

FIFTH AND SIXTH – SCIENCE AND THE ENVIRONMENT

Teacher Guidelines:

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Linkage:

- Living things: Plants and animals
- Environmental awareness
- Materials: properties and characteristics

Integration:

- Language development – English and Gaeilge
- Visual Arts
- Mathematics
- History
- Geography

Content Objective:

APPRECIATE THE APPLICATION OF SCIENCE AND TECHNOLOGY IN FAMILIAR CONTEXTS.

At home: microwave oven, cooker, dustbin, coffee maker

At school: photocopier, projector, information and communication technologies

In the work-place: conveyor belts and pulleys

In a factory; pneumatic drill, cement mixer and crane on a building site

In hospitals; stethoscope, X-ray, radium treatment

Designing and making activities

Some suggested activities:

Explore the following in the home: methods of cooking, cleaning, lighting, heating, communication, leisure pursuits, DIY maintenance and gardening offer many opportunities to consider the contribution of science and technology, including: microwave cooker, iron, ball cock mechanism in cistern, hedge trimmer, strimmer, lawnmower, roller and spray painter, superglue, sealers, self-assembly furniture, telephones, computer and internet. Hobbies/pastimes to be explored might include angling, computer games, TV/video, DVD/hi-fi systems, photography, model building, music (listening and performing) and windsurfing/hang-gliding.

Explore the following in the classroom: name/discuss/compare with older people some of the items seen and used on a daily basis, ballpoint/pen, nib and ink/fountain pen; flask with tea/bottle of milk; information storage and retrieval in computers/ledgers; draft, re-draft creative writing on word processor/longhand and writing of essay, correction, re-writing; range of paints, glues, gums, papers, card etc. for art/craft; intercom; production of trend graphs re attendance etc.; school furniture

Explore the following while shopping: pasteurized/homogenized /powdered/longlife milk, cash registers, weighing scales, barcodes, electronic stocktaking/ordering, open refrigeration, sell by dates, pre- packaged meats, pre-mixed and imported breads for baking on the premises, floor cleaning, security cameras and tagging.

Explore the world of work: automatic machines, plumbing carpentry and electrical fittings, clocking in/out procedures, computation of wages, electronic banking, internal and external communication, data and information research, storage, retrieval and dissemination, maintenance and repair procedures, safety procedures;

Explore health/medicine: diagnostic procedures, preventive and curative measures, alternative medicine, electronic monitoring, stethoscope, X-ray, hospital furniture, traction, surgical procedures, microphotography, machines in ophthalmology, orthodontics, orthopaedics etc.

Some suggested investigations:

- Cooking potatoes: investigate time and electrical energy used
- Investigate hedge cutting re neat finish, time and energy required
- Make graphs, pie-charts etc using pencil, squared paper, ruler; compare with computer generated graphs etc.
- Investigate speed and efficiency of copying short document in various ways: long hand, carbon copy, typewriter, and photocopier
- Efficiency of calculating mentally, using pen and paper or calculator
- Drilling holes in wood using various means
- Which materials are best for heat insulation.
- Investigate efficiency and strength of glues and superglues
- Investigate accuracy of various weighing scales

Some suggested design and make:

- Design and make a stethoscope
- Design and make a worm compostor: investigate range of material which can be composted; compare with regular composting

Content Objective:**EXAMINE SOME WAYS THAT SCIENCE AND TECHNOLOGY HAVE CONTRIBUTED POSITIVELY TO THE USE OF THE EARTH'S RESOURCES**

Purifying water, mixing materials to produce new materials, medicines, processing food, preserving food, generating electricity, using fertilisers for increased agricultural yields

Some suggested activities:

- Visit a reservoir and water treatment facility
- Use and discuss water-purifying tablets
- Make a water filter using gravel, sand, cotton wool etc.
- Investigate waterclocks, waterwheels, hydroelectric power
- Investigate wind energy, kites, hang gliding, parachutes, gliders, sailing
- Investigate magnets used in motors, in industry, in sound amplification
- Investigate heat used in smelting, welding, candle making, petrol and paraffin extraction from oil, evaporation of sea water leaving salt
- Investigate how was/is turf harvested, processed and used in electrical energy production
- Investigate natural and manufactured fertilizers
- Investigate use of materials over time: e.g. kettles made from cast iron, steel, plastic; window frames from wood, aluminium, PVC; carrier bag from cane, fabric, paper, plastic; bottles from clay, glass, plastic.
- Electricity generation using coal, turf,
- Investigate solar energy
- Investigate role of micro-organisms in composting, water treatment, and cleaning up oil spills

Some suggested design and make:

- A Windmill
- A Water-wheel
- Solar energy – make 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)

Content Objective:**RECOGNISE THE CONTRIBUTION OF SCIENTISTS TO SOCIETY**

Work of scientists in the past and present

Some suggested activities:

There are and have been so many inventions, discoveries, development of ideas and continuing research that there are innumerable topics to address through science education. Depending on children's interests, motivation, level of development and ability, some topics to consider might be: Fire, the inclined plane, rollers, the wheel, wind power, water power, levers, adding machine, flight, motor car, barometer, photography, bicycle, x-ray photography, quarantine, bifocal lenses, vaccination, braille, antiseptics, pasteurization, antibiotics, velcro, radio, measurement of time, television, engines, microscopes, electric battery, ballpoint pen, flush toilet, helicopter, anaesthesia, circulation of blood, food canning, classification of plants and animals, pulleys, printing, computers, cloning, electromagnetism, gravity, the solar system

Content Objective:**RECOGNISE AND INVESTIGATE ASPECTS OF HUMAN ACTIVITIES THAT MAY HAVE POSITIVE OR ADVERSE EFFECTS ON ENVIRONMENTS**

Activities that protect flora and fauna, such as creating a wildlife area and planting trees enhance built environments affect the quality of air, soil, water and the built environment

Some suggested activities:

Investigate some of the following:

- Hazardous waste: production and management
- Unauthorised dumping
- Air pollution
- Smoking
- Water pollution
- Noise: industry, traffic and leisure
- Recycling
- Re-using
- Landfill: traditional and modern
- Composting
- Water conservation

- Energy conservation
- Infrastructure: traffic management and urban sprawl
- Packaging
- Protection of endangered species: flora and fauna
- Fur, feather and pelts in clothing
- Use of animals in research
- Deforestation
- Opencast mining
- Legislation/litter wardens/environment officers
- Acid rain and measures to counteract same
- Energy awareness: production of electricity using wind, water and solar power
- Environmental awareness campaigns
- Humans changing habitats: trampling, cutting grass, cut down a tree, remove bushes etc., spray with weedkiller, use slug pellets, put down paving stones/concrete

Some suggested investigations:

- Habitats: description, light, temperature, moisture, shelter etc. What aspects of a particular habitat suit a particular creature or plant
- Investigate different ways to save water
- Investigate water quality and living things in a stream or pond
- Soil types: living things and drainage
- Make compost bins with/without worms: compare
- Investigate waste management strategies locally
- Electricity usage in school