What’s the Matter??

Science Grade 5

Matter

Matter is anything that has mass and volume (i.e., takes up space).

A material is a type of matter that is used to make things (e.g., glass, iron, plastic, rock, wood)

Definitions

What are the states of matter?

- **Solid**- substance has both a definite shape and a definite volume
- **Liquid**- substance has a definite volume but no definite shape
- **Gas**- has neither definite shape nor definite volume

Three States of Matter

Solids

Liquids

Gases

hat

skateboard

pencil

table

snow

bicycle

apple

computer

treehouse

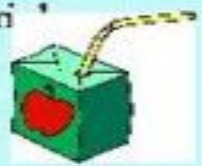
milk

water in pool

dri

drink

hot chocolate



juice

rain

soup

wind

air

hot air balloon

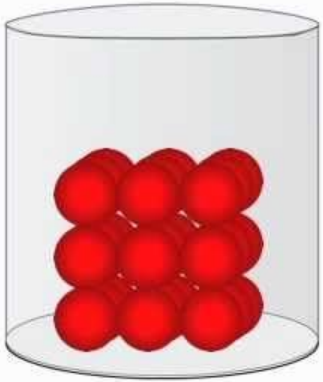
wind from fan

steam

fog

wind

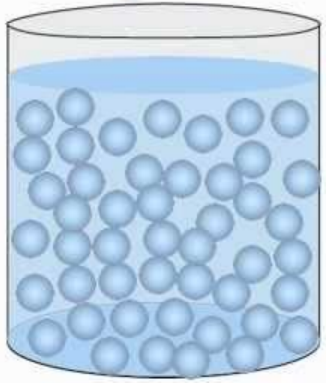
solid



- rigid
- fixed shape
- fixed volume

cannot be squashed

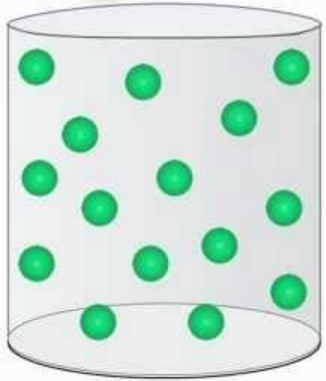
liquid



- not rigid
- no fixed shape
- fixed volume

cannot be squashed

gas



- not rigid
- no fixed shape
- no fixed volume

can be squashed


ABSOLUTE
ZERO

Air

Air has the following properties:

- air has mass

Air

- air takes up space (it has volume)

Air

- air expands (takes up more space) when heated

Air

air contracts (takes up less space) when cooled

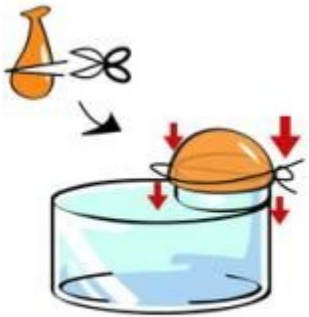


FIG:1 Container and rubber

FIG:2 Heating the air

FIG:3 Cooling the air

7 different ways to Identify Materials

- Wednesday, March 24th, 2021
- Read through Pages 12-13
  - Strength
  - Buoyancy
  - Texture
  - Colour
  - Flexibility
  - Solubility
  - Hardness

7 different ways to Identify Materials

Strength

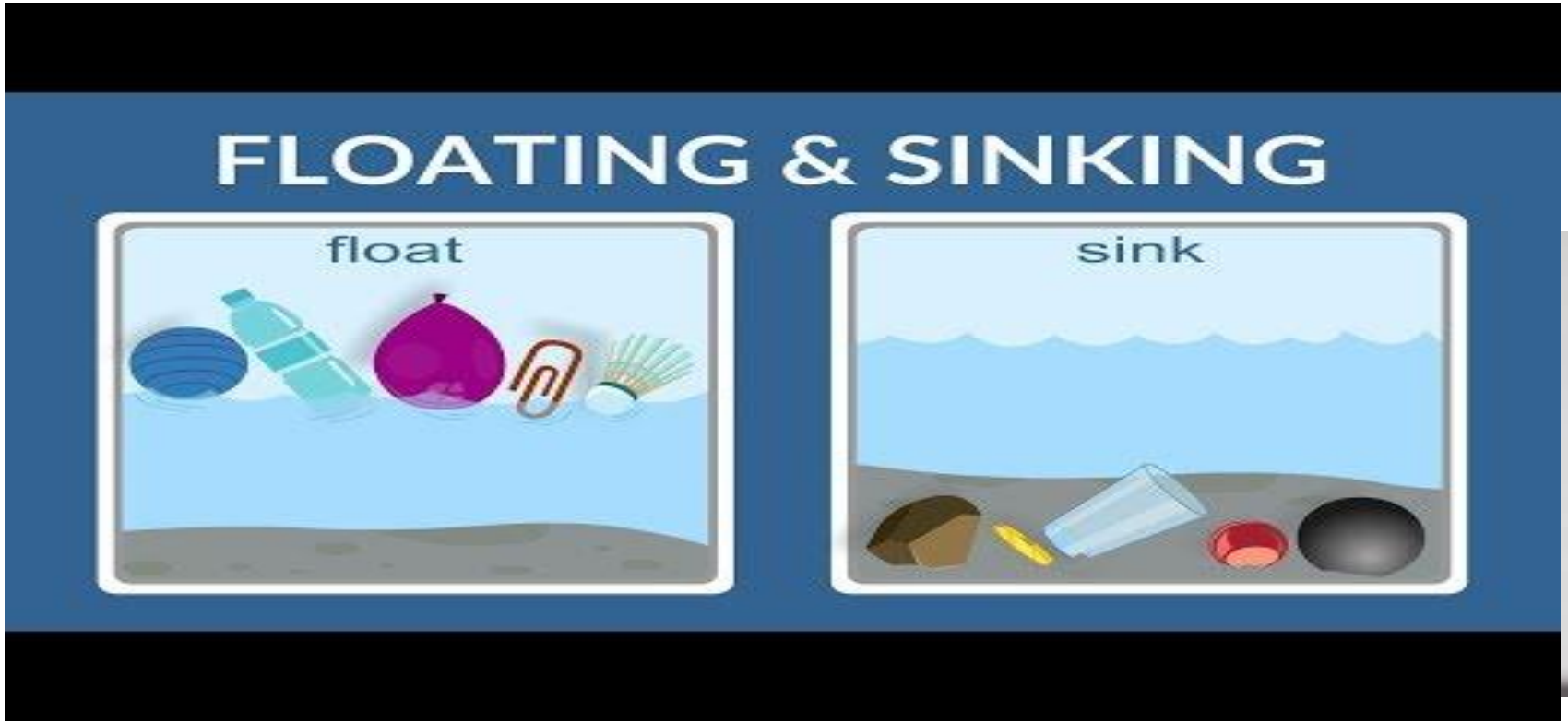
- How strong a material is
- Resistance to being broken or changed in shape

7 different ways to Identify Materials

Buoyancy

- The ability to float

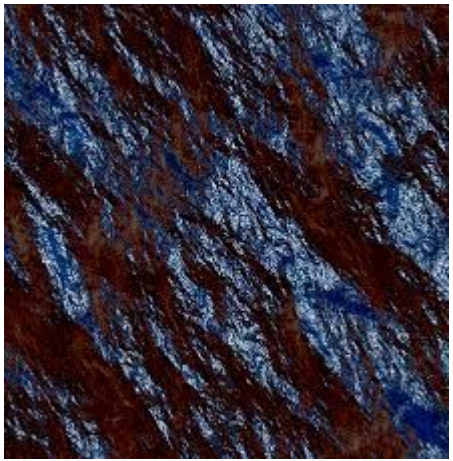
7 different ways to Identify Materials



7 different ways to Identify Materials

Texture

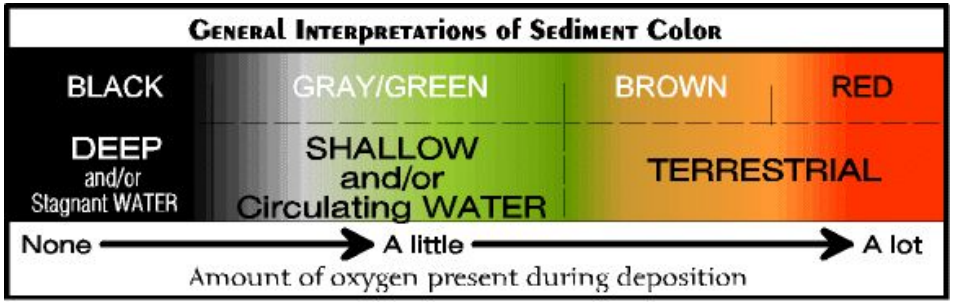
- How a material feels
- Smooth, rough, slippery



7 different ways to Identify Materials

Colour

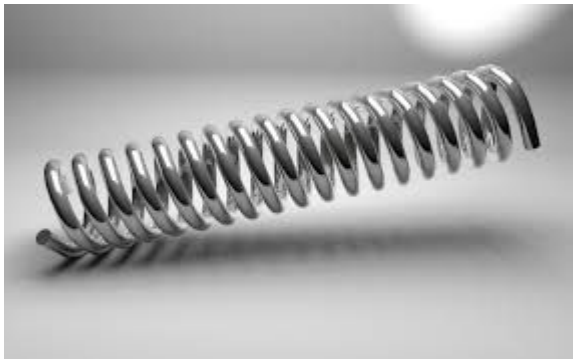
- The colour of an object

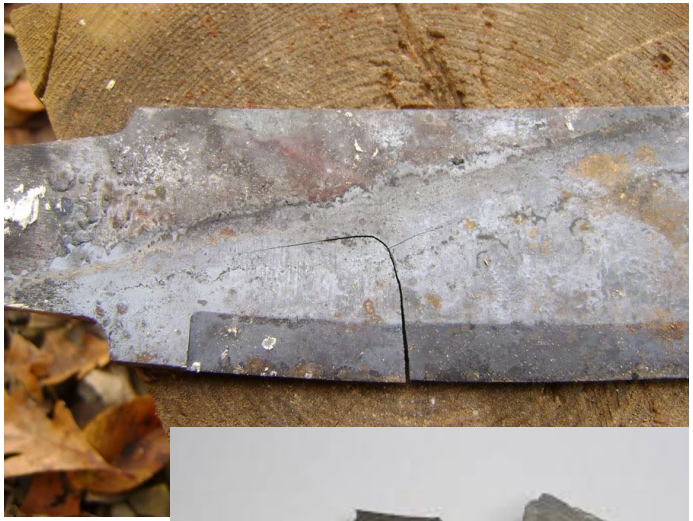


7 different ways to Identify Materials

Flexibility

- A measure of how far a material can bend without being broken



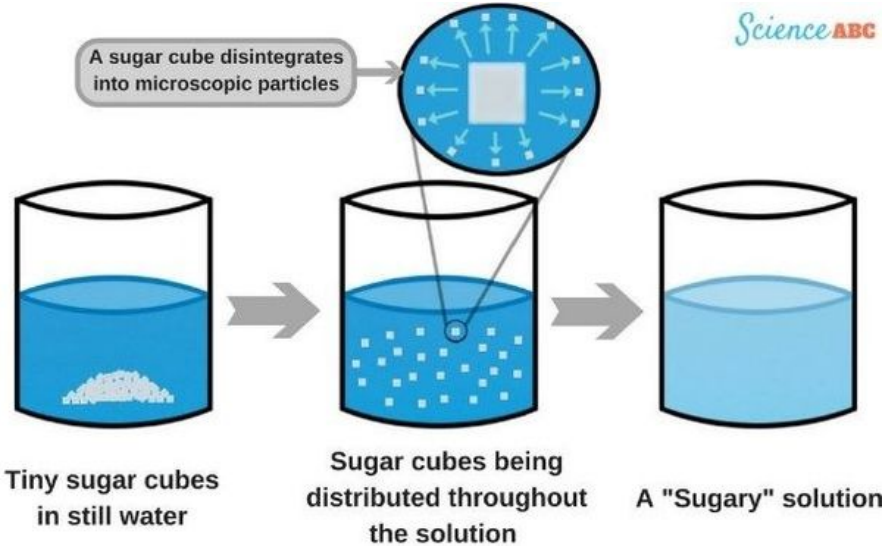


7 different ways to Identify Materials

7 different ways to Identify Materials

Solubility

- Does it dissolve in water

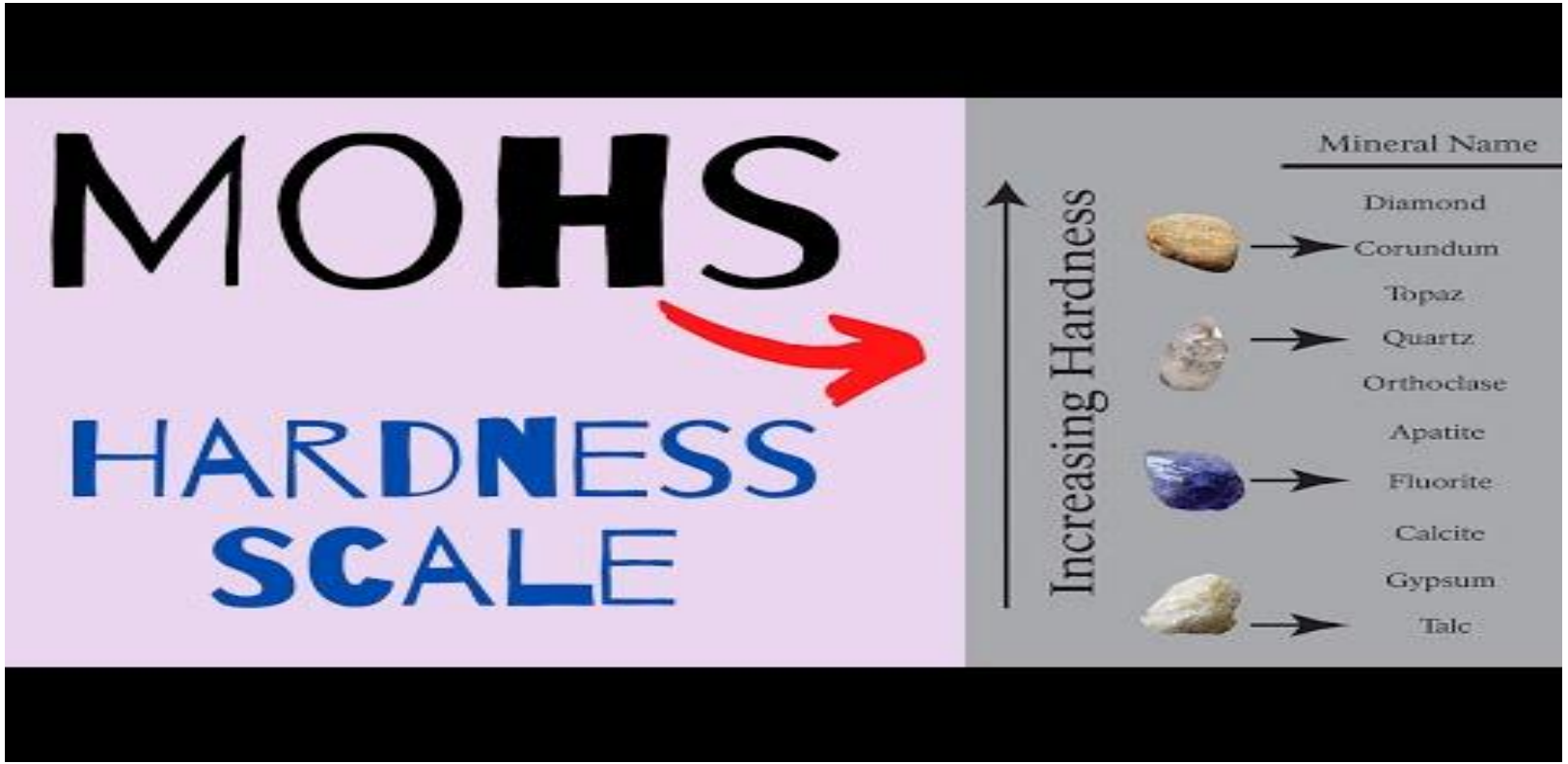


7 different ways to Identify Materials

Hardness

- How easily you can scratch an object

7 different ways to Identify Materials



Change of State

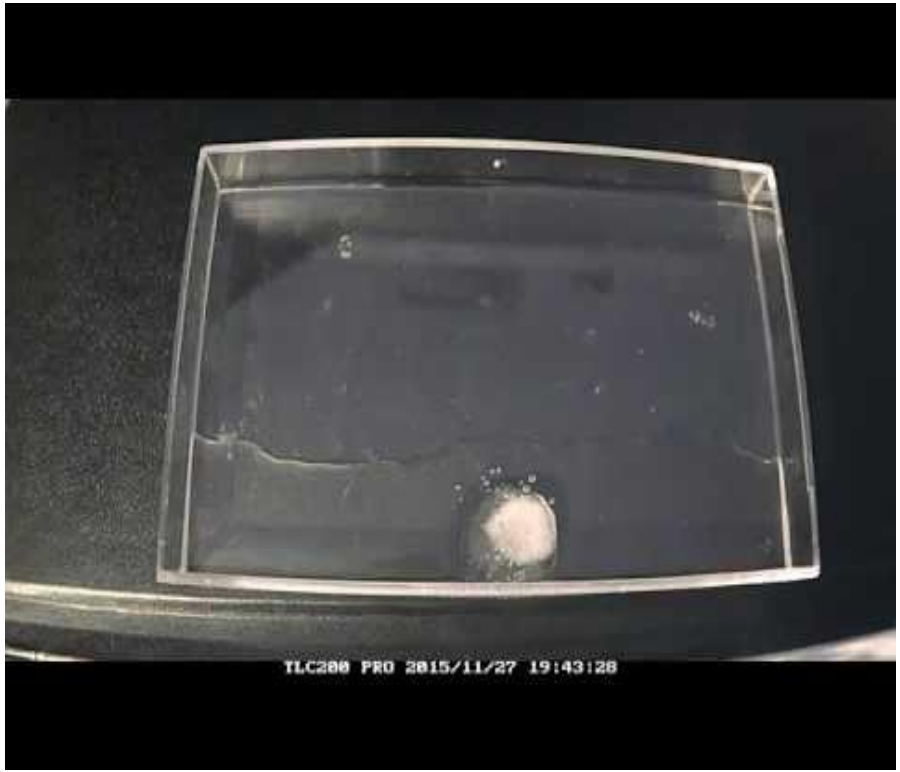
- Objects can be changed in many ways:
  - A wooden object could be burned, cut, drilled, hammered, painted, sanded, soaked in water, split, stained, steamed, or waxed.

Change of State

- Some of these changes affect one or more properties of the wood (e.g., steaming the wood makes it more flexible)
- While other changes do not (e.g., cutting wood does not change its colour, texture, hardness, density, flammability, flexibility, buoyancy, or inability to conduct electricity)
- Sometimes changes result in the formation of a new material

Change of State

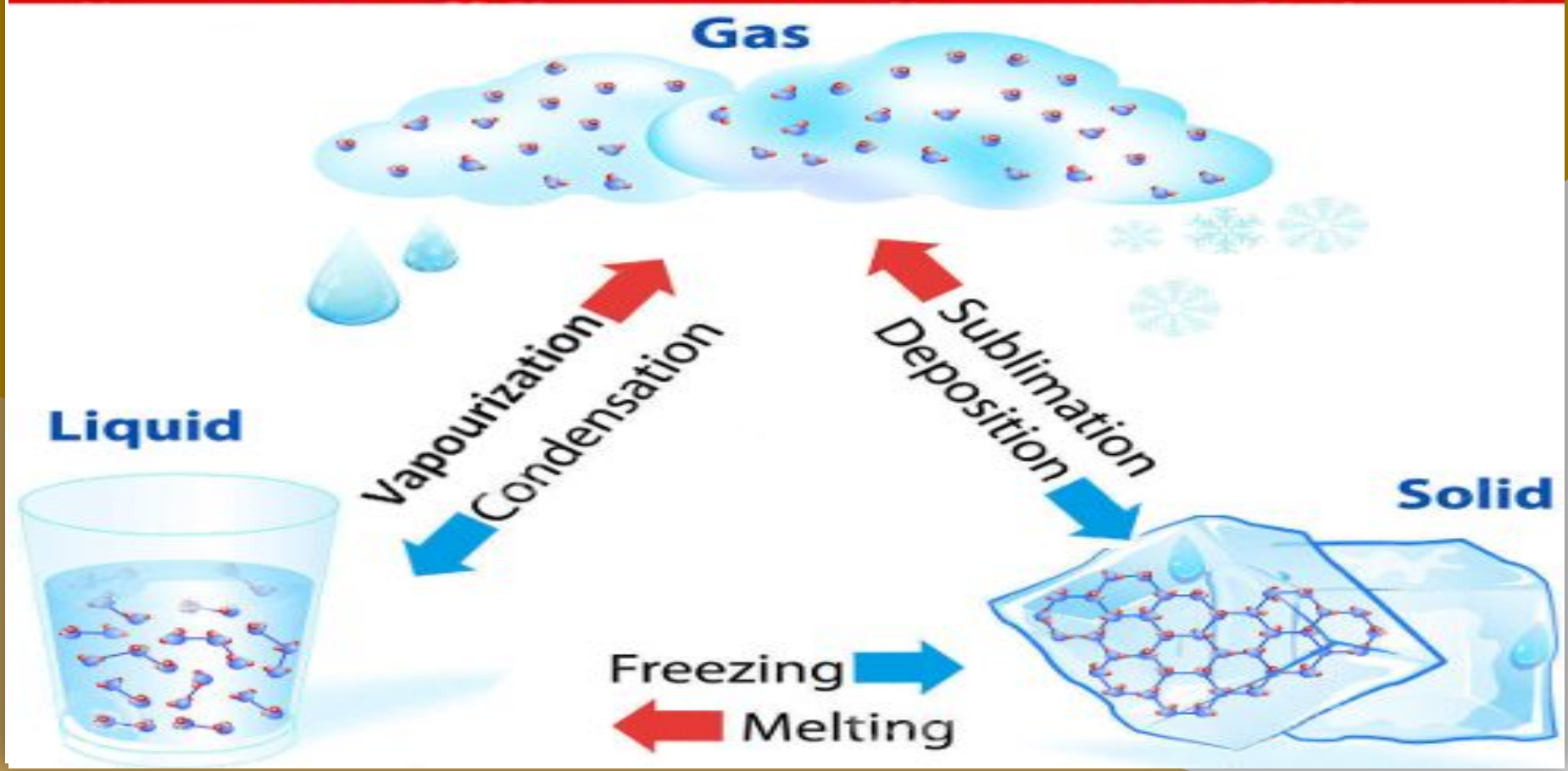
- A material changes from one state of matter to another
- Think of an ice cube changing from a solid (ice), to a liquid (water), to a gas (steam)



Change of State

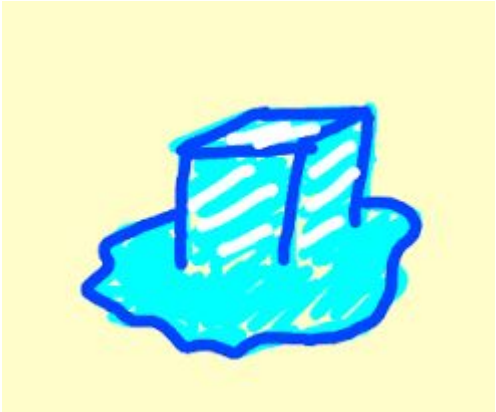
- What Do You Think?
  - How can you change an apple without charging the properties of the material the apple is made of?
  - When you change an object, does its mass change?
  - How can you change the state of a piece of choclate?

STATE OF MATTER



Change of State

- melting - changing a solid to a liquid



- evaporation - changing a liquid to a gas

Change of State

- condensation - changing a gas to a liquid

- solidification (i.e., freezing) - changing a liquid to a solid,

Change of State

- sublimation - changing a solid to a gas

- deposition - changing a gas to a solid.

What happens When Materials Interact?

- We have two different types of changes:
  - Physical Change
  - Chemical Change

Physical and Chemical Changes

What happens When Materials Interact?

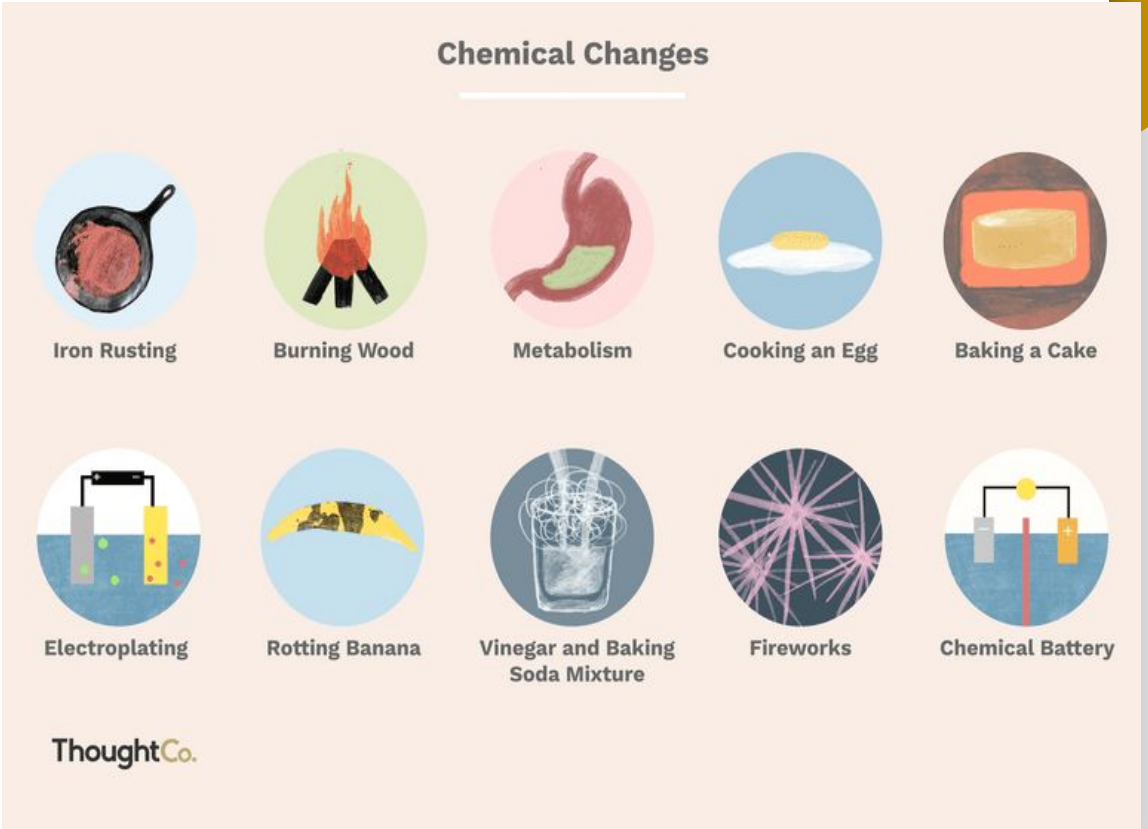
- Physical Change
  - Modify the object
  - Does not create a new object
  - Can sometimes be **reversed**

Example (cut a piece of paper)

What happens When Materials Interact?

- Chemical Change
  - Energy is given off (gas, light, heat)
  - New substance is formed
  - Can **not be reversed**

Example (mix vinegar and baking soda together)



Reversible vs. Non- Reversible

- Reversible - materials can be changed back into its original shape
  - Changes of state are all reversible

- Non-reversible - materials can not be changed back
  - Chemical reactions are not reversible


Irreversible
change
vinegar
carbon
dioxide
gas

Reversible vs. Non- Reversible

- Identify whether the following changes are reversible or nonreversible:
  - chocolate melting
  - paper burning
  - water boiling
  - sugar dissolving in water
- iron rusting
- eating a sandwich,
- chopping a carrot, and
- mixing oil and water.

Change of State

- Let us use the Chrome Books!!!