

Name : _____

Little Bits of Stuff (MATTER) Moving Around Part. 1

(or as some like to call it - Kinetic Molecular Theory)

PARTICLE MODEL OF MATTER

A very long time ago - over 2000 years ago - the Greek philosopher, Democritus, hypothesised that **MATTER** was made up of particles too small for the human eye to see and that as you move from the solid to the liquid to the gas **STATES OF MATTER** these particles get further apart.

Democritus' ideas were neglected or forgotten for about 2000 years until the Renaissance and the emergence or, at least, rekindling in Europe of scientific reasoning. Scientists became intrigued by this idea of the **Particle Model of Matter** as they tried to understand how their world worked. Democritus' ideas became the basis for many theories and discoveries over the next 400 years that have expanded and continue to expand our understanding of the composition of something we now call **MATTER**.



Did you know that our word 'Atom' comes from the Greek word 'Átamos' which means 'indivisible'?

Before we begin, let us take a step back to all the work we have done so far. Let us define **MATTER**.

We have been using various devices to derive information about stuff. We have been measuring the

PROPERTIES OF MATTER.

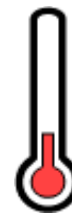
To measure the **MASS** (in the presence of Gravity we call it **WEIGHT**) of an object we used a _____. We measured the mass/weight of those objects in _____ (units).

To measure the **VOLUME** of an object we used a _____. We measured the volume of those objects in _____ (units) which are the same as _____ (units).

MATTER is defined by its measurable properties so if you were going to write a definition for **MATTER** it would be:

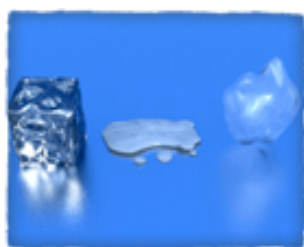
MATTER is anything that

MATTER actually has one more measurable property and there is a specific piece of equipment for doing this measurement. Do you know what the 3rd measurable property of **MATTER** is and which device you would use to measure it?



PROPERTY:	DEVICE:	UNITS:
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ICE IS NICE, WATER IS HOTTER, & STEAM IS THE DREAM



Matter exists in **4 STATES**. On Earth most matter exists in one of 3 states, either _____, _____ or _____. The 4th state, which makes up most of the visible matter in the Universe but very little of the matter on Earth, is _____. H₂O is the only material that exists naturally on Earth in the **SOLID, LIQUID** and **GAS** state.

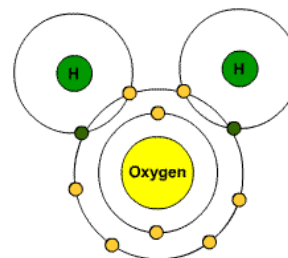
STATION 1

MATERIALS

- Ice cubes

PROCEDURE

1. Look at an ice cube.
2. In which **STATE OF MATTER** are the H₂O molecules?
3. Hold the ice cube in your hand and squeeze it tightly.
4. Into which **STATE OF MATTER** are the molecules changing?
5. _____
What did you apply to the molecules to make them change state?
6. What do we call this change of state?



7. Pour the excess water from your hands.
8. Rub your hands together vigorously for 30 seconds.
9. Into which **STATE OF MATTER** did the H₂O molecules change?

10. What did you apply to the molecules to make them change state?

11. What do we call this change of state? _____

STATION 2

- Ice Cubes
- Tin Can
- Thermometer
- Stir Stick
- Salt
- 15mL Measuring Spoons
- Water



Materials

Procedure

1. Fill can with ice cubes.
2. Record temperature inside can: _____
3. Pour water into can until can is 1/2 full of water.
4. Record temperature inside can: _____
5. What temperature, approximately, do you think the **OUTSIDE** of the can is at this point in time? _____
6. What do you notice forming on the outside of the can?

7. Why does this happen?

8. Measure 15 mL of salt and pour it into the can.
9. Stir thoroughly for at least 2 minutes.
10. Record the temperature inside can: _____
11. What temperature do you think the **OUTSIDE** of the can is at this point in time? _____
12. What do you notice forming on the outside of the can?

13. Why does this happen?

IN THE BOXES BELOW DRAW THE ARRANGEMENT OF H₂O MOLECULES IN THE SOLID, LIQUID AND GAS STATES.

Solid	Liquid	Gas

When you wanted to change the ice cube to water you applied _____ . When you wanted to change the water to water vapour you applied _____ . If you want to change the water to ice again you would have to remove _____ from the water. If you wanted to change the water vapour to water you would have to remove _____ . **HEAT** is a form of _____ .

When matter changes states, we have specific names for the processes. They are:

