

Fingerprinting

Grades K-1-2-3-4-5-6-7-8

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

LIFE SCIENCE STANDARDS

LEVELS K-4	LEVELS 5-8
Characteristics of organisms	Structure and function in living systems
	Reproduction and heredity

SCIENCE AND TECHNOLOGY STANDARDS

LEVELS K-4	LEVELS 5-8
Abilities to distinguish between natural objects and objects made by humans	Abilities of technological design
Abilities of technological design	Understanding about science and technology
Understanding about science and technology	

SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

LEVELS K-4	LEVELS 5-8
Characteristics and changes in populations	
Science and technology in local challenges	Science and technology in society

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

Kindergarten Science

(a) Introduction.

- (1) In Kindergarten, science introduces the use of simple investigations and fieldwork to help students develop the skills of asking questions, gathering information, communicating findings, and making informed decisions. Using their own senses and common tools such as a hand lens, students make observations and collect information.
 - (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 physical world.
-

(b) Knowledge and skills

- | | |
|--|---|
| <p>(1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.</p> | <p>The student is expected to:</p> <ol style="list-style-type: none">(A) demonstrate safe practices during laboratory investigations and fieldwork; and(B) make wise choices in the use and conservation of resources and the disposal of materials |
| <p>(2) Scientific processes. The student develops abilities necessary to do science inquiry in both the field and the classroom.</p> | <p>The student is expected to:</p> <ol style="list-style-type: none">(A) ask questions about objects and events;(B) plan and conduct simple investigations;(C) gather information using simple equipment and tools to extend the senses;(D) construct reasonable explanations using information; and(E) communicate findings about simple investigations. |
| <p>(3) Scientific processes. The student knows that information and critical thinking are used in making decisions.</p> | <p>The student is expected to:</p> <ol style="list-style-type: none">(A) make decisions using information, and(B) discuss and justify the merits of decisions. |

- | | |
|---|--|
| (4) Scientific processes. The student uses age-appropriate tools and models to verify that objects and parts of objects can be observed, described, and measured. | The student is expected to:
(A) make observations using tools including hand lenses, balances, cups, and bowls, and
(B) identify senses as tools of observation. |
| (5) Science concepts. The student knows that objects have properties and patterns. | The student is expected to:
(A) compare and describe the properties of objects;
(B) observe and identify patterns including seasons, growth, and day and night; and
(C) recognize and copy patterns seen in chart and graphs. |
| (6) Science concepts. The student knows that objects have parts. | The student is expected to:
(A) sort objects according to their parts; and
(C) observe and record parts of animals including wings, feet, heads, and tails. |

Grade 1 Science

(a) Introduction.

- (1) In Grade 1, science introduces the use of simple investigations and fieldwork to help students develop the skills of asking questions, gathering information, making measurements using non-standard units, using tools such as a thermometer, to extend their senses, constructing explanations, and drawing conclusions.
 - (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 physical world.
-

(b) Knowledge and skills

- | | |
|---|---|
| (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices. | The student is expected to:
(A) demonstrate safe practices during laboratory investigations and fieldwork; and
(B) make wise choices in the use and conservation of resources and the disposal of materials |
|---|---|

- | | |
|---|--|
| (2) Scientific processes. The student develops abilities necessary to do science inquiry in both the field and the classroom. | The student is expected to:
(A) ask questions about objects and events;
(B) plan and conduct simple investigations;
(C) gather information using simple equipment and tools to extend the senses;
(D) construct reasonable explanations and draw conclusions; and
(E) communicate findings about simple investigations. |
| (3) Scientific processes. The student knows that information and critical thinking are used in making decisions. | The student is expected to:
(A) make decisions using information, and
(B) discuss and justify the merits of decisions. |
| (4) Scientific processes. The student uses age-appropriate tools and models to verify that objects and parts of objects can be observed, described, and measured. | The student is expected to:
(A) collect information using tools including hand lenses, clocks, computers, thermometers, and balances;
(B) record and compare collected information; and
(C) measure objects and parts of objects, using non-standard units such as paper clips, hands, and pencils. |
| (5) Science concepts. The student knows that objects have properties and patterns. | The student is expected to:
(A) sort objects and events based on properties and patterns; and
(B) identify, predict, and create patterns including those seen in charts, graphs, and numbers. |
| (6) Science concepts. The student knows that objects have parts. | The student is expected to:
(A) sort objects according to their parts and characteristics. |

Grade 2 Science

(a) Introduction.

- (1) In Grade 2, science introduces the use of simple investigations and fieldwork 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.
- (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 physical world.

(b) Knowledge and skills

- | | |
|---|--|
| (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices. | The student is expected to:
(A) demonstrate safe practices during laboratory investigations and fieldwork; and
(B) make wise choices in the use and conservation of resources and the disposal of materials |
| (2) Scientific processes. The student develops abilities necessary to do science inquiry in both the field and the classroom. | The student is expected to:
(A) ask questions about objects and events;
(B) plan and conduct simple 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. |
| (3) Scientific processes. The student knows that information and critical thinking are used in making decisions. | The student is expected to:
(A) make decisions using information, and
(B) discuss and justify the merits of decisions. |
| (4) Scientific processes. The student uses age-appropriate tools and models to verify that objects and parts of objects can be observed, described, and measured. | The student is expected to:
(A) collect information using tools including rulers, meter sticks, measuring cups, clocks, hand lenses, computers, thermometers, and balances; and
(B) measure and compare objects and parts of objects, using standard and non-standard units. |
| (5) Science concepts. The student knows hat objects have properties and patterns. | The student is expected to:
(A) classify and sequence objects and events based on properties and patterns; and
(B) identify, predict, replicate, and create patterns including those seen in charts, graphs, and numbers. |

Grade 3 Science

(a) Introduction.

- (1) In Grade 3, the study of science includes planning and implementing simple laboratory investigations and fieldwork to develop the skills of collecting information using tools such as a microscope, making inferences, communicating conclusions, and making informed decisions.
 - (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 physical world.
-

(b) Knowledge and skills

- (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.

The student is expected to:

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

- (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 equipment and technology;
- (B) collect information by observing and measuring in various ways;
- (C) organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct simple graphs, tables, and charts to organize, examine and evaluate information.

(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 physical world using models and identify their limitations;
- (D) evaluate the impact of research on scientific thought, society, and the environment;
- (E) connect Grade 3 science concepts with careers; and
- (F) connect Grade 3 science concepts with the history of science and contributions of scientists.

(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.

Grade 4 Science

(a) Introduction.

- (1) In Grade 4, the study of science includes planning and implementing laboratory investigations and fieldwork using scientific methods, analyzing information, making informed decisions, and using tools such as compasses and computers to collect and organize information.
- (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 physical world.

(b) Knowledge and skills

(1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.

The student is expected to:

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

(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 equipment and technology;
- (B) collect information by observing and measuring in various ways;
- (C) organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct simple graphs, tables, and charts to organize, examine and evaluate information.

(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 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 physical world using models and identify their limitations;
- (D) evaluate the impact or research on scientific thought, society, and the environment;
- (E) connect Grade 4 science concepts with careers; and
- (F) connect Grade 4 science concepts with the history of science and contributions of scientists.

- | | |
|---|---|
| <p>(4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.</p> | <p>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.</p> |
| <p>(8) Science concepts. The student knows that many likenesses between offspring and parents are inherited or learned.</p> | <p>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.</p> |

Grade 5 Science

(a) Introduction.

- (1) In Grade 5, the study of science includes planning and implementing laboratory investigations and fieldwork using scientific methods, analyzing information, making informed decisions, and using tools such as nets, cameras, and computers to collect and organize information.
 - (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 physical world.
-

(b) Knowledge and skills

- | | |
|--|--|
| <p>(1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.</p> | <p>The student is expected to:
(A) demonstrate safe practices during laboratory investigations and fieldwork; and
(B) make wise choices in the use and conservation of resources and the disposal of materials</p> |
|--|--|

(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 equipment and technology;
- (B) collect information by observing and measuring in various ways;
- (C) organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct simple graphs, tables, and charts to organize, examine, and evaluate information.

(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 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 physical world using models and identify their limitations;
- (D) evaluate the impact of research on scientific thought, society, and the environment;
- (E) connect Grade 5 science concepts with careers; and
- (F) connect Grade 5 science concepts with the history of science and contributions of scientists.

(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.

(9) 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; and
- (B) give examples of learned characteristics that result from the influence of the environment.

Grade 6 Science

(a) Introduction.

- (1) In Grade 6, the study of science includes conducting laboratory investigations and fieldwork 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.
 - (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 physical world.
-

(b) Knowledge and skills

- | | |
|--|---|
| <p>(1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.</p> | <p>The student is expected to:</p> <ol style="list-style-type: none">(A) demonstrate safe practices during laboratory investigations and fieldwork; and(B) make wise choices in the use and conservation of resources and the disposal of materials. |
| <p>(2) Scientific processes. The student uses scientific methods during fieldwork and laboratory investigations.</p> | <p>The student is expected to:</p> <ol style="list-style-type: none">(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;(B) collect information by observing and measuring in various ways;(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 to organize, examine, and evaluate information. |

(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 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 physical world using models and identify their limitations;
- (D) evaluate the impact or research on scientific thought, society, and the environment;
- (E) connect Grade 6 science concepts with careers; and
- (F) connect Grade 6 science concepts with the history of science and contributions of scientists.

(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.

(10) Science concepts. The student knows that traits of organisms are contained in genetic material.

The student is expected to:

- (B) interpret the role of genes in inheritance.

Grade 7 Science

(a) Introduction.

- (1) In Grade 7, the study of science includes conducting laboratory investigations and fieldwork 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.
- (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 living systems in humans to identify the structures and functions of those systems. 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 physical world.
-

(b) Knowledge and skills

- (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.

The student is expected to:

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

- (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 equipment and technology;
- (B) collect information by observing and measuring in various ways;
- (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 to organize, examine, and evaluate information.

- (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 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 physical world using models and identify their limitations;
- (D) evaluate the impact or research on scientific thought, society, and the environment;
- (E) connect Grade 7 science concepts with careers; and
- (F) connect Grade 7 science concepts with the history of science and contributions of scientists.

(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, timing devices, magnets, and compasses; and
- (B) analyze collected information to recognize patterns such as rates of change.

(9) Science concepts. The student knows that traits of organisms are contained in genetic material.

The student is expected to:

- (B) distinguish between dominant and recessive traits and recognize that inherited traits of an individual can be determined by one or many genes.

Grade 8 Science

(a) Introduction.

- (1) In Grade 8, the study of science includes conducting laboratory investigations using scientific methods, analyzing data, critical-thinking, scientific problem-solving, and using tools such as telescopes to collect, analyze, and record information.
 - (4) Grade 8 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 physical world.
-

(b) Knowledge and skills

(1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.

The student is expected to:

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

(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 equipment and technology;
- (B) collect information by observing and measuring in various ways;
- (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 to organize, examine, and evaluate information.

(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 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 physical world using models and identify their limitations;
- (D) evaluate the impact or research on scientific thought, society, and the environment;
- (E) connect Grade 8 science concepts with careers; and
- (F) connect Grade 8 science concepts with the history of science and contributions of scientists.

(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.

(9) Science concepts. The student knows that traits of organisms are contained in genetic material.

The student is expected to:

- (A) distinguish between inherited traits and other characteristics that result from interactions with the environment; and
- (B) make predictions about possible outcomes of genetic combinations of inherited characteristics.