

Crime Lab Chemistry

Grades 2-3-4-5-6-7-8

National Science Education Standards

SCIENCE AS INQUIRY STANDARDS	
LEVELS K-4	LEVELS 5-8
Abilities necessary to do scientific inquiry	Abilities necessary to do scientific inquiry
Understanding about scientific inquiry	Understanding about scientific inquiry

PHYSICAL SCIENCE STANDARDS	
LEVELS K-4	LEVELS 5-8
Properties of objects and materials	Properties and changes of properties in matter
Position and motion of objects	Motion and forces
Light, heat, electricity, and magnetism	

LIFE SCIENCE STANDARDS	
	LEVELS 5-8
	Reproduction and heredity

HISTORY AND NATURE OF SCIENCE STANDARDS	
LEVELS K-4	LEVELS 5-8
Science as a human endeavor	Science as a human endeavor
	Nature of science
	History of science

Texas Essential Knowledge and Skills

Grade 2 Science

(a) Introduction.

- (1) In Grade 2, the study of science includes planning and conducting simple classroom and field investigations to help students develop the skills of making measurements using standard and non-standard units, using tools such as rulers and clocks to collect information, classifying and sequencing objects and events, and identifying patterns. Students also use computers and information technology tools to support their investigations.
 - (2) As students learn science skills, they identify component of the natural world including the water cycle and the use of resources. They observe melting and evaporation, weathering, and the pushing and pulling of objects as examples of change. In addition, students distinguish between characteristics of living and nonliving objects, compare lifelong need of plants and animals, understand how living things depend on their environments, and identify functions of parts of plants and animals.
 - (3) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.
 - (4) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
 - (5) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions build from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.
-

(b) Knowledge and skills

(2.1) Scientific processes. The student conducts classroom and field investigations following home and school safety procedures.

The student is expected to:

- (A) demonstrate safe practices during classroom and field investigations; and
- (B) learn how to use and conserve resources and dispose of materials.

- | | |
|--|--|
| <p>(2.2) Scientific processes. The student develops abilities necessary to do science inquiry in the field and the classroom.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none"> (A) ask questions about organisms, objects, and events; (B) plan and conduct simple descriptive investigations (C) compare results of investigations with what students and scientists know about the world; (D) gather information using simple equipment and tools to extend the senses; (E) construct reasonable explanations and draw conclusions using information and prior knowledge; and (F) communicate findings about simple investigations. |
| <p>(2.3) Scientific processes. The student knows that information and critical thinking are used in making decisions.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none"> (A) make decisions using information, and (B) discuss and justify the merits of decisions. |
| <p>(2.4) Scientific processes. The student uses age-appropriate tools and models to verify that objects and parts of organisms and objects can be observed, described, and measured.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none"> (A) collect information using tools including rulers, meter sticks, measuring cups, clocks, hand lenses, computers, thermometers, and balances. |
| <p>(2.5) Science concepts. The student knows that organisms, objects, and events have properties and patterns.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none"> (A) classify and sequence organisms, objects, and events based on properties and patterns; and (B) identify, predict, replicate, and create patterns including those seen in charts, graphs, and numbers. |
| <p>(2.7) Science concepts. The student knows that many types of change occur.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none"> (A) observe, measure, record, analyze, predict, and illustrate changes in size, weight, temperature, color, position, quantity, sound, and movement; and (B) identify, predict, and test ways uses of heat to cause change such as melting and evaporation. |

Grade 3 Science

(a) Introduction.

- (1) In Grade 3, the study of science includes planning and implementing simple classroom and field investigations to develop the skills of collecting information using tools such as a microscope, making inferences, communicating conclusions, and making informed decisions. Students also use computers and information technology tools to support their investigations.
- (3) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by

physical, mathematical, and conceptual models, and also should know that science may not answer all questions.

- (4) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
- (5) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions build from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.
-

(b) Knowledge and skills

(3.1) Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.

The student is expected to:

- (A) demonstrate safe practices during field and laboratory investigations; and
- (B) make wise choices in the use and conservation of resources and the disposal of materials

(3.2) Scientific processes. The student uses scientific methods during field and laboratory investigations.

The student is expected to:

- (A) plan and implement descriptive investigations procedures including asking well-defined questions, formulating testable hypotheses, and selecting equipment and technology;
- (B) collect information by observing and measuring;
- (C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct simple graphs, tables, and charts to organize, examine and evaluate information.

- (3.3) Scientific processes. The student knows that information, critical thinking, and scientific problem solving are used in making decisions.
- The student is expected to:
- (A) analyze, review, and critique hypotheses and theories as to their strengths and weaknesses using scientific evidence and information;
 - (B) draw inferences based on information related to promotional material for products and services;
 - (C) represent the natural world using models and identify their limitations;
 - (D) evaluate the impact or research on scientific thought, society, and the environment; and
 - (E) connect Grade 3 science concepts with the history of science and contributions of scientists.
- (3.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.
- The student is expected to:
- (A) collect and analyze information using tools including calculators, microscopes,, cameras, safety goggles, sound recorders, clocks, computers, thermometers, hand lenses, meter sticks, rulers, balances, magnets, and compasses; and
 - (B) demonstrate that repeated investigations may increase the reliability of results.
- (3.7) Science concepts. The student knows that matter has physical properties.
- The student is expected to:
- (A) gather information about the physical properties of matter including temperature, magnetism, hardness, and mass using appropriate instruments; and
 - (B) identify matter as liquids, solids, and gases.

Grade 4 Science

(a) Introduction.

- (1) In Grade 4, the study of science includes planning and implementing field and laboratory investigations using scientific methods, analyzing information, making informed decisions, and using tools such as compasses and computers to collect and organize information. Students also use computers and information technology tools to support scientific investigations.
- (2) As students learn science skills, they identify components and processes of the natural world including properties of soil, effects of the oceans on land, and the role of the sun as our major source of energy. In addition, students identify the physical properties of matter and observe the addition or reduction of heat as an example of what can cause changes in states of matter.
- (3) Students learn the roles of living and nonliving components of simple systems and investigate differences between learned characteristics and inherited traits. They learn that adaptations of organisms that lived in the past may have increased some species' ability to survive.
- (4) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by

physical, mathematical, and conceptual models, and also should know that science may not answer all questions.

- (5) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
- (6) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions build from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.
-

(b) Knowledge and skills

- | | |
|---|--|
| <p>(4.1) Scientific processes. The student conduct field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.</p> | <p>The student is expected to:</p> <p>(A) demonstrate safe practices during field and laboratory investigations; and</p> <p>(B) make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> |
| <p>(4.2) Scientific processes. The student uses scientific inquiry during field and laboratory investigations.</p> | <p>The student is expected to:</p> <p>(A) plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting equipment and technology;</p> <p>(B) collect information by observing and measuring;</p> <p>(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;</p> <p>(D) communicate valid conclusions; and</p> <p>(E) construct simple graphs, tables, and charts to organize, examine, and evaluate information.</p> |

- (4.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.
- The student is expected to:
- (A) analyze, review, and critique explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
 - (B) draw inferences based on information related to promotional material for products and services;
 - (C) represent the natural world using models and identify their limitations;
 - (D) evaluate the impact or research on scientific thought, society, and the environment; and
 - (E) connect Grade 4 science concepts with the history of science and contributions of scientists.
- (4.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.
- The student is expected to:
- (A) collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, meter sticks, timing devices, balances, and compasses; and
 - (B) demonstrate that repeated investigations may increase the reliability of results.
- (4.7) Science concepts. The student knows that matter has physical properties.
- The student is expected to:
- (A) observe and record changes in the states of matter caused by the addition or reduction of heat; and
 - (B) conduct tests, compare data, and draw conclusions about physical properties of matter including states of matter, conduction, and buoyancy.
- (4.9) Science concepts. The student knows that many likenesses between offspring and parents are inherited or learned.
- The student is expected to:
- (A) distinguish between inherited traits and learned characteristics; and
 - (B) identify and provide examples of inherited traits and learned characteristics.

Grade 5 Science

(a) Introduction.

- (1) In Grade 5, the study of science includes planning and implementing field and laboratory investigations using scientific methods, analyzing information, making informed decisions, and using tools such as nets, cameras, and computers to collect and organize information. Students also use computers and information technology tools to support scientific investigations.
- (2) As students learn science skills, they identify structures and functions of Earth systems including the crust, mantle, and core and the effect of weathering on landforms. Students learn that growth, erosion, and dissolving are examples of how some past events have affected present events. Students learn about magnetism, physical states of matter, and conductivity as properties that are used to classify matter.

- In addition, students learn that light, heat, electricity, and magnetism are all forms of energy.
- (3) Students learn that adaptations can improve the survival of members of a species, and they explore an organism's niche within an ecosystem. Students continue the study of organisms by exploring a variety of trait that are inherited by offspring from their parents and study examples of learned characteristics.
 - (4) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.
 - (5) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
 - (6) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions build from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.
-

(b) Knowledge and skills

- | | |
|---|---|
| (5.1) Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices. | The student is expected to:
(A) demonstrate safe practices during field and laboratory investigations; and
(B) make wise choices in the use and conservation of resources and the disposal or recycling of materials |
| (5.2) Scientific processes. The student uses scientific methods during field and laboratory investigations. | The student is expected to:
(A) plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology;
(B) collect information by observing and measuring;
(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;
(D) communicate valid conclusions; and
(E) construct simple graphs, tables, and charts to organize, examine, and evaluate information. |

- (5.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.
- The student is expected to:
- (A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
 - (B) draw inferences based on information related to promotional material for products and services;
 - (C) represent the natural world using models and identify their limitations;
 - (D) evaluate the impact of research on scientific thought, society, and the environment; and
 - (E) connect Grade 5 science concepts with the history of science and contributions of scientists.
- (5.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.
- The student is expected to:
- (A) collect and analyze information using tools including calculators, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, compasses, balances, meter sticks, timing devices, magnets, collecting nets, and safety goggles; and
 - (B) demonstrate that repeated investigations may increase the reliability of results.
- (5.7) Science concepts. The student knows that matter has physical properties.
- The student is expected to:
- (A) classify matter based on its physical properties including magnetism, physical state, and the ability to conduct or insulate heat, electricity, and sound;
 - (B) demonstrate that some mixtures maintain the physical properties of their ingredients;
 - (C) identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving sugar in water; and
 - (D) observe and measure characteristic properties of substances that remain constant such as boiling points, melting points, and solubility.
- (5.10) Science concepts. The student knows that likenesses between offspring and parent can be inherited or learned.
- The student is expected to:
- (A) identify traits that are inherited from parent to offspring in plants and animals.

Grade 6 Science**(a) Introduction.**

- (1) In Grade 6, the study of science includes conducting field and laboratory investigations using scientific methods, analyzing information, making informed decisions, and using tools such as beakers, test tubes and spring scales to collect, analyze, and record information. Students also use computers and information technology tools to support scientific investigations.
 - (3) Students classify substances by their chemical properties and identify the water cycle and decay of biomass as examples of the interactions between matter and energy. They identify life processes and the relationships between structure and function of organisms.
 - (4) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.
 - (5) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
 - (6) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions build from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.
-

(b) Knowledge and skills

- | | |
|--|---|
| (6.1) Scientific processes. The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. | The student is expected to:
(A) demonstrate safe practices during field and laboratory investigations; and
(B) make wise choices in the use and conservation of resources and the disposal or recycling of materials. |
| (6.2) Scientific processes. The student uses scientific methods during fieldwork and laboratory investigations. | The student is expected to:
(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology;
(B) collect information by observing and measuring;
(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;
(D) communicate valid conclusions; and
(E) construct graphs, tables, and charts using tools including computers to organize, examine, and evaluate information. |

- (6.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.
- The student is expected to:
- (A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
 - (B) draw inferences based on data related to promotional material for products and services;
 - (C) represent the natural world using models and identify their limitations;
 - (D) evaluate the impact of research on scientific thought, society, and the environment; and
 - (E) connect Grade 6 science concepts with the history of science and contributions of scientists.
- (6.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.
- The student is expected to:
- (A) collect, analyze, and record information using tools including beakers, petri dishes, metric-meter sticks, graduated cylinders, weather instruments, timing devices, heating apparatuses, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers, and computer probes; and
 - (B) identify patterns in collected information using percent, average, range, and frequency.
- (6.7) Science concepts. The student knows that substances have physical and chemical properties.
- The student is expected to:
- (A) demonstrate that new substances can be made when two or more substances are chemically combined and compare the properties of the new substances to the original substances; and
 - (B) classify substances by their physical and chemical properties.
- (6.8) Science concepts. The student knows that complex interactions occur between matter and energy.
- The student is expected to:
- (A) define matter and energy; and
 - (B) explain and illustrate the interactions between matter and energy in the water cycle and in the decay of biomass such as in a compost bin.
- (6.11) Science concepts. The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms.
- The student is expected to:
- (A) identify cells as structures containing genetic material; and
 - (B) interpret the role of genes in inheritance.

Grade 7 Science**(a) Introduction.**

- (1) In Grade 7, the study of science includes conducting field and laboratory investigations using scientific methods, critical-thinking, problem-solving, and using tools such as weather instruments and graphing calculators to collect and analyze information to explain a phenomena. Students also use computers and information technology tools to support scientific investigations.
 - (2) As students learn science skills, they identify gravity and phases of the moon as components of the solar system and explore the effects of events such as hurricanes on the Earth. Students use pulleys and levers to understand the relationship between force and motion. Students then relate the concept to processes in the human organism such as the movement of blood. In addition, Grade 7 students study chemical and physical properties of substances, examine the tarnishing of metal or burning of wood as example of chemical processes, and identify physical properties used to place elements on the periodic table.
 - (3) Students learn about kinetic and potential energy and identify photosynthesis as an example of the transformation of radiant energy from the sun into chemical energy for use by plants. Students investigate systems in humans to identify the structures and functions. Students compare asexual and sexual reproduction to illustrate that genetic materials are responsible for both dominant and recessive traits in organisms.
 - (4) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.
 - (5) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
 - (6) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions build from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.
-

(b) Knowledge and skills

- | | |
|---|--|
| <p>(7.1) Scientific processes. The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.</p> | <p>The student is expected to:</p> <p>(A) demonstrate safe practices during field and laboratory investigations; and</p> <p>(B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.</p> |
|---|--|

(7.2) Scientific processes. The student uses scientific methods during field and laboratory investigations.

The student is expected to:

- (A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology;
- (B) collect information by observing and measuring;
- (C) organize, analyze, make inferences, and predict trends from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct graphs, tables, and charts using tools including computers to organize, examine, and evaluate data.

(7.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.

The student is expected to:

- (A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
- (B) draw inferences based on data related to promotional material for products and services;
- (C) represent the natural world using models and identify their limitations;
- (D) evaluate the impact or research on scientific thought, society, and the environment; and
- (E) connect Grade 7 science concepts with the history of science and contributions of scientists.

(7.4) Scientific processes. The student knows how to use tools and methods to conduct science inquiry.

The student is expected to:

- (A) collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, heating apparatuses, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, graphing calculators, field equipment, compasses, computers, computer probes, timing devices, magnets, and compasses; and
- (B) analyze collected information to recognize patterns such as rates of change.

(7.7) Science concepts. The student knows that substances have physical and chemical properties.

The student is expected to:

- (A) identify and demonstrate everyday examples of chemical phenomena such as rusting and tarnishing of metals and burning of wood.

- (7.10) Science concepts. The student knows that species can change through generations and that the instructions for traits are contained in genetic material of the organisms.
- The student is expected to:
 (B) distinguish between dominant and recessive traits and recognize that inherited traits of an individual are contained in genetic material.

Grade 8 Science

(a) Introduction.

- (1) In Grade 8, the study of science includes conducting field and laboratory investigations using scientific methods, analyzing data, critical-thinking, scientific problem-solving, and using tools such as telescopes to collect, analyze, and record information. Students also use computers and information technology tools to support scientific investigations.
- (3) Students examine information on the periodic table to recognize that elements are grouped into families. In addition, students demonstrate that exothermic and endothermic chemical reactions indicate that energy is lost or gained during a chemical reaction. Interactions in matter and energy are explored in solar, weather, and ocean systems. Students identify the origin of waves and investigate their ability to travel through different media.
- (4) Students predict possible outcomes that result from different genetic combinations and explore the extinction of some species.
- (5) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.
- (6) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
- (7) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions build from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.

(b) Knowledge and skills

- (8.1) Scientific processes. The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.
- The student is expected to:
 (A) demonstrate safe practices during field and laboratory investigations; and
 (B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(8.2) Scientific processes. The student uses scientific methods during field and laboratory investigations.

The student is expected to:

- (A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;
- (B) collect information by observing and measuring;
- (C) organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct graphs, tables, and charts using tools including computers to organize, examine, and evaluate information.

(8.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.

The student is expected to:

- (A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
- (B) draw inferences based on data related to promotional material for products and services;
- (C) represent the natural world using models and identify their limitations;
- (D) evaluate the impact or research on scientific thought, society, and the environment; and
- (E) connect Grade 8 science concepts with the history of science and contributions of scientists.

(8.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.

The student is expected to:

- (A) collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, heating apparatuses, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, graphing calculators, field equipment, compasses, computers, computer probes, water test kits, timing devices; and
- (B) extrapolate from collected information to make predictions.

(8.9) Science concepts. The student knows that substances have physical and chemical properties.

The student is expected to:

- (A) demonstrate that substances may react chemically to form new substances; and
- (D) identify that physical and chemical properties that influence the development and application of everyday materials such as cooking surfaces, insulation, adhesives, and plastics.

(8.11) Science concepts. The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms.

The student is expected to:

- (B) make predictions about possible outcomes of genetic combinations of inherited characteristics.