FORM 1 SCIENCE

CHAPTER 1 INTRODUCTION TO SCIENCE

1. **Prefix**

mili	0.001	10^{-3}
centi	0.01	10^{-2}
deci	0.1	10^{-1}
kilo	1000	10^{3}

2. **Measuring Instructions**

a. **To measure curve line** (e.g. river or road on the map)
- Use thread and ruler
- Use opisometer

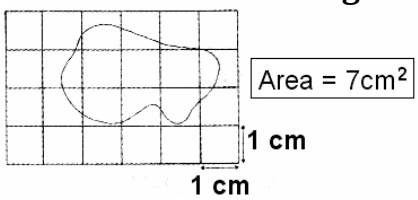
b. i. **Internal calipers** to measure internal diameter of cylinder.

ii. **External caliper** to measure external diameter of cylinder.

iii. Thickness of cylinder

$$= \frac{\text{Extended - Internal}}{2}$$

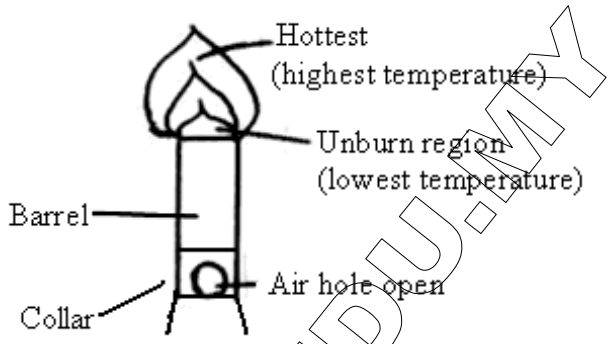
3. a. **Estimate the area of an irregular object**



- Any box that more than 50% are calculated as $1cm^2$.

b.

Differences	
Mass	**Weight**
- quantity of matter	- force reacts on an object
- measured by level balance	- measured by spring balance
- unit kilogram	- unit Newton
- constant	- influenced by gravity force



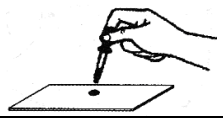
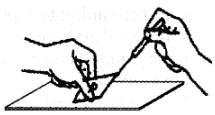
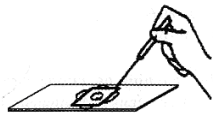
4. **Steps to light a Bunsen burner**
- Close the air hole
- Light the match stick and bring near
- Turn on the gas pipe
- Adjust the collar

5. **Sequences of scientific investigation**
a. Make an observation
b. Make a hypothesis
c. Carry out a experiment
d. Analyse and interpret data
e. Make a conclusion

CHAPTER 2 CELL AS A UNIT OF LIFE

1. a. **Cytoplasm** = place where chemical process occur.

b. **Preparation of cheek cell**

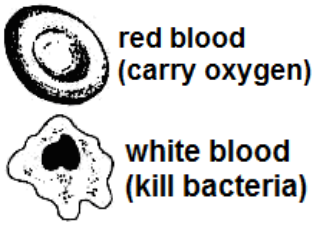
			
Add methylene blue solution on the cell	Cover with slip	Wipe off excess methylene blue solution	Observe under microscope

2.

Cell → **Tissues** → **Organ** → **System** → **Organism**

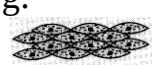
- a basic unit
- eg: sperm, ovum, platelet, white blood, red blood, neurone

sperm ovum (reproductory process)

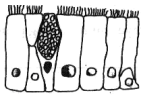


- A group of similar cells performing the same function

eg:



i. Muscle tissue (allow movement)



ii. epithelial tissue

iii. cardiac tissue

- A few groups or different groups of tissues involved in a specific function.
- Digestive system

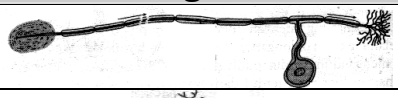
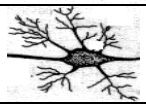
- animal and plant

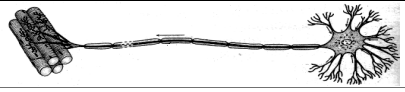
2b.

Organ	System	Function
Stomach	Digestive	to digest or break food
Heart	Blood circulation	to pump blood
Lungs	Respiratory	Absorb oxygen
	Excretion	Carbon dioxide / water
Uterus	Reproductory	
Eyes / **skin**	Sight / touch	
Ear / nose	Hearing / smelling	
Pancreas	Digestive	
Kidney	Excretory	excrete waste product
Intestine	Digestion	Absorb food
Bone	Skeleton	Support and protect

3. a. Nerve / neurone = carries impulse / send information from one part to another part in a human body.

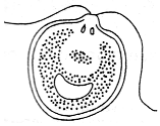
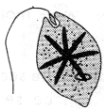
b.

Type of nerve	Diagram	Function
Sensory neurone		- To transfer impulses to the brain.
Relay neurone		- To connect sensory nerve and motor nerve.

Motor neurone		- To transfer impulses to the effector.

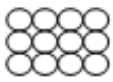
c. Stimulus → receptor → Sensory nerve → Brain → motor nerve → effector

4.

Organism			
Multicellular		**Unicellular (can move)**	
Plants		**Animals**	**Plants**
- with chloroplast - can make food by photosynthesis  Spirogyra	- without chloroplast - can't make food.  Mucuor  Hydra  Mushroom  Yeast	- Without chloroplast - Can't make food  Paramecium  Amoeba	- With chloroplast - Can make food by photosynthesis  Chlamydomonas  Euglena

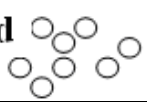
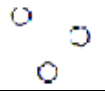
CHAPTER 3 MATTER

1a.

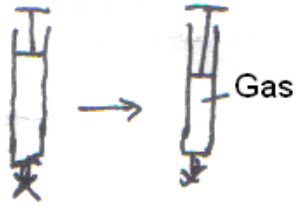
Matter	
 Solid melting / heat up freezing /cooling  Liquid	
Freezing	**Melting**
- Kinetic energy ↓/ heat is released - Distance between molecules nearer. - The particles become closely together and orderly arranged. - Particle vibrate only - Can't move freely	- Kinetic energy ↑/ heat is absorbed - Distance between molecules become further - The particles move further apart and faster - Move randomly - collision greater

Number of molecules unchanged
Size of molecule unchanged

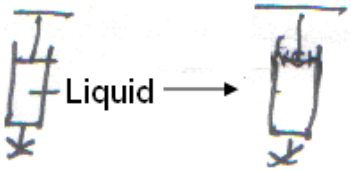
b.

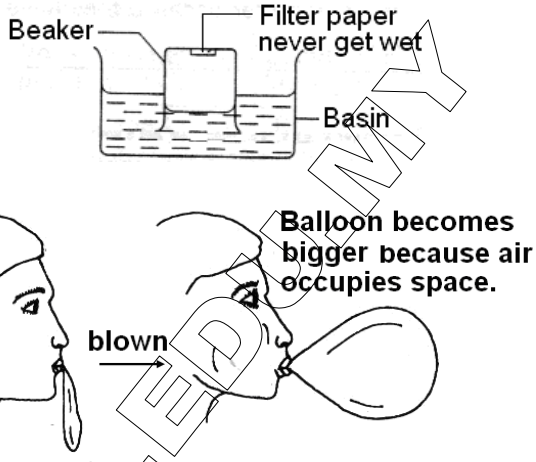
Liquid  heat up / boiling ⇌ heat loss / condensation  Gas	
- Kinetic energy ↓/ heat loss - Distance of particles closer - Particles moves slower	- Kinetic energy ↑/ heat absorbed - Distance of particles increase - Particles moves faster

2a. **Gas is compressible** (because the gas particles are far apart)

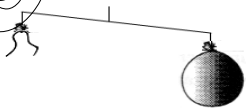


b. **Liquid is uncompressible** (because the liquid particles are closely together)





4. **Air has weight / mass**



3. **Properties of particles in matter**:
   - has volume, mass and occupy space.
     a. **Air occupies space**

CHAPTER 4 VARIETY OF RESOURCE ON EARTH

1.

Substances

Atom (one unit only)	**Molecule** (more than one atoms)	
- e.g: ○ or ⊘	**Element**	**Compound**
	- same type of atoms - e.g: ⊘⊘ or ○○	- different type of atoms - e.g: ○⊘ or ○○

2. **Element** + **Element** —*heated*→ **Compound**

●　○　●○

Iron + Sulphur —*heated*→ Iron sulphide

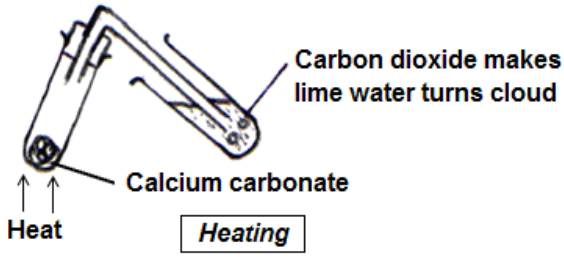
Mixture
Iron can be attracted by a magnet

Compound
Iron can't be attracted by a magnet

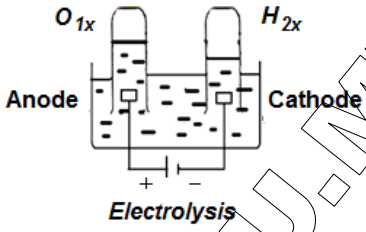
3.

Natural Resource	
- living things - water	- air - soil
- minerals - light - fossil fuel (petroleum, natural gas, coal)	

4. a.i.



ii.



b. Compound can be separated into element chemically.

	Compound	⟶	Element	+	Element
i. **By Heating**	Calcium carbonate	⟶	Calcium oxide	+	Carbon dioxide ↑
ii. **By Electrolysis**	Water, H_2O	⟶	Hydrogen, H_2	+	*Oxygen, O* ↑

CHAPTER 5 THE AIR AROUND US

1.

a.

Combustion	Respiration	Photosynthesis
i. Occur day and night	- Occur day and night	- Occur daytime only
ii. Produce energy	- Produce energy	- Absorb energy
iii. Release CO_2	- Release CO_2	- Release O_2
iv. Absorb O_2	- Absorb O_2	- Absorb CO_2
v. Occur outside of the living cell	- Occur inside the living cell	- Occur inside the living cell

2. a. **Photosynthesis** (use carbon dioxide)

i. maintain the composition of carbon dioxide and oxygen in the atmosphere. (reduce the amount of carbon dioxide in the atmosphere but increase the amount of oxygen in the atmosphere).

ii. supply food and oxygen for living organisms.

iii. $$\text{Carbon dioxide} + \text{Water} \xrightarrow[\text{chlorophyll}]{\text{light}} \text{Glucose} + \text{Oxygen}$$

b. **Effect of deforestation** / logging

i. cause greenhouse effect / global warming

ii. increase of carbon dioxide level in the atmosphere.

iii. lower of oxygen level in the atmosphere.

iv. destroy the habitat of flora and fauna.

c. **Ways to prevent air pollution**

- enforcement of laws
- used unleaded petrol
- practice car-pooling system
- ban open burning in public area.
- replanting tree

d. Prevent depleting of ozone

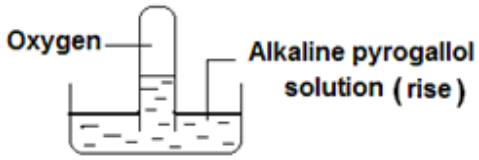
- reduce the usage of CFC materials in air conditioning and aerosiol can

e. O**zone layer**

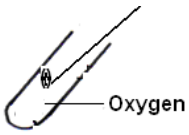
- protect our earth from harmful ultra-violet
- ultra-violet can cause eye cataract and skin cancer.

- ozone layer can be depleted by CFC (chloroflour-carbon)

3.

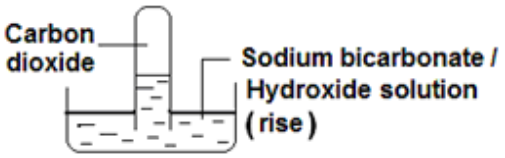


Oxygen can



a. dissolve into water
b. dissolve into alkaline pyrogallol solution
c. **relight a glowing splinter** (**support combustion**)
d. for respiration of organism
- neutral

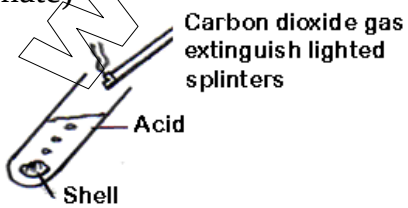
4.



Carbon dioxide (acidic)

a. Dissolve or absorbed by sodium bicarbonate solution / sodium hydroxide solution.
b. Turns bicarbonate indicator yellowish
c. Turns lime water cloudy
d. Turns moist blue litmus paper into red (acidic).
e. Extinguish a burning splinter / do not support combustion.
f. Excess carbon dioxide cause greenhouse effect.
g. Used in photosynthesis process.

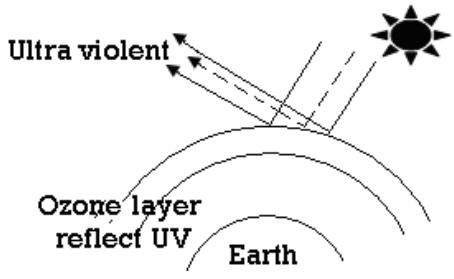
5. **Snail shell + dilute acid → carbon dioxide** (Carbonate)



6. a. **Pollutant**

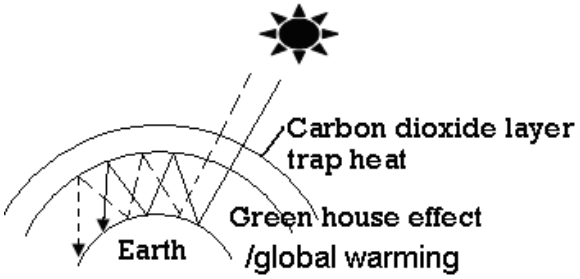
i. **CFC**	Thinning the ozone layer
ii. **Lead**	Damage the nervous system
iii. **Soot**	Retard the growth of plant cause respiratory problem
iv. **Carbon dioxide**	Cause green house effect and global warming
v. **Chemical waste**	From factory
vi. **Fertilizer / Nitrogenous compound**	From agriculture land
vii. **Oil**	From tanker ship at the port or harbour
viii. **Carbon monoxide (from exhaust pipe)**	Harmful to respiratory system / **reduce in take of oxygen** to the brain.
ix. **Acid rain**	corrode roofs and buildings

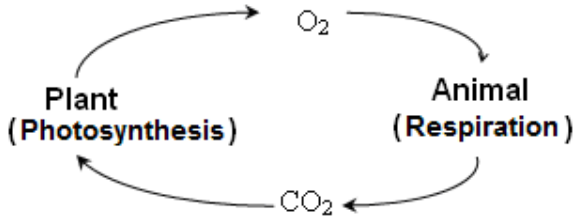
b.i. **Ozone layer**
- reflect ultra-violet ray.
- deplete due to CFC (chlorofluocarbon), usage of air-conditional and erosoil can.



ii. **Ways to prevent depletion of ozone layer**
- reduce the usage of CFC materials such as aerosoil can.

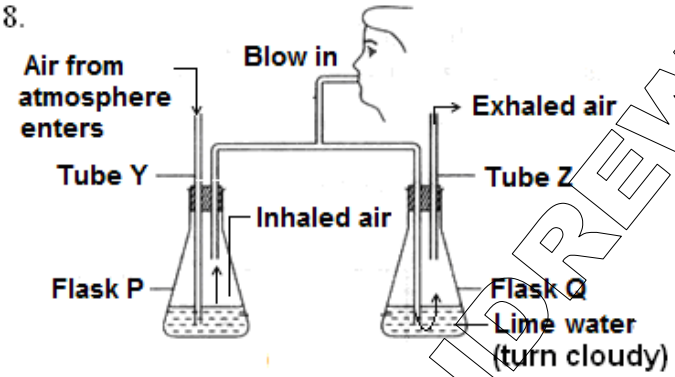
c. **Green house effect**





7. **Photosynthesis** and **respiration** processes maintain the composition of oxygen and carbon dioxide in the atmosphere.

8.



- **Exhale** air contains more carbon dioxide than **inhale** air
- Flask *Q* turn cloudy earlier.

9. **Experiment showing that oxygen is needed to survive**

a.

b. **Inference:** Organism needs oxygen to survive.

10ai.

The fish alive because the water weed **carries out photosynthesis process to supply oxygen and food to the fishes.**

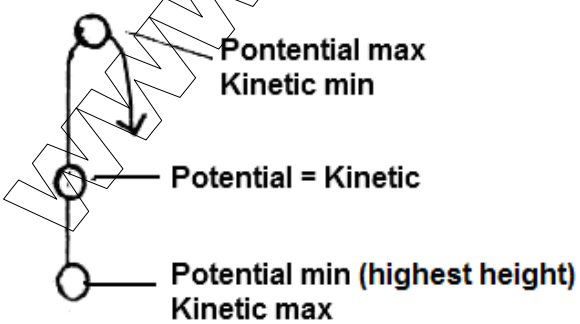
ii.

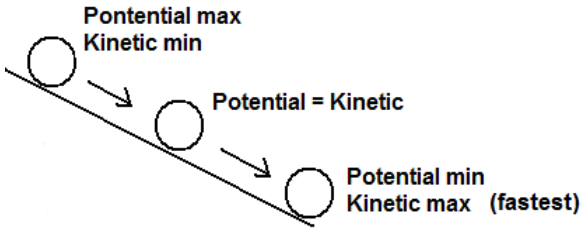
After two days, the fish die because:
- insufficient of oxygen
- without food.

c. **Whale which breath through lungs** need to rise up to the surface of the water to obtain oxygen.

CHAPTER 6 SOURCES OF ENERGY

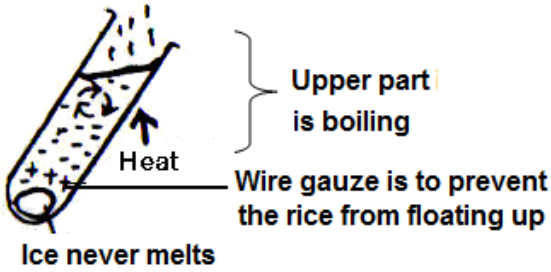
1.



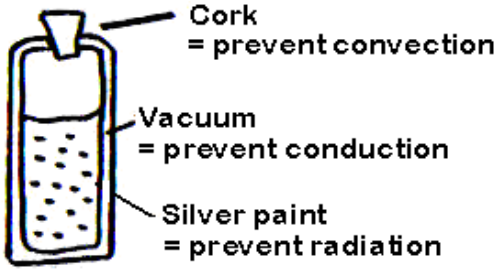


CHAPTER 7 HEAT

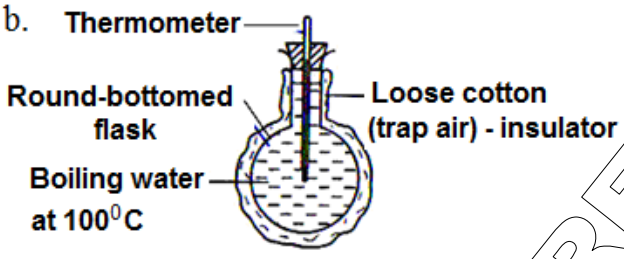
1. **Water** is a **poor conductor of heat**.



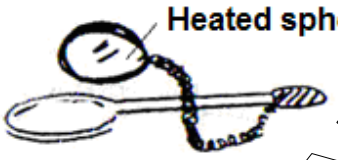
2.a. Thermos flask



b.



3.

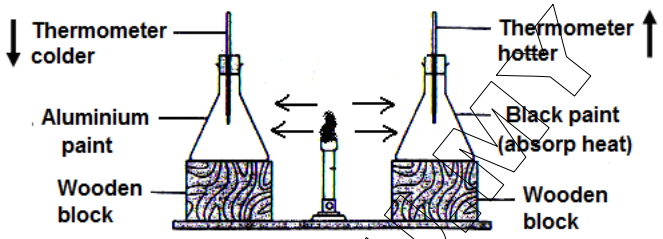


The heated sphere ball can't go through the ring because **the spaces / distance of particles becomes further apart** in the sphere ball causing the sphere ball to expand.

4. **Absorption of heat**

a. i. Black surface absorbs heat better than white surface.

ii.



iii.

White and Shinny	Black and Dull
- Good reflector of heat.	- Good absorber of heat

iv. Aluminium foil as chocolate wrapper, white lorry tanker and house painted white to make it less hot. White surface is a good reflector of heat.

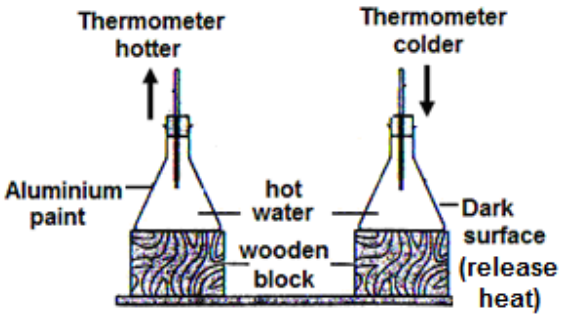
v. Solar panel painted black to absorb heat

vi. Car or buildings are painted **white to reflect heat** and make them less hot.

vii. Dark colour shirt is not suitable to wear as it absorbs heat and make us hot.

viii. Dark colour shirt is not suitable to wear as it absorbs heat and make us hot.

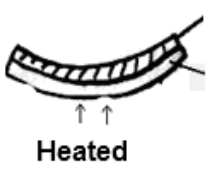
b. **Radiation of Heat**



White and Shinny	Black and Dull
- Poor radiator of heat	- Good radiator of heat

ii. Car radiator is painted black to radiate heat.

5. a. **Bimetallic strip**



(expands more than iron because brass bends towards iron)

b. **Conclusion**

Different metals has different rate of expansion

c. **Devices using bimetallic principle:**

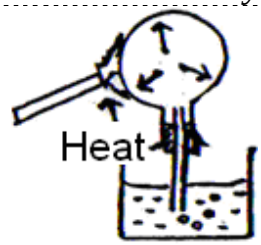
- Fire alarm system
- Refrigerator
- Air-conditional
- Iron
- Oven

d.

Ascending order of expansion

$x \rightarrow y \rightarrow z$

6.



a. Air bubbles are released when the air is heated.

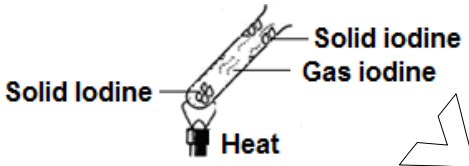
b. Bubbles are given out because air particle distance further apart and faster when heated. The kinetic energy increase and the collision is greater.

c. **Mercury** is used in thermometer because it expands evenly with heat.

7. **Sublimation**

Solid ⇌ Gas

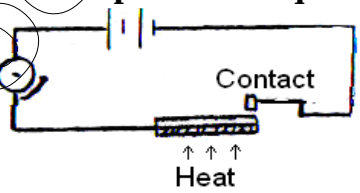
eg - Iodine crystal, ammonium chloride
- Naphtalene
- Solid carbon dioxide.



8.

Differences	
Evaporation	**Boiling**
- occur on the surface	- occur all over the liquid
- occur at any temperature below 100°C	- occur at 100 °C only
- slow process	- quick process

9. a. **Fire alarm operation sequences**



Bimetallic gets hot
↓
Bimetallic expands and bends
↓
Bimetallic touch the contact
↓
Electric flow
↓
Bell rings

The fire heat up the bimetallic strip and cause it to expand and bend. The bimetallic touch the contact, enable the current to flow and cause the bell to ring.

b. A tight metal cap of a bottle can be removed by immersing the metal cap into hot water. **The metal cap gets hot, expand and become loose**.

c. Two glasses that are stuck together and be separated by putting the outer glass into hot water as the outer glass will expand more than the inner glass.

d. The electric cables become straightened during cold weather. **The electric cables contract when it is cooled**.

e. **Ping-pong ball**

A dented ping-pong ball will become round again when put into hot water. The air pressure inside the ping-pong ball has high energy to push the wall round again.

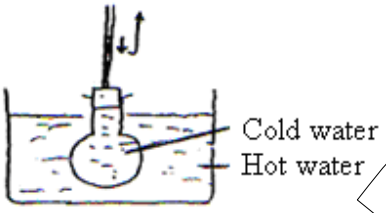
f. **Thermometer**

- The mercury expands when the thermometer is placed into hot water.
- The mercury contracts when the thermometer is placed into the cold water.

10. **Electric Cables**

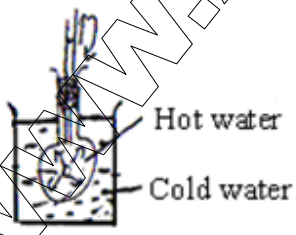
- During winter the cables contract and become straighten because the cable's atoms move closely together.
- During summer the cables expand and become curve because the cable's atoms move further away.

11 a.



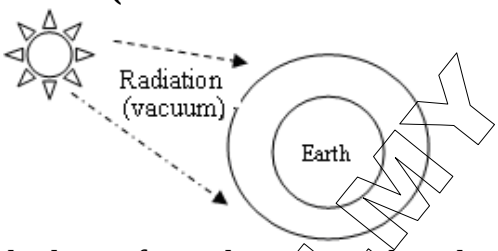
- The water level drops first because the flask expands. Then the water level rises because the cool water inside gets hot and expand.

b.



- The water level rise first then drop because the flask shrinks. Then water level drops slightly as the hot water contract.

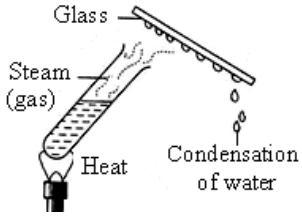
12. **Radiation (no medium of transfer heat)**



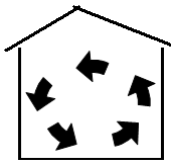
- The heats from the sun reach us by radiation.
- Radiation can transfer through outer space which is vacuum.

13. **Condensation**

- gas ⟶ liquid
- The gas molecules lose its kinetic energy and turn into liquid molecules.

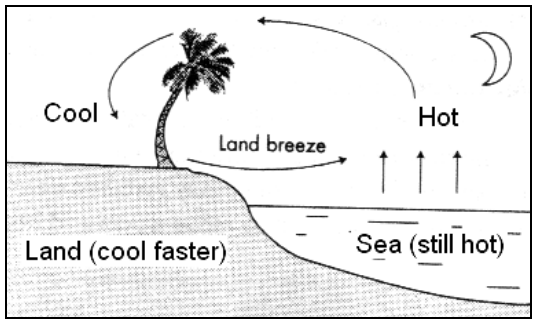


14. **Convection**



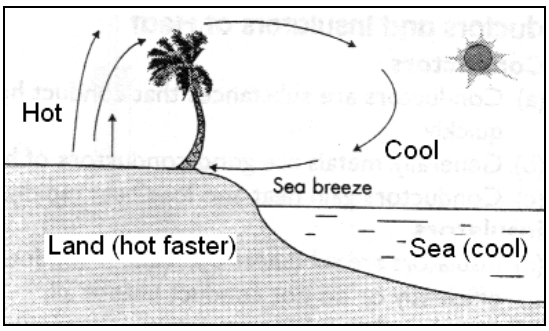
- Hot air moves up
- Cool air moves down
- e.g. car radiator, **refrigenerator**, kettle (**boiling of water/kettle)** and air conditioner.
- **Natural phenomena of convection** :

i.



Land Breeze (night time)

ii.

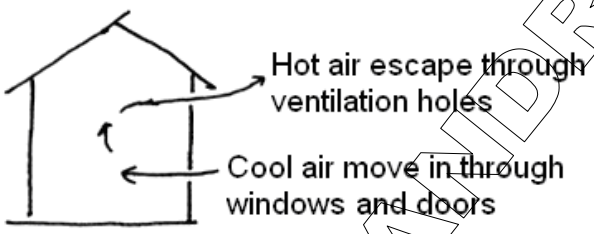


Sea Breeze (day time)

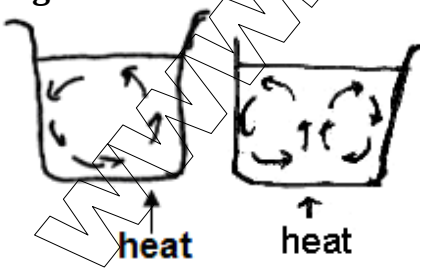
iii. **The spiral turns** due to convection of hot air

iv. **Convection**

v. **Convection cools the house**

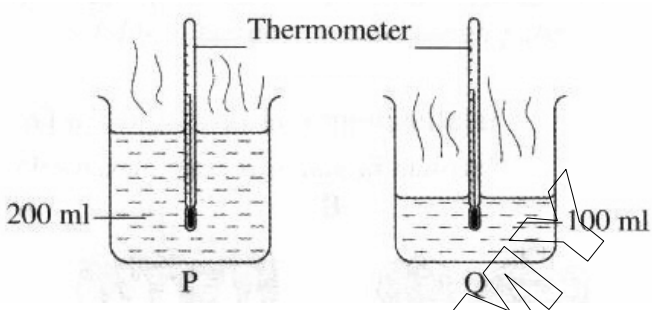


vi. **Boiling of water**



Hot water rises up.
Cool water moves down

15. Heat content over mass / volume



Heat content of beaker P is higher than Q because the volume / mass of water P is greater than Q (Both have same temperature).