



# PiXL Science

## KS3 Application Particles

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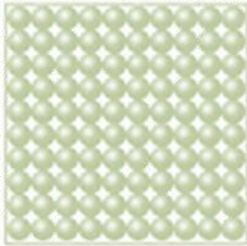
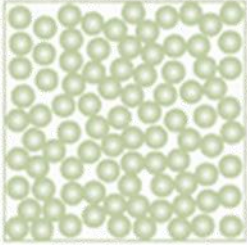
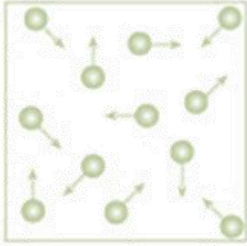
# Particles

You need to be familiar with the three states of matter and their properties and be able to apply the particle model to unfamiliar materials and contexts.

**Complete the following table:**

	Diagram	Movement of particles	Properties
Solid			
Liquid			
Gas			

You will also need to be able to identify the suitable method of separation for a mixture.

	Diagram	Movement of particles	Properties
Solid		Closely spaced and vibrating	Fixed shape, cannot be compressed, cannot flow
Liquid		Random motion but in contact	Can flow and take shape of container, cannot be compressed
Gas		Random motion and widely spaced	Flow and fill container, can be compressed

# Distillation

Distillation can be used to separate mixtures of liquids.

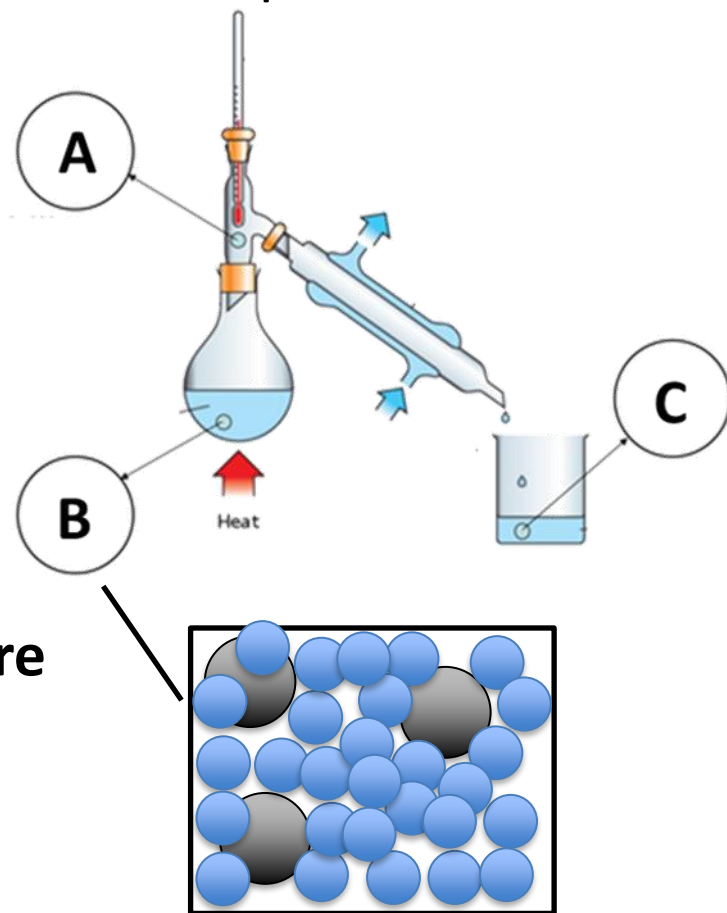
Name the process which causes the change in state between B and A.

Name the process which causes the change in state between A and C.

This particle diagram shows the mixture of liquids in the flask at B.

Beaker C contains pure water. ●

Draw a particle diagram showing the particles at A and at C.



# Distillation

Name the process which causes the change in state between B and A.

**Evaporation/ boiling**

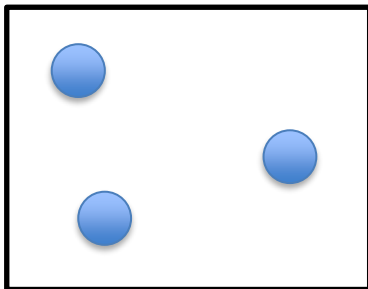
Name the process which causes the change in state between A and C.

**Condensation**

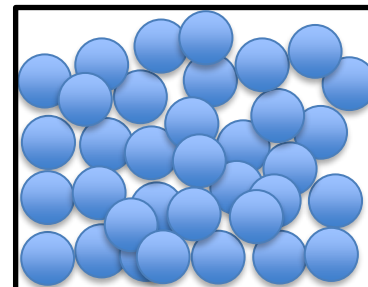
Beaker C contains pure water. ●

Draw a particle diagram showing the particles at A and at C.

**A: Gas,  
pure water**



**B: Liquid,  
pure water**



# Chromatography

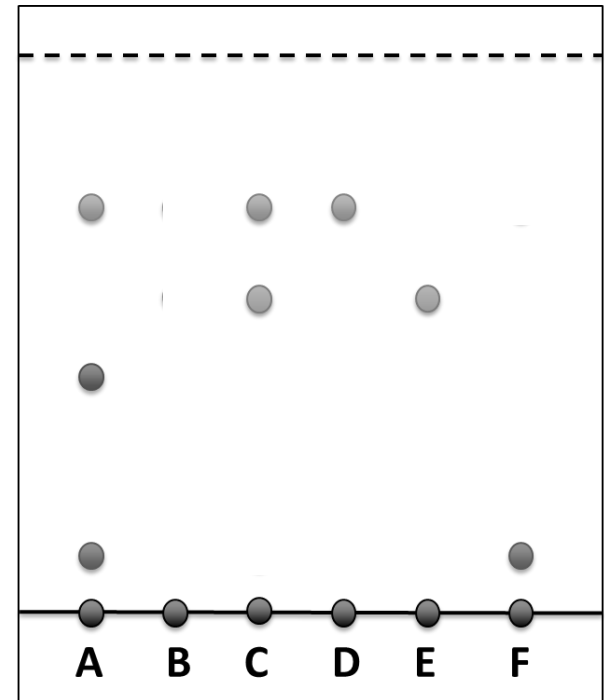
Chromatography can be used to separate food colouring.

Look at the results of this chromatography experiment.

**How many dyes were separated out of C?**

**Which dye, D, E or F, is not found in C?**

**What is unusual about A?**



**Food colouring B did not separate into different dyes.**

**Why do you think this happened?**

**What could you do differently to ensure the dyes separated?**

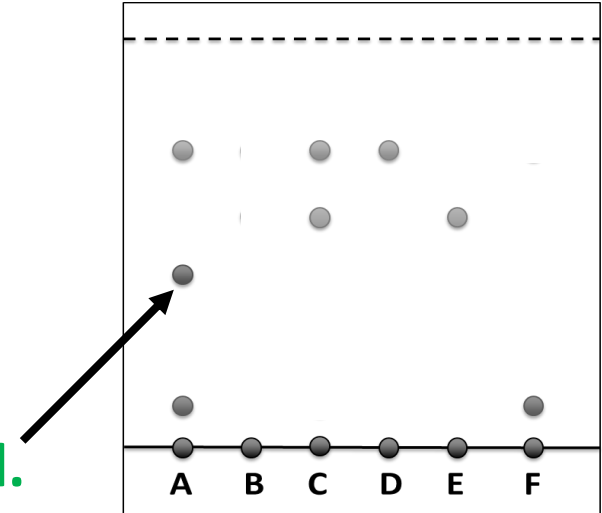
# Chromatography - answers.

How many dyes were separated out of C? **2**

Which dye, D, E or F, is not found in C? **F**

What is unusual about A?

**It contains a dye/ spot which is not identified.**



Food colouring B did not separate into different dyes.

Why do you think this happened?

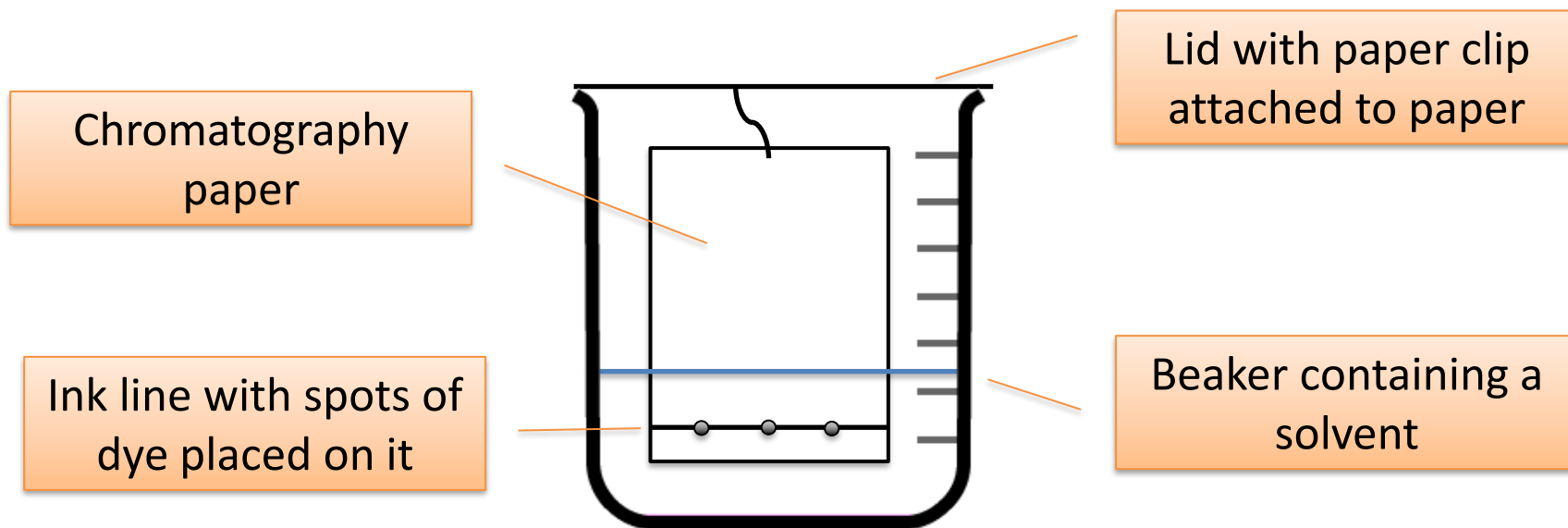
**It is not soluble in the solvent used.**

What could you do differently to ensure the dyes separated?

**Change the solvent.**

# Chromatography

A student set up a chromatography experiment incorrectly.



**Identify the mistakes the student made when setting up the experiment.**

**For each mistake explain what the student should have done and why.**



# Chromatography

**Identify the mistakes the student made when setting up the experiment.**

**For each mistake explain what the student should have done and why.**

Line drawn in ink.

Should have been drawn in pencil.

Otherwise the ink would dissolve in the solvent and travel up the paper with the dyes.

Solvent level is above the spots.

Solvent level should be below the spots.

Otherwise the spots will dissolve in the solvent and not travel up the paper correctly.

# Gas particles

Nitrogen gas and oxygen gas react very slowly with each other. In order for gas particles to react with each other they need to **collide** (hit each other).

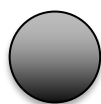
Plunger

**Complete the particle model diagram showing a mixture of oxygen and nitrogen gas.**

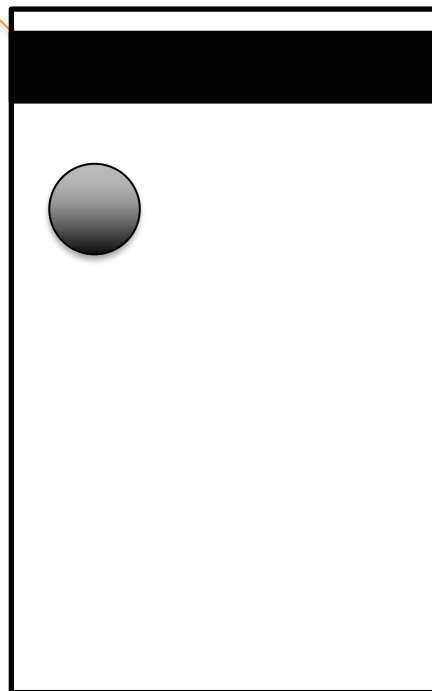
Key:



Nitrogen



Oxygen

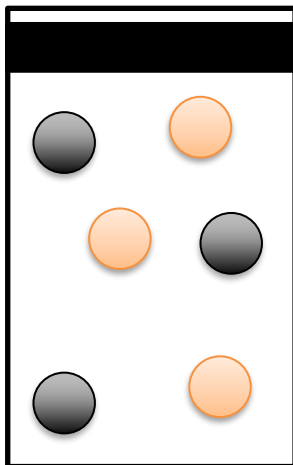


**If the plunger is pushed down:**

- **What will happen to the mixture of gases?**
- **What will happen to the speed of the reaction?**
- **Why will this happen?**

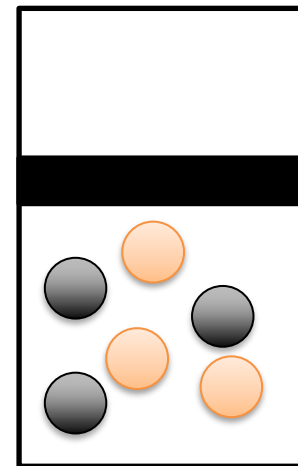
# Gas particles

Complete the particle model diagram showing a mixture of oxygen and nitrogen gas.



If the plunger is pushed down:

- What will happen to the mixture of gases?  
**It will be compressed, pressure will increase.**
- What will happen to the speed of the reaction?  
**It will be faster.**
- Why will this happen?



**Particles collide more often because they are closer together.**