

# Terrarium Habitats

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

### National Science Education Standards

#### SCIENCE AS INQUIRY STANDARDS

| LEVELS K-4                                   | LEVELS 5-8                                   |
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| 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 |
| Organisms and environments   | Regulation and behavior                  |
|                              | Populations and ecosystems               |
|                              | Diversity and adaptations of organisms   |

#### EARTH AND SPACE SCIENCE STANDARDS

| LEVELS K-4                    | LEVELS 5-8                    |
|-------------------------------|-------------------------------|
| Properties of earth materials | Structure of the earth system |

#### SCIENCE AND TECHNOLOGY STANDARDS

| LEVELS K-4                        | LEVELS 5-8                        |
|-----------------------------------|-----------------------------------|
| Abilities of technological design | Abilities of technological design |

#### SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

| LEVELS K-4                                 | LEVELS 5-8                               |
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| Characteristics and changes in populations | Populations, resources, and environments |

# 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.
  - (2) As students learn science skills, they identify component of the natural world including rocks, soil, and water. Students observe the seasons and growth as examples of change. In addition, Kindergarten science includes the identification of objects and their parts. Students learn how to group living and nonliving things and explore the basic needs of living things.
  - (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.
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### (b) Knowledge and skills

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| <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> <ul style="list-style-type: none"><li>(A) demonstrate safe practices during laboratory investigations and fieldwork; and</li><li>(B) make wise choices in the use and conservation of resources and the disposal of materials</li></ul> |
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| (2) Scientific processes. The student develops abilities necessary to do science inquiry in both the field and the classroom.                                     | The student is expected to:<br>(A) ask questions about objects and events;<br>(B) plan and conduct simple investigations;<br>(C) gather information using simple equipment and tools to extend the senses;<br>(D) construct reasonable explanations using information; and<br>(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:<br>(A) make decisions using information, and<br>(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:<br>(A) make observations using tools including hand lenses, balances, cups, and bowls, and<br>(B) identify senses as tools of observation.  |
| (5) Science concepts. The student knows that objects have properties and patterns.  | The student is expected to:<br>(A) compare and describe the properties of objects;<br>(B) observe and identify patterns including seasons, growth, and day and night.   |
| (6) Science concepts. The student knows that objects have parts.  | The student is expected to:<br>(C) observe and record parts of animals including wings, feet, heads, and tails.   |
| (7) Science concepts. The student knows that many types of change occur.  | The student is expected to:<br>(A) observe, describe, and record changes in size, weight, color, position, quantity, sound, and movement.   |
| (8) Science concepts. The student knows the difference between living and nonliving objects.  | The student is expected to:<br>(A) identify a particular object as living or nonliving, and<br>(B) group objects as living or nonliving.  |

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| (9) Science concepts. The student knows that living things have basic needs.                     | The student is expected to:<br>(A) identify examples of how living things meet their basic needs;<br>(B) give examples of how living things depend on each other, and<br>(C) identify ways that the Earth provides resources for life. |
| (10) Science concepts. The student knows that the natural world includes rocks, soil, and water. | The student is expected to:<br>(A) observe and describe properties of rocks, soil, and water; and<br>(B) give examples of ways that rocks, soil, and water are useful.   |

## **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.
  - (2) As students learn science skills, they identify component of the natural world including rocks, soil, and natural resources. Students observe that heat from the sun or friction, is an example of something that causes change. In addition, Grade 1 students identify basic needs of living things, explore ways that living things depend on each other, and group living and nonliving things. Students identify parts that can be put together with other parts to do new things.
  - (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.
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### (b) Knowledge and skills

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| (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.             | The student is expected to:<br>(A) demonstrate safe practices during laboratory investigations and fieldwork; and<br>(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:<br>(A) ask questions about objects and events;<br>(B) plan and conduct simple investigations;<br>(C) gather information using simple equipment and tools to extend the senses;<br>(D) construct reasonable explanations and draw conclusions; and<br>(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:<br>(A) make decisions using information, and<br>(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:<br>(A) collect information using tools including hand lenses, clocks, computers, thermometers, and balances;<br>(B) record and compare collected information.  |
| (5) Science concepts. The student knows that objects have properties and patterns.  | The student is expected to:<br>(A) sort objects and events based on properties and patterns; and<br>(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:<br>(A) sort objects according to their parts and characteristics; and<br>(B) observe and describe the parts of plants and animals.   |
| (7) Science concepts. The student knows that many types of change occur.  | The student is expected to:<br>(A) observe, measure, and record changes in size, weight, color, position, quantity, sound, and movement; and<br>(D) observe and record stages in the life cycle or organisms.  |

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| (8) Science concepts. The student distinguishes between living and nonliving objects.            | The student is expected to:<br>(A) group and compare living objects; and<br>(B) group and compare nonliving objects.   |
| (9) Science concepts. The student knows that living things have basic needs.                     | The student is expected to:<br>(A) identify and describe how living things meet their basic needs;<br>(B) compare and give examples of how living things depend on each other for their basic needs.   |
| (10) Science concepts. The student knows that the natural world includes rocks, soil, and water. | The student is expected to:<br>(A) observe and describe a variety of natural sources of water including streams, lakes, and oceans;<br>(B) observe and describe difference in rocks and soil samples; and<br>(C) identify the importance and uses of natural and human-made materials. |

## **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.
- (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, Grade 2 students identify characteristics of living and nonliving things, 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 physical world.

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(b) Knowledge and skills

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| (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.             | The student is expected to:<br>(A) demonstrate safe practices during laboratory investigations and fieldwork; and<br>(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:<br>(A) ask questions about objects and events;<br>(B) plan and conduct simple investigations<br>(C) compare results of investigations with what students and scientists know about the world;<br>(D) gather information using simple equipment and tools to extend the senses;<br>(E) construct reasonable explanations and draw conclusions using information and prior knowledge; and<br>(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:<br>(A) make decisions using information, and<br>(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:<br>(A) collect information using tools including rulers, meter sticks, measuring cups, clocks, hand lenses, computers, thermometers, and balances; and<br>(B) measure and compare objects and parts of objects, using standard and non-standard units.   |
| (5) Science concepts. The student knows that objects have properties and patterns.  | The student is expected to:<br>(A) classify and sequence objects and events based on properties and patterns; and<br>(B) identify, predict, replicate, and create patterns including those seen in charts, graphs, and numbers.  |

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| (6) Science concepts. The student knows that objects have parts.                                 | The student is expected to:<br>(A) manipulate, predict, and identify parts that, when separated from the whole, may result in the part or the whole not working, such as flashlights without batteries and plants without leaves;<br>(C) observe and record the functions of plant parts; and<br>(D) observe and record the functions of animal parts. |
| (7) Science concepts. The student knows that many types of change occur.                         | The student is expected to:<br>(A) observe, measure, record, analyze, predict, and illustrate changes in size, weight, temperature, color, position, quantity, sound, and movement; and<br>(B) identify, predict, and test ways uses of heat to cause change such as melting and evaporation.  |
| (8) Science concepts. The student distinguishes between living and nonliving objects.            | The student is expected to:<br>(A) identify characteristics of living objects; and<br>(B) identify characteristics of nonliving objects.   |
| (9) Science concepts. The student knows that living things have basic needs.                     | The student is expected to:<br>(A) compare the lifelong needs of plants and animals; and<br>(B) compare and give examples of how living things depend on each other and on their environments.   |
| (10) Science concepts. The student knows that the natural world includes rocks, soil, and water. | The student is expected to:<br>(A) describe and illustrate the water cycle; and<br>(B) identify uses of natural resources.   |

### **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.
- (2) As students learn science skills, they identify the importance of components of the natural world including rocks, soils, water, an atmospheric gases. They observe the

direction and position of objects as they are pushed and pulled, and movement of the Earth's surface as examples of change caused by a force. Grade 3 students investigate magnetism and gravity. In addition, students explore organisms' needs, habitats, competition with other organisms, and their ecosystem.

- (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.
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(b) Knowledge and skills

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| (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices. | The student is expected to:<br>(A) demonstrate safe practices during laboratory investigations and fieldwork;<br>and<br>(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:<br>(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;<br>(B) collect information by observing and measuring in various ways;<br>(C) organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence;<br>(D) communicate valid conclusions; and<br>(E) construct simple graphs, tables, and charts to organize, examine and evaluate information. |

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| <p>(3) Scientific processes. The student knows that information, critical thinking, and scientific problem solving are used in making decisions.</p>               | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(A) analyze, review, and critique hypotheses and theories as to their strengths and weaknesses using scientific evidence and information;</li><li>(B) draw inferences based on information related to promotional material for products and services; and</li><li>(C) represent the physical world using models and identify their limitations.</li></ul> |
| <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:</p> <ul style="list-style-type: none"><li>(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</li><li>(B) demonstrate that repeated investigations may increase the reliability of results.</li></ul>          |
| <p>(5) Science concepts. The student knows that systems exist in the world.</p>  | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(A) observe and identify simple systems such as a sprouted seed and a wooden toy car; and</li><li>(B) observe a simple system and describe the role of various part such as a yo-yo an string.</li></ul>  |
| <p>(7) Science concepts. The student knows that matter has physical properties.</p>  | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(A) gather information about the physical properties of matter including temperature, magnetism, hardness, and weight using appropriate instruments.</li></ul>  |
| <p>(8) Science concepts. The student knows that living organisms need food, water, light, air, a way to dispose of waste, and an environment in which to live.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(A) observe and describe the habitats of organisms within an ecosystem.</li><li>(B) observe and identify organisms with similar needs that compete with one another for resources such as oxygen, water, food, and space; and</li><li>(C) describe environmental changes in which some organisms would relocate, survive, or perish.</li></ul>            |

- (9) Science concepts. The student knows that many likenesses between offspring and parents are inherited from the parents. The student is expected to:
- (A) identify some inherited traits of plants, and
  - (B) identify some inherited traits of animals.
- (10) Science concepts. The student knows that species have different adaptations that help them survive. The student is expected to:
- (A) observe and identify adaptations of various species; and
  - (B) analyze how adaptations help species survive.
- (11) Science concepts. The student knows that the natural world includes rocks, soil, water, and gases of the atmosphere. The student is expected to:
- (A) identify and describe the importance of rocks, soil, water, and gases of the atmosphere in the local area and classify them as renewable, nonrenewable, or inexhaustible; and
  - (B) identify additional record properties of soils such as color and texture, capacity to retain water, and ability to support the growth of plants.

## **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.
- (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, Grade 4 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 physical world.

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(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; and
- (C) represent the physical world using models and identify their limitations.

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| (4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.    | The student is expected to:<br>(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<br>(B) demonstrate that repeated investigations may increase the reliability of results. |
| (5) Science concepts. The student knows that systems exist in the world.   | The student is expected to:<br>(A) identify and describe the roles of some organisms in living systems such as fish in an aquarium and plants in a terrarium, and<br>(B) identify and describe the role of the components in nonliving systems, such as a light bulb in a circuit and stream in a watershed.   |
| (6) Science concepts. The student knows that change can create recognizable patterns.                                | The student is expected to:<br>(A) identify patterns of change such as weather, metamorphosis, and objects in the sky.   |
| (7) Science concepts. The student knows that matter has physical properties.   | The student is expected to:<br>(A) observe and record changes in the states of matter caused by the addition or reduction of heat.   |
| (8) Science concepts. The student knows that many likenesses between offspring and parents are inherited or learned. | The student is expected to:<br>(A) distinguish between inherited traits and learned characteristics; and<br>(B) identify and provide examples of inherited traits and learned characteristics.   |
| (9) Science concepts. The student knows that adaptations may increase the survival of members of a species.          | The student is expected to:<br>(A) compare adaptations of various species.   |
| (11) Science concepts. The student knows structures and functions of Earth systems.                                  | The student is expected to:<br>(A) test properties of soils including texture, capacity to retain water, and ability to support life.  |

## **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.
  - (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. Grade 5 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 physical world.
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(b) Knowledge and skills

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| <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> <p>(A) demonstrate safe practices during laboratory investigations and fieldwork; and</p> <p>(B) make wise choices in the use and conservation of resources and the disposal of materials</p> |
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(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; and
- (C) represent the physical world using models and identify their limitations.

(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) Science concepts. The student knows that systems may not work if some of their components are removed.

The student is expected to:

- (A) observe and describe the effects of removing a component from a biological or non-biological system such as the removal of a predator from an ecosystem or a wheel from a skateboard; and
- (B) predict and draw conclusions about what happens to a system when it is modified.

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| (6) Science concepts. The student knows that some change occurs in cycles.                                       | The student is expected to:<br>(A) identify events and describe changes that occur on a regular basis such as in daily, weekly, an seasonal cycles; and<br>(B) identify the significance of the water, carbon, and nitrogen cycles.  |
| (7) Science concepts. The student knows that matter has physical properties.                                     | The student is expected to:<br>(A) classify matter based on its physical properties including magnetism, physical sate, and the ability to conduct or insulate heat, electricity, and sound.   |
| (9) Science concepts. The student knows that likenesses between offspring an parent can be inherited or learned. | The student is expected to:<br>(A) identify traits that are inherited from parent to offspring in plants and animals; and<br>(B) give examples of learned characteristics that result from the influence of the environment.   |
| (10) Science concepts. The student knows that adaptations may increase the survival of members of a species.     | The student is expected to:<br>(A) analyze and describe an organism's niche within an ecosystem;<br>(B) compare the adaptations of organisms hat improve their ability to survive in an ecosystem; and<br>(C) predict the adaptation required for survival by an organism in an ecosystem. |
| (11) Science concepts. The student knows that certain past events affect present and future events.              | The student is expected to:<br>(A) identify and observe actions that require time for changes to be measurable, including growth, erosion, dissolving, weathering, an flow.  |

## 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.
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### (b) Knowledge and skills

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

(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.

(11) Science concepts. The students knows that the responses of organisms are caused by internal or external stimuli.

The student is expected to:

- (B) identify responses in organisms due to external stimuli such as the presence or absence of heat or light.

## **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.

- (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.
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(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; and
- (C) represent the physical world using models and identify their limitations.

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| <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:</p> <ul style="list-style-type: none"><li>(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</li><li>(B) analyze collected information to recognize patterns such as rates of change.</li></ul> |
| <p>(5) Science concepts. The student knows that there is a relationship between force and motion.</p>                        | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(C) relate forces to basic processes in living organisms including the flow of blood and the emergence of seedlings.</li></ul>  |
| <p>(8) Science concepts. The student knows the relationship between structure and function in living systems.</p>            | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(A) determine that all organisms are composed of cells which carry on functions needed to sustain life.</li></ul>   |
| <p>(10) Science concepts. The students knows that the responses of organisms are caused by internal or external stimuli.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(B) observe and identify changes in organisms resulting from external stimuli such as an earthworm being touched or a plant responding to light.</li></ul>  |
| <p>(11) Science concepts. The students knows that there is a relationship between organisms and the environment.</p>         | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(A) identify components of an ecosystem;</li><li>(B) observe and describe how organisms including producers, consumers, and decomposers live together in an environment and use existing resources;</li><li>(C) describe how different environments support different varieties of organisms; and</li><li>(D) observe and describe the role of ecological succession in ecosystems.</li></ul>   |

## **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.
  - (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.
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(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; and
- (C) represent the physical world using models and identify their limitations.

(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) Science concepts. The student knows the relationship between structure and function in living systems.

The student is expected to:

- (C) describe interactions within ecosystems.