

You Be The Chemist Grades 5-8 – Curriculum Connections

Ontario Curriculum, Grades 5 - 8

Lesson 1: Goofy Putty

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 3.5 describe chemical changes in matter as changes that are irreversible (e.g., when the chrome on a bicycle rusts, it can never go back to being chrome; when an egg is boiled it can never go back to being a raw egg)

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 2.4 use scientific inquiry/experimentation skills (see page 12) to investigate the properties of mixtures and solutions (e.g., the amount of solute required to form a saturated solution; differences between pure substances and mixtures)
- 3.4 distinguish between solutions and mechanical mixtures
- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none

Lesson 2: Goldenrod Detector

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 3: Rusting Wool

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.5 describe chemical changes in matter as changes that are irreversible (e.g., when the chrome on a bicycle rusts, it can never go back to being chrome; when an egg is boiled it can never go back to being a raw egg)
- 3.7 identify indicators of a chemical change (e.g., production of a gas, change in colour, formation of precipitate)

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 3.1 distinguish between pure substances (e.g., distilled water, salt, copper pipe) and mixtures (e.g., salad dressing, chocolate chip cookies)
- 3.5 describe the processes (e.g., evaporation, sifting, filtration, distillation, magnetism) used to separate mixtures or solutions into their components, and identify some industrial applications of these processes (e.g., use of cheesecloth to separate seeds and skins from juice and pulp to make fruit jellies; use of evaporation in

maple syrup production; use of different sizes of sieves to separate wheat grains in white bread production; use of strainers in industries to separate slurry into solids and liquids)

- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none

Lesson 4: Buoyant Butter

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.2 measure temperature and mass, using appropriate instruments (e.g., a thermometer, a single-pan balance)
- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication

Grade 6: none

Grade 7: none

Grade 8: UNDERSTANDING MATTER AND ENERGY - FLUIDS

- 2.7 use appropriate science and technology vocabulary, including viscosity, density, particle theory of matter, hydraulic, and pneumatic, in oral and written communication
- 3.2 describe the relationship between mass, volume, and density as a property of matter
- 3.3 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)
- 3.6 determine the buoyancy of an object, given its density, in a variety of fluids (e.g., less dense objects float, more dense objects sink)

Lesson 5: Rubber Eggs

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.5 describe chemical changes in matter as changes that are irreversible (e.g., when the chrome on a bicycle rusts, it can never go back to being chrome; when an egg is boiled it can never go back to being a raw egg)
- 3.7 identify indicators of a chemical change (e.g., production of a gas, change in colour, formation of precipitate)

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none

Lesson 6: The Moving Molecule Stomp

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 3.2 identify properties of solids, liquids, and gases (e.g., solids have definite volume and hold their shape; liquids have definite volume but take the shape of their container or spread when they are not contained; gases have no definite volume and take the volume and shape of their container or spread when they are not contained), and state examples of each

UNDERSTANDING EARTH AND SPACE SYSTEMS – CONSERVATION OF ENERGY AND RESOURCES

- 2.4 use appropriate science and technology vocabulary, including energy, heat, light, sound, electrical, mechanical, and chemical, in oral and written communication

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 3.2 state the postulates of the particle theory of matter (all matter is made up of particles; all particles are in constant motion; all particles of one substance are identical; temperature affects the speed at which particles move; in a gas, there are spaces between the particles; in liquids and solids, the particles are close together and have strong forces of attraction between them)

Grade 8: UNDERSTANDING MATTER AND ENERGY - FLUIDS

- 3.3 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)

Lesson 7: Lumpy Liquids

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.5 describe chemical changes in matter as changes that are irreversible (e.g., when the chrome on a bicycle rusts, it can never go back to being chrome; when an egg is boiled it can never go back to being a raw egg)

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 2.3 investigate processes (e.g., filtration, distillation, settling, magnetism) used for separating different mixtures
- 2.5 use appropriate science and technology vocabulary, including mechanical mixture, solution, solute, insoluble, saturated, unsaturated, and dilute, in oral and written communication
- 3.3 use the particle theory to describe the difference between pure substances (which have identical particles) and mixtures (which have different particles)
- 3.4 distinguish between solutions and mechanical mixtures
- 3.5 describe the processes (e.g., evaporation, sifting, filtration, distillation, magnetism) used to separate mixtures or solutions into their components, and identify some industrial applications of these processes (e.g., use of cheesecloth to separate seeds and skins from juice and pulp to make fruit jellies; use of evaporation in maple syrup production; use of different sizes of sieves to separate wheat grains in white bread production; use of strainers in industries to separate slurry into solids and liquids)
- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none

Lesson 8: Milk Rainbow

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: UNDERSTANDING MATTER AND ENERGY - FLUIDS

- 2.7 use appropriate science and technology vocabulary, including viscosity, density, particle theory of matter, hydraulic, and pneumatic, in oral and written communication
- 3.2 describe the relationship between mass, volume, and density as a property of matter

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: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 2.3 investigate processes (e.g., filtration, distillation, settling, magnetism) used for separating different mixtures
- 3.5 describe the processes (e.g., evaporation, sifting, filtration, distillation, magnetism) used to separate mixtures or solutions into their components, and identify some industrial applications of these processes (e.g., use of cheesecloth to separate seeds and skins from juice and pulp to make fruit jellies; use of evaporation in maple syrup production; use of different sizes of sieves to separate wheat grains in white bread production; use of strainers in industries to separate slurry into solids and liquids)

Grade 8: none

Lesson 11: The Great Escape

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.2 measure temperature and mass, using appropriate instruments (e.g., a thermometer, a single-pan balance)

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 2.2 use scientific inquiry/experimentation skills (see page 12) to investigate factors (e.g., temperature, type of solute or solvent, particle size, stirring) that affect the solubility of a substance and the rate at which substances dissolve

- 2.4 use scientific inquiry/experimentation skills (see page 12) to investigate the properties of mixtures and solutions (e.g., the amount of solute required to form a saturated solution; differences between pure substances and mixtures)
- 2.5 use appropriate science and technology vocabulary, including mechanical mixture, solution, solute, insoluble, saturated, unsaturated, and dilute, in oral and written communication
- 3.1 distinguish between pure substances (e.g., distilled water, salt, copper pipe) and mixtures (e.g., salad dressing, chocolate chip cookies)
- 3.2 state the postulates of the particle theory of matter (all matter is made up of particles; all particles are in constant motion; all particles of one substance are identical; temperature affects the speed at which particles move; in a gas, there are spaces between the particles; in liquids and solids, the particles are close together and have strong forces of attraction between them)
- 3.3 use the particle theory to describe the difference between pure substances (which have identical particles) and mixtures (which have different particles)
- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none

Lesson 12: Diaper Polymers

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.5 describe chemical changes in matter as changes that are irreversible (e.g., when the chrome on a bicycle rusts, it can never go back to being chrome; when an egg is boiled it can never go back to being a raw egg)
- 3.8 distinguish between a physical change and a chemical change (e.g., a physical change can be reversed [ice to water to ice], whereas a chemical change creates new substance[s] [wood to smoke and ash])

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 13: Disappearing Glass

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: none

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: UNDERSTANDING MATTER AND ENERGY - FLUIDS

- 2.7 use appropriate science and technology vocabulary, including viscosity, density, particle theory of matter, hydraulic, and pneumatic, in oral and written communication
- 3.2 describe the relationship between mass, volume, and density as a property of matter

Lesson 16: Fountain Of Soda

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.5 describe chemical changes in matter as changes that are irreversible (e.g., when the chrome on a bicycle rusts, it can never go back to being chrome; when an egg is boiled it can never go back to being a raw egg)
- 3.7 identify indicators of a chemical change (e.g., production of a gas, change in colour, formation of precipitate)

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 2.2 use scientific inquiry/experimentation skills (see page 12) to investigate factors (e.g., temperature, type of solute or solvent, particle size, stirring) that affect the solubility of a substance and the rate at which substances dissolve
- 2.5 use appropriate science and technology vocabulary, including mechanical mixture, solution, solute, insoluble, saturated, unsaturated, and dilute, in oral and written communication
- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none

Lesson 17: Blubber In Sea Mammals

Grade 5: none

Grade 6: none

Grade 7: UNDERSTANDING EARTH AND SPACE SYSTEMS - HEAT IN THE ENVIRONMENT

- 1.1 assess the social and environmental benefits of technologies that reduce heat loss or transfer (e.g., insulated clothing, building insulation, green roofs, energy-efficient buildings)
- 2.5 use appropriate science and technology vocabulary, including heat, temperature, conduction, convection, and radiation, in oral and written communication
- 3.4 explain how heat is transmitted through conduction (e.g., the transmission of heat from a stove burner to a pot and from the pot to the pot handle), and describe natural processes that are affected by conduction (e.g., the formation of igneous and metamorphic rocks and diamonds)

Grade 8: none

Lesson 18: Puffed Rice Fleas

Grade 5: none

Grade 6: UNDERSTANDING MATTER AND ENERGY - ELECTRICITY AND ELECTRICAL DEVICES

- 2.3 use scientific inquiry/experimentation skills (see page 12) to investigate the characteristics of static electricity
- 2.6 use appropriate science and technology vocabulary, including current, battery, circuit, transform, static, electrostatic, and energy, in oral and written communication
- 3.1 distinguish between current and static electricity
- 3.2 use the principles of static electricity to explain common electrostatic phenomena (e.g., the attraction of hairs to a comb that has been rubbed on a piece of wool; the attraction of small pieces of paper to a plastic ruler that has been rubbed with a rag; the attraction of pieces of clothing to each other when they come out of a clothes dryer)

Grade 7: none

Grade 8: none

Lesson 19: Hold The Salt

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.4 describe physical changes in matter as changes that are reversible (e.g., a melted ice cube can be refrozen; a bottle of frozen water can be thawed to a liquid state again; water vapour that has condensed on a cold window can evaporate into a vaporous state again; water from a puddle that has evaporated will fall to the ground as rain)
- 3.8 distinguish between a physical change and a chemical change (e.g., a physical change can be reversed [ice to water to ice], whereas a chemical change creates new substance[s] [wood to smoke and ash])
- 3.8 distinguish between a physical change and a chemical change (e.g., a physical change can be reversed [ice to water to ice], whereas a chemical change creates new substance[s] [wood to smoke and ash])

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 1.2 assess the impact on society and the environment of different industrial methods of separating mixtures and solutions
- 2.3 investigate processes (e.g., filtration, distillation, settling, magnetism) used for separating different mixtures
- 2.5 use appropriate science and technology vocabulary, including mechanical mixture, solution, solute, insoluble, saturated, unsaturated, and dilute, in oral and written communication
- 3.1 distinguish between pure substances (e.g., distilled water, salt, copper pipe) and mixtures (e.g., salad dressing, chocolate chip cookies)
- 3.3 use the particle theory to describe the difference between pure substances (which have identical particles) and mixtures (which have different particles)
- 3.5 describe the processes (e.g., evaporation, sifting, filtration, distillation, magnetism) used to separate mixtures or solutions into their components, and identify some industrial applications of these processes (e.g.,

use of cheesecloth to separate seeds and skins from juice and pulp to make fruit jellies; use of evaporation in maple syrup production; use of different sizes of sieves to separate wheat grains in white bread production; use of strainers in industries to separate slurry into solids and liquids)

- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none

Lesson 20: Liquid Rainbow

Grade 5: none

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 2.4 use scientific inquiry/experimentation skills (see page 12) to investigate the properties of mixtures and solutions (e.g., the amount of solute required to form a saturated solution; differences between pure substances and mixtures)
- 2.5 use appropriate science and technology vocabulary, including mechanical mixture, solution, solute, insoluble, saturated, unsaturated, and dilute, in oral and written communication
- 3.1 distinguish between pure substances (e.g., distilled water, salt, copper pipe) and mixtures (e.g., salad dressing, chocolate chip cookies)
- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)
- 3.8 describe the concentration of a solution in qualitative terms (e.g., dilute, concentrated) and in quantitative terms (e.g., 5 grams of salt in 1000 ml of water)

Grade 8: UNDERSTANDING MATTER AND ENERGY – FLUIDS

- 2.2 determine the mass-to-volume ratio of different amounts of the same substance (e.g., water, corn syrup, copper pennies)
- 2.3 investigate and compare the density of a variety of liquids (e.g., water, salt water, corn syrup, liquid soap)
- 2.7 use appropriate science and technology vocabulary, including viscosity, density, particle theory of matter, hydraulic, and pneumatic, in oral and written communication

Lesson 21: Making Paper

Grade 5: none

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 3.4 distinguish between solutions and mechanical mixtures
- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none

Lesson 22: Balloon Rockets

Grade 5: none

Grade 6: UNDERSTANDING STRUCTURES AND MECHANISMS - FLIGHT

- 2.2 use scientific inquiry/experimentation skills (see page 12) to investigate the properties of air (e.g., air takes up space, has mass, can be compressed)
- 3.5 describe ways in which flying devices or living things use unbalanced forces to control their flight (e.g., a plane can be steered up or down by tilting the elevators on the tail; when a bird flaps its wings, the wings develop lift as well as forward and upward force, thus causing it to take off)

Grade 7: none

Grade 8: UNDERSTANDING MATTER AND ENERGY – FLUIDS

- 3.8 compare the ways in which fluids are used and controlled in living things to the ways in which they are used and controlled in manufactured devices (e.g., compare the role of valves in the circulatory system to the role of valves in an internal combustion engine; compare the role of a fish's swim bladder to the role of the ballast tanks in a submarine)

Lesson 23: Paper Chromatography

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 24: Exploding Bags

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.5 describe chemical changes in matter as changes that are irreversible (e.g., when the chrome on a bicycle rusts, it can never go back to being chrome; when an egg is boiled it can never go back to being a raw egg)
- 3.7 identify indicators of a chemical change (e.g., production of a gas, change in colour, formation of precipitate)

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 25: Gasping For Air

Grade 5: none

Grade 6: UNDERSTANDING EARTH AND SPACE SYSTEMS - SPACE

- 2.4 use appropriate science and technology vocabulary, including axis, tilt, rotation, revolution, planets, moons, comets, and asteroids, in oral and written communication

- 3.4 identify the technological tools and devices needed for space exploration (e.g., telescopes, spectroscopes, spacecraft, life-support systems)

Grade 7: none

Grade 8: none

Lesson 26: Capillary Carnations

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: UNDERSTANDING MATTER AND ENERGY - FLUIDS

- 2.4 investigate applications of the principles of fluid mechanics (e.g., in aeronautical research, shipping, food services, plumbing, hydrodynamic engineering)

Lesson 27: Melting Ice With Salt

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.4 describe physical changes in matter as changes that are reversible (e.g., a melted ice cube can be refrozen; a bottle of frozen water can be thawed to a liquid state again; water vapour that has condensed on a cold window can evaporate into a vaporous state again; water from a puddle that has evaporated will fall to the ground as rain)
- 3.8 distinguish between a physical change and a chemical change (e.g., a physical change can be reversed [ice to water to ice], whereas a chemical change creates new substance[s] [wood to smoke and ash])

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 2.4 use scientific inquiry/experimentation skills (see page 12) to investigate the properties of mixtures and solutions (e.g., the amount of solute required to form a saturated solution; differences between pure substances and mixtures)
- 3.1 distinguish between pure substances (e.g., distilled water, salt, copper pipe) and mixtures (e.g., salad dressing, chocolate chip cookies)

Grade 8: none

Lesson 28: Separating Salt & Pepper

Grade 5: none

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 1.2 assess the impact on society and the environment of different industrial methods of separating mixtures and solutions
- 2.3 investigate processes (e.g., filtration, distillation, settling, magnetism) used for separating different mixtures

- 2.5 use appropriate science and technology vocabulary, including mechanical mixture, solution, solute, insoluble, saturated, unsaturated, and dilute, in oral and written communication
- 3.1 distinguish between pure substances (e.g., distilled water, salt, copper pipe) and mixtures (e.g., salad dressing, chocolate chip cookies)
- 3.3 use the particle theory to describe the difference between pure substances (which have identical particles) and mixtures (which have different particles)
- 3.4 distinguish between solutions and mechanical mixtures
- 3.5 describe the processes (e.g., evaporation, sifting, filtration, distillation, magnetism) used to separate mixtures or solutions into their components, and identify some industrial applications of these processes (e.g., use of cheesecloth to separate seeds and skins from juice and pulp to make fruit jellies; use of evaporation in maple syrup production; use of different sizes of sieves to separate wheat grains in white bread production; use of strainers in industries to separate slurry into solids and liquids)

Grade 8: none

Lesson 29: Antigravity Water

Grade 5: none

Grade 6: none

Grade 7: none

Grade 8: none

Lesson 30: Solid Or Liquid?

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.2 identify properties of solids, liquids, and gases (e.g., solids have definite volume and hold their shape; liquids have definite volume but take the shape of their container or spread when they are not contained; gases have no definite volume and take the volume and shape of their container or spread when they are not contained), and state examples of each

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 2.4 use scientific inquiry/experimentation skills (see page 12) to investigate the properties of mixtures and solutions (e.g., the amount of solute required to form a saturated solution; differences between pure substances and mixtures)
- 2.5 use appropriate science and technology vocabulary, including mechanical mixture, solution, solute, insoluble, saturated, unsaturated, and dilute, in oral and written communication
- 3.3 use the particle theory to describe the difference between pure substances (which have identical particles) and mixtures (which have different particles)
- 3.4 distinguish between solutions and mechanical mixtures
- 3.6 identify the components of a solution (e.g., solvent, solute)

Grade 8: UNDERSTANDING MATTER AND ENERGY – FLUIDS

- 3.3 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)

Lesson 31: Balloon In A Bottle

Grade 5: UNDERSTANDING MATTER AND ENERGY – PROPERTIES OF AND CHANGES IN MATTER

- 2.2 measure temperature and mass, using appropriate instruments (e.g., a thermometer, a single-pan balance)
- 2.5 use appropriate science and technology vocabulary, including mass, volume, properties, matter, physical/reversible changes, and chemical/irreversible changes, in oral and written communication
- 3.6 explain how changes of state involve the release of heat (e.g., when water freezes it releases heat) or the absorption of heat (e.g., when an ice cube melts, it absorbs heat)

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 3.2 state the postulates of the particle theory of matter (all matter is made up of particles; all particles are in constant motion; all particles of one substance are identical; temperature affects the speed at which particles move; in a gas, there are spaces between the particles; in liquids and solids, the particles are close together and have strong forces of attraction between them)

Grade 8: UNDERSTANDING MATTER AND ENERGY – FLUIDS

- 3.1 demonstrate an understanding of viscosity and compare the viscosity of various liquids (e.g., water, syrup, oil, shampoo, ketchup)
- 3.2 describe the relationship between mass, volume, and density as a property of matter
- 3.6 explain in qualitative terms the relationship between pressure, volume, and temperature when a liquid (e.g., water) or a gas (e.g., air) is compressed or heated

Lesson 32: Rubber-Band Racers

Grade 5: UNDERSTANDING STRUCTURES AND MECHANISMS – FORCES ACTING ON STRUCTURES AND MECHANISMS

- 2.4 use technological problem-solving skills (see page 16) to design, build, and test a frame structure (e.g., a bridge, a tower) that will withstand the application of an external force (e.g., a strong wind or simulated vibrations from a train) or a mechanical system that performs a specific function (e.g., a building crane)

Grade 6: none

Grade 7: none

Grade 8: UNDERSTANDING STRUCTURES AND MECHANISMS - SYSTEMS IN ACTION

- 2.4 use technological problem-solving skills (see page 16) to investigate a system (e.g., an optical system, a mechanical system, an electrical system) that performs a function or meets a need
- 2.6 use appropriate science and technology vocabulary, including mechanical advantage, input, output, friction, gravity, forces, and efficiency, in oral and written communication
- 3.2 identify the purpose, inputs, and outputs of various systems (e.g., a garden – purpose: to grow things; input: seeds, water, fertilizer; output: flowers, food)
- 3.3 identify the various processes and components of a system (e.g., robot, front-end loader/backhoe, heating system, transportation system, health care system) that allow it to perform its function efficiently and safely

Lesson 33: T-shirt Tye-Dye

Grade 5: none

Grade 6: none

Grade 7: UNDERSTANDING MATTER AND ENERGY - PURE SUBSTANCES AND MIXTURES

- 3.4 distinguish between solutions and mechanical mixtures
- 3.6 identify the components of a solution (e.g., solvent, solute)
- 3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)

Grade 8: none