FIFTH AND SIXTH CLASSES – HEAT

Teacher Guidelines:
p129 Exemplar 43 p128

Linkage:

- Living Things: Myself - using senses; Plants and animals
- Materials and change - p 123 – effects of heating and cooling
- Properties and characteristics of materials – materials that keep us warm

Integration:

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

FIFTH AND SIXTH CLASSES – HEAT

Content Objective:

EXPERIMENT WITH A RANGE OF MATERIALS TO ESTABLISH THAT HEAT MAY BE TRANSFERRED IN DIFFERENT WAYS

Through water, metals or air

Some suggested activities:
See below

Some suggested investigations:

1. Which spoon should I use for stirring? (blobs of butter on a wooden ruler, a metal ruler and a plastic ruler all submerged in warm water – heat is transferred better through metals than through other materials – teacher demonstration)

Some suggested designing and making:

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Content Objective:

RECOGNISE A VARIETY OF SOURCES OF HEAT

Renewable sources (eg solar energy, heat from burning of bio mass)
Non-renewable sources (eg heat from burning of fossil fuels)
Friction in mechanical movement

Some suggested activities:

1. Solar Heat:
- White paper, black paper, tin foil: Which piece feels warmest after an hour exposed to the sun's rays? (Caring for the environment)

2. Friction as a source of heat – Poem "Grandma's hands"
- Rub hands together 10 seconds, what happens?
- Repeat the experiment but this time for 20 seconds.
- What difference is observed by the children
- Rub your hand on the table for 10 then 20 seconds.
- Explain results this time
- What happens to the brake pads on a bike when the brakes are pulled for a while?

Some suggested investigations:

Which heats water the best for the paddling pool- 5 plastic bottles/10 plastic bottles or 15 plastic bottles around the hose? 500ml bottles/ 2 litre bottles or 5 litre bottles – bottles acting as mini greenhouses

Some suggested designing and making:
A solar panel to heat water on a sunny day. (Paint the inside of a baking tray black, fill with cold water, take the temperature, cover in clear plastic, leave in the sun for an hour. Take temperature again at this stage)

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Content Objective:

KNOW THAT HEAT ENERGY CAN BE TRANSFERRED

In solids (conduction)
In water and air (convection)
From the sun (radiation)

Some suggested activities:

1. Heat energy can be transferred by *radiation*:
- Use a magnifier to melt a blob of butter.
- Feel heat from lamp on your hand.

2. *Conduction*: blob of butter on a spoon in hot water.
- What causes the butter to melt and drop off?

3. *Convection*: Heat energy can be transferred in water – 2 jars.
- One filled with coloured hot water, one with coloured cold water.
- Will they mix?
- Heat transferred in air – Plastic bottle in hot water.
- Put a balloon over the neck of the bottle

Some suggested investigations:

1. Does the temperature of the water affect how much the balloon inflates?
2. Which melts fastest on a metal spoon – butter, margarine or lard? (Materials and change)
3. Radiation from the sun – How hot is it in parked cars?
4. Which Material is Best for Keeping the Heat In?

Some suggested designing and making:

Blinds to keep a car cool in hot weather

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Content Objective:

MEASURE AND RECORD TEMPERATURE USING THERMOMETER

Some suggested activities: See below

Some suggested investigations:

1. Does the wind make any difference to temperatures recorded in an area?
2. What happens to the temperature when ice melts?
3. Which materials are the best insulators; artificial or natural materials?
    - Set up investigation with four cups each wrapped in a different material, two artificial e.g. Lycra and nylon and two natural materials e.g. wool and cotton.
    - Take the temperature when hot water is poured in. Continue to take the temperature at 5 min intervals for 30 minutes
    - Repeat investigation using dark/light paper foil/baking paper to observe how dark colours absorb/insulate heat

Some suggested designing and making:

- A thermometer
- A Solar still (what temperature does water evaporate)