FIFTH AND SIXTH CLASSES - 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

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE

Content Objective:

Heating and cooling

- **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 defrosting. Compare same activity with salty water.
- Investigate which melts fastest; butter, margarine, or wax.
- Explore condensation on everyday items eg. 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.)

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE

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.

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE

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.

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE

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.

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE

Content Objective:

Mixing separating and other changes

- **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 etc, food colouring, oil etc)

Some suggested investigations:

- Do all liquids mix?

Some suggested designing and making:

- A volcano

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE

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 eg nails in milk, lemonade, water, salt water, oil, etc. How will test be kept fair? (amount of liquid the same, nails the same)

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE
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.

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE
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 designing and making:** ○ Make an item to extinguish candles.

FIFTH AND SIXTH CLASSES - MATERIALS AND CHANGE

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 3rd / 4th class