Name: _____

Date: _____

Matter

Particle model

Relate the features of the particle model to the properties of materials in different states.

1 Know

Ideas

K1 Properties of solids, liquids and gases can be described in terms of particles in motion but with differences in the arrangement and movement of these same particles: closely spaced and vibrating (solid), in random motion but in contact (liquid), or in random motion and widely spaced (gas).

K2 Observations where substances change temperature or state can be described in terms of particles gaining or losing energy.

Facts

K3 A substance is a solid below its melting point, a liquid above it, and a gas above its boiling point.

Key words

K4 **Particle:** A very tiny object such as an atom or molecule, too small to be seen with a microscope.

K5 **Particle Model:** A way to think about how substances behave in terms of small, moving particles.

K6 **Diffusion:** the process by which particles in liquids or gases spread out through random movement from a region where there are many particles to one where there are fewer.

K7 **Gas pressure:** Caused by collisions of particles with the walls of a container.

2 Apply

A1 Explain unfamiliar observations about gas pressure in terms of particles.

A2 Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles.

A3 Explain changes in states in terms of changes to the energy of particles.

A4 Draw before and after diagrams of particles to explain observations about changes of state, gas pressure and diffusion.

A5

K8 **Density:** How much matter there is in a particular volume, or how close the particles are.

K9 **Evaporate:** Change from liquid to gas at the surface of a liquid, at any temperature.

K10 **Boil:** Change from liquid to a gas of all the liquid when the temperature reaches boiling point.

K11 **Condense:** Change of state from gas to liquid when the temperature drops to the boiling point.

K12 **Melt:** Change from solid to liquid when the temperature rises to the melting point.

K13 **Freeze:** Change from liquid to a solid when the temperature drops to the melting point.

K14 **Sublime:** Change from a solid directly into a gas.

3 Extend

E1 Argue for how to classify substances which behave unusually, as solids, liquids, or gases.

E2 Evaluate observations that provide evidence for the existence of particles.

E3 Make predictions about what will happen during unfamiliar physical processes, in terms of particles and their energy.

E4

E5