Manitoba Alternative Energies Curriculum Connections

Grade 6-8 Science

Cluster 3: Electricity

6-3-01 Use appropriate vocabulary related to their investigations of electricity.
Include: positive charge, negative charge, current electricity, static electricity, electrical circuit, insulator, conductor, switch, series circuit, parallel circuit, electromagnet, magnetic field, motor, generator, transformation, electrical energy, renewable, non-renewable, energy consumption. GLO: C6, D4, E4

6-3-02 Explain the attraction and repulsion of electrostatically charged materials.
Include: negatively and positively charged materials attract one another; materials of like charge repel one another. GLO: D4

6-3-03 Explain current electricity, and compare the characteristics of current and static electricity by using a model. GLO: A2, D4

6-3-04 Identify dangers associated with static and current electricity, and demonstrate and describe appropriate safety precautions. GLO: C1, D4

6-3-05 List electrical devices used at home, at school, and in the community, and identify the human needs that they fulfill.
Examples: heat, light, communication, movement... GLO: B1, B2, D4

6-3-06 Develop a definition of an electrical circuit, based on classroom explorations.
Include: an electrical circuit is a continuous path for charges and must contain a power source and a conductor. GLO: C2, D4

6-3-07 Experiment to classify a variety of materials as insulators or conductors. GLO: C2, D3, D4, E1

6-3-08 Demonstrate and describe the function of switches in electrical circuits. GLO: D4

6-3-09 Construct and diagram simple series circuits and simple parallel circuits. GLO: C2, C6, D4, E1

6-3-10 Explore to determine factors that affect bulb brightness in simple series and parallel circuits.
Include: number of bulbs, number of batteries, placement of bulbs and batteries. GLO: C2, D4

6-3-11 Use the design process to construct an electrical circuit that performs a useful function.
Examples: doorbell, alarm, motorized toy, game... GLO: C3, D4

6-3-12 Demonstrate, using a simple electromagnet constructed in class, that an electric current can create a magnetic field. GLO: C2, D4

6-3-13 Explore motors and generators to determine that electromagnets transform electricity into motion, and motion into electricity.
GLO: A5, D4, E2, E4

6-3-14 Identify forms of energy that may result from the transformation of electrical energy, and recognize that energy can only be changed from one form into another, not created or destroyed.
Include: light, heat, sound, motion. GLO: D4, E4

6-3-15 Identify the two major sources of electrical energy, and provide examples of each.
Include: chemical sources such as batteries; electromagnetic sources such as turbine motion caused by wind, falling water, and steam.
GLO: B1, D4, E4

6-3-16 Identify renewable and non-renewable sources of electrical energy, and discuss advantages and disadvantages of each.
Examples: renewable sources such as hydroelectric, wind, geothermal, solar; non-renewable sources such as fossil fuels, nuclear fission...
GLO: B5, E4

6-3-17 Evaluate an electrical device using the design process.
Examples: light bulbs, kitchen appliances... GLO: B5, C4

6-3-18 Describe factors that affect the consumption of electrical energy, and outline an action plan to reduce electrical energy consumption at home, at school, or in the community. GLO: B5, C4, E4

6-3-19 Describe the ways in which electricity has had an impact on daily life.
GLO: B1, B2, B5

Cluster 3: Forces and Simple Machines

5-3-01 Use appropriate vocabulary related to their investigations of forces and simple machines.
Include: applied force, balanced and unbalanced forces, fulcrum, load, friction, terms related to types of simple machines. GLO: C6, D4

5-3-02 Describe, using diagrams, the forces acting on an object and the effects of increasing or decreasing them.
Include: force arrows representing direction and relative strength of forces acting in the same plane, balanced and unbalanced forces.
GLO: C6, D4

5-3-03 Investigate a variety of levers used to accomplish particular tasks in order to compare them qualitatively with respect to fulcrum position, applied force, and load.
Include: first-class, second-class, and third-class levers.
GLO: C2, D4, E1

5-3-04 Identify objects in the school and at home that use wheels and axles, and describe the forces involved.
Examples: doorknob, manual pencil sharpener, hinge, bicycle...
GLO: B1, D4, E1

5-3-05 Recognize that a gear is a wheel and axle used to turn another wheel and axle. GLO: D4, E2

5-3-06 Identify common devices and systems that incorporate pulleys and/or gears. GLO: A5, B1, D4, E1

5-3-07 Explore to determine how the direction and amount of the applied force and the speed of rotation vary within a two-gear system.
GLO: C2, D4, E2

5-3-08 Compare, quantitatively, the force required to lift a load using a pulley system versus a single fixed pulley, and recognize the relationship between the force required and the distance over which the force is applied.
Include: a system of pulleys reduces the force required while increasing the distance over which the force is applied; a single fixed pulley requires a greater force but applies it over a shorter distance.
GLO: C2, D4, E2

5-3-09 Identify and make modifications to their own pulley and/or gear systems to improve how they move loads.
Include: reducing friction. GLO: C3, D4, E2

5-3-10 Identify and describe types of simple machines.
Include: levers, wheel and axle, pulley, gear, inclined plane, screw, wedge. GLO: D4

5-3-11 Describe the advantage of using simple machines to move or lift a given load.
Include: to decrease the force required; to increase the resulting force; to change the direction of the applied force. GLO: D4

5-3-12 Investigate to identify advantages and disadvantages of using different simple machines to accomplish the same task.
Examples: using a pulley, inclined plane, or lever to move a piano to the second floor... GLO: B1, C2, C4, D4

5-3-13 Compare devices that use variations of simple machines to accomplish similar tasks.
Examples: a short- or long-handled pump, a racing or mountain bicycle... GLO: B1, C3, C4, D4

5-3-14 Use the design process to construct a prototype containing a system of two or more different simple machines that move in a controlled way to perform a specific function. GLO: C3, D4, E2