States of Matter Activities

We have brought together a series of activities for this topic which have been used extensively at different key stages.

1. Solids, Liquids and Gases from Steve Cooke and Alison Tidmarsh in Leicester City. A Connect Four activity that has been used from KS2 up.
2. Ditto from Claire Fletcher and colleagues in Hounslow, but this time a sorting and collecting card game.
3. Another Connect Four activity,which can also be a matching activity, for KS3 up from Rose Elgar in Cambridgeshire.

We expect that these activities will shortly be posted on their respective local websites and linked to the National Grid for Learning Inclusion Search Engine.

The webaddress for this activity is <http://www.collaborativelearning.org/statesofmatter.pdf>.

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COLLABORATIVE LEARNING PROJECT
Project Director: Stuart Scott
Supporting a cooperative network of teaching professionals throughout the European Union to develop and disseminate accessible teaching materials in all subject areas and for all ages.

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BRIEF SUMMARY OF BASIC PRINCIPLES BEHIND OUR TEACHING ACTIVITIES:
The project is a teacher network, and a non-profit making educational trust. Our main aim is to develop and disseminate classroom tested examples of effective group strategies across all phases and subjects. We hope they will inspire you to use similar strategies in other topics and curriculum areas. We run teacher workshops, swapshops and conferences throughout the European Union. The project publishes a catalogue of activities plus lists in selected subject areas, and a newsletter available by post or internet: "PAPERCLIP'.

*These activities were influenced by current thinking about the role of language in learning. They are designed to help children learn through talk and active learning in small groups. They work best in mixed classes where children in need of language or learning support are integrated. They are well suited for the development of speaking and listening . They provide teachers opportunities for assessment of speaking and listening and other formative assessment.

*They support differentiation by placing a high value on what children can offer to each other on a particular topic, and also give children the chance to respect each other's views and formulate shared opinions which they can disseminate to peers. By helping them to take ideas and abstract concepts, discuss, paraphrase and move them about physically, they help to develop thinking skills.

*They give children the opportunity to participate in their own words and language in their own time without pressure. Many activities can be tried out in mother tongue and afterwards in English. A growing number of activities are available in more than one language, not translated, but mixed, so that you may need more than one language to complete the activity.

*They encourage study skills in context, and should therefore be used with a range of appropriate information books which are preferably within reach in the classroom.

*They are generally adaptable over a wide age range because children can bring their own knowledge to an activity and refer to books at an appropriate level. The activities work like catalysts.

*All project activities were planned and developed by teachers working together, and the main reason they are disseminated is to encourage teachers to work effectively with each other inside and outside the classroom. They have made it possible for mainstream and language and learning support teachers to share an equal role in curriculum delivery. They should be adapted to local conditions. In order to help us keep pace with curriculum changes, please send any new or revised activities back to the project, so that we can add them to our lists of materials.

Solids Liquids and Gases Card Game

A card game for 3 players or 3 groups of players.

Aim: You must try and collect all the cards which describe the state (solid, liquid or gas) shown on your picture card.

Instructions.

A. Short game.
1.There are three picture cards. Place them face down on the table.
2. Each player/group picks a picture card.
3. Shuffle the other cards and spread them face up on the table.
4. Take it in turns to pick a card. If it describes your picture card, keep it. If not, you must give it to the player who needs it!
5. The game continues until all the players have completed their sets.

B. Longer game.

Replace rule 5 with: If the statement describes your picture keep it. If not, put it back on the table face up.

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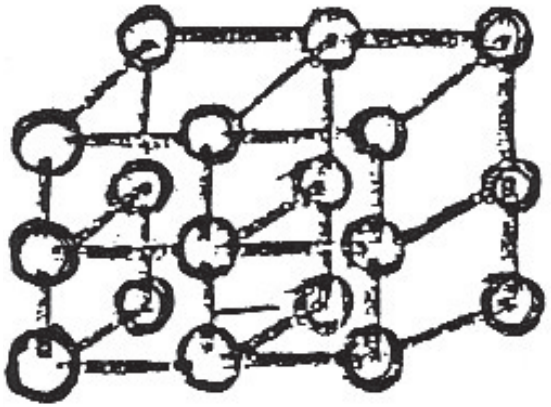
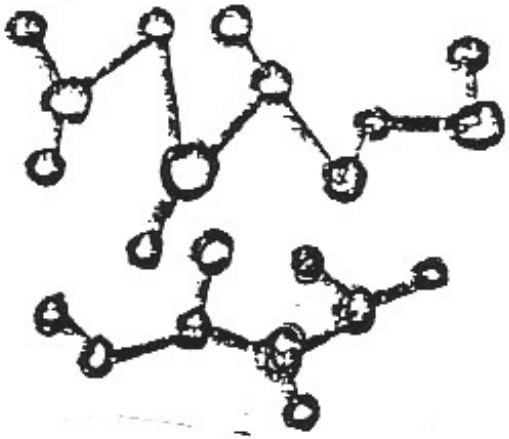
Solids Liquids and Gases Picture Card Game

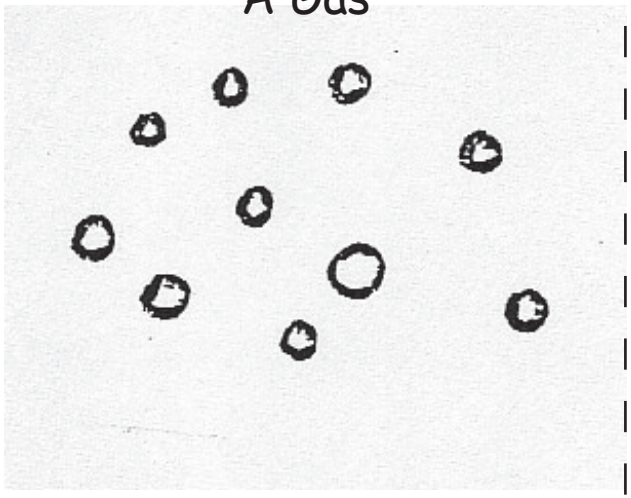
A Solid



A Liquid



A Gas



Preparation.
You need to print the pictures above and the statements below on card and cut them out. You might want to make the activity easier by writing 'solid' liquid' 'gas' on the back of every or just a few statements so that guesses can be checked by turning the card over. We have provided a template for the last set of statements so you just have to fold the page in half and stick it together before you cut out the cards

Solids, Liquids and Gases Picture Card Game

We can't feel it.	The particles move quickly.	The particles have some movement energy	It has a fixed volume, but it changes shape.
It fills any container you put it in.	It flows from one container to another.	The particles are spread far apart.	The particles are fairly close together.
The particles move slowly about.	It does not have a fixed volume or shape.	The particles are packed close together.	The particles have a lot of movement energy.
It spreads to fill the bottom of a container.	It spreads out in all directions.	The particles do not attract each other.	The particles attract each other weakly.
It has a fixed shape and size.	It stays in one	The particles attract each other strongly.	The particles are not in a pattern,

Solids, Liquids and Gases Picture Card Game

If you fold this page in half the statements match descriptions.

The particles have almost no movement energy	The particles have a weak pattern.	LIQUID	SOLID
The particles are in a fixed pattern.	It is usually invisible.	GAS	SOLID
It keeps its own shape.	It is runny.	LIQUID	SOLID
It stays in a lump.	It feels hard.	SOLID	SOLID
It is wet.	The particles are in a fixed position.	SOLID	LIQUID

Solids Liquids and Gases Card Game

Extension Activity

Now look at all the cards for solids and try to sort them into two groups.

Cards which describe what we find by observing solids, liquids and gases.	Cards which describe how the 'particle theory' explains these observations.

Do the same for liquids and gases!

Now in your group write a paragraph about the three states of matter. You can use the cards to help you, but use your own ideas too!

http://www.collaborativelearning.org/statesofmatter.pdf

Teachers' notes on these two Connect Four games.

You may find it easier to enlarge the game board to A3, but it might be easier to keep the cards smaller, particularly for the higher level game.

We would encourage you and or your students to add other pictures for new cards, revise or correct or expand text and devise other versions of these activities. Please send your more creative versions back to the project for inclusion on the website. Even better, if you have a school website post them there, send us the link and we will provide a link to you, and encourage you to submit the activity to the National Grid for Learning Inclusion website.

How to play Connect Four or 'Four in a Row':

1. One can play against one or better two against two because it stimulates more discussion.
2. Put the cards in two piles face down.
3. Each side should take turns to pick up one of their cards and match it to the description written on the board.
4. The first player to get four cards in a row wins. The row can be vertical, horizontal or diagonal.

Solids Liquids and Gases Connect Four Game Board

It flows but is does not have a fixed volume.	It can be squeezed.	It does not have a fixed shape.	It has a fixed volume.	It has a fixed volume but you cannot walk through it.	You cannot squeeze it easily and you cannot pour it.
It does not flow.	It has a fixed volume and a fixed shape.	It cannot be squeezed easily.	It does not spread throughout the whole room.	It does not have a fixed shape nor a fixed volume.	You can walk through it.
You can pour it, but it does not have a fixed volume.	You can walk through it but it does not have a fixed volume.	It flows, but it has a fixed volume.	It does not have a fixed shape.	It has a fixed volume, but you can walk through it.	You can pour it and you can squeeze it easily.
It can spread throughout a whole room.	It cannot be squeezed easily, but you can walk through it.	It has a fixed shape.	It does not have a fixed volume.	It flows.	You cannot pour it.
You cannot walk through it.	It has a fixed volume.	It does not spread through-out the room, but it does not have a fixed shape.	It has a fixed volume, but it does not have a fixed shape.	It has a fixed shape.	It flows, but it does not have a fixed volume.

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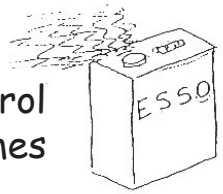
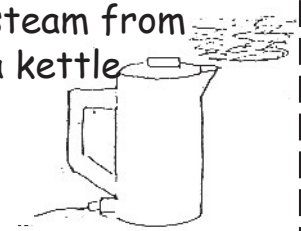
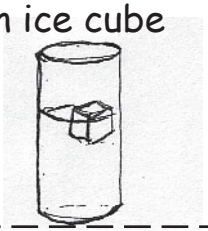
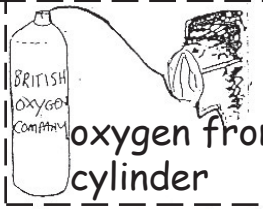
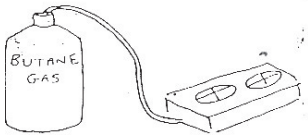
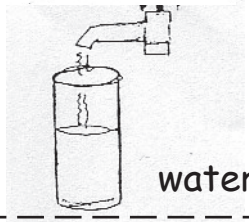
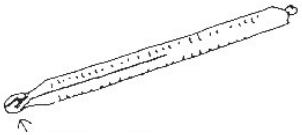
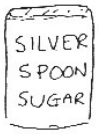
These should be printed on card in two colours and cut up.

Solids Liquids and Gases Connect Four

 the gas in an aerosol can	 petrol fumes	steam from a kettle 	an ice cube 	 wood from a tree	 plastic pen
 oxygen from a cylinder	 camping gas	exhaust fumes from a car 			
 water	 washing-up liquid	 mercury			
  syrup	  paint	 glass			
  sugar	 a rock	 a gold bar			

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States of Matter Connect Four Game Board

These show how a material behaves or looks.	The temperature at which a solid changes into a gas.	The temperature at which a liquid changes into a gas.	Something that allows electricity to pass through	Something that allows heat to pass through it.
The simplest particle that all matter is made.	A substance made up from only one kind of atom.	A short hand way of showing an element.	A table that shows all the elements.	A column in the periodic table.
A row in the periodic table.	When no new substance is made: e.g. ice melting.	Made when a metal reacts with oxygen.	Made when a metal reacts with chlorine.	Made when a metal reacts with sulphur.
This happens when metals are left outside for a long time	A substance made up of two or more types of atom joined together	A substance is pure when it contains only one type of atom or compound.	A group of atoms joined together.	A table that shows all the elements.
The simplest particle, that all matter is made from.	Something that allows electricity to pass through it.	A row in the periodic table.	The temperature at which a solid changes into a gas.	Something that allows heat to pass through it.

States of Matter Connect Four Cards

These should be printed on card in two colours and cut up.

properties	melting point	boiling point	conductor of electricity	conductor of thermal energy
atom	element	symbol	periodic table	group
period	physical change	oxide	chloride	sulphide
corrosion	compound	pure	molecule	periodic table
atom	conductor of electricity	period	melting point	conductor of thermal energy