

MATERIALS 2

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Name _____

Form _____

Solid, Liquid or Gas?

Solids, liquids and gases are called the **three states of matter**

Look at the materials you have been given and decide what state they are (solid, liquid or gas) they are.
Write the name of each substance in the correct column

Substances you may be given include: **ice, water, air, sand, rubber, chocolate, sugar, fizzy drink (the liquid part), fizzy drink (the bubbles of carbon dioxide)**

Solid	Liquid	Gas

Facts about solids liquids and gases

Solids	Liquids	Gases
Solids do not flow. They always have a fixed shape	Liquids flow and can be poured easily	Gases flow and change shape
Solids always take up the same amount of space	Liquids change their shape depending on their container	Gases spread out to fill the space of their container
Solids can be cut or shaped	Liquids always take up the same amount of space (the volume does not change)	Gases can be squashed (compressed)
Solids stay in one place and can be held		

http://www.bbc.co.uk/bitesize/ks2/science/materials/solids_liquids_gases/play/

The three states of matter

Summary

	SOLIDS	LIQUIDS	GASES
Examples		Oil	Air
Does it keep its shape?		No	
Does it always have the same volume?		Yes	
Can it flow down a pipe?	No		Yes
Can it be squashed up (can it be compressed?)	No	No	

The three states of matter

SOLID LIQUID GAS

Name



I can flow easily but always have the same volume

What am I?.....

I always completely fill whatever container I am put into **What am I?.....**

I am hard and always have the same volume.

What am I?.....

I can be squashed into smaller spaces

What am I?.....

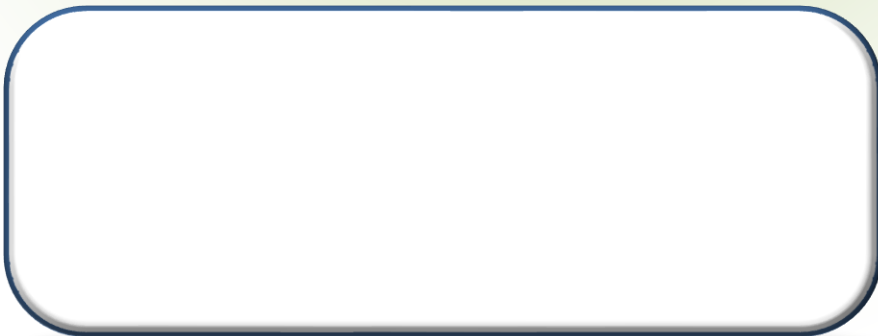
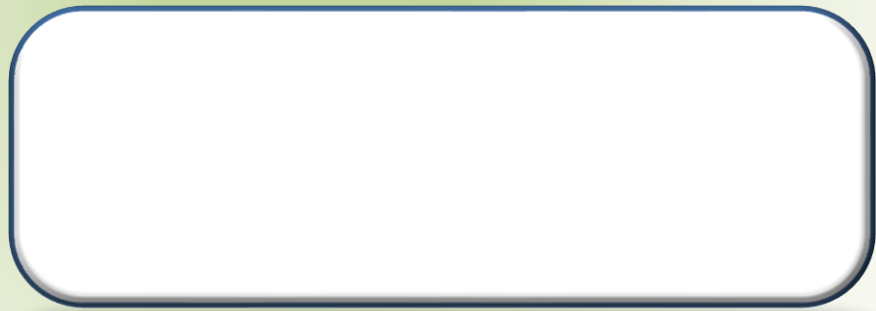
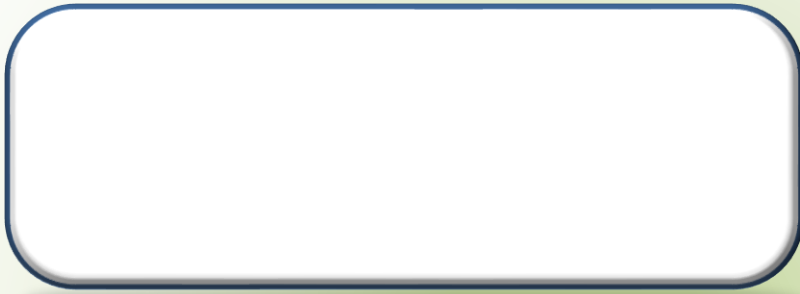
I keep my shape and cannot flow

What am I?.....

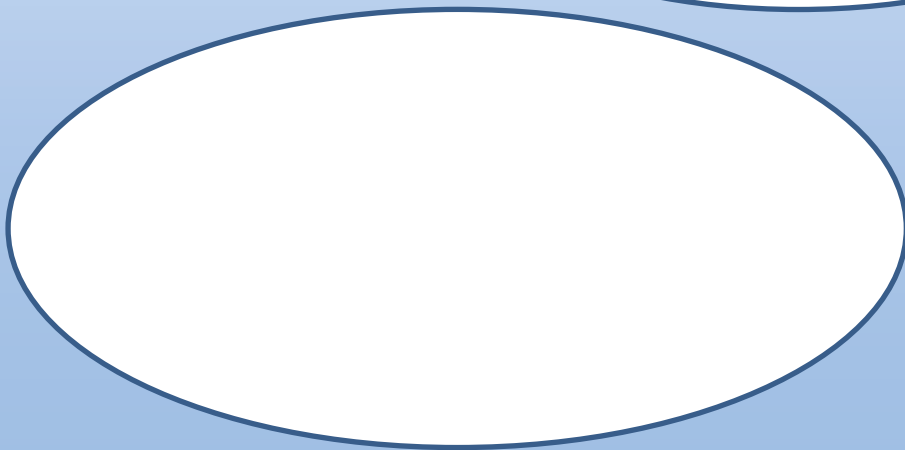
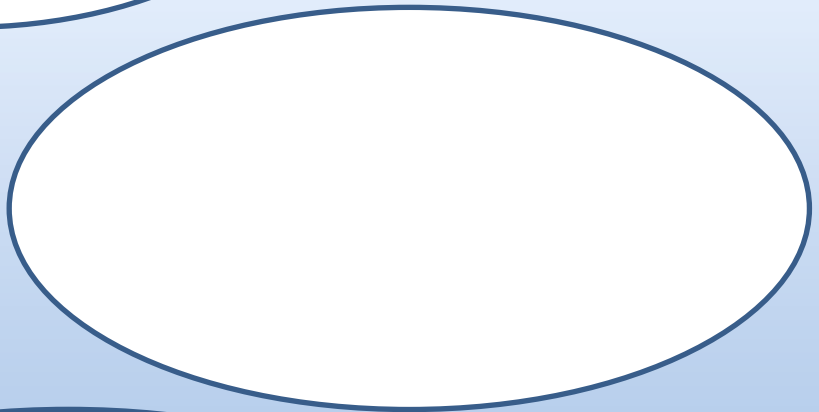
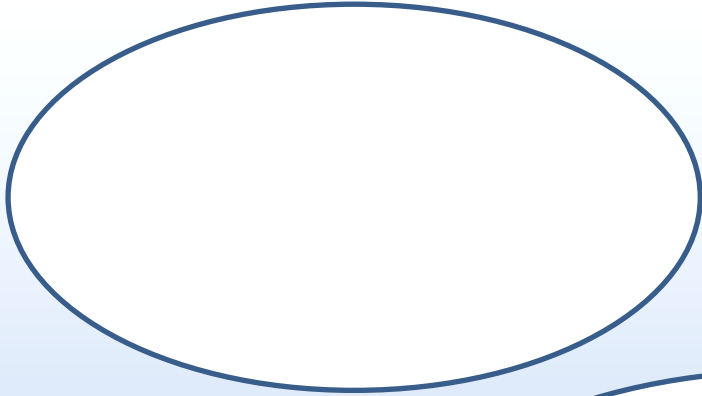
I take on the shape of my container but I cannot be squashed into a smaller space

What am I?.....

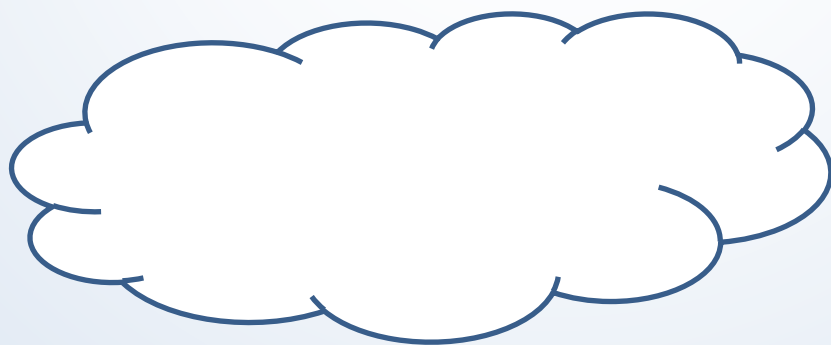
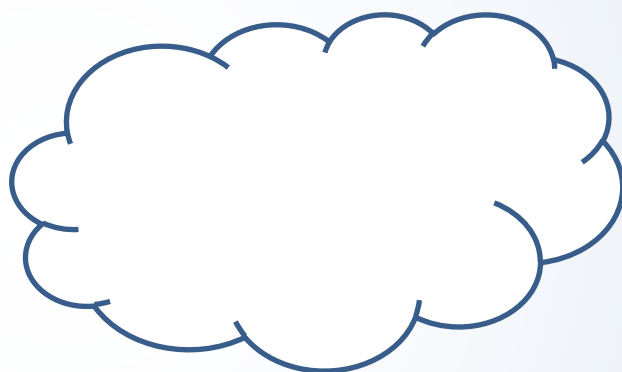
SOLIDS



LIQUIDS



GASES



Experiment:

Make your own notes on a separate sheet of paper

Making a Solution

1. Place 100 ml of water into a 250ml beaker and add 1 spatula of sand.
Stir the mixture well. What happens?
2. Place 100 ml of water into a 250ml beaker and add 1 spatula of sugar
Stir the mixture well. What happens?

Write a note explaining what you did along with the results.
Explain what you observed.

Whenever something dissolves a **solution** is formed

The liquid we used to make the solution is called the **solvent**

The solid that we dissolved is called the **solute**

Summary:

SUGAR	+	WATER	=	SUGAR SOLUTION
solute	+	solvent	=	solution

Note: The solvent is usually water but could be any liquid like petrol

Which substances dissolve?

You are now going to do an experiment to see which substances are soluble in water.

1. Place 50 ml of water into a 100ml beaker and add 1 spatula of powdered solid.
Stir the mixture well and write down what you observe

RESULTS

Substance	Observation	Soluble / Insoluble
Salt		
Chalk		
Sand		
Sugar		
Coffee		

To make it a fair test I kept these factors the same for each experiment

- The quantity of solid being used.
- The volume of water
- The rate of stirring
- The temperature of the water.
- The size of the particles in the solid

Did all the materials dissolve equally easily?.....

Out of the materials that DID dissolve, which dissolved the best and which dissolved the least easily?

.....

.....

Experiment:

Make your own notes on a separate sheet of paper

Dissolving a sugar lump

Aim: Investigating how to make a sugar lump dissolve quicker

What you do:

Dissolve a sugar lump using a variety of techniques and measure how long it takes the sugar to dissolve in each case

Remember use the same mass of sugar and same volume of water for each experiment and to record your results carefully

Apparatus needed

1 x 250ml beaker, 1 spatula, 1 stopwatch or timer, 1 mortar and pestle

RESULTS

Conditions	Time taken to dissolve
A No stirring+ cold water	
B Stirring the lump+ cold water	
C Stirring + crushing + cold water	
D Stirring + crushing + warm water	
E Stirring + warm water (not crushed)	

The experiment where the sugar dissolved the quickest is

I know this because the time taken for the sugar to dissolve was.....

For each experiment this is what I measured:.....

This is what I kept the same:.....

.....

Conclusion: we found three ways to help the sugar lump dissolve quicker:

1.

2.

3.

Assessment test 1 A

Date:.....

1. Solid, liquid or gas?

I can flow easily but cannot be squashed up. What am I? **Solid/ Liquid/Gas**

I always keep my shape and don't change size. What am I? **Solid/ Liquid/Gas**

I always completely fill whatever container I am put in. What am I? **Solid/ Liquid/Gas**

2. Fill in the table below.

Put the following substances into its correct box below: **Air, Water, Brick, Helium, ice, Ink**

There should now be two words in each box

Solid	Liquid	Gas
1.	1.	1.
2.	2.	2.

Making a solution

Sugar easily dissolves in water to form sugar solution

Sand does not dissolve

1. If something can dissolve we say it is **soluble** **insoluble**
2. If something cannot dissolve then we say it is **soluble** **insoluble**
3. When something dissolves it forms a **solution** **solute** **solvent**
4. Name a substance that is **soluble** in water **sand** **sugar** **flour**
5. Name a substance that is **insoluble** in water **sand** **salt** **sugar**
6. Sugar takes a long time to dissolve in cold water

To make the sugar dissolve quicker this is what I would do:

.....

Assessment test 1B

Date:.....

1. Solid, liquid or gas?

I can flow easily but cannot be compressed. What am I? **Solid/ Liquid/Gas**

I always keep my shape and have a definite volume. What am I? **Solid/ Liquid/Gas**

I can be compressed and always fill whatever container I am put in. What am I?
Solid/ Liquid/Gas

2. Fill in the table below.

Put the following substances into their correct columns **Air, Water, Helium, Brick, Ice, Ink**

Write one more substance of your own in each column (there should now be two substances in each)

Solid	Liquid	Gas

Making a solution

Sugar easily dissolves in water to form sugar solution

Sand does not dissolve

7. If something can dissolve we say it is **soluble** **insoluble**

8. If something cannot dissolve then we say it is **soluble** **insoluble**

9. When something dissolves it forms a **solution** **solute** **solvent**

10. Name the **solute** in sugary water **salt** **sugar** **water**

11. Name the **solvent** in sugary water **sand** **sugar** **water**

12. Name a substance that is **soluble** in water **sand** **sugar** **flour**

13. Name a substance that is **insoluble** in water **sand** **salt** **sugar**

Describe three things the girl could do to help the sugar dissolve more quickly

- i.
- ii.
- iii.

A boy did an experiment to investigate how quickly a sugar lump dissolved.

He took three sugar lumps and dissolved each a different way.

He timed how long it took each to dissolve and wrote down his results

	How he dissolved the lump	Time taken for the sugar lump to dissolve
Sugar Lump 1	Stirred it into cold water	25 seconds
Sugar Lump 2	Stirred it into hot water	12 seconds
Sugar Lump 3	Crushed the lump and then stirred it into cold water	15 seconds

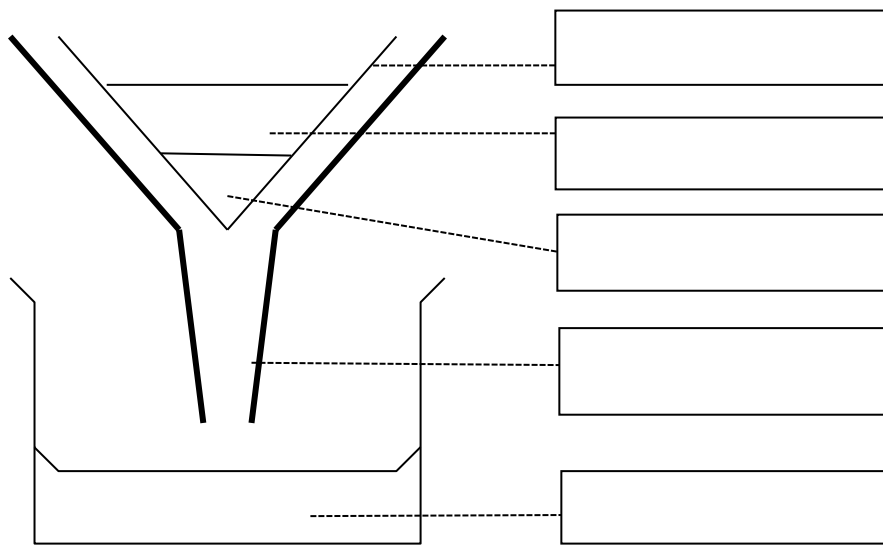
9. Which sugar lump dissolved the quickest?.....

10. Which sugar lump dissolved the slowest?.....

How to filter a liquid

Date:.....

Filtrating (or filtration) is used to separate a solid from a liquid



Filter paper, Dirty water, Dirt, Filter funnel, Clear water

Filtrate: The filtrate is the clear liquid that drips through the filter paper

Residue: The residue is any solid that gets caught in the filter paper

What is the residue in this experiment (***clear water*** or ***dirt***)?

What is the filtrate in this experiment (***clear water*** or ***dirt***)?

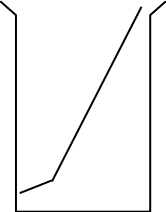

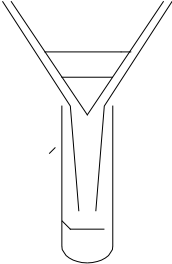
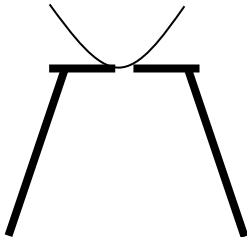
Clear water passes through tiny holes in the filter paper and collects in the container below.
Particles of dirt do not fit through the holes and remain in the filter paper.

Note: The clear water that collects may not be pure.

Anything dissolved in the water (like salt) will **not** get stopped by the filter paper neither will very tiny objects like germs.

Making Rock salt pure

Date.....

			
Beaker and spatula	Mortar and pestle	Filter funnel and boiling tube	Evaporating basin and tripod

Fill in the boxes to show how you made pure salt from rock salt

What we did first:

To do this we used this apparatus:

We then

To do this we used this apparatus

We then

To do this we used this apparatus

We then

To do this we used this apparatus

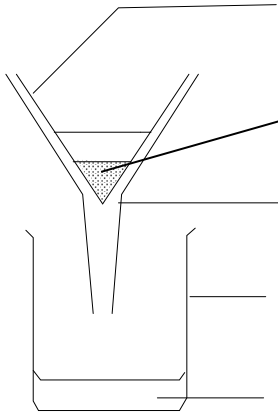
At the end of the experiment we were left behind with:.....

Use these sentences to help you fill in the boxes.

1. Stirred the rock salt into warm water to dissolve the salt
2. Crushed the salt to make it dissolve easier
3. Filtered the mixture to remove the dirt
4. Warmed the mixture to evaporate the water

A pupil filtered some muddy water using the apparatus below

1. Label the apparatus using words from the list below the diagram



FILTER FUNNEL CLEAR WATER BEAKER DIRT FILTER PAPER

2. What stays in the filter paper?

.....

3. What liquid drips into the beaker?

.....

4. Would the clear water in the beaker be safe to drink? (yes or no).....

Give a reason for your answer above

5. Why could you not use a sieve to separate mud from water?

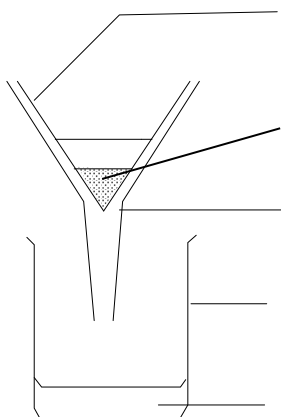
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Science Assessment Test 2B

Date:.....

A pupil filtered some muddy water using the apparatus below

6. Label the apparatus using words from the list below the diagram



FILTER FUNNEL **CLEAR WATER** **BEAKER** **DIRT** **FILTER PAPER**

7. What would be the FILTRATE in this experiment?

8. What would be the RESIDUE in this experiment?

9. Would the clear water be safe to drink? (yes or no).....

Give a reason for your answer above

10. Why could the pupil not use a sieve to separate mud from water?

.....

11. How could you obtain the substance in the first column from the mixture in the second column
(the answers are below the question)

Substance that you want	Mixture that you have	Method of separation
Gravel	sand and gravel	
iron filings	iron filings and sand	
salt	salty water	
dirt	dirt and water	

Use a magnet, Evaporate the water, Filter the mixture, Use a sieve

Words list

Natural	Found in nature. Not made by humans. Wood is natural
Synthetic	Man-made. Artificial. All plastics are man-made.
Solute	The substance dissolved in a solution
Solvent	The liquid used to make a solution (usually water)
Solution	A clear liquid containing a dissolved solid
Soluble	Able to dissolve eg sugar is soluble in water
Insoluble	Cannot dissolve eg sand is insoluble in water
Evaporate	When a liquid turns into a gas
Boil	When a liquid turns into a gas at its boiling point
Condense	When a gas or vapour turns into a liquid (when it cools down)
Freeze	When a liquid turns into a solid (when it cools down)
Melt	When a solid turns into a liquid (when it warms up)
Filtering	What you do to separate the solid from a liquid using filter paper
Filtrate	The clear liquid that drips through the filter paper during filtration
Residue	The solid left on the filter paper after filtering