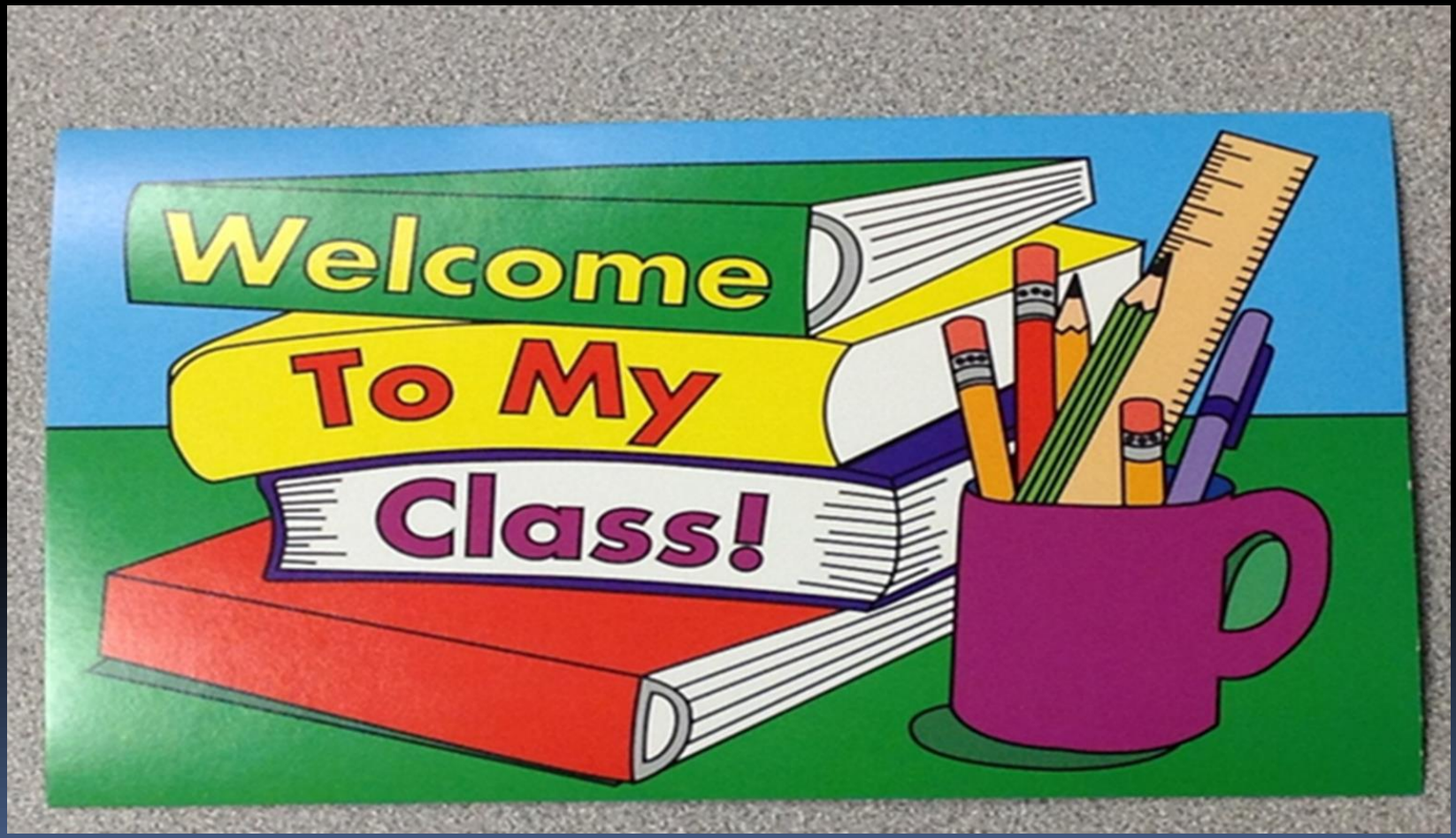
Pakistan School
Kingdom of Bahrain

Class: 9
subject: Physics



Engaging starter

- Name 3 modes of transfer of heat.
- What is the name of mode of transfer of heat in solids?

topic

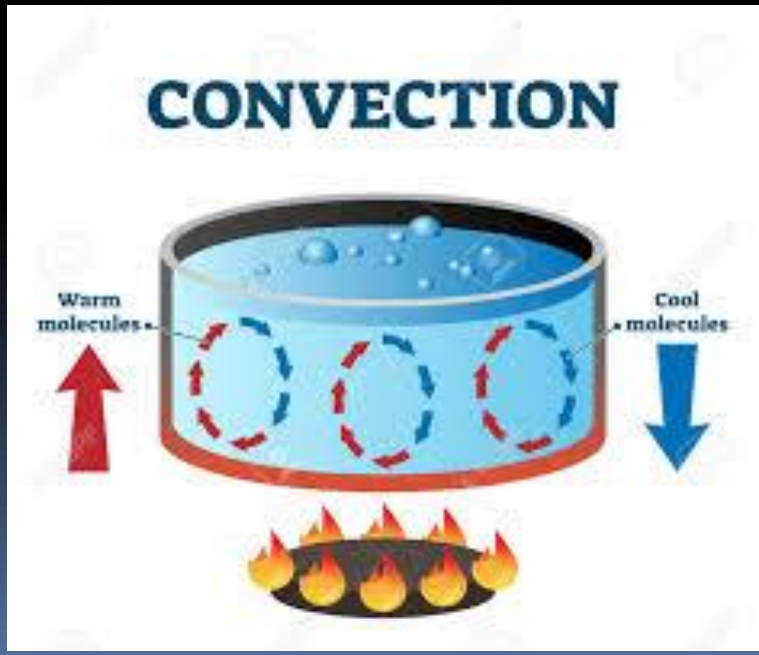
- Convection

Objective:

- At the end of this lesson students will be able to:
- Describe the transfer of heat by convection method.

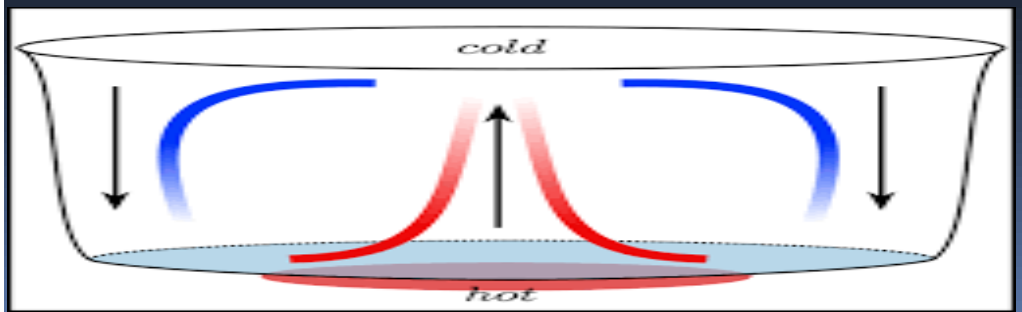
Convection

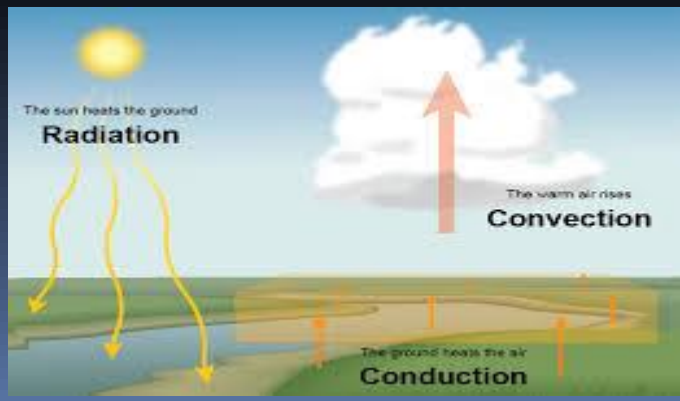
- Definition:
- Transfer of heat by actual movement of molecules from hot place to a cold place is
- known as convection".



Explanation:

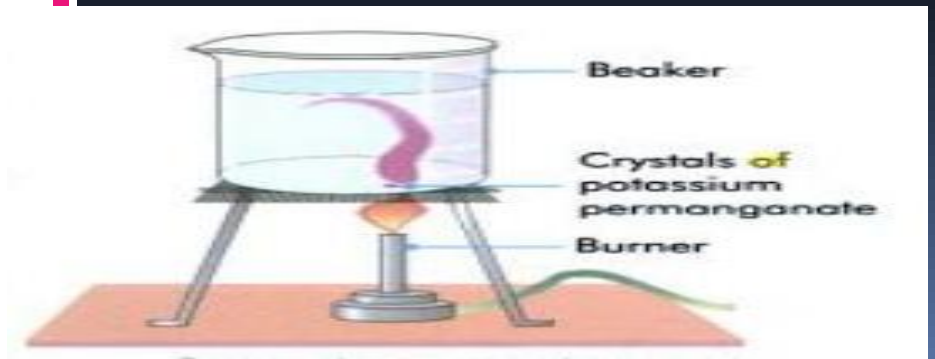
- Liquids and gases are poor conductors of heat. However, heat is transferred through fluids
- easily by another method called convection.
- A liquid or a gas becomes lighter as it expands on heating. Hot liquid or gas rises up above the
- heated area. The cooler liquid or gas from the surroundings fills the place which in turns is heated up.
- In this way, all the fluid is heated up. Therefore, transfer of heat though fluids takes place by the
- actual movement of heated molecules from hot to cold parts of the fluid.





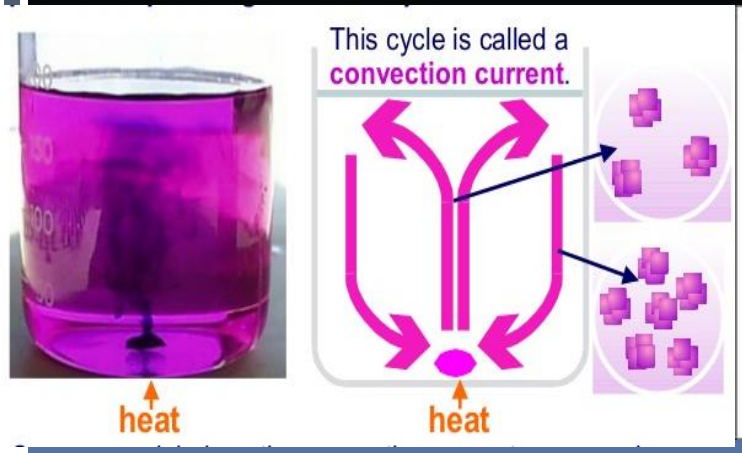
Experiment:

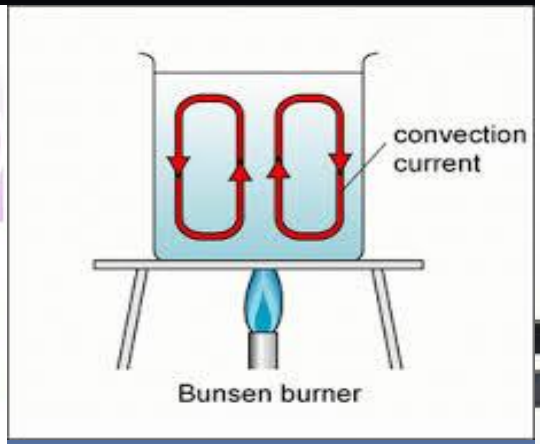
- Take a beaker and fill two-third of it with water. Heat the beaker
- by keeping a burner below it drop two or three crystals of potassium
- permanganate in the water. It will be seen that colored streaks of water
- formed by the crystals move upwards above the flame and then move
- downwards from sideways. These colored streaks show the path of
- currents in the liquid. The liquid currents stop on removing the burner
- under the beaker.
- When the water at the bottom of the beaker gets hot, it expands,
- becomes lighter and rises up. While the cold but denser water moves
- downward to take its place.



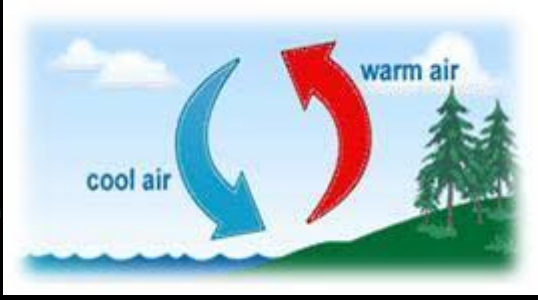
Observation:

- These colored streaks show the path of
- currents in the liquid. The liquid currents stop on removing the burner
- under the beaker.
- Reason :
- When the water at the bottom of the beaker gets hot, it expands,
- becomes lighter and rises up. While the cold but denser water moves downward to take its place.

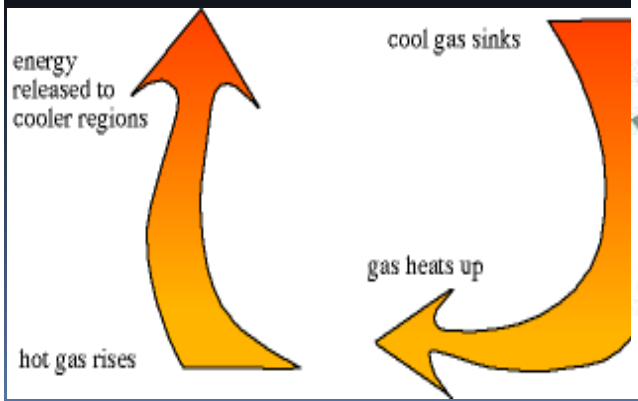


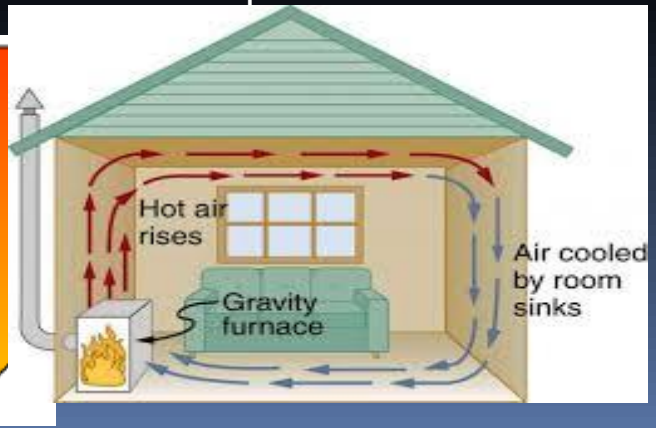


Convection Currents i



- Gases also expand on heating, thus convection currents are
- easily set up due to the differences in the densities of air at various as shown in figure
- Use of Convection Currents:
- i. Convection currents set up by electric, gas or coal heaters help to warm our homes and
- offices.
- ii. Central heating systems in buildings work on the same principle by convection.
- iii. Convection currents occur on a large scale in nature. The day-to-day temperature changes in
- the atmosphere result from the circulation of warm or cold air that travels across the region
- iv. Land and sea breezes are also the examples of convection currents.



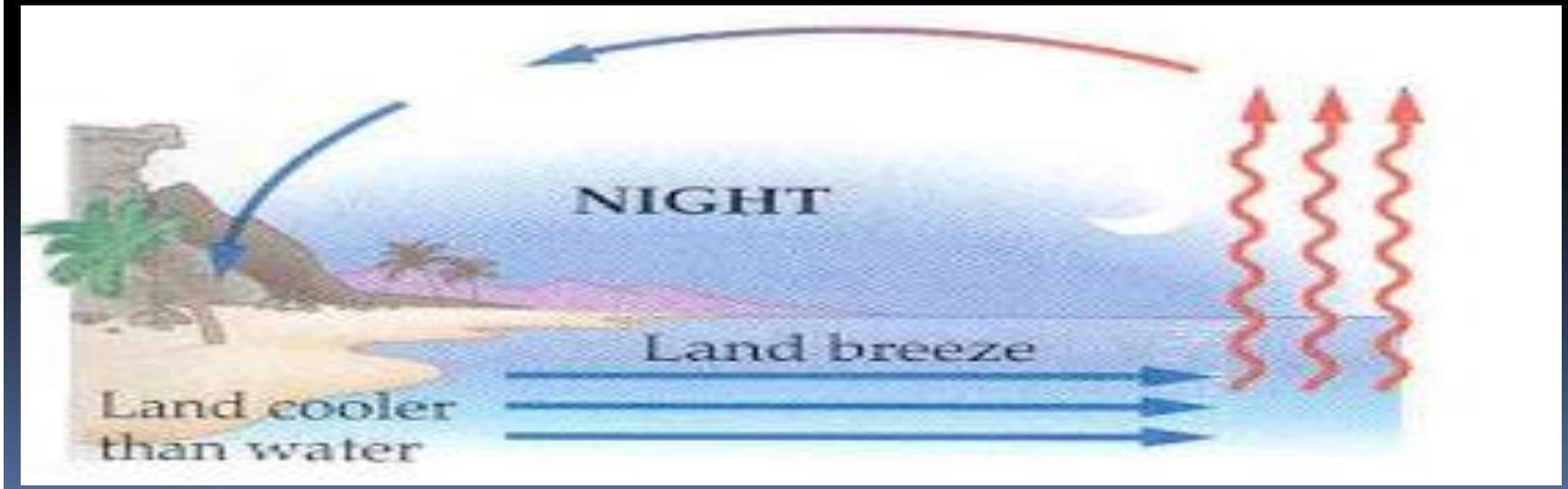


LAND AND SEA BREEZES:

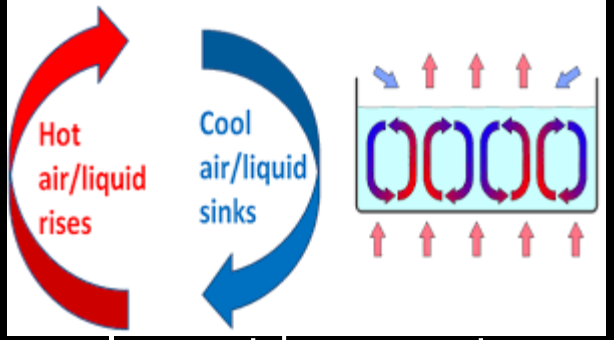
- Land and sea breezes are the result of convection.
- Sea Breeze:
- On a hot day, the temperature of the land increases more quickly
- than the sea. It is because the specific heat of land is much smaller as compared to water. The air above land gets hot and rises up. Cold air from the sea begins to move towards the land. It is called sea breeze.

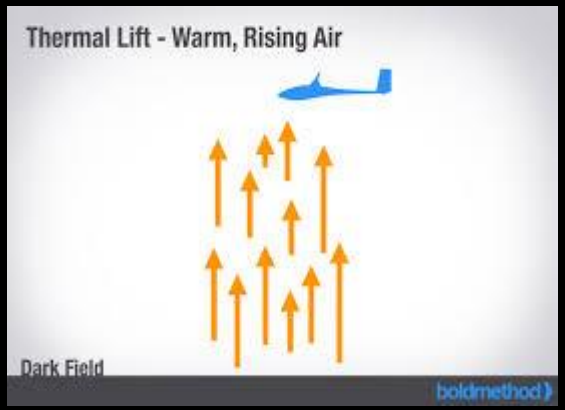
Land Breeze:

- At night, the land cools faster than the sea. Therefore, air above
- the sea is warmer, rises up and the cold air from the land begins to move
- towards the sea. It is called land breeze.
- Importance:
- The land and sea breezes help to keep the temperature moderate in coastal areas.

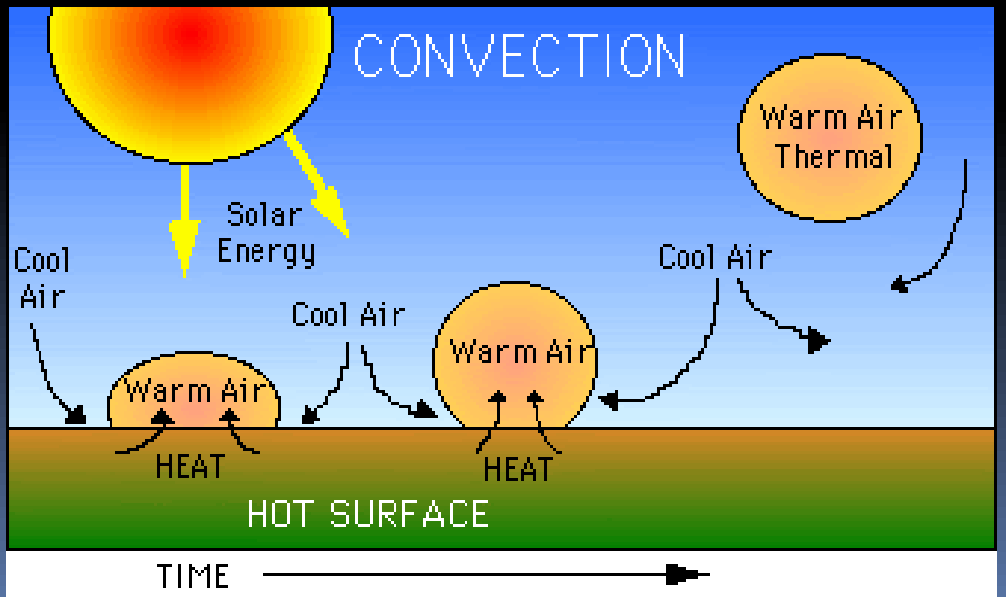


GLIDING:



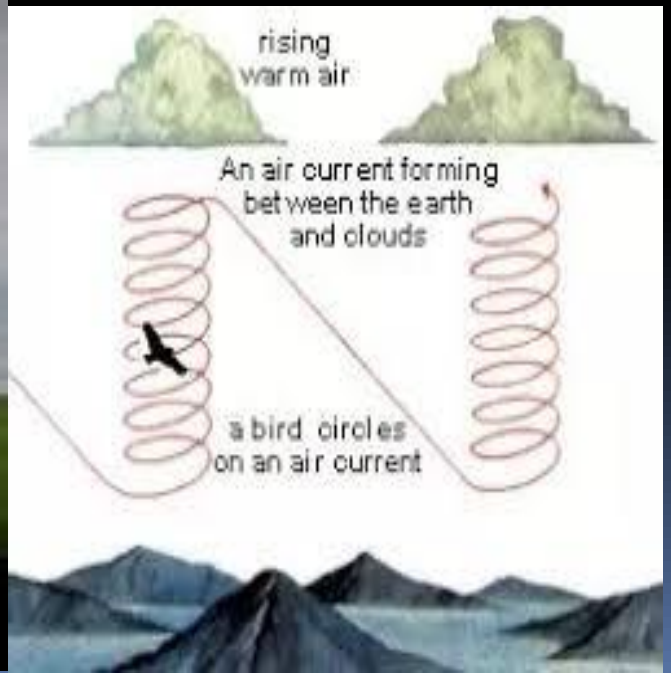


- A glider looks like a small aero plane without engine.
- Principle of Gliding:
- Glider pilots use upward movement of hot air currents due to
- convection of heat. These rising currents of hot air are called thermals.
- Gliders ride over these thermals. The upward movement of air currents in
- thermals helps them to stay in air for a long period.



Process of Gliding in Birds:

- The birds stretch out their wings and circle in these thermals. The
- upward movement of air helps birds to climb up with it. Eagles, hawks and vultures are expert thermal climbers. After getting a free lift, birds are able to fly for hours without flapping their wings. They glide from one thermal to another and thus travel through large distances and hardly need to flap their wings.



plenary

- In convection heat is transferred by actual movement of .....
- Convection is done in ..... (solid/ liquids)
- Give one example of convection in daily life.
- When air is heated it becomes.....And goes .....
- Sea breezes blow from sea to land at day time . T/F
- The rising currents of hot air are called ..... (waves / thermals).
- Tell the name of any 1 best thermal climber.

Homework

- Search and write some more examples of convection in daily life.


STAY HOME!
STAY SAFE!

- Allah Hafiz