"kinetic energy" = energy of things in motion

PART C: KINETIC MOLECULAR THEORY (KMT)

Is used to explain the motion of matter and how that creates the different states of matter:

1. All matter is made of small particles (atoms or molecules) too small to be seen (without an electron microscope)
2. These particles are in constant motion (unless matter is at absolute zero: -273°C) — ØK = -273°C ("Kelvin")
   - In solids, particles are tightly packed together and can only vibrate in place.
   - In liquids, particles are touching but can slide past each other. (more room)
   - In gases, particles are far apart and can move freely and bounce (most room)
3. Energy makes the particles move. Increasing particle energy increases particle movement.
4. As energy increases, particle attraction to other particles decreases. (don't want to be near each other)
5. With enough kinetic energy, matter can change state. (*example*: solid to liquid) (KE) ↑KE = matter can solid → liquid → gas

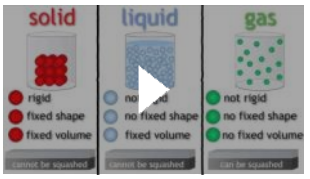
States of Matter

- **Solid**
  - Solid matter has a definite shape and a definite volume (can't change / already been defined)
  - Particles of solids are tightly packed, vibrating about a fixed position. (don't move much)

- **Liquid**
  - Liquid matter has a definite volume (certain amount) but an indefinite shape (can change)
  - Its shape is determined by its container

- **Gas**
  - Particles are far apart and moving freely.
  - Gaseous matter has an indefinite shape (can change) and indefinite volume
  - Its volume and shape are determined by its container.

States of Matter - solids, liquids and gases | Chemistry for All | The Fuse School



HW Oct 3

Homework **ASSIGNMENT #4: Matter all around us Part A + Part B**
This assignment is to be completed below in the space provided.

Matter all around us

Vocabulary	
boiling point	mass
change of state	matter
conductivity	melting point
density	movement
elements	particles
gas	properties
heat	solid
kinetic	states
liquid	volume

Use the terms in the vocabulary box to fill in the blanks. Use each term only once. You will not need to use every term.

1. Matter is anything that has mass and volume. According to the kinetic molecular theory, all matter is made of very small particles that are constantly moving.
2. Mass is the amount of matter in an object. The amount of space an object occupies is its volume. The ratio of a material's mass to its volume is its density.
3. There are three states of matter: solid, liquid and gas. Each of these can change when heat is added or removed.
4. The temperature at which ice turns to water is the melting point. The temperature at which water turns to water vapour is the boiling point.
5. Conductivity describes how easily electricity or heat can move through a material.
6. Kinetic energy is the energy of movement.
7. Particles of a solid are packed so tightly together that they can only vibrate in place. Particles of a liquid are farther apart and can slide past each other. Particles of a gas are very far apart and move around freely and quickly.
8. The kinetic molecular theory describes what happens to the particles of matter during a change of state.
9. Oxygen and gold are examples of elements, which cannot be broken down or separated into simpler substances.

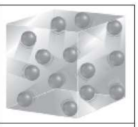
Matter all around us Part B

Fill in the blanks by choosing one of the words provided in brackets.

1. The difference between a COLD SOLID and a HOT SOLID is that the particles in the HOT solid vibrate faster (FASTER/SLOWER). This difference is due to the COLD solid's molecules having less (MORE/LESS) kinetic energy.
2. The difference between a solid and a liquid at the same temperature is that the liquid has more (MORE/LESS) kinetic energy.
3. The kinetic molecular theory states that:
   a. All matter is made of particles too small to be seen (unless you have a scanning tunneling electron microscope!).
   b. These particles are in constant motion (unless at absolute zero!).
   c. The more energy particles have the faster (FASTER/SLOWER) they move.
   d. Particles in a solid (SOLID, LIQUID, GAS) can only vibrate whereas particles in a liquid (SOLID, LIQUID, GAS) can slide past each other and particles in a gas (SOLID, LIQUID, GAS) are very far apart.
   e. The more energy (ENERGY/MASS/VOLUME) that particles have the faster they can move.

Show what you know about states of matter.

1. Complete the following table by describing the three states of matter. The table has been partially completed to help guide you.

			
state of matter	solid	Liquid	gas
shape	fixed shape	indefinite shape	indefinite shape
volume	fixed volume	fixed volume	indefinite volume
spaces between particles	particles packed tightly together	particles are spread out (a little)	particles are far apart (lots of space between particles)
movement of particles	particles can only vibrate	particles slide over + between each other	move freely in all directions