RABINDRANATH WORLD SCHOOL
GURGAON
विवेक और ज्ञान

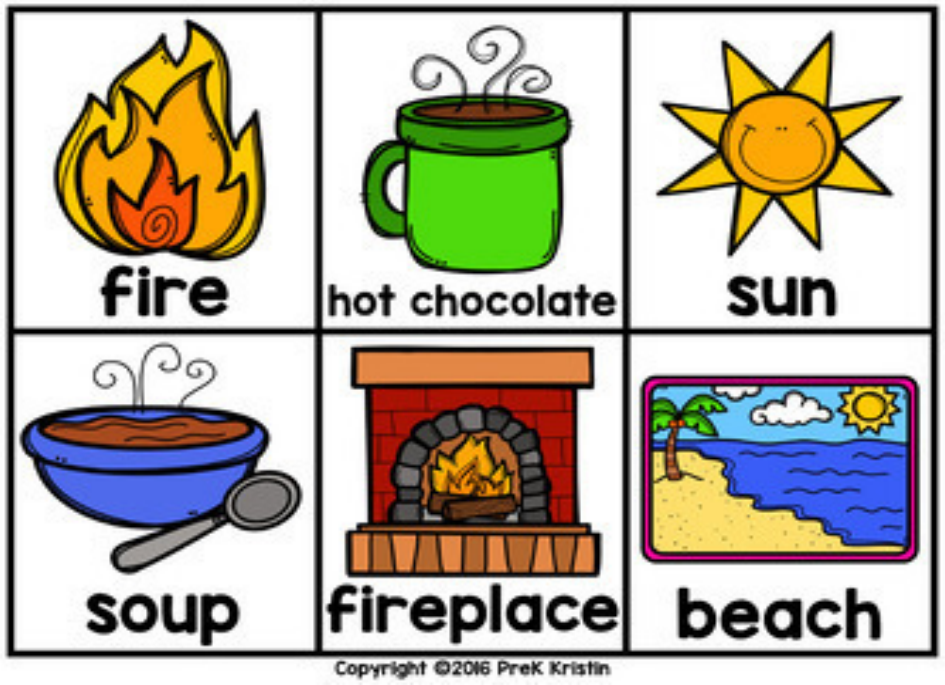
WE ARE RABINDRANATH WORLD SCHOOL

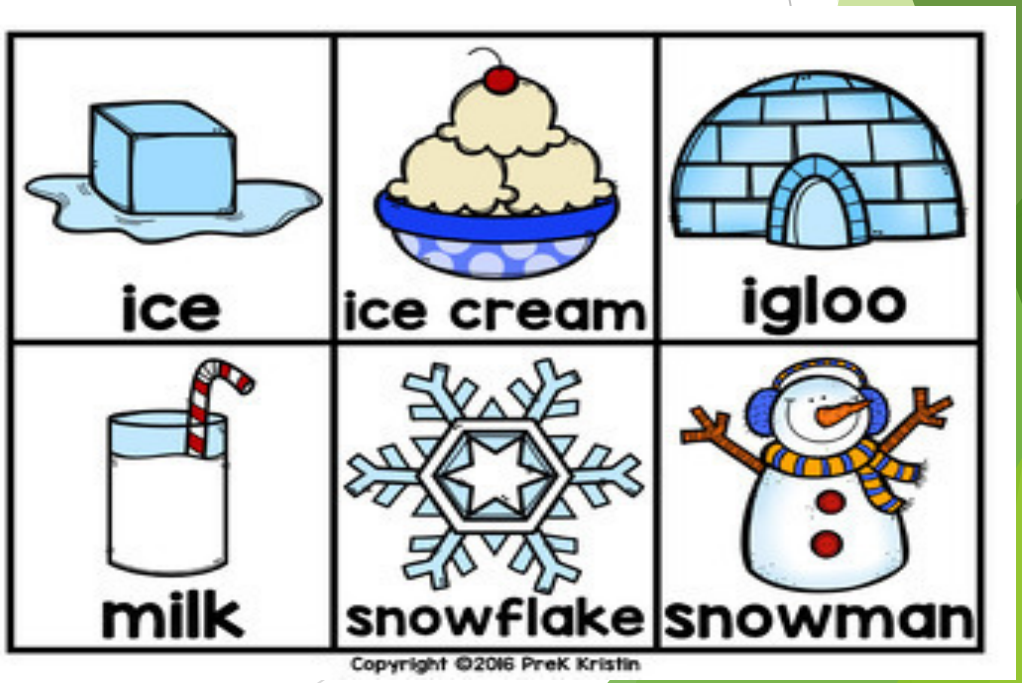
CLASS 7th
science

Heat

May, 21

- Heat is a form of energy. It makes a substance hotter. We cannot see it, we can only feel it.
- In our daily life we come across a number of objects. Some of them are hot while some are cold.
- A reliable measure of the hotness or coldness of an object is its temperature.





Temperature

- The temperature of an object is the degree of hotness or coldness of the object.
- A hot object has a high temperature whereas a cold object has a low temperature.
- Temperature is measured by a devise called thermometer.
- The temperature is expressed in the unit ‘ degree Celsius ’. Which is written as C.

Thermometers

A thermometer is a device for measuring the temperature of an object. There are two types of thermometers:

Laboratory thermometer and Clinical thermometer

Laboratory thermometer

- This is used for measuring the temperatures of different chemicals in science laboratory.
- The temperature range of laboratory thermometer is generally **from -10 Celsius to 110 Celsius.**
- A laboratory thermometer cannot be used to measure the human body temperature.

Precautions to be taken while reading laboratory thermometer.

- For taking the reading with clinical thermometer, the bulb of the thermometer should be in proper contact of object whose temperature is to be measured.
- For example:- for taking temperature of boiling water in beaker the thermometer had to be immersed in water and not touch side of beaker.
- The reading of the temperature should be taken without removing the thermometer from its position.
- The eye of the observer should be at the same vertical level as that of the mercury in the capillary tube.
- The thermometer should not be use to measure the temperature below its lowest marking or above its highest markings.

Clinical Thermometer

- This thermometer is used to measure human body temperature.
- It has a very short range of temperature from **35 Celsius to 42 Celsius.**
- A clinical thermometer has a **kink** in its glass tube just above the bulb.
- It has two temperature scales : **Celsius scale and Fahrenheit scale.**
- The normal temperature of human body is **37 Celsius** or **98.6 Fahrenheit**.

Precautions to be observed while reading a clinical thermometer

1. Thermometer should be washed before and after use, preferably with an antiseptic solution.
2. Ensure that before use the mercury level is below 35°C.
3. Read the thermometer keeping the level of mercury along the line of sight.
4. Handle the thermometer with care. If it hits against some hard object, it can break.
5. Don't hold the thermometer by the bulb while reading it.

Difference between Clinical and Laboratory Thermometer

Clinical thermometer	Laboratory thermometer
It is used to measure the body temperature.	It is used to measure the temperature in laboratory.
It is graduated from 35 °C to 42 °C or 94 °F to 108 °F.	It is graduated from –10 °C to 110 °C.
There is a kink near the bulb to prevent the fall of mercury level.	No kink is present, so mercury level falls on its own.
Jerks are given to lower the mercury level.	Jerks need not be given, mercury level falls automatically.
Temperature can be read after removing it from the source.	Temperature is read while being in contact with the source.

Transfer of Heat

- To carry heat from one part of an object to its other part, or from one object to another object is called transfer of heat.

- Heat flows from a **hot object** to **cold object**. It flows from an object at **higher temperature** to another object at **lower temperature**.
- Heat can be transferred in three different ways:

Conduction

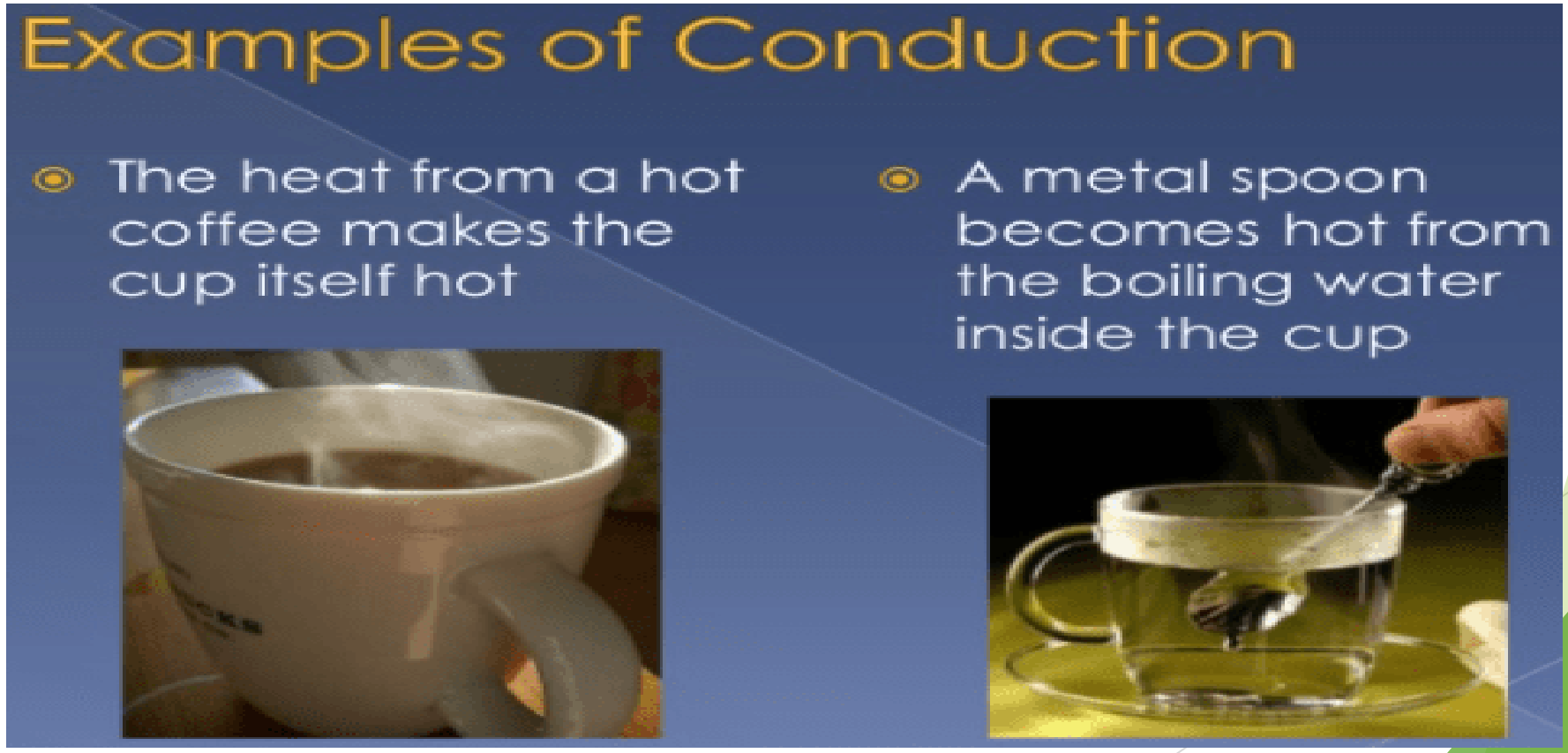
Convection

Radiation

Conduction

It is the transfer of heat from the **hotter part** of a material to its **colder part** or from a hot material to a cold material **in contact** with it without the movement of material as a whole.

The transfer of heat by the process of conduction takes place in **solids only.**



Good conductors and poor conductors of heat

On the basis of conduction of heat, all the materials are classified into two groups:

Good conductors of heat

Bad conductors of heat

- Those materials which allow heat to pass through them easily are called **good conductors of heat.**
- **All metals** are good conductors of heat.
- **Copper** is one of the best conductor of heat.
- All the objects made up of **metals or metal alloys** are good conductors of heat.

Good and Poor Conductors

Conductors: *material that easily transfers heat*

- Poor Heat Conductors

- Wood
- Plastic
- Glass
- Gases

- Good Heat Conductors

-Most metals

Those materials which do not allow heat to pass through them easily are called **poor conductors of heat.**

- They are also called **Insulators.**
- **Liquids** are poor conductor of heat and **gases** are very poor conductor of heat.
- The materials which **trap air** as wool, fur etc. are very poor conductor of heat.
- Some examples are – wood, leather, plastic, rubber.

Uses of good conductors and poor conductors of heat

Uses of Good and Bad Conductors of Heat:

1. Cooking utensils are made from good conductors of heat. Such utensils get heated up quickly. Food can be cooked efficiently in shorter time. The utensils are generally made of copper, brass, steel, aluminium etc.

2. The handles of kettles and utensils are made of bad conductors of heat such as wood, plastic, ebonite, etc. They help in holding them comfortably.

3. Woolen clothes are bad conductors. Woolen clothes are not actually warm. They do not allow heat to conduct away or to escape out and thus keep our body warm.

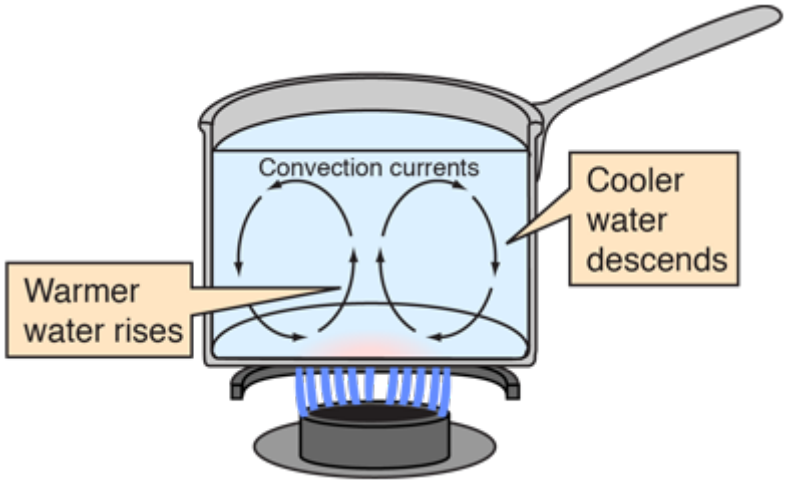
4. Building materials like brick, asbestos, mud, grass, etc., are bad conductors of heat. They do not permit heat and cold to pass through the walls of bricks. They keep the houses warm in winter and cool in summer.

Convection

- It is the transfer of heat from the hotter parts of **a liquid or gas** to its colder parts by the movement of the liquid or gas itself.
- The transfer of heat by convection **cannot** take place in **solids** because the particles in the solids are fixed at a place and hence cannot move about freely.

- Convection **also cannot** take place in **empty space** (vacuum) because there are no particles which can move and transfer heat.

Convection in water



Water is a **poor conductor** of heat. Water transfers heat by the process of **convection.**

When the water in a beaker is heated over a burner, water at the bottom gets heated, expands and become lighter. This hot water rises upwards and carries heat along with it. The cold water from above sinks down.

The **circulatory movements** of water in the beaker in which hot water rises and cold water sinks again and again , are called **convection currents.**

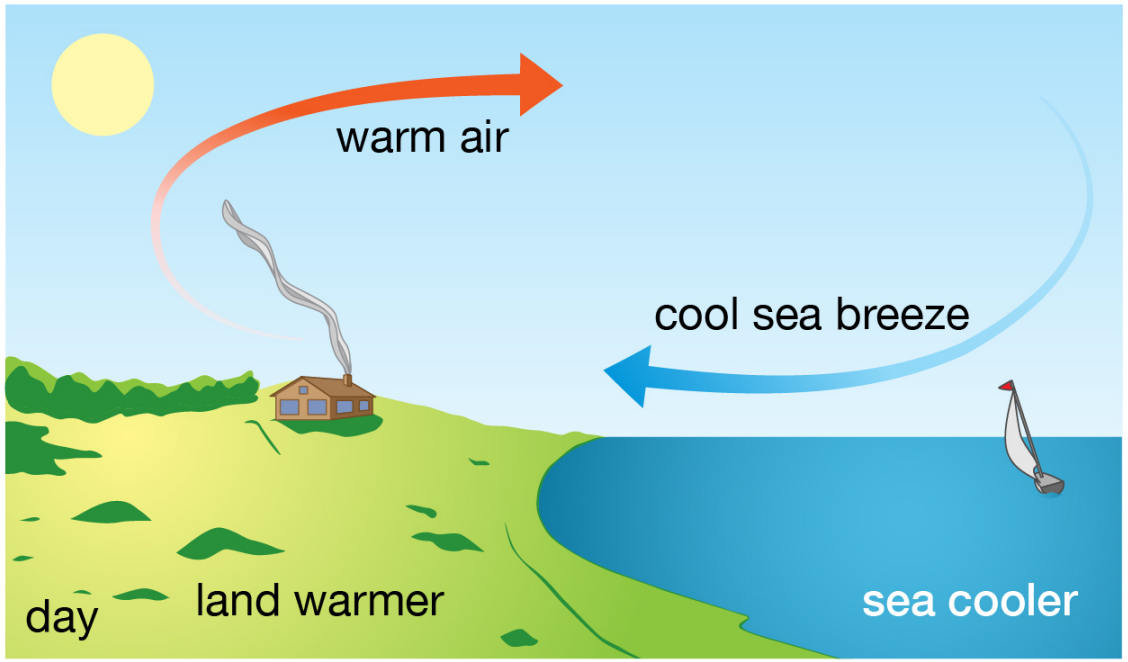
The water in a beaker is heated by **convection currents.**

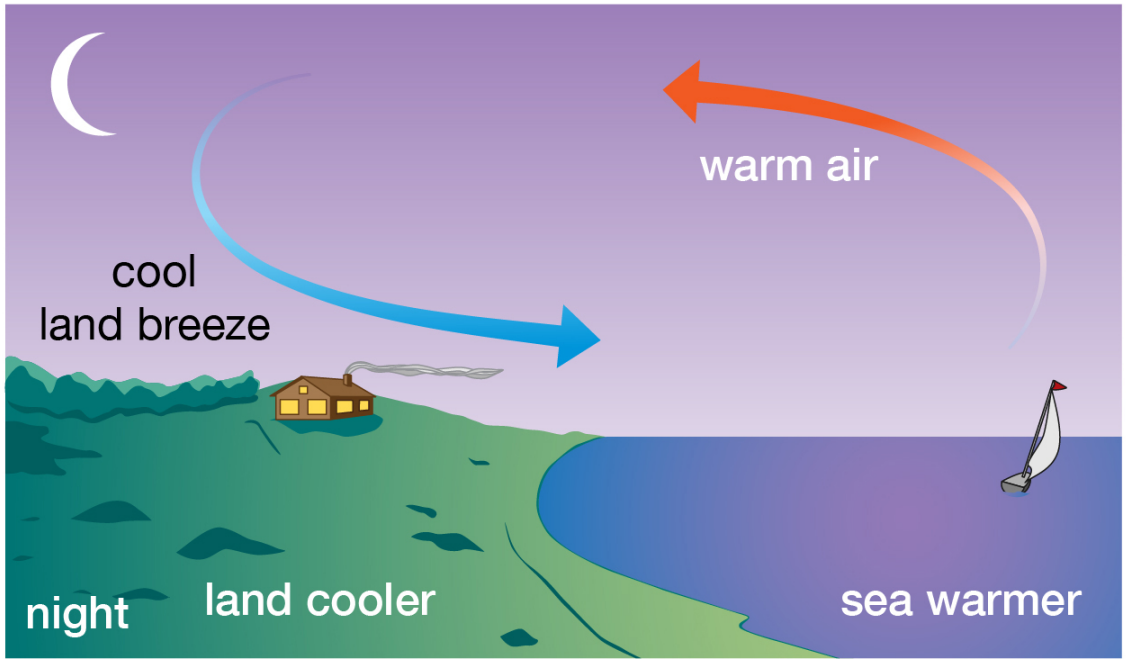
Convection in Air

Air is very **poor conductor of heat**. Air also transfers heat from its hotter parts to colder parts by the process of convection.

When a room heater is kept in a room , it heats all the air in the room by setting up convection currents in the air.

In this process the hot air rises upward and cold air sinks downward again and again until the air in the room gets heated uniformly.





The breeze blowing from the sea towards the land is called sea breeze.

The breeze blowing from the land towards the sea is called land breeze.

Sea breeze and land breeze are also formed by the transfer of heat in air by convection currents.

Radiation

It is the transfer of heat energy from a hot body to a cold body by **means of heat rays**, without any material medium between them.

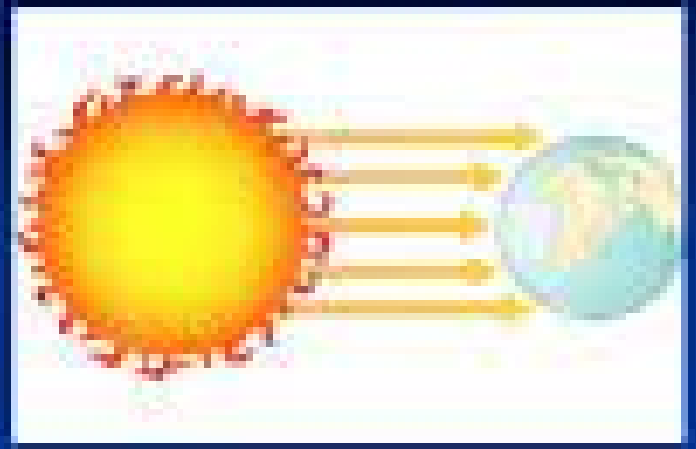
The hot electric bulb transfers its heat to our hand held below it by the process called radiation.

Every hot object emits **invisible heat rays** in all directions.

Best example of radiation is the transfer of **heat energy of the sun to the earth.**

The objects having dark colours absorb more heat radiations than the objects having light colours. That's why we wear dark coloured clothes in winters and light coloured clothes in summer.

Examples of Radiation



THANK YOU

CLASS 7th

Science

Website

www.rwsgurgaon.com

Ms. Simi Rana

Email Address

info@rwsgurgaon.com