

You Be The Chemist Grades 5-8 – Northwest Territories Curriculum Connections

NOTE: NWT uses the Alberta curriculum for grades 7-9. The connections for Grades 7 and 8 below are the same as in the Alberta curriculum map document.

Lesson 1: Goofy Putty

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Use appropriate vocabulary, including correct science and technology terms in describing their investigations and observations (e.g., use terms such as texture, hardness, strength, buoyancy, solubility, flexibility to describe properties and processes of materials);
- Identify and describe some changes to materials that are reversible and some that are not (e.g., freezing and melting are reversible; burning is not);
- Describe changes they observe in the properties of materials as they interact with each other (e.g., when paints are mixed; when water is combined with gelatin, vegetable oil is mixed with water);

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)
 - 4th point: relate the properties of mixtures and solutions to the particle model of matter (*e.g., recognize that the attraction between particles of solute and particles of solvent helps keep materials in solution*)

Lesson 2: Goldenrod Detector

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 3: Rusting Wool

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Use appropriate vocabulary, including correct science and technology terms in describing their investigations and observations (e.g., use terms such as texture, hardness, strength, buoyancy, solubility, flexibility to describe properties and processes of materials);
- Describe how physical and chemical processes change materials found at home and materials used in industry (e.g., cooking, manufacturing plastic); Describe physical changes and chemical reactions that can take place in household products and explain how these reactions affect the use of the products (e.g., the role of baking soda, the role of heat in cooking an egg);
- Measure, in different materials, observable changes that result from such processes as rusting, dissolving and bleaching and identify products that are affected by these processes (e.g., metal, powdered foods, fabrics);

- Describe chemical changes that can be caused in a substance, and explain how the changes affect the use and function of the substance (e.g., changes caused by exposing newspaper or construction paper to light or heat; exposing an apple or potato to air);

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 4: Buoyant Butter

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 3rd point: compare densities of materials; and explain differences in the density of solids, liquids and gases, using the particle model of matter

Lesson 5: Rubber Eggs

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (e.g., freezing and melting are reversible; burning is not);
- Use appropriate vocabulary, including correct science and technology terms in describing their investigations and observations (e.g., use terms such as texture, hardness, strength, buoyancy, solubility, flexibility to describe properties and processes of materials);
- Describe how physical and chemical processes change materials found at home and materials used in industry (e.g., cooking, manufacturing plastic);
- Describe physical changes and chemical reactions that can take place in household products and explain how these reactions affect the use of the products (e.g., the role of baking soda, the role of heat in cooking an egg);
- Describe chemical changes that can be caused in a substance, and explain how the changes affect the use and function of the substance (e.g., changes caused by exposing newspaper or construction paper to light or heat; exposing an apple or potato to air);

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 6: The Moving Molecule Stomp

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Demonstrate an understanding of the three states of matter (solid, liquid, gas) and of changes in state;
- Identify the three different states of matter (solid, liquid, and gas) and give examples of each state (e.g., solid: sugar, rock; liquid: water, vegetable oil; gases: water vapour, air, oxygen);

- Describe the characteristic properties of each of the three states of matter based on their properties (e.g., solids have definite shape and volume and hold their shape; liquids have definite volume but take the shape of their containers; gases have no definite volume and take the shape of their container);

Grade 6: none

Grade 7: UNIT C: HEAT AND TEMPERATURE

- 2 Describe the nature of thermal energy and its effects on different forms of matter, using informal observations, experimental evidence and models
 - 3rd point: explain the difference between solids, liquids, and gases in terms of density, using the particle theory of matter (e.g., in general, solids are more dense than liquids, which are more dense than gases)

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 3rd point: compare densities of materials; and explain differences in the density of solids, liquids and gases, using the particle model of matter
 - 6th point: investigate and compare the compressibility of liquids and gases

Lesson 7: Lumpy Liquids

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (e.g., freezing and melting are reversible; burning is not);
- Describe changes they observe in the properties of materials as they interact with each other (e.g., when paints are mixed; when water is combined with gelatin, vegetable oil is mixed with water);
- Describe chemical changes that can be caused in a substance, and explain how the changes affect the use and function of the substance (e.g., changes caused by exposing newspaper or construction paper to light or heat; exposing an apple or potato to air);

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 1. Investigate and describe fluids used in technological devices and everyday materials
 - 3rd point: describe examples in which materials are prepared as fluids in order to facilitate transport, processing or use (e.g., *converting mineral ores to liquids or slurries to facilitate transport, use of paint solvents to facilitate mixing and application of pigments, use of soapy water to carry away unwanted particles of material*)
- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (e.g., *identify examples found in households*)

Lesson 8: Milk Rainbow

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)

Lesson 9: Egg-Dye Solutions

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 10: Iron In Cereal

Grade 5: none

Grade 6: ELECTRICITY

- Use appropriate vocabulary, including correct science and technology terms, in describing their investigations and observations (*e.g., use terms such as current, battery, circuit, conductor, insulator; polarity, positive (plus) and negative (minus) charges for electrically charged materials; north pole and south pole for magnetic materials*);

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)

Lesson 11: The Great Escape

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (*e.g., freezing and melting are reversible; burning is not*);
- Investigate and describe the changes in the relative volume, shape, and temperature of materials when pressure is applied to them (*e.g., the effects of using a hammer on clay or of sitting on a beach ball with the stopper removed*).
- Describe physical changes and chemical reactions that can take place in household products and explain how these reactions affect the use of the products (*e.g., the role of baking soda, the role of heat in cooking an egg*);

Grade 6: none

Grade 7: UNIT C: HEAT AND TEMPERATURE

- 2 Describe the nature of thermal energy and its effects on different forms of matter, using informal observations, experimental evidence and models
 - 3rd point: describe the effect of heat on the motion of particles; and explain changes of state, using the particle model of matter
 - 4th point: distinguish between heat and temperature; and explain temperature, using the concept of kinetic energy and the particle model of matter

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)
 - 3rd point: investigate and identify factors that affect solubility and the rate of dissolving a solute in a solvent (*e.g., identify the effect of temperature on solubility; identify the effect of particle size and agitation on rate of dissolving*)
 - 4th point: relate the properties of mixtures and solutions to the particle model of matter (*e.g., recognize that the attraction between particles of solute and particles of solvent helps keep materials in solution*)
- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 1st point: investigate and compare fluids, based on their viscosity and flow rate, and describe the effects of temperature change on liquid flow

Lesson 12: Diaper Polymers

Grade 5: none
 Grade 6: none
 Grade 7: none
 Grade 8: none

Lesson 13: Disappearing Glass

Grade 5: none
 Grade 6: none
 Grade 7: none

Grade 8: UNIT C: LIGHT AND OPTICAL SYSTEMS

- 1. Investigate the nature of light and vision; and describe the role of invention, explanation and inquiry in developing our current knowledge
 - 3rd point: investigate light beams and optical devices, and identify phenomena that provide evidence of the nature of light (*e.g., evidence provided by viewing the passage of light through dusty air or cloudy water*)
- 2. Investigate the transmission of light, and describe its behaviour using a geometric ray model
 - 3rd point: investigate, measure and describe the refraction of light through different materials (*e.g., measure differences in light refraction through pure water, salt water and different oils*)

Lesson 14: Wacky Waxy Watercolours

Grade 5: none
 Grade 6: none
 Grade 7: none
 Grade 8: none

Lesson 15: Floating Paper Clips

Grade 5: none
 Grade 6: none
 Grade 7: none
 Grade 8: none

Lesson 16: Fountain Of Soda

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (e.g., freezing and melting are reversible; burning is not);
- Describe examples of interactions between materials that result in the production of a gas (e.g., antacid tablets in water, baking soda in vinegar);

Grade 6: none
 Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)
 - 2nd point: investigate the solubility of different materials, and describe their concentration (*e.g., describe concentration in grams of solute per 100 mL of solution*)
 - 3rd point: investigate and identify factors that affect solubility and the rate of dissolving a solute in a solvent (*e.g., identify the effect of temperature on solubility; identify the effect of particle size and agitation on rate of dissolving*)
 - 4th point: relate the properties of mixtures and solutions to the particle model of matter (*e.g., recognize that the attraction between particles of solute and particles of solvent helps keep materials in solution*)
- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 5th point: describe pressure as a force per unit area by using the formula $p = F/A$, and describe applications of pressure in fluids and everyday situations (*e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure*)

Lesson 17: Blubber In Sea Mammals

Grade 5: CONSERVATION OF ENERGY

- Use appropriate vocabulary, including correct science and technology terms, in describing their investigations and observations (e.g., use terms such as heat, light, sound, electrical, mechanical, magnetic, chemical when describing forms of energy);
- Explain the ways in which technological innovations affect our use of natural resources and increase or decrease our ability to conserve energy (e.g., home insulation allows us to conserve heat and reduce consumption of energy resources);

Grade 6: none

Grade 7: UNIT C: HEAT AND TEMPERATURE

- 3 Apply an understanding of heat and temperature in interpreting natural phenomena and technological devices
 - 3rd point: compare and evaluate materials and designs that maximize or minimize heat energy transfer (e.g., design and build a device that minimizes energy transfer, such as an insulated container for hot drinks; evaluate different window coatings for use in a model home)
 - 6th point: investigate and describe practical problems in controlling and using thermal energy (e.g., heat losses, excess energy consumption, damage to materials caused by uneven heating, risk of fire)

Grade 8: none

Lesson 18: Puffed Rice Fleas

Grade 5: none

Grade 6: ELECTRICITY

- Compare the characteristics of current and static electricity;

Grade 7: none

Grade 8: none

Lesson 19: Hold The Salt

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (e.g., freezing and melting are reversible; burning is not);

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (e.g., identify examples found in households)
- 4. Identify, interpret and apply technologies based on properties of fluids
 - 1st point: describe technologies based on the solubility of materials (e.g., mining salt or potash by dissolving)

UNIT E: FRESHWATER AND SALTWATER SYSTEMS

- 1. Describe the distribution and characteristics of water in local and global environments, and identify

the significance of water supply and quality to the needs of humans and other living things

- 2nd point: recognize that fresh water and salt water contain varying amounts of dissolved materials, particulates and biological components; and interpret information on these component materials
- 4th point: describe, in general terms, methods for generating fresh water from salt water, based on evaporation, distillation and reverse osmosis

Lesson 20: Liquid Rainbow

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 1. Investigate and describe fluids used in technological devices and everyday materials
 - 4th point: identify properties of fluids that are important in their selection and use (*e.g., lubricant properties of oils, compressibility of gases used in tires*)
- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)
 - 4th point: relate the properties of mixtures and solutions to the particle model of matter (*e.g., recognize that the attraction between particles of solute and particles of solvent helps keep materials in solution*)
- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 2nd point: observe the mass and volume of a liquid, and calculate its density using the formula $d = m/v$ [*Note: This outcome does not require students to perform formula manipulations or solve for unknown terms other than the density.*]

Lesson 21: Making Paper

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)

Lesson 22: Balloon Rockets

Grade 5: none

Grade 6: PROPERTIES OF AIR AND CHARACTERISTICS OF FLIGHT

- Demonstrate an understanding of the properties of air (*e.g., air and other gases have mass, are compressible, and have an undefined volume*) and explain how these can be applied to the principles of flight;
- Investigate the principles of flight and determine the effect of the properties of air on materials when designing and constructing flying devices;

- Describe the sources of propulsion for flying devices (e.g., moving air, propellers, combustion of fuel in jet engines and rockets);
- Describe how unbalanced forces are used to steer airplanes and spacecraft (e.g., ailerons, elevators, rudder control an aircraft and rocket maneuvering thrusters maneuver a space craft).
- Use appropriate vocabulary, including correct science and technology terms, to communicate ideas, procedures, and results (e.g., use terms such as lift, thrust, drag, gravity, angle of attack, streamline, and aerodynamics when discussing flight);

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 5th point: describe pressure as a force per unit area by using the formula $p = F/A$, and describe applications of pressure in fluids and everyday situations (*e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure*)
- 4. Identify, interpret and apply technologies based on properties of fluids
 - 5th point: construct a device that uses the transfer of fluids to apply a force or to control motion (*e.g., construct a model hydraulic lift; construct a submersible that can be made to sink or float by transfer of a fluid; construct a model of a pump*)

Lesson 23: Paper Chromatography

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (e.g., freezing and melting are reversible; burning is not);
- Describe changes they observe in the properties of materials as they interact with each other (e.g., when paints are mixed; when water is combined with gelatin, vegetable oil is mixed with water);

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 1. Investigate and describe fluids used in technological devices and everyday materials
 - 4th point: identify properties of fluids that are important in their selection and use (*e.g., lubricant properties of oils, compressibility of gases used in tires*)
- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)
 - 4th point: relate the properties of mixtures and solutions to the particle model of matter (*e.g., recognize that the attraction between particles of solute and particles of solvent helps keep materials in solution*)

Lesson 24: Exploding Bags

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (e.g., freezing and melting are reversible; burning is not);
- Describe changes they observe in the properties of materials as they interact with each other (e.g., when paints are mixed; when water is combined with gelatin, vegetable oil is mixed with water);
- Describe examples of interactions between materials that result in the production of a gas (e.g., antacid tablets in water, baking soda in vinegar);

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 5th point: describe pressure as a force per unit area by using the formula $p = F/A$, and describe applications of pressure in fluids and everyday situations (*e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure*)

Lesson 25: Gasping For Air

Grade 5: none

Grade 6: TOPIC A: AIR AND AERODYNAMICS

- 6-5.1 Provide evidence that air takes up space and exerts pressure, and identify examples of these properties in everyday applications.

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 5th point: describe pressure as a force per unit area by using the formula $p = F/A$, and describe applications of pressure in fluids and everyday situations (*e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure*)

Lesson 26: Capillary Carnations

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: UNIT B: CELLS AND SYSTEMS

- Investigate and describe the role of cells within living things
 - 4th point: describe the movement of gases and liquids into and out of cells during diffusion and osmosis, based on concentration differences [*Note: This outcome requires a general understanding of processes, not a detailed analysis of mechanisms.*]

Lesson 27: Melting Ice With Salt

Grade 5: none

Grade 6: none

Grade 7: UNIT C: HEAT AND TEMPERATURE

- 1 Illustrate and explain how human needs have led to technologies for obtaining and controlling thermal energy and to increased use of energy resources
 - 2nd point: trace linkages between human purposes and the development of heat-related materials and technologies (*e.g., development of hair dryers and clothes dryers; development of protective clothing, such as oven mitts, ski suits and survival clothing*)
 - 3rd point: identify and explain uses of devices and systems to generate, transfer, control or remove thermal energy (*e.g., describe how a furnace and wall thermostat keep a house at a constant temperature*)
- 2 Describe the nature of thermal energy and its effects on different forms of matter, using informal observations, experimental evidence and models
 - 3rd point: describe the effect of heat on the motion of particles; and explain changes of state, using the particle model of matter
- 3 Apply an understanding of heat and temperature in interpreting natural phenomena and technological devices
 - 6th point: investigate and describe practical problems in controlling and using thermal energy (*e.g., heat losses, excess energy consumption, damage to materials caused by uneven heating, risk of fire*)

Grade 8: none

Lesson 28: Separating Salt & Pepper

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)

Lesson 29: Antigravity Water

Grade 5: none

Grade 6: TOPIC A: AIR AND AERODYNAMICS

- 6-5.1 Provide evidence that air takes up space and exerts pressure, and identify examples of these properties in everyday applications.

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter

- 5th point: describe pressure as a force per unit area by using the formula $p = F/A$, and describe applications of pressure in fluids and everyday situations (*e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure*)

Lesson 30: Solid Or Liquid?

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (*e.g., freezing and melting are reversible; burning is not*);
- Describe changes they observe in the properties of materials as they interact with each other (*e.g., when paints are mixed; when water is combined with gelatin, vegetable oil is mixed with water*);

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 4th point: relate the properties of mixtures and solutions to the particle model of matter (*e.g., recognize that the attraction between particles of solute and particles of solvent helps keep materials in solution*)
- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 1st point: investigate and compare fluids, based on their viscosity and flow rate, and describe the effects of temperature change on liquid flow
 - 5th point: describe pressure as a force per unit area by using the formula $p = F/A$, and describe applications of pressure in fluids and everyday situations (*e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure*)

Lesson 31: Balloon In A Bottle

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Describe the characteristic properties of each of the three states of matter based on their properties (*e.g., solids have definite shape and volume and hold their shape; liquids have definite volume but take the shape of their containers; gases have no definite volume and take the shape of their container*);

Grade 6: PROPERTIES OF AIR AND CHARACTERISTICS OF FLIGHT

- Demonstrate understanding that gases expand to fill a space;
- Demonstrate that air expands when heated (*e.g., heat a garbage bag or dry cleaning bag partially filled with air using the heat from a blow dryer to heat the surface of the bag*);

Grade 7: UNIT C: HEAT AND TEMPERATURE

- 2. Describe the nature of thermal energy and its effects on different forms of matter, using informal observations, experimental evidence and models
 - 3rd point: describe the effect of heat on the motion of particles; and explain changes of state, using the particle model of matter

- 5th point: investigate and describe the effects of heating and cooling on the volume of different materials, and identify applications of these effects (*e.g., use of expansion joints on bridges and railway tracks to accommodate thermal expansion*)

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 1. Investigate and describe fluids used in technological devices and everyday materials
 - 4th point: identify properties of fluids that are important in their selection and use (*e.g., lubricant properties of oils, compressibility of gases used in tires*)
- 3. Investigate and compare the properties of gases and liquids; and relate variations in their viscosity, density, buoyancy and compressibility to the particle model of matter
 - 1st point: investigate and compare fluids, based on their viscosity and flow rate, and describe the effects of temperature change on liquid flow
 - 5th point: describe pressure as a force per unit area by using the formula $p = F/A$, and describe applications of pressure in fluids and everyday situations (*e.g., describe pressure exerted by water in hoses, air in tires, carbon dioxide in fire extinguishers; explain the effects of flat heels and stiletto heels, using the concept of pressure*)

Lesson 32: Rubber-Band Racers

Grade 5: CONSERVATION OF ENERGY

- Describe how energy is stored and transferred in a given device or system (*e.g., in an automobile, chemical energy is stored in the gasoline and is transformed into mechanical energy upon combustion, enabling the vehicle to move and releasing thermal energy as heat and exhaust gasses*);
- Recognize that energy cannot be created or destroyed but can only be changed from one form into another (*e.g., chemical energy in a battery can be converted to electrical energy*);

Grade 6: MOTION

- Demonstrate an understanding of different kinds of motion (linear, rotational, reciprocating, oscillating);

Grade 7: none

Grade 8: UNIT D: MECHANICAL SYSTEMS

- 2. Analyze machines by describing the structures and functions of the overall system, the subsystems and the component parts
 - 1st point: analyze a mechanical device, by:
 - describing the overall function of the device
 - describing the contribution of individual components or subsystems to the overall function of the device
 - identifying components that operate as simple machines
 - 2nd point: identify the source of energy for some familiar mechanical devices
 - 3rd point: identify linkages and power transmissions in a mechanical device, and describe their general function (*e.g., identify the purpose and general function of belt drives and gear systems within a mechanical device*)
- 3. Investigate and describe the transmission of force and energy between parts of a mechanical system
 - 2nd point: build or modify a model mechanical system to provide for different turning ratios between a driving and driven shaft, or to achieve a given force ratio

Lesson 33: T-shirt Tye-Dye

Grade 5: PROPERTIES OF AND CHANGES IN MATTER

- Identify and describe some changes to materials that are reversible and some that are not (e.g., freezing and melting are reversible; burning is not);
- Describe changes they observe in the properties of materials as they interact with each other (e.g., when paints are mixed; when water is combined with gelatin, vegetable oil is mixed with water);

Grade 6: none

Grade 7: none

Grade 8: UNIT A: MIX AND FLOW OF MATTER

- 2. Investigate and describe the composition of fluids, and interpret the behaviour of materials in solution
 - 1st point: distinguish among pure substances, mixtures and solutions, using common examples (*e.g., identify examples found in households*)