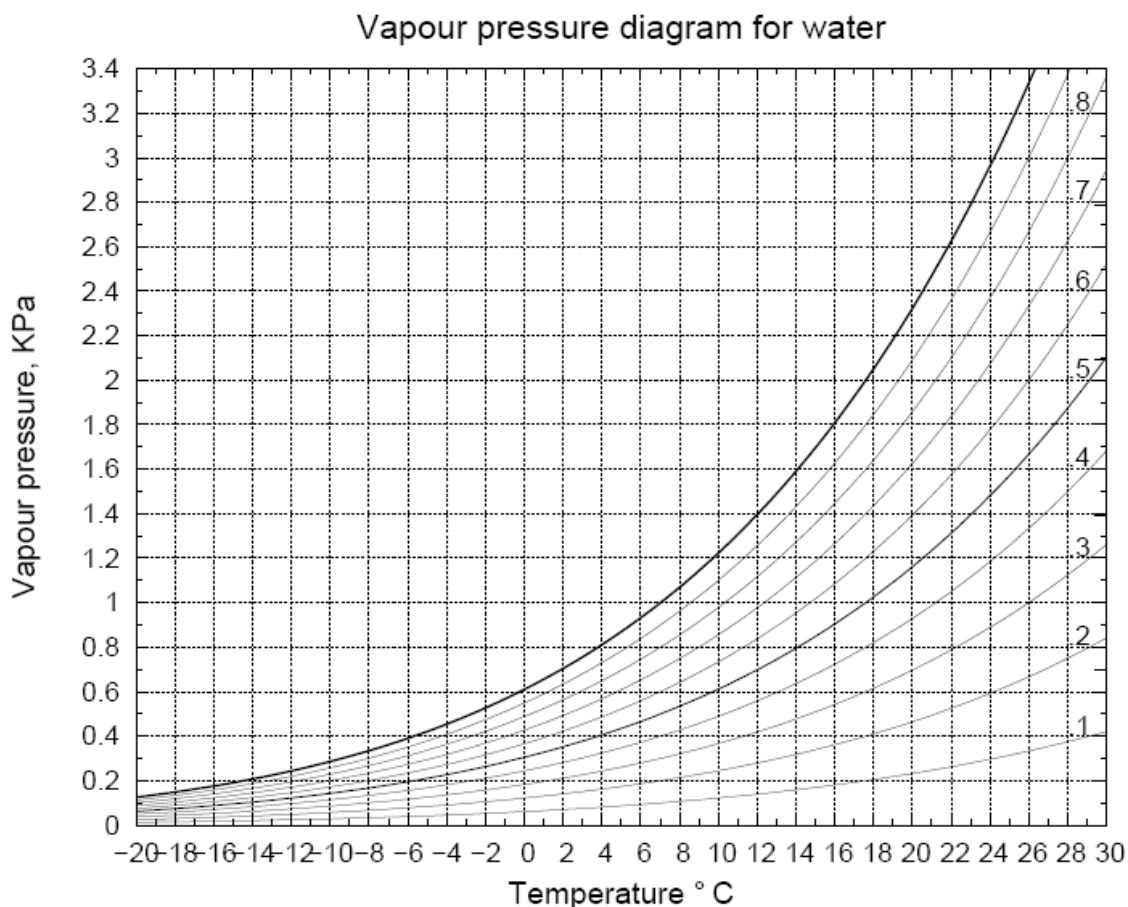




A substance that has a higher vapour pressure moves into the gas state more readily at room temperature. e.g., alcohols tend to have higher vapour pressure than water.

Diffusion – the passive mixing of liquids or gasses as a result of motion within the liquid or gas.

e.g., perfume molecules will diffuse through a room. As they spread through the room the molecules become less concentrated = harder to smell.

Viscosity – the resistance of a fluid to flow. e.g., molasses is more viscous than water and cold molasses is more viscous than hot molasses. e.g., glass is an extremely high viscosity liquid because the flow rate is virtually undetectable.

Chemical change – a change that produces a new substance (i.e., a chemical reaction). The new substance must have new properties.

Orally: *What evidence can be provided to suggest that a chemical reaction is occurring?*

Evidence of chemical reaction:

1. Heat and/or light is released/absorbed. Energy releasing reactions are said to be exothermic while energy absorbing reactions are endothermic. Orally: We will talk more about heat later in the course).
e.g., fire releases heat and light. Photosynthesis in plants absorb light energy to make sugar.
2. The formation of bubbles: a gas is forming.
3. A colour change. e.g., toasting a marshmallow.
4. A solid forms (i.e., a precipitate). e.g., two colourless solutions combine and the solution turns cloudy white.

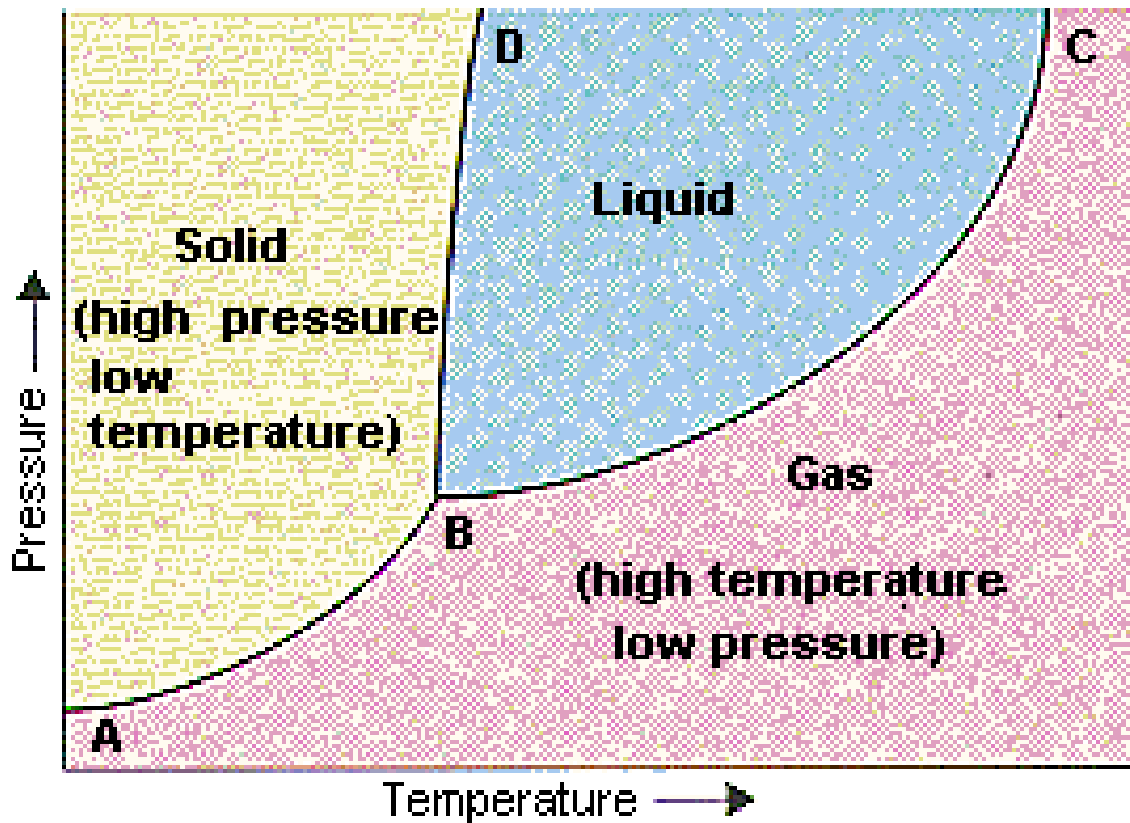
Physical changes – A change in which the properties of the original substance are retained (i.e., no new substance is formed. e.g., water freezes to form ice. The ice is still made up of water molecules, but now the molecules are in the solid state.

Orally: *Caution: chemical changes are often accompanied by physical changes. We need to depend on the resulting properties to decide ultimately on whether the change is considered to be chemical or physical.*

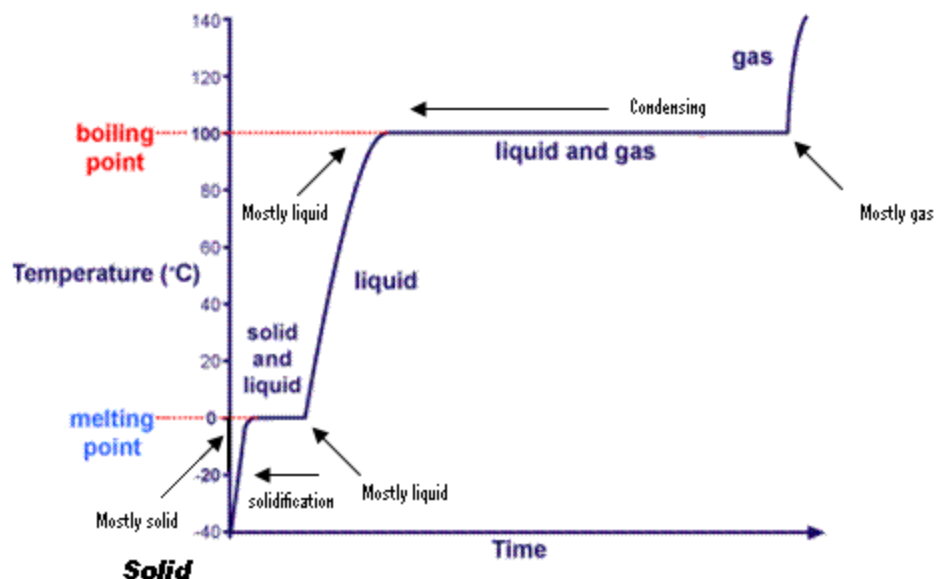
Phase change diagrams – diagrams that illustrate the change in state during melting, boiling, etc.

Orally: *Since more than one state is represented at a time, we refer to the states as phases because of the distinct boundaries that occur.*

Physical changes are often represented by phase changes. See the diagram below.



Orally: Note that a temperature and pressure exist where all three states of water are present at the same time. This diagram illustrates many observations we make in everyday life. eg., It's spring and there is ice on the street melting. The liquid portion can then undergo a degree of vapourization which is a function of it's vapour pressure at a given temperature and pressure. In other words there is a temperature where all states coexist. The boundaries that are created between the solid water, the liquid and gas produce the resulting phases that we observe.



Orally: notice that the temperature of the substance stops changing until the phase change is complete.

The average kinetic energy of boiling water (i.e., the temperature) is the same until the liquid phase moves completely to the gas. Reminder: This is what pure substances do. If we had a mixture, the temperature would continue to rise when boiling starts.

<http://www.youtube.com/watch?v=pOYgdQp4euc> (boiling water at room temp with lower pressure)

Assignment: Hebden workbook pg. 47 #17 – 19, 21, 23, 27 - 32