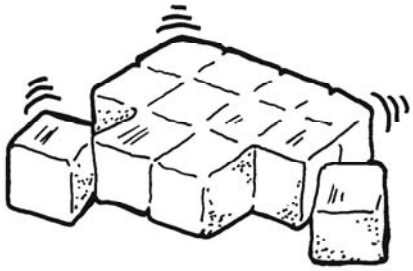
Making Jelly

Will and Vicky were arguing about how to make jelly fastest.
Will said it was better if you used hot water. He explained:

"When you use hot water, the water has more energy to dissolve the jelly. So the jelly will disappear faster."



Vicky said that might be true, but a better way was to cut up the jelly into very small pieces. She argued:

" If the jelly is cut up really small then there is more surface area for the water to work on.

Carry out this investigation to see whether they were right.
Perhaps they were both right!

Before you start look at a copy of Will and Vicky's methods and check if they were fair tests.

After your investigation explain what you have found out. Fill in the Year 6 Investigation section of your Science Passport. Then apply for your Investigation Visa.

Will's results table – remember to write down the units you measure in.

Temperature	Time to dissolve

Do at least six different temperatures between 10°C and 60°C, but measure them as accurately as possible. Keep the jelly cubes in one piece.

Vicky's results table – remember to write down the units you measure in.

One cube cut into:	Time to dissolve
1 piece	
2 pieces	
4 pieces	
8 pieces	
16 pieces	
32 pieces	

The temperature was kept at ……. °C

Making Jelly

Will's fair test method

I need to make sure that the only variable I change is the temperature of the water for making jelly.

I will keep these things the same for all my tests:

- 4 separate cubes of the same brand of jelly.
- 160 cm^3 of water measured with a measuring cylinder.
- two 360 degree stirs every 30 seconds.
- the same mixing container
- the same type of water (tap water)

I will use water at different temperatures, including a bottle of tap water that has been in the fridge overnight. I will measure out the correct volumes. I will measure the time that it takes the jelly to dissolve each time.

I will record my results in a table.
Then I will draw a graph with the temperature along the bottom and time to dissolve up the side.

Vicky's fair test method

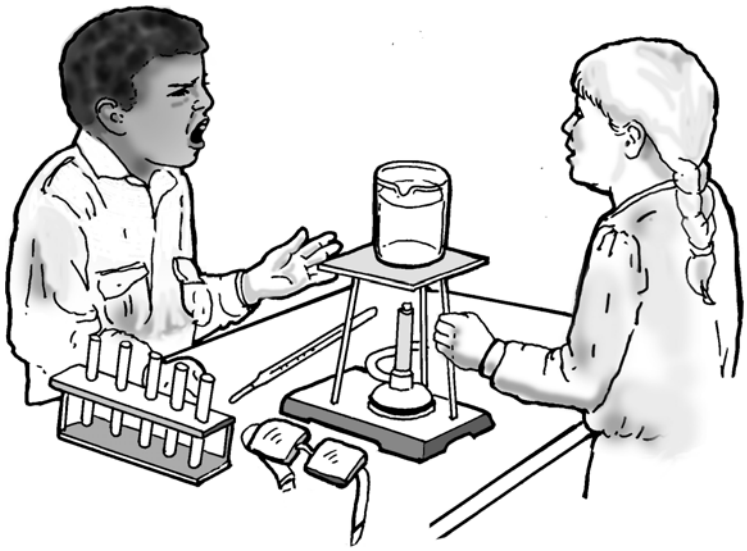
I need to make sure that the only variable I change is the size of the jelly pieces.
I will keep these things the same for all my tests:

- 4 cubes of the same brand of jelly each time cut into smaller and smaller pieces.
- 160 cm^3 of water measured with a measuring cylinder.
- two 360 degree stirs every 30 seconds.
- the same mixing container
- the same type of water (tap water)

I will use water at the same temperature. I will do this by putting a plastic bottle of warm tap water in a bucket of warm water. The water in the bucket will be 40°C and will keep the bottle of water at 40°C. I will measure out the correct volumes. I will measure the time that it takes the jelly to dissolve each time.

I will record my results in a table.
Then I will draw a graph with number of jelly pieces along the bottom and time to dissolve up the side.

Is there a limit to how much can dissolve?



When they were in primary school Vicky and Will investigated how to make substances dissolve faster. They found out that substances dissolve faster if they are in a hotter solvent **and** if they are cut up into smaller pieces.

They are now arguing about how much of a solute will dissolve.

Will says: " You can just keep adding more and more of the solid you are dissolving – it will all dissolve in the end. It's like adding sugar to coffee, all of it will dissolve."

Vicky says: "More will dissolve if the solvent is hot. If the solvent is cold, less solid dissolves and some will be left over."

Vicky : "It's like when honey goes sugary. If a lot of solid is dissolved and then the solution cools down, the solid will start to reappear."

You are going to make solutions in hot water and then let them cool.

Discuss

1. What should you see if Vicky is right?

2. What should you see if Will is right?

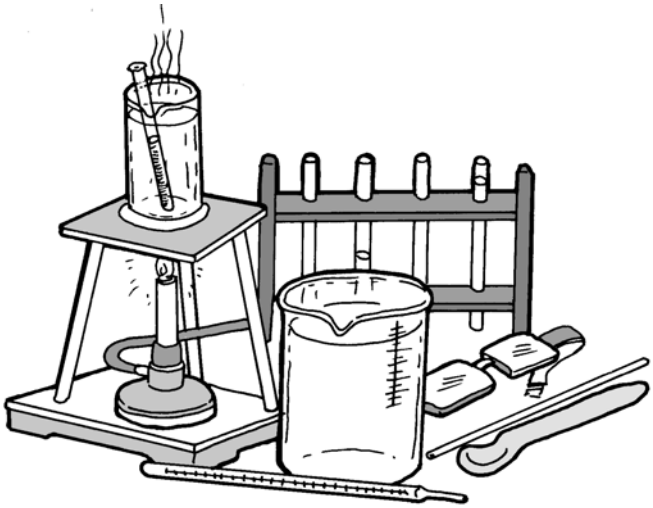
3. Whose idea do you agree with? This is your prediction.

4. What do these scientific words mean? **solute** **solvent** **solution**

[You could add them to your Passport word list.]

Is there a limit to how much can dissolve?

Instructions



As a whole class you are going to make solutions that have different amounts of solid dissolved in them. You will cool them down and see if crystals of solid appear as they cool. Divide the work up between the whole class.

Use 10cm^3 of water every time.
Use a different mass of potassium nitrate crystals: 4.0g, 5.0g, 6.0g, 7.0g, 8.0g, 9.0g, 10.0g, 11.0g

Wear eye protection when handling potassium nitrate.
Put the solid and water in a test tube.
Heat the test tube in a beaker of hot water until all the solid dissolves. Stir the solution **carefully** with a glass rod.

When the solid has dissolved, carefully lift the test tube out of the water. Put it in a test-tube rack.

Put the thermometer in and leave it to see if crystals appear. Stir the mixture once every minute. As soon as any crystals appear measure the temperature.

Record your answers in the table. Fill in any gaps in the table with answers from others in your class.

Mass of potassium nitrate (g)	Volume of water (cm^3)	Temperature when crystals first appeared (oC)
4.0	10.0	
5.0	10.0	
6.0	10.0	
7.0	10.0	
8.0	10.0	
9.0	10.0	
10.0	10.0	
11.0	10.0	

Making Jelly Results

Discuss

1. (a) What have you changed in your investigation?
   (b) What have you kept the same in your investigation? (Try and think of three things that have stayed the same).
   (c) What have you measured?

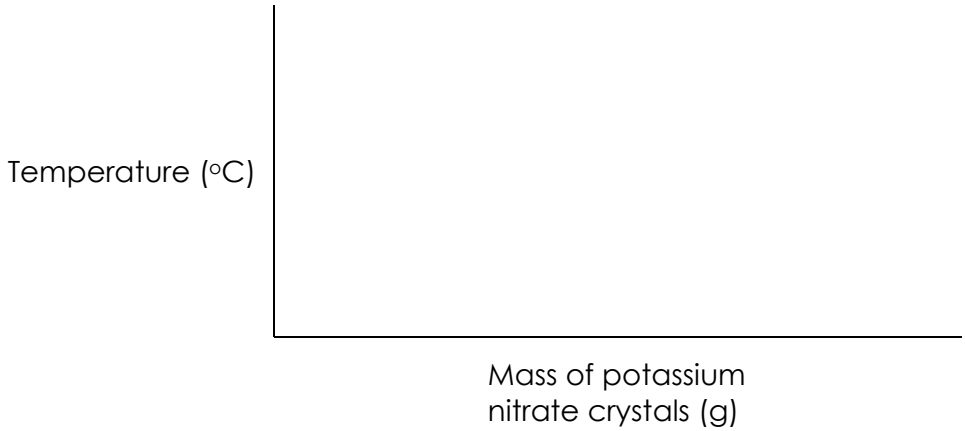
2. Some groups in your class may do the investigation with the same mass of crystals as another group. Do you think this is good or a waste of time?

3. Why do you think this?

4. What is the pattern in your results?

5. How can you show this pattern better in a graph?

6. Which axis will you use to put the temperature and which the mass? Why? (Remember to divide the axes up in equal jumps!)



7. Do your results agree with your prediction?

Evaluation

1. How accurate do you think your investigation was?

2. How could your investigation have been improved?

Use what you have found out to fill in the Year 7 part of your Science Passport.