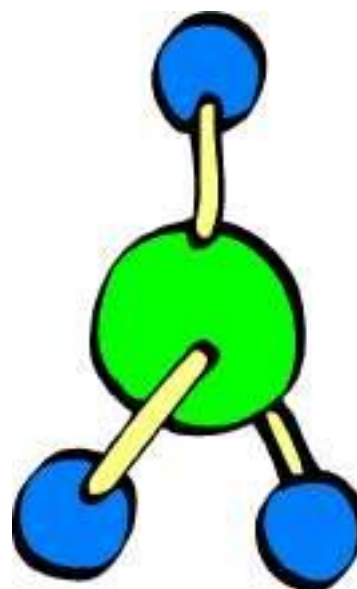
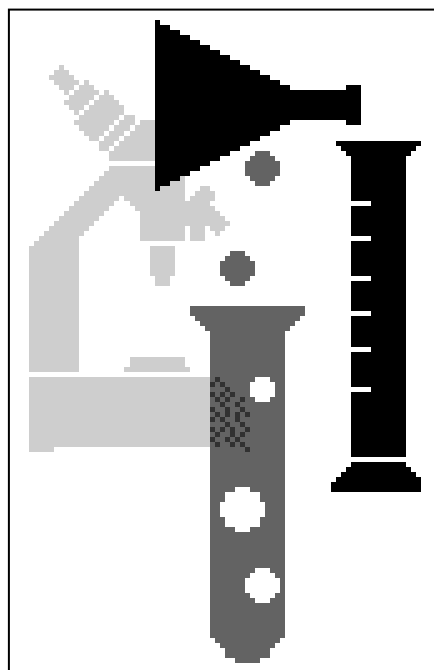


Task Booklet
Year 7 Science

**States
Of Matter**



Student Name:
Science Teacher:

Standard

Substances

There are three states of matter - solid, liquid and gas.
Substances have different properties depending on which state they are in.

Complete the table below by writing the statements under the correct headings. Some of the statements may need to go in more than one column.

- *occupies all the space available*
- *takes the shape of its container*
- *can move freely*
- *has a fixed volume*
- *has a fixed shape*
- *is easy to compress (squash)*
- *has a fixed mass*
- *cannot be compressed (squashed)*

Solid	Liquid	Gas

Standard

Substances 2

Some substances have properties which make it difficult for us to decide whether they are solids or liquids. Glass is a good example.

Glass appears to be a solid but if you leave it for long enough (about 20 years) the particles at the top of window glass start to flow from the top of the window to the bottom. Sometimes you can see this as 'runs' in the glass -they change what we see slightly as the glass is thicker in some places than in others.

The ability to flow is a property of liquids, not solids, so glass appears to have properties of both solids and liquids.

1. Write down all the reasons you can think of that make glass a solid.

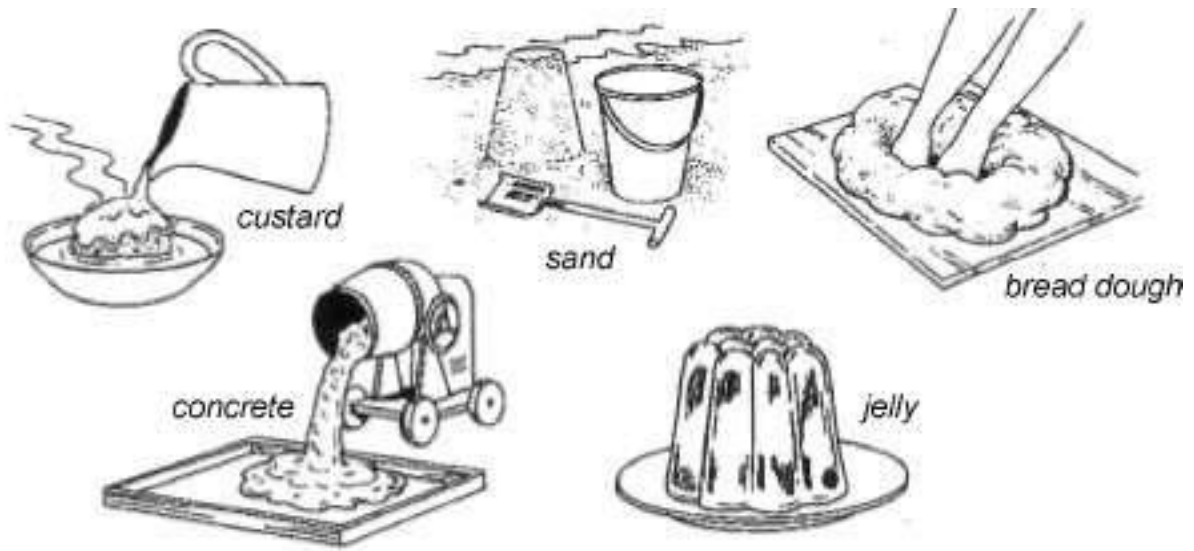
2. Why might we also think that glass is a liquid?

3. What would you need to do to glass to change it from solid glass to liquid (molten) glass?

4. What do you need to do to change a liquid like water into a solid?

Extension

Choose one of the following materials:



5. Imagine you are writing to a friend. Describe the material you have chosen, without mentioning its name, so that your friend can guess what the material is.

6. Is the material solid, liquid or gas?

7. Write down your reasons for thinking it is a solid.

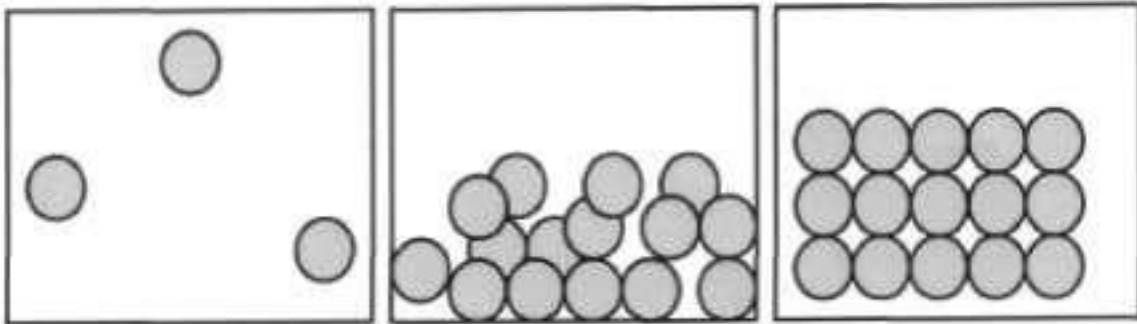
8. Write down your reasons for thinking it is a liquid.

States of Matter

Core

There are three states of matter - solid, liquid and gas.

1. Each of the drawings below shows how the particles are arranged in either a solid, a liquid or a gas. Look at each diagram and decide which it is. Write the answers underneath the diagrams.



Standard

2. Below are three statements which describe the way particles are arranged in solids liquids and gases. Decide which each sentence is describing and write the answer underneath the sentence.

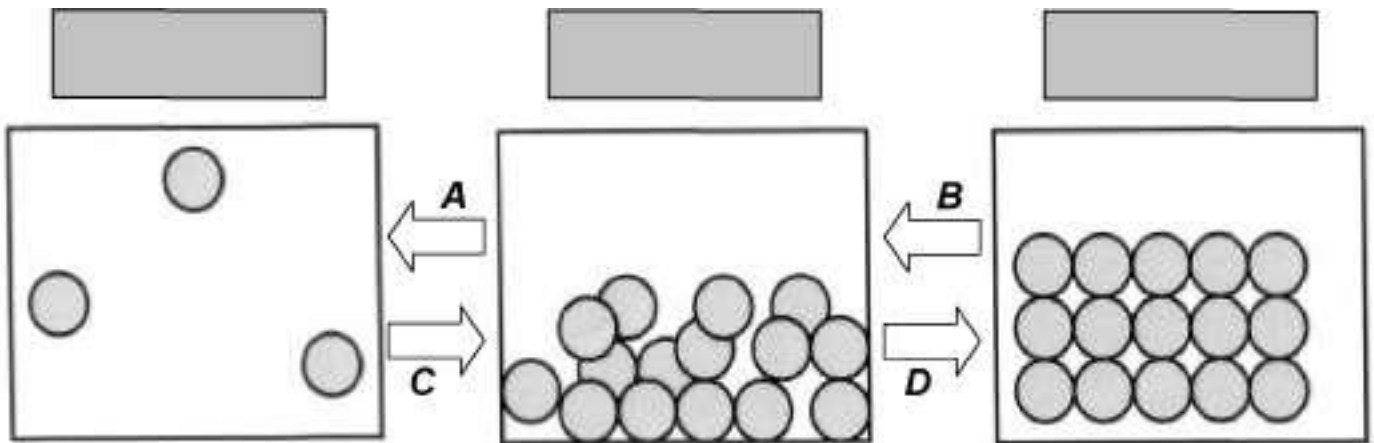
(a) Particles are close together and arranged in a regular pattern. The particles are not free to move - they can only vibrate in place.

(b) Particles are free to move. Their movement is in all directions and without any pattern.

(c) Particles are close together but there is no regular pattern. The particles are free to move but their movement is limited.

Particles

The diagrams below show the particles in a solid, a liquid and a gas.



Use words from the box to answer the questions below.

liquid melting solid boiling gas freezing condensing

Core

1. Fill in the grey boxes to show which state of matter each diagram shows.

Standard

2. The arrows show changes of state from one form to another,
 - (a) What change of state is shown by arrow 'A' ?

 - (b) What change of state is shown by arrow 'B' ?

 - (c) What change of state is shown by arrow 'C' ?

 - (d) What change of state is shown by arrow 'D' ?

3. In which state of matter are the particles closest together?

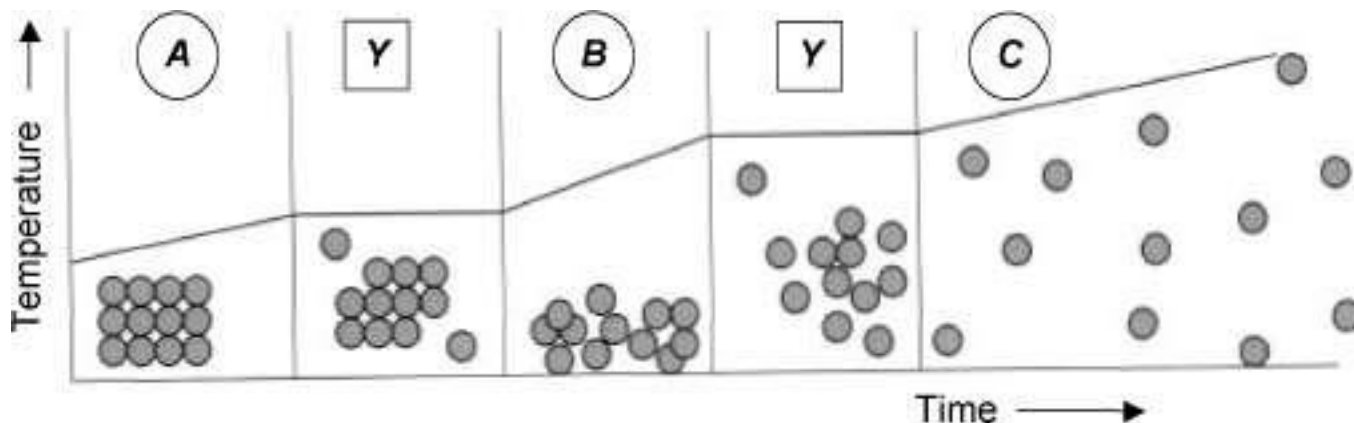
4. In which state of matter are the particles far apart and moving quickly?

5. What has to be done to a liquid in order to change it into a gas?

continued ->

Extension

6. The diagram below shows how the arrangement of particles in a substance changes as the temperature increases.



The circles A, B and C show the states of matter (solid, liquid and gas).

The squares Y and Z show the changes of state (melting and boiling), (a)

Which state of matter is shown at circle A ?

(b) Which state of matter is shown at circle B ?

(c) Which state of matter is shown at circle C ?

(d) Which change of state is shown at square Y ?

(e) Which change of state is shown at square Z ?

7. In which state of matter are the particles regularly arranged?

8. Particles are not regularly arranged but are close together with large forces of attraction between them. Which state of matter is this?

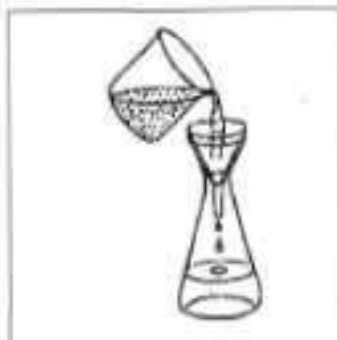
9. Describe the arrangement of particles in a gas.

Core / Standard

Separating Mixtures

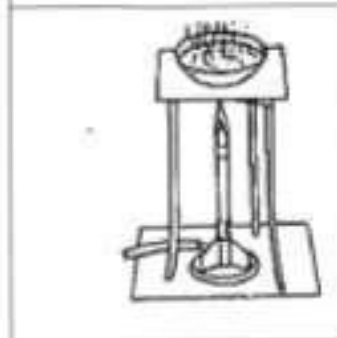
Draw a line to connect the name of the separating method with the correct diagram and description.

seiving



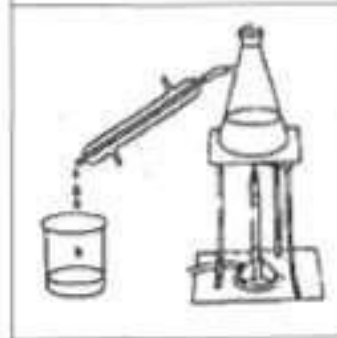
soluble solid
from a liquid
(saving the
solid)

filtering



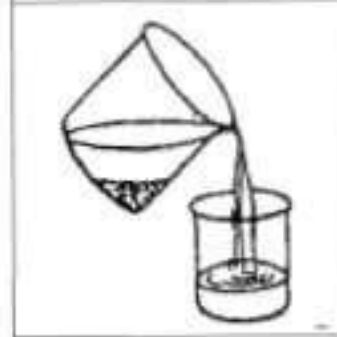
insoluble solid from a liquid

decanting



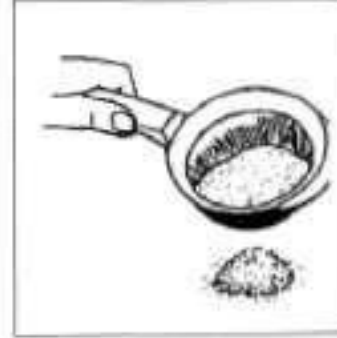
different sizes of solid grains

evaporating



soluble solid
from a liquid
(not saving the
liquid)

distilling



insoluble solid from a liquid

Solutions

Core

1. Use the words in the box to complete the sentences below.

soluble insoluble solution saturated solution

- (a) A substance that does not dissolve in water is
- (b) A liquid in which no more solid will dissolve is a
- (c) A substance that dissolves in water is
- (d) The liquid made when a solid dissolves in water is a

Standard

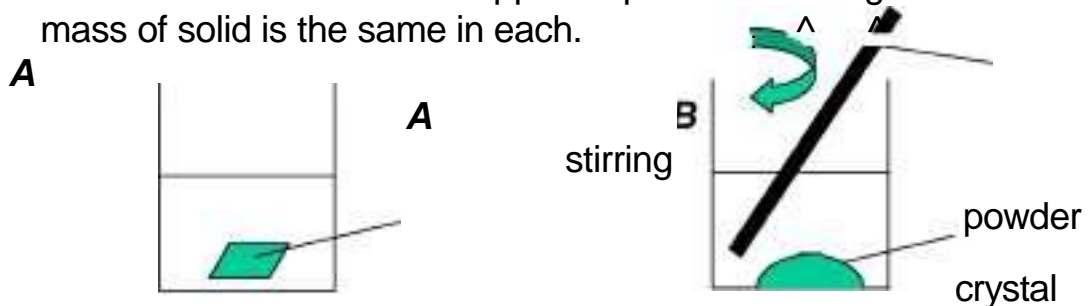
2. The box below shows some different substances.

copper sulphate sand sugar coffee iron filings
cooking oil flour

Fill these substances into the table to show whether they are soluble or not.

<i>insoluble</i>	<i>soluble</i>

3. The beakers below show copper sulphate dissolving in water. The mass of solid is the same in each.

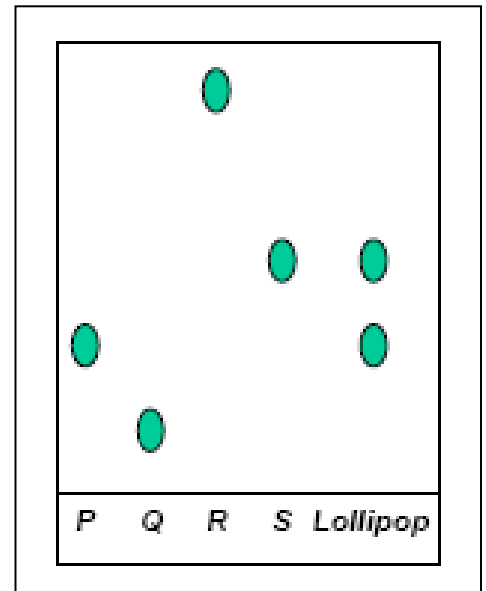


- (a) Which beaker will dissolve quickest, A or B ?
- (b) Explain why _____

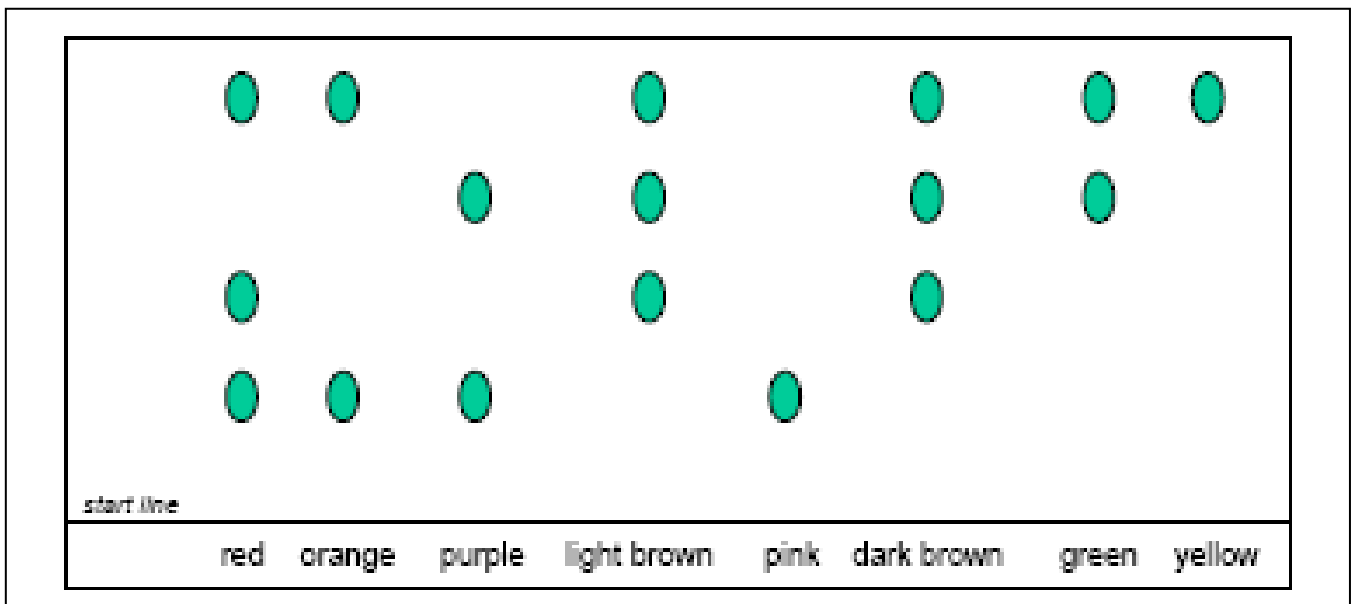
Standard

Chromatography

In chromatography a solvent is used to carry a substance along the paper. As substances do not all dissolve by the same amount, some substances are carried further than others. A student made the chromatogram shown of the lollipop when trying to identify the flavours used. Each flavour is produced by substances that are carried a certain distance by the solvent. By looking at the trace you can see that the lollipop flavour was made using substances P and S as they line up with the lollipop.



A student investigated different smartie colours using chromatography. The solvent used was water. The final chromatogram is shown below.



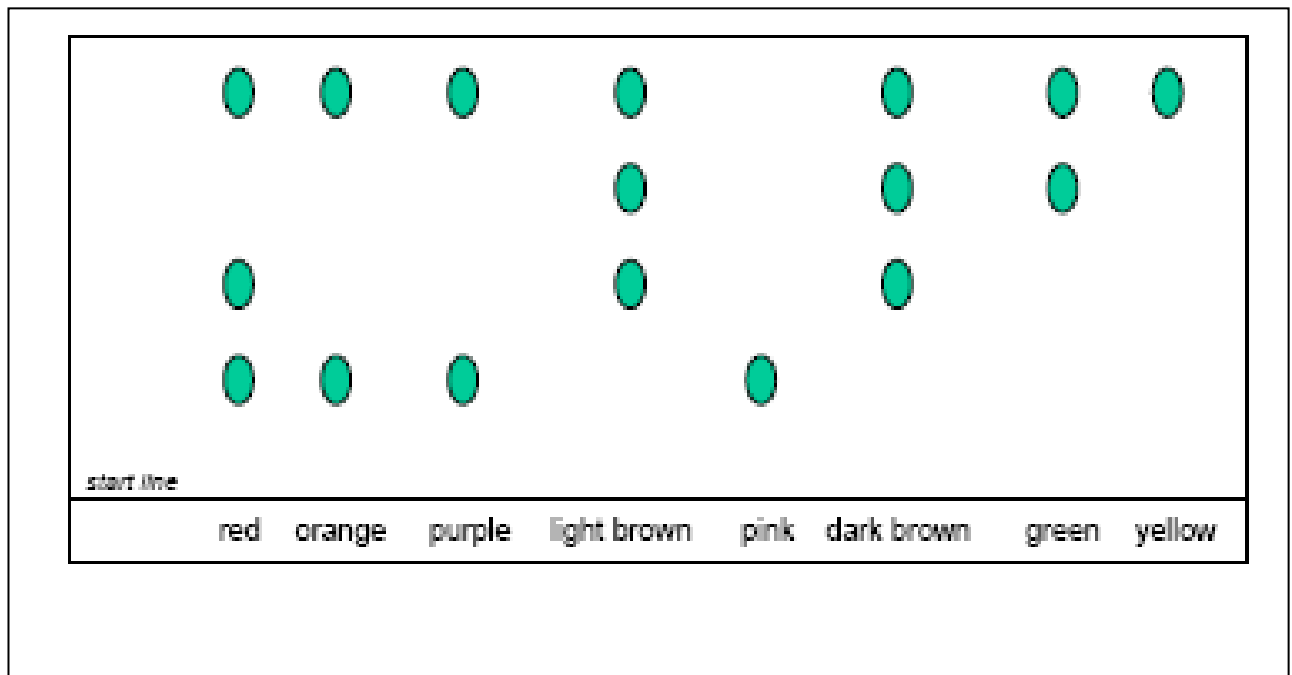
1. Which colours are made from only one dye?

2. Which colours are used to make orange?

3. How many different dyes (not colours) are there on this chromatogram?

Extension

One of the dyes in Smarties has been changed. The chromatogram in the previous question showed the dyes **AFTER** the change. The chromatogram below shows the dyes used **BEFORE** the change.



4. Which colours have been changed?

5. Explain how you know that this is the case.
