

The Big Drip - Key Stage 1

INTRODUCTION

The Big Drip is based on attainment target 3 of the National Curriculum for Science and these notes are intended as a guide to the scientific content of the play should you wish to undertake any preparatory work. However we do aim to present the play in such a way that the scientific content becomes self-explanatory so preparatory work is not essential.

The topics covered in the play are the properties of materials, the properties of solids, liquids and gases, mixtures and changes of state, all with special reference to water.

THE PROPERTIES OF MATERIALS

Everything on Earth can be said to be made of some sort of material. Most useful materials are solids at normal temperatures and are used extensively by humans. All materials have certain characteristics and properties which help us to identify them and which govern how they are used. Iron, for example, is used in construction because of its strength and plastic has many uses because of its malleability.

The story begins at the Missing Materials Bureau where we meet Detective T Copper and Miss Spendapenny and together we learn about materials. Firstly we realise that everything is made of different materials, like wood, plastic, metal etc. and then we discover that each type of material behaves in a certain way. Metal is hard, cold to the touch, smooth and shiny, wood is warm to the touch, rough, brown and hard and we then have to identify various materials that have been described using only their properties. In conclusion we realise that we know a material by its properties.

In the classroom you could try grouping a variety of materials according to certain similar properties, like weight, hardness, smoothness, colour etc. and then try to work out which properties are common to a type of material, such as metal, glass, wood, paper etc.

SOLIDS, LIQUIDS & GASES

All substances on Earth exist as either a solid, a liquid or a gas. In general solids are rigid with a definite shape, liquids have no definite shape but take on the shape of the container they are in and are fluid and flow, and gases have no definite shape or size but will fill whatever vessel they are in.

Back at the Missing Materials Bureau another classification is taking place. One by one we are introduced to solids, liquids and gases and try to discover their properties. We discover that solids have a fixed shape, liquids drip and flow and change their shape to fit their container and gases fill the space they're in. Each state is given a sound and action to remind us of the properties and they are used throughout the play.

fixed shape



spoon is solid

changes shape



lemonade is liquid

**glass appears empty
but is filled with gas**



air is gas

In class you can try to think of the main solids and all the liquids and gases we use in our everyday lives. You can also try to think of as many uses for water that you can such as firefighting, washing, cooling, to swim in, cooking etc.

MIXTURES

By mixing materials we can create new and useful substances. Often these new substances are very different in looks from the constituent ingredients and through heating them or by mixing them they have been permanently changed. We use the example of baking a cake to illustrate this point.

Miss Spendapenny visits Dr Boffin who explains that you can mix various materials to make something entirely different and he shows us his favourite recipe for pickled onion flavoured fairy cakes. He demonstrates that by mixing together the individual ingredients and then by heating them up in an oven they will change permanently and become a cake.



mixture of materials for a cake



in the oven the ingredients change to become cakes

Many of our foods are made from a mixture of materials and in class you can discuss how sometimes the ingredients will remain very similar to their original state, as in a stew, whereas on other occasions they will look totally different, as in a loaf of bread. We use mixtures of solids, liquids and gases but they also occur naturally. Air is one of the most important natural mixtures of gases and water usually contains a mixture of minerals. Water is a very important mixer and is used constantly to make tea, coffee, squash etc. to create a variety of flavours for us to drink.

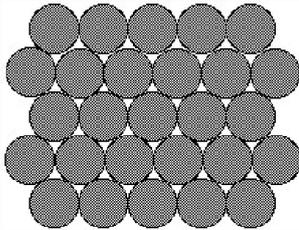
CHANGES OF STATE

Most substances can occur in three different states - solid, liquid or gas. At great temperatures even rock will melt to form lava but the most obvious example is water.

Back at the Bureau Miss Spendapenny explains that ice, water and steam are in fact the same material. Using six volunteers from the audience she demonstrates how this can be. The volunteers represent particles of water. They link arms and squash tightly together to show how particles are densely packed together in a solid, ice. That's why a solid has a fixed shape. The particles then move further apart and hold

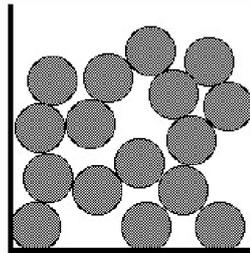
hands. Miss Spendapenny describes how in a liquid the particles have looser bonds so they can move around more freely and that now they are representing water. If water is heated up enough it turns into steam, a gas, and the volunteers now demonstrate how the particles move in a gas. They have no bonds, but are free to move where ever they like.

a solid



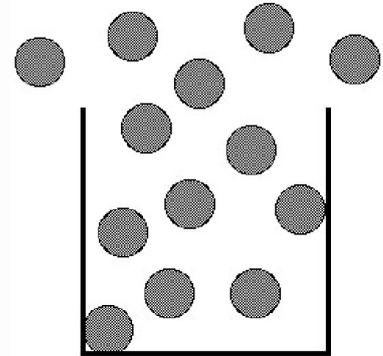
particles are packed tightly together

a liquid



bonds between particles loosen

a gas



no bonds and particles are free to move

In class it would be interesting to watch how steam turns back from a gas into liquid water and perhaps you could try heating and cooling other materials, such as wax or chocolate to see how it affects them.

These are the topics covered in *The Big Drip*. At the end of the performance the actors will be happy to take questions from the audience.

Show Requirements

The actors will be arriving approximately forty minutes prior to the start time in order to set up and will need to have access to the school hall from then. They bring the set, lighting and sound equipment with them so only need access to a plug socket. They'll need a space approximately 15' wide by 10' deep with the children sitting in front, either seated or on the floor. The show works well 'on the flat' but if it's more convenient for the actors to use your stage, please let them know on arrival. **Quirks in the Works** lasts one hour.