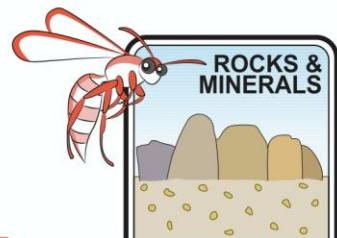


Melting and Crystallising – Teacher Notes



When rocks melt due to increased pressure and heat within the Earth, they will subsequently rearrange their molecules into crystalline minerals that are stable under those particular conditions. Sediments may recrystallise to form granites. Not all minerals melt at the same time. When rocks are metamorphosed only those which are unstable at that temperature will melt and recrystallise into new minerals.

Misconception

Students commonly confuse melting with solution. Laboratory activities using solutions of chemicals to form crystals may be partly responsible for this.

Melting A change of state from solid to liquid involving an increase in temperature/ increase in kinetic energy.
ONLY ONE SUBSTANCE IS INVOLVED

Dissolving Molecules of the solid are spread out within the liquid.
Solute + solvent = solution
TWO OR MORE SUBSTANCES ARE INVOLVED.
In the cases of sugar or salt the solid may no longer be visible but does not disappear as it can still be tasted in the solution. Potassium permanganate can be seen to disperse in solution.

Demonstration Melting and solution

Materials

- Sugar
- Two small beakers
- Water
- Crucible
- Tripod
- Gauze
- Matches
- Glasses

1. Demonstrate sugar dissolving in water.

Name the solute (solid) **Sugar**

Name the solvent (liquid) **Water**

Name the solution **Sugar solution**

Observe the solution. How can we tell that the sugar has not disappeared?

We can still taste the sugar in the water.

How many substances were produced when sugar dissolved in water? **One**

2. Repeat using water and potassium permanganate (Condy's crystals)

Name the solute (solid) **potassium permanganate**

Name the solvent (liquid) **Water**

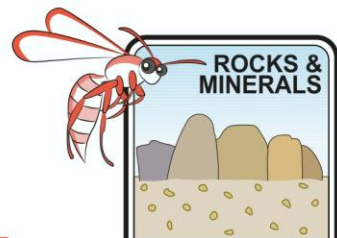
Name the solution **Potassium permanganate solution**

Observe the solution. How can we tell that the sugar has not disappeared?

We can see the purple potassium permanganate dispersed through the water.

How many substances were produced when potassium permanganate dissolved in water? **One – a mixture**

Melting and Crystallising – Teacher Notes



3. Place sugar in crucible, light Bunsen and heat until sugar melts.

4. Allow to cool

How many substances were heated? **One**

How many substances were there when it cooled? **One**

When sugar dissolved in water, was this a physical change or a chemical change? Explain your answer. **It was a physical change as no new substance was produced. The mixture contained both of the original substances which could be physically separated by evaporation and condensation. Dissolving is a change of state.**

When sugar was melted, was this a physical change or a chemical change? **It was a physical as no new substance was produced. Melting is a change of state.**

A simple 5 minute video reinforcing these concepts can be found on You Tube

http://www.youtube.com/watch?v=vA_f38UDoR4

Crystals

When we want to make chemicals form crystals in schools, we often dissolve them in water. Convection currents moves heat to the mineral molecules and allows them to heat without burning (oxidising in the atmosphere) in much the same way as we use water to cook potatoes and oil to cook chips without burning. Removing heat allows the molecules to rearrange themselves into different crystalline pattern.

Rapid heat loss produces small crystals whilst geologically slow cooling can create large crystals. Igneous rocks are hard because their crystals are interconnecting

More information and activities involving crystals can be found in the Minerals and Igneous rocks sections of this package or at www.earthsciencewa.com.au