FIFTH AND SIXTH – MATERIALS AND CHANGE

Teacher Guidelines:

- Pp. 123-128

Linkage:

- Living Things
- Properties and characteristics of materials
- Heat
- Environmental awareness and care

Integration:

- Geography: Natural Environments – Weather
- Oral Language Development – English and Gaeilge
- Visual Arts
- SPHE
- History
- Maths - sorting

HEATING AND COOLING

Content Objective:

EXPLORE THE EFFECTS OF HEATING AND COOLING ON A RANGE OF SOLIDS, LIQUIDS AND GASES

Temporary changes (e.g., from solids to liquid to gas)

Expansion of water on freezing

Evaporation of water on heating

Permanent changes (e.g. those caused by baking bread in an oven)

Some suggested activities:

- Explore heating and cooling various materials. Observe the effects.
- Place a full plastic bottle of water in the freezer. Observe what happens. What happens as it is de frosting. Compare same activity with salty water.
- Investigate which melts fastest; butter, margarine, or wax.
- Explore condensation on everyday items e.g. Cans from the fridge, windows on damp days, shiny surfaces, breath on mirrors.

Some suggested investigations:

- Can you inflate a balloon with a bottle? / Does the size of the bottle affect the amount the balloon inflates? / Does the temperature of the water affect the amount the balloon inflates?
- What happens to liquids as they warm? (bottle, straw, coloured water – place in hot water / compare glass bottle with plastic bottle.)

Content Objective:

EXPERIMENT TO ESTABLISH WHICH MATERIALS ARE GOOD CONDUCTORS OF HEAT OR GOOD INSULATORS

Explore ways in which liquids and solids may be kept warm or cold

Some suggested activities:

- See investigations below

Some suggested investigations:

- What type of spoon is best to stir something hot? (Teacher Guidelines p 128)
- Which will get hot faster? metal spoon, wooden spoon, plastic spoon.
- On which spoon will butter/ice/chocolate melt fastest? Place the butter on three spoons and hold over a bowl of hand hot water.

Content Objective:

IDENTIFY WAYS IN WHICH HOMES AND BUILDINGS ARE HEATED AND INSULATED

Some suggested activities:

- Discussion on how homes are insulated eg lagging jacket, double glazing, draught proofing, carpets/wooden floors etc.

Some suggested investigations:

- Which materials are best insulators. Nylon, velvet, cotton, aluminium.

Some suggested designing and making:

- Design and make a draught excluder.

Content Objective:

RECOGNISE HOW HEATING AND COOLING CAN BE USED TO PRESERVE FOOD

Some suggested activities:

- Discussion on careful storage of food for healthy eating. Transportation of food e.g. food for picnics, cooler bags etc.
- See Exemplar 40 Teacher Guidelines p.125

Some suggested investigations:

- Where will milk curdle the quickest? Fridge, window sill, under a tree, in direct sunlight, over the radiator.

MIXING, SEPARATING AND OTHER CHANGES

Content Objective:

INVESTIGATE HOW A WIDE RANGE OF MATERIALS MAY BE CHANGED BY MIXING

Mixing and dissolving materials in water solutions, *exploring liquids that will not mix*

Some suggested activities:

- Activities in mixing various materials and see what happens. (Mix common household items e.g. sugar of all types, rice, flour, SMA baby food, dried food, food colouring, oil etc)

Some suggested investigations:

- Do all liquids mix?

Some suggested design and make:

- A volcano

Content Objective:

INVESTIGATE THE EFFECTS THE EFFECTS OF LIGHT, AIR AND WATER ON MATERIALS

Discoloration and fading

Rusting of iron and steel

Investigate how rusting can be controlled

Characteristics of materials when wet and dry

Some suggested activities:

- Discuss the effects of weather on buildings i.e discoloration form rain and sunlight on paint work etc.

- Place paper/material on the window sill and observe the changes.
- What colour is ink? Chromatography. (See light content objective)

Some suggested investigations:

- Where a nail rusts the quickest. Use 250ml soft drink bottles to examine how nails rust in various conditions e.g. nails in milk, lemonade, water, salt water, oil, etc. How will test be kept fair? (amount of liquid the same, nails the same)

Content Objective:

EXAMINE THE CHANGES THAT TAKE PLACE IN MATERIALS WHEN PHYSICAL FORCES ARE APPLIED

When materials are beaten, whisked, mixed, squashed, pulled, bent

Some suggested activities:

- Allow the children explore with selection of items. Cut, mix, crush and stir these items and observe the changes. Observe which changes are reversible and which are not.

Content Objective:

RECOGNISE THAT OXYGEN IS REQUIRED FOR BURNING

Some suggested activities:

- See below

Some suggested investigations:

- Will a candle stay lighting if we put a container over it? (Teacher demonstration)

Some suggested design and make:

- Make an item to extinguish candles

Content Objective:

EXPLORE SOME SIMPLE WAYS IN WHICH MATERIALS MAY BE SEPARATED

Using sieves of varying meshes,

Using a magnet

Using a ruler charged with static electricity Allowing

sediment to settle in a jar of liquid Separation of

salt and water by evaporation

Separation of water and soil using simple sieves (filtration)

Some suggested activities:

- Using sieves, meshes, magnets, static electricity children experiment with separating a wide range of common household materials.
- Children can also separate materials through evaporation by leaving mixtures over the radiator or on the window sill.
- See sediment activity for third and fourth class