Properties and Uses of Substances

Early Level

Lesson 1	Sorting Materials
Outcome	Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes. **SCN 0-15a**
Resources	Loose materials
Lesson Outline	Show the pupils a range of objects and get them to describe them using words related to their physical properties. Then ask them to collect objects and then sort them into groups. Discuss why they have chosen the groups that they have. Could they have done it differently? Now ask them to find a stone or similar size object and ask them to think about a shelter for their stone. What kind of materials would they use and why? Build shelters.

Lesson 2	Bubble making
Outcome	Through creative play, I explore different materials and can share my reasoning for selecting materials for different purposes. **SCN 0-15a**
Resources	Variety of soaps Bubble hoops
Lesson Outline	Supply a range of soaps, containers, water and bubble loops. Discuss what makes a good bubble. Let pupils investigate the effectiveness of the different soaps for making bubbles. Are any of them as good as the commercially available mixtures?

Level 1

Lesson 1	Why do we use these materials?
Outcome	Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges. **SCN 1-15a**
Resources	Clipboards, Camera. Range of materials.
Lesson Outline	Go out in small groups to observe and record the different materials around the school. Discuss the properties that make the material suitable for the job. Give the task of selecting a fabric to make a backpack. Which properties must it have? Which are the most important? How could they be tested? Supply each group with a range of fabrics and ask them to carry out their tests and choose a fabric. They then present their results and reasoning to the other groups.
	Extension – introduce the idea of fair tests.

Lesson 2	Egg Drop
Outcome	Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges. **SCN 1-15a**
Resources	Eggs
Lesson Outline	Pupils select and design a protective layer of natural materials that will ensure the egg can be dropped from a height of 1.5m on to a hard surface and remain intact. Link to cycling safety and the use of a helmet. Repeat using man-made materials as well. Discuss the results.

Lesson 3	Bridge that gap
Outcome	Through exploring properties and sources of materials, I can choose appropriate materials to solve practical challenges. **SCN 1-15a**
Resources	Den building kit.
Lesson Outline	Other ideas to highlight the way properties need to be related to use include; den building and bridge making. Pupils could be asked to design and build a shelter using materials supplied as well as those available naturally. Design a bridge or a tower with the capacity to support a designated weight.

Level 2

Lesson 1	What's Cooking?
Outcome	By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed. **SCN 2-15a**
Resources	Fire making kit, Ghillie Kettle, Marshmallows, Popcorn
Lesson Outline	Discuss changes that pupils will have seen; food rotting, metals rusting, ice cream melting. Ask them if they think they are always getting something different, e.g. what happens when you refreeze ice cream. Light fire, talk about what they can see. Is something else being produced? Could they turn the ash back into wood? Boil water in the kettle, hold a cold plate in the steam to show that it turns back into water. Cook marshmallows over the fire. Pop some corn. Discuss the changes seen.
Extension	Expand the range of cooking, eggs, meat, cakes etc.

Lesson 2	Making Compost
Outcome	By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed. **SCN 2-15a**
Resources	Kitchen waste, Spade, Soil thermometer.
Lesson Outline	Discuss with pupils what they think happens to all the leaves, twigs, plants as they die in woods and fields. Where do they go? Take some kitchen waste and divide it into 2 piles. Add a few pieces of plastic such as milk bottle tops to demonstrate what happens to plastic when it is buried. Dig 2 holes about 30 cms deep, in the garden or somewhere similar, put the waste into each hole and cover back up. Mark the holes "no water" and "water". Water the "water" pile every day for several weeks. Record the temperature of each pile and compare it with the surrounding soil. After several weeks dig up your pile to see what has happened. Spread it out on a plastic bag to get a good look. What happened to the plastic?
Extension	Look out for worms in the area. What affect does packing it tightly or adding grass clippings have.

Lesson 3	Slimy
Outcome	By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed. **SCN 2-15a**
Resources	Plastic bottle (300mls), vinegar, PVA glue, baking soda, borax, food colouring.
Lesson Outline	2/3 fill bottle with water, add a 1 teaspoon of borax and 5 of baking soda. Shake well. In a separate cup thoroughly mix 2 tablespoons of vinegar, 2 tablespoons of glue and a few drops of food colouring. Quickly pour this mix into the bottle and watch what happens.