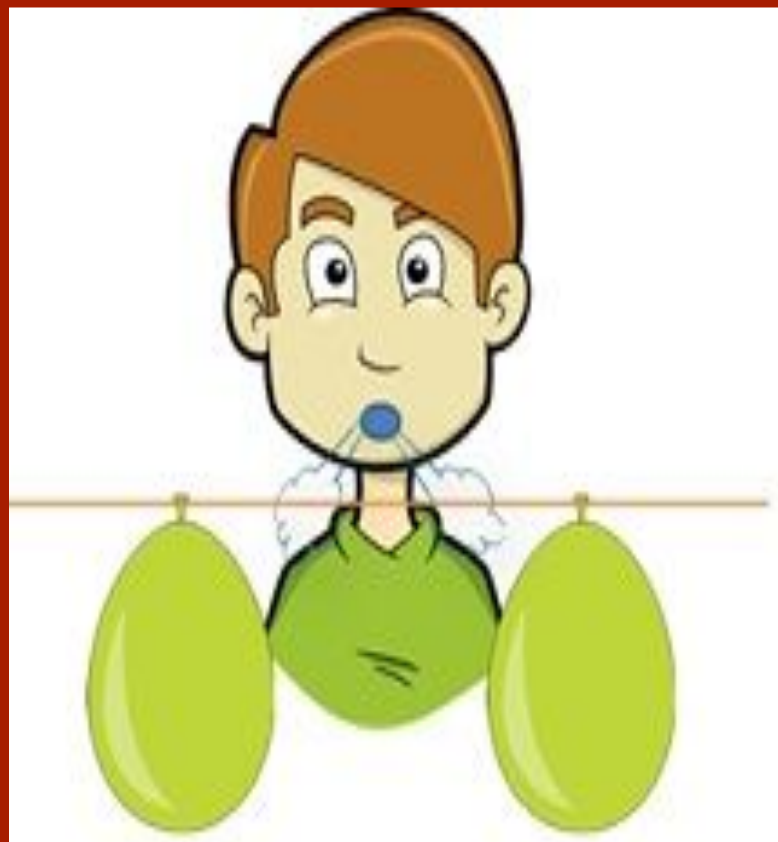
Air Pressure concepts -

As the pressure of an area reduces, wind speed increases and vice versa. Higher the pressure difference, higher the speed of wind.

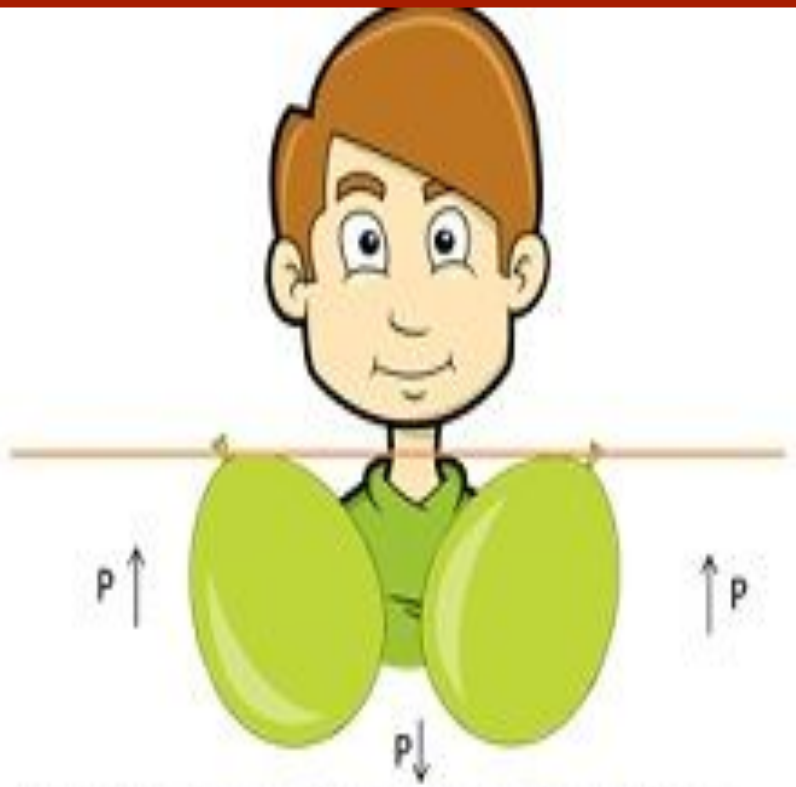
Thus, the two major concepts are:

1. **High speed winds are accompanied by reduced air pressure.**
2. **Air travels from high pressure areas to low pressure areas.**

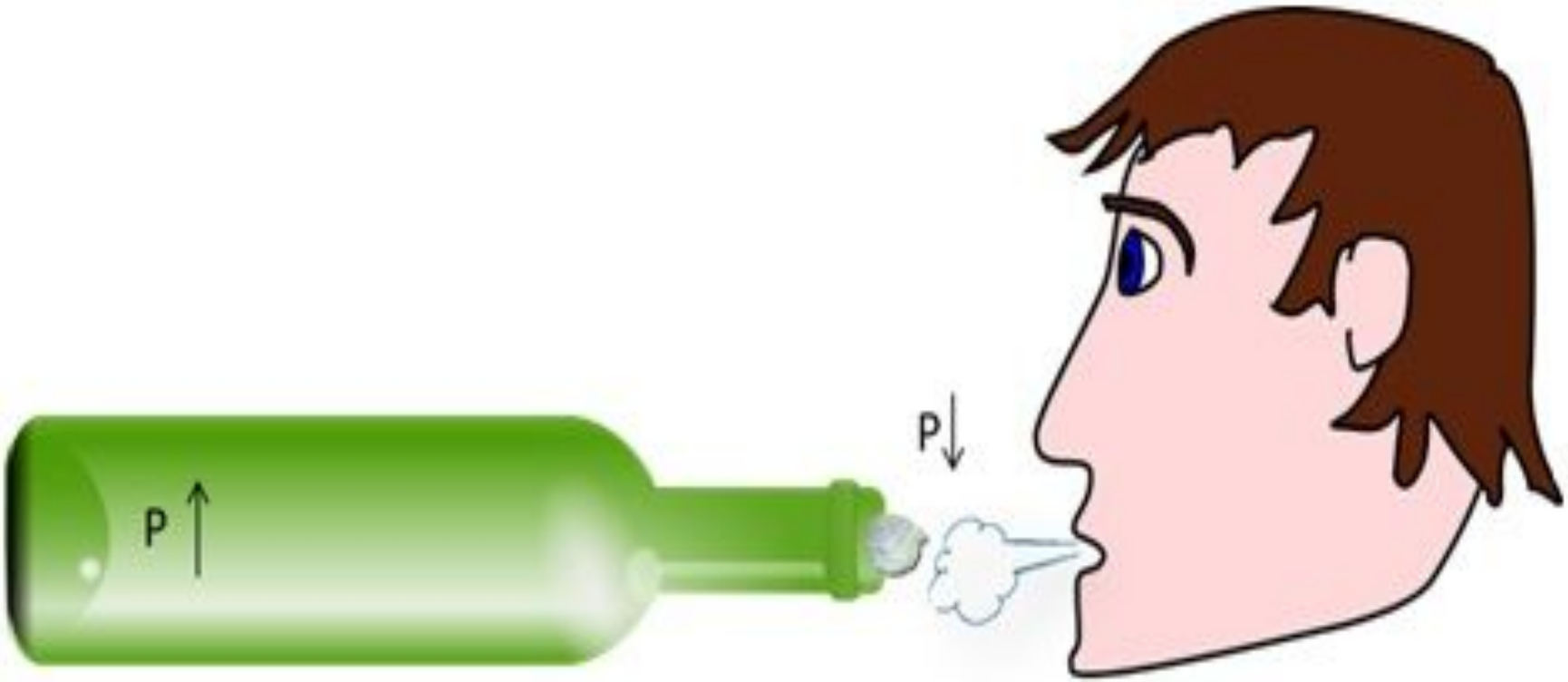
Examples -



Blowing air between two balloons tied to a rod.
This reduces the air pressure between the balloons.



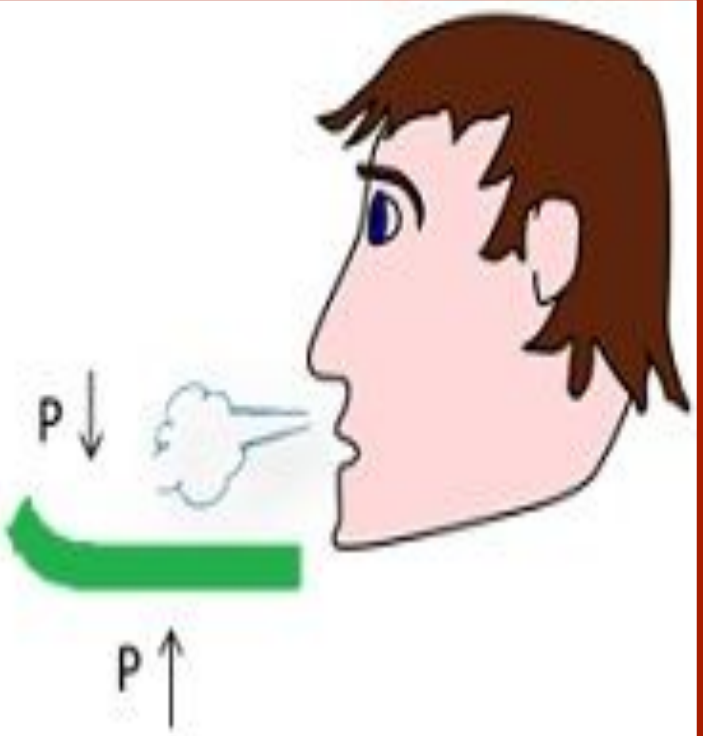
Since the pressures at the outer parts are higher than inside, the balloon move towards each other (High pressure to Low Pressure).



Since the pressure inside the bottle becomes higher than that outside the bottle when air is blown, the paper ball doesn't go inside. In fact, the ball comes out of the bottle (from high pressure area to lower pressure area).

https://youtu.be/--XgAEbD1iM

Blowing air above a paper strip.



High speed air reduces pressure above paper strip, so strip moves up from high pressure to low.

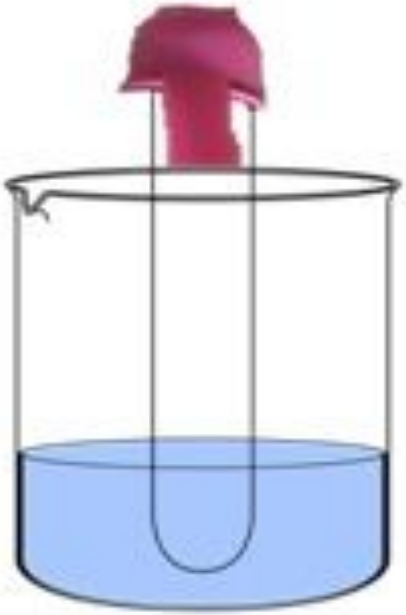
Air Expands on Heating -

- Air molecules expand on heating and contract on cooling.
- Hot air molecules take more space than cold air molecules.
- Warm or Hot air is lighter than cool air.
- Warm air, like smoke, rises up and cool air settles down.
- When warm air rises up, it creates low pressure in the area, so surrounding cooler air, from relatively higher pressure, then comes to take up its place.

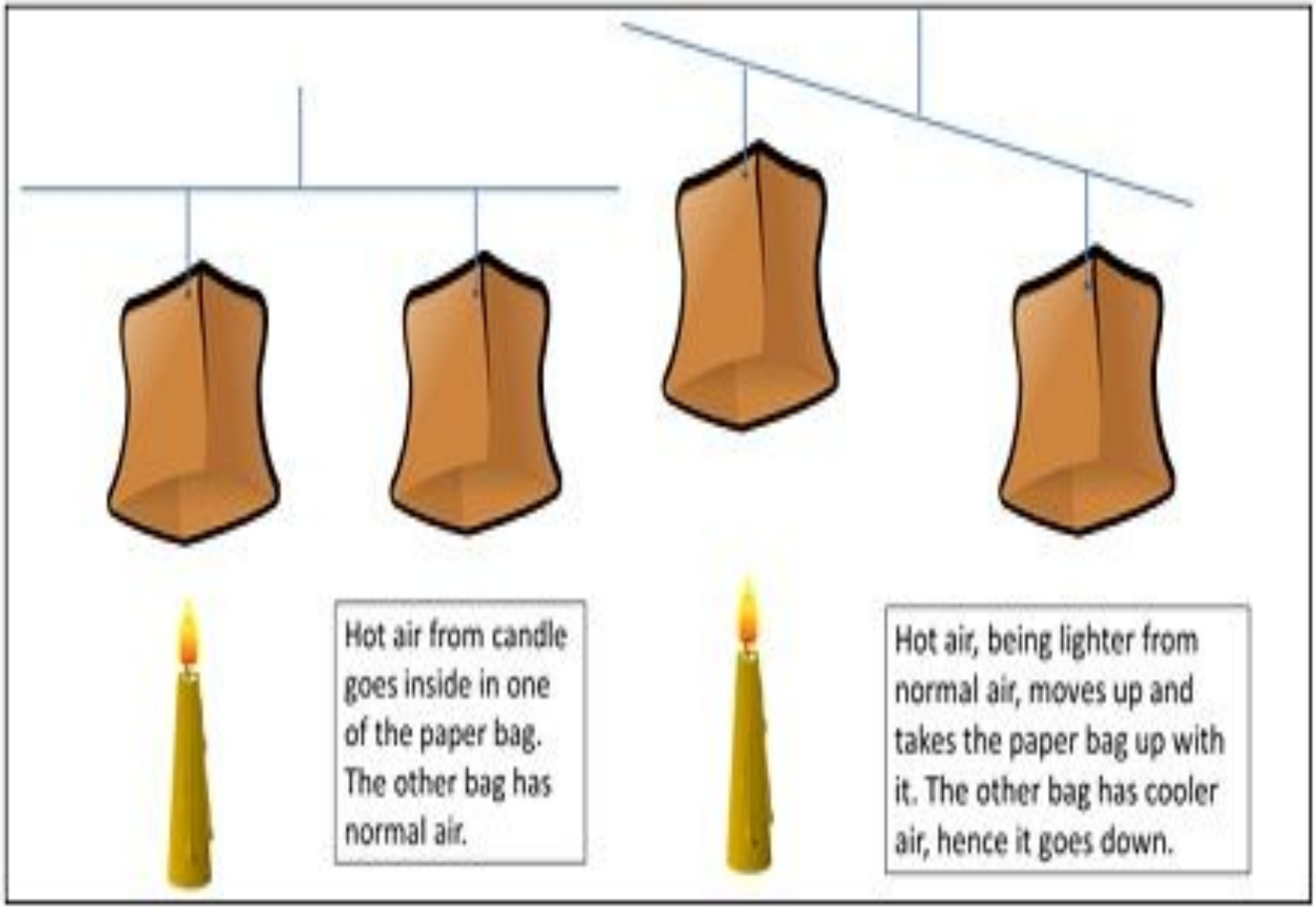
Examples -

- When a test tube is immersed in hot water, the air inside it expands and tries to take more space. On the other hand, when immersed in cold water, the air inside the tube contracts a little and tries to take up lesser space than normal.

A balloon gets a little blown up when attached to a tube under hot water

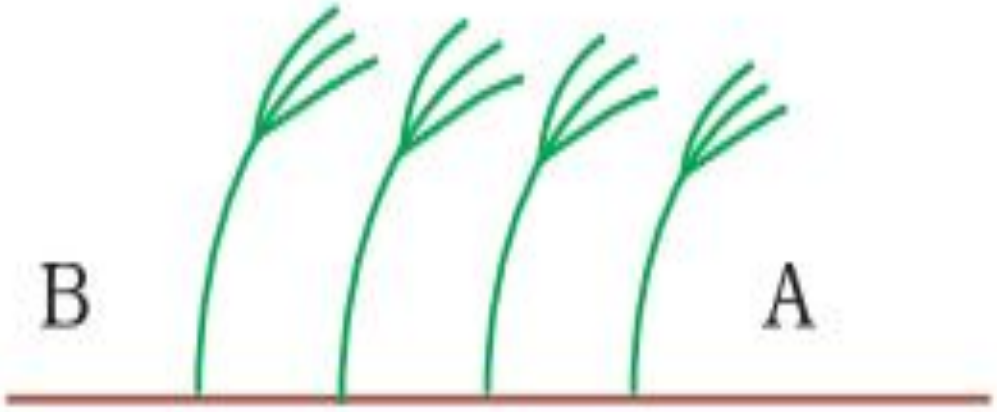


A balloon gets sucked inside when attached to a tube under cold water


Hot air from candle goes inside in one of the paper bag. The other bag has normal air.
Hot air, being lighter from normal air, moves up and takes the paper bag up with it. The other bag has cooler air, hence it goes down.

PLENARY -

Q. Figure shows a diagrammatic representation of trees in the afternoon along a sea coast. State on which side is the sea, A or B? Give reasons for your choice.



Answer.

In the afternoon, the wind blows from sea to land.

As pressure on the land is less than the pressure above sea, so the sea is on B side.

ASSESSMENT / EVALUATION -

Q. Rohan was very happy that there was his birthday. He was decorating the room by blowing balloons. He was wondered that most of his balloons bursted. He rushed to his father and asked the reason. His father smiled and explained.

(a) Can you explain the reason that why his balloons get burst?

(b) What can be conclude from the condition mentioned?

A. (a) When Rohan blows air into the balloon, the balloon gets inflated due to the pressure exerted by air. But, Rohan observed that most of his balloons bursted. The reason behind it was, he overfilled the air into the balloon. The warm air gets expanded inside the balloon and exerted more and due to the more pressure on the walls of the balloon, balloons bursted.

(b) From the condition mentioned above, it can be concluded that air expands on heating.