Everyday Chemistry

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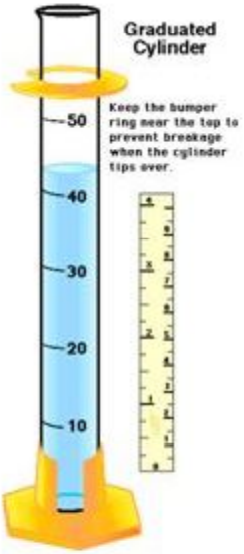
What is matter?

Matter is anything that has mass and takes up space



Matter has mass and volume

Mass-the amount of matter in an object

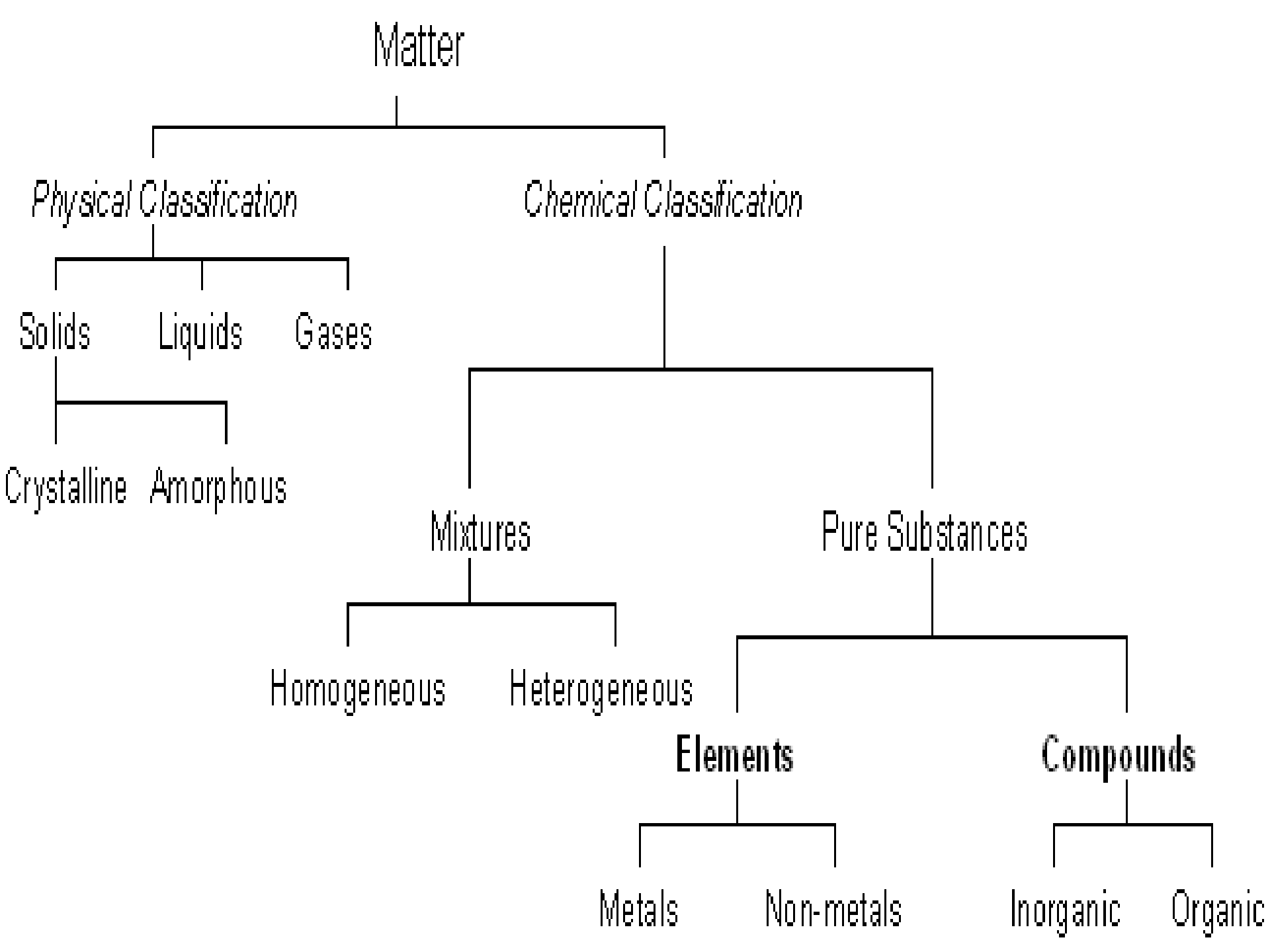
Volume-the amount of space occupied by an object

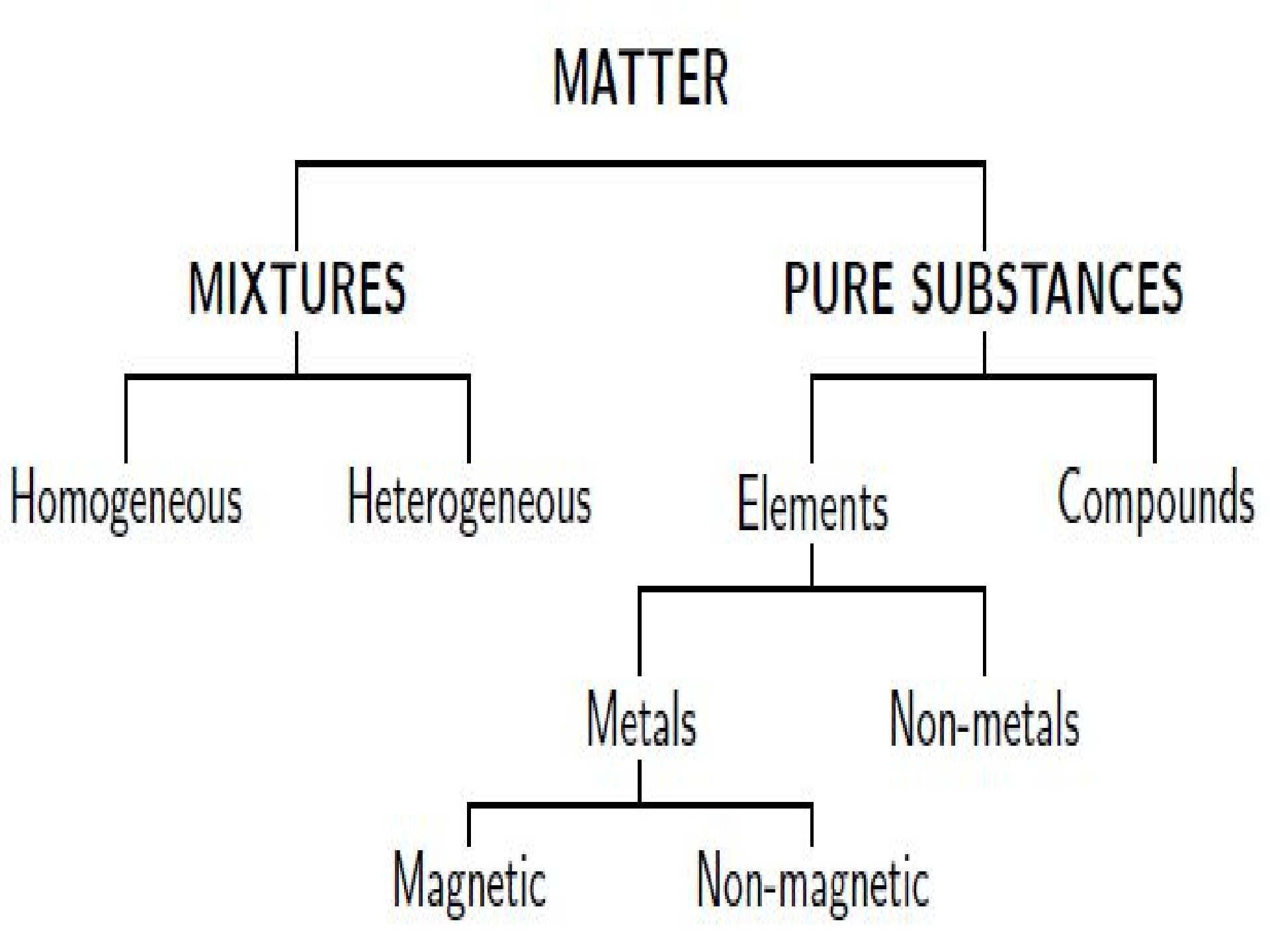
How is mass measured?

Mass is measured using a balance

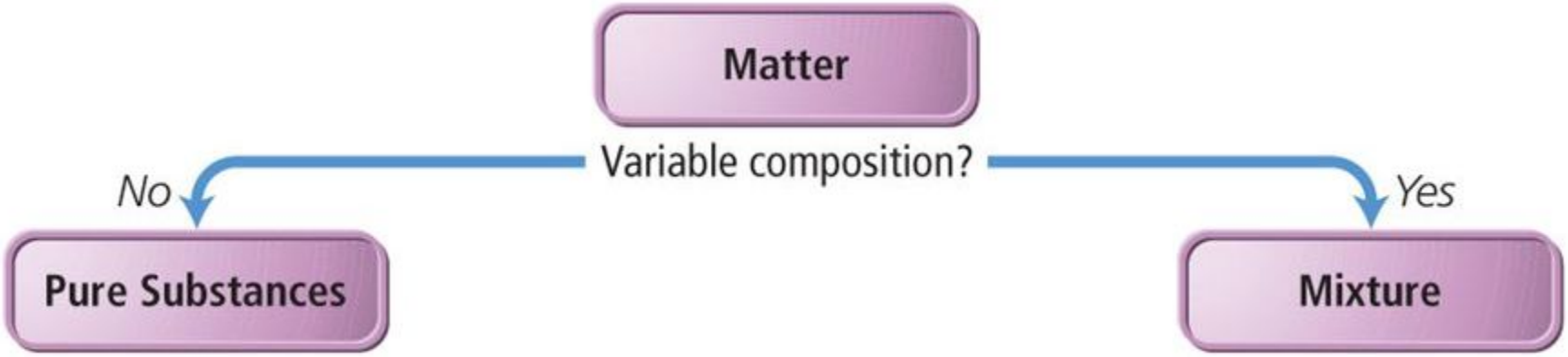
How is volume measured?

Volume is measured using a meter stick and calculations or a graduated cylinder


Matter
Physical Classification
Chemical Classification
Solids
Liquids
Gases
Crystalline
Amorphous
Mixtures
Pure Substances
Homogeneous
Heterogeneous
Elements
Compounds
Metals
Non-metals
Inorganic
Organic


MATTER
MIXTURES
PURE SUBSTANCES
Homogeneous
Heterogeneous
Elements
Compounds
Metals
Non-metals
Magnetic
Non-magnetic

Classification of Matter by Composition



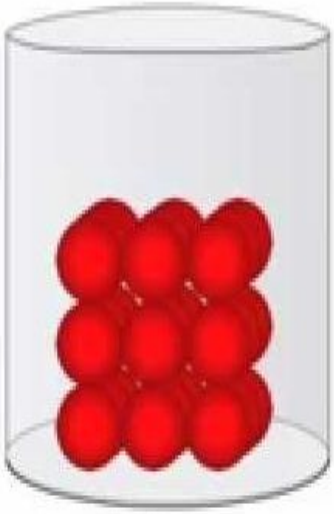
1) made of one type of particle
2) all samples show the same intensive properties

1) made of multiple types of particles
2) samples may show different intensive properties

What is matter?

- **Element**: a substance made with only one type of *atom* (H, He, Li, etc.)
- **Atom**: the smallest form of an element that retains its chemical properties; tiny particles
- **Molecule**: a combination of two or more atoms (O_2, H_2, H_2O, CH_4)
- **Compound**: a substance composed of two or more different atoms (CH_4, $AlCl_3$)

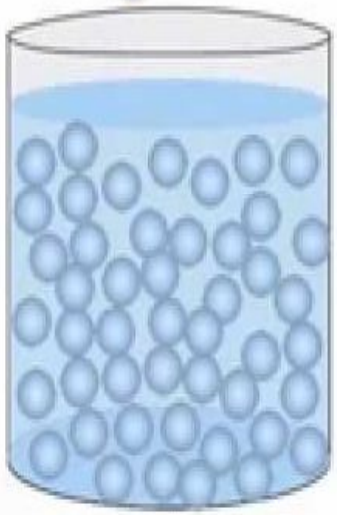
solid



- rigid
- fixed shape
- fixed volume

cannot be squashed

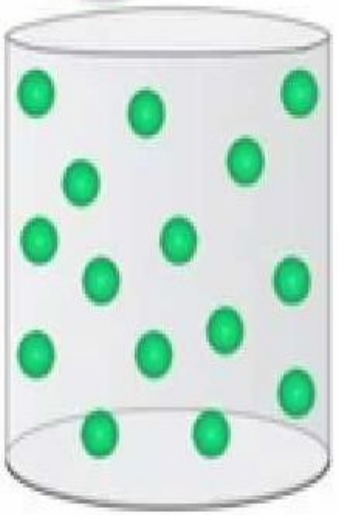
liquid



- not rigid
- no fixed shape
- fixed volume

cannot be squashed

gas



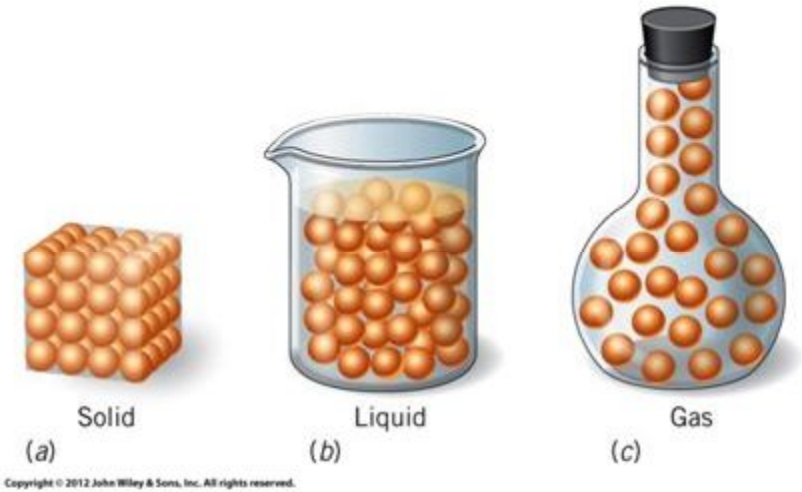
- not rigid
- no fixed shape
- no fixed volume

can be squashed

States of Matter

Solids:

- Fixed shape & volume
- Particles are close together
- Have restricted motion



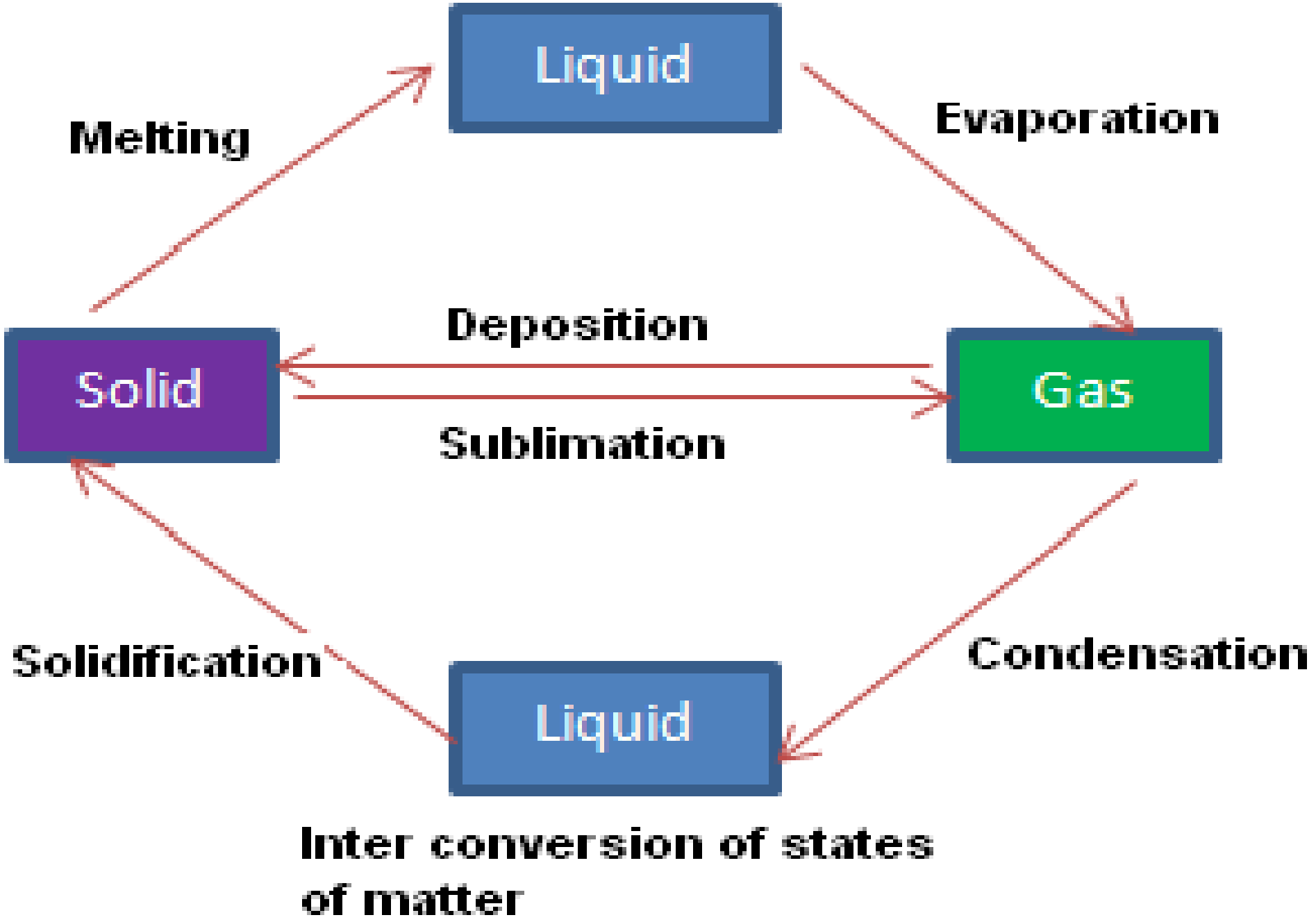
Liquids:

- Fixed volume, but take container shape
- Particles are close together
- Are able to flow

Gases:

- Expand to fill entire container
- Particles separated by lots of space

Ex. Ice, water, steam


Liquid
Melting
Evaporation
Deposition
Solid
Gas
Sublimation
Solidification
Condensation
Liquid
Inter conversion of states of matter

ENERGY

- Has no mass and does not take up space
  - Compared with matter, energy is **less tangible**
  - **Measured by only its effect on matter**
- **Is the capacity to do work, or to put matter into motion**

Thermal Energy

energy of moving particles (heat)

Mechanical Energy

energy of objects in motion

Electrical Energy

energy of particles moving through a wire

Magnetic Energy

energy causing push or pull

Sound Energy

form of energy we can hear

Light Energy

form of energy our eyes can detect

TYPES OF ENERGY

- **RENEWABLE ENERGY:**

Renewable energy can be generated continuously practically without decay of source.

Some examples are :

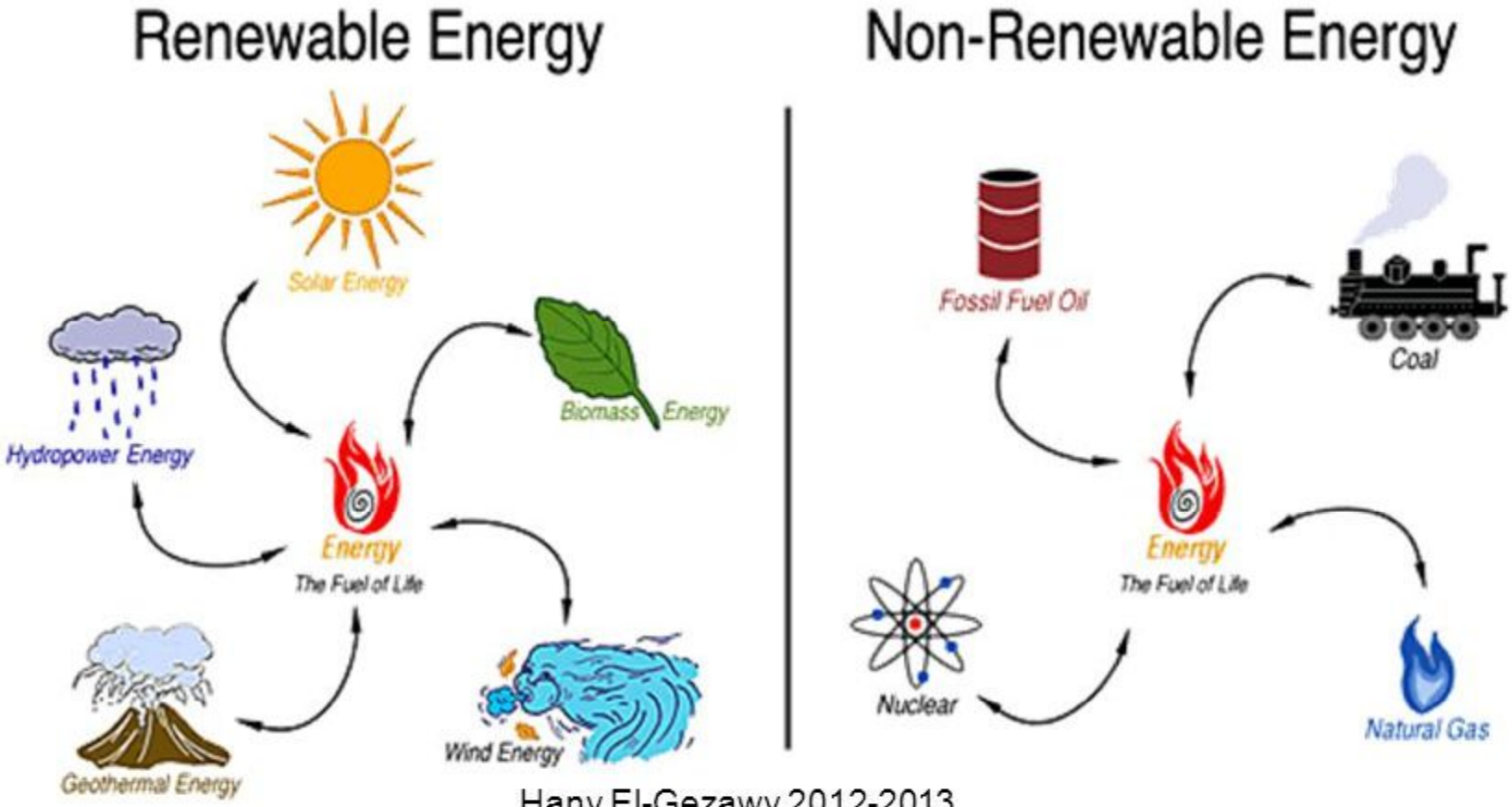
- Solar energy , Wind energy , Geothermal energy , Hydro energy.

NON-RENEWABLE ENERGY:

Non-renewable energy is energy that comes from the ground and is not replaced in a relatively short amount of time.

e.g. energy generated from combustion of fossil fuels , coal , gas etc.

Renewable and non-renewable energy sources

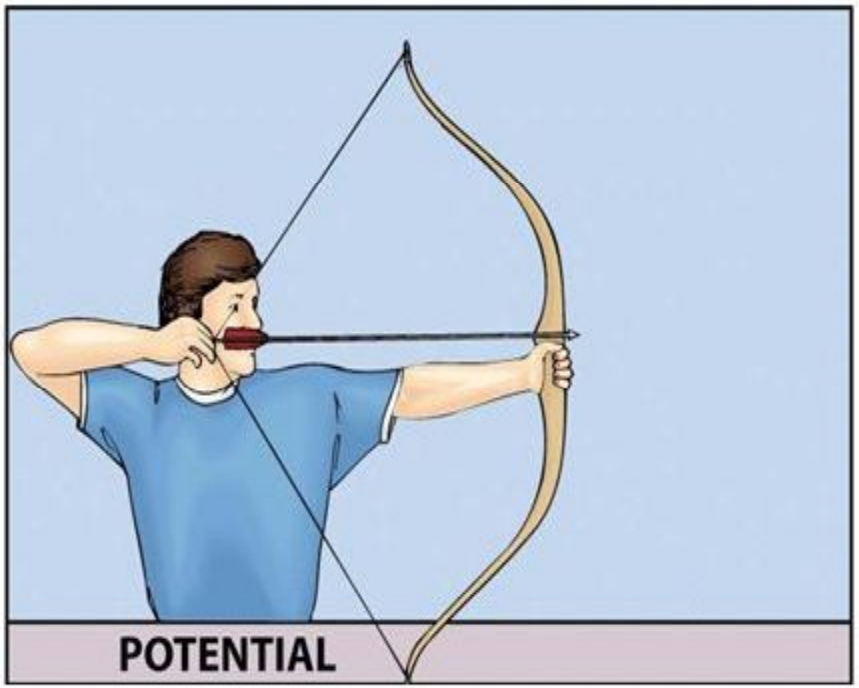


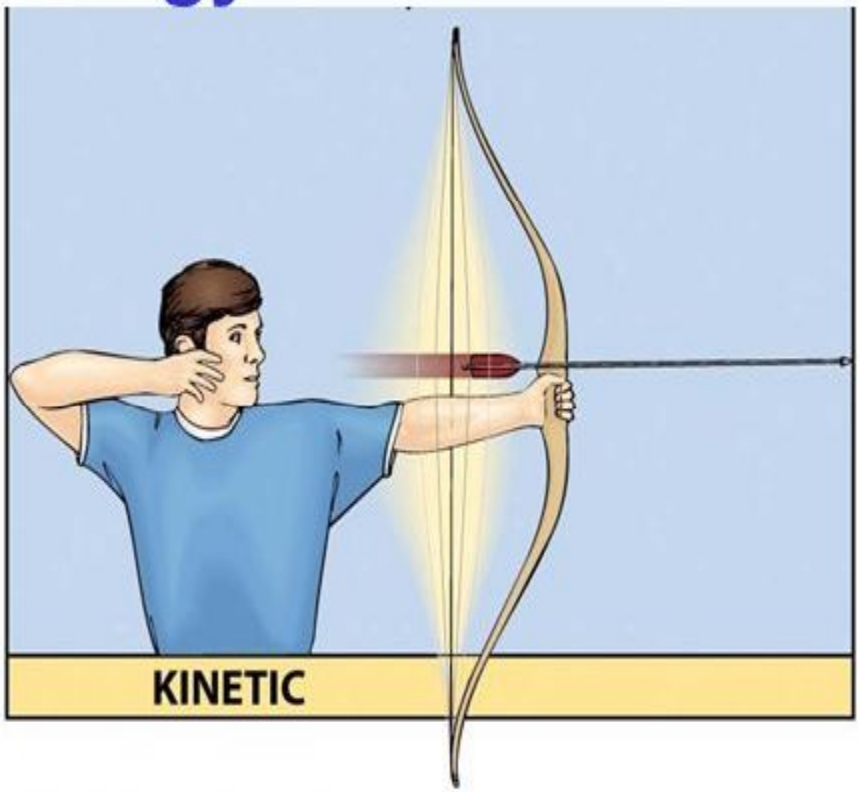
Hany El-Gezawy 2012-2013

Matter and Energy

- Matter and energy are essential constituents of both the universe and living organisms.
- **Matter** - everything that takes up space and has mass
- **Energy** - the capacity to do work

Potential vs. Kinetic Energy





This is stored energy

This is the energy of motion

Potential energy changed into kinetic energy when the arrow is released

Potential Kinetic

Potential energy is stored energy.

- Chemical
- Nuclear
- Mechanical
- Gravitational

Kinetic energy is motion.

* Radiant
* Thermal
* Motion
* Sound
* Electrical

Law of conservation of energy

"Energy cannot be created or destroyed it only can be transformed from one form into another"