

Buzzing a Hive

Grades K-1-2-3

National Science Education Standards

SCIENCE AS INQUIRY STANDARDS

LEVELS K-4

Abilities necessary to do scientific inquiry

Understanding about scientific inquiry

PHYSICAL SCIENCE STANDARDS

LEVELS K-4

Properties of objects and materials

Position and motion of objects

LIFE SCIENCE STANDARDS

LEVELS K-4

Characteristics of organisms

Life cycles of organisms

Organisms and environments

SCIENCE AND TECHNOLOGY STANDARDS

LEVELS K-4

Abilities to distinguish between natural objects and objects made by humans

Abilities of technological design

HISTORY AND NATURE OF SCIENCE STANDARDS

LEVELS K-4

Science as a human endeavor

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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| (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 using information; 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) make observations using tools including hand lenses, balances, cups, and bowls, and
(B) identify senses as tools of observation. |

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| (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; 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. |
| (7) Science concepts. The student knows that many types of change occur. | The student is expected to:
(A) observe, describe, and record changes in size, weight, color, position, quantity, sound, and movement; and
(D) observe and record stages in the life cycle or organisms. |
| (8) Science concepts. The student knows the difference between living and nonliving objects. | The student is expected to:
(A) identify a particular object as living or nonliving, and
(B) group objects as living or nonliving. |
| (9) Science concepts. The student knows that living things have basic needs. | The student is expected to:
(A) identify examples of how living things meet their basic needs;
(B) give examples of how living things depend on each other, and
(C) identify ways that the Earth provides resources for live. |

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 an 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:
(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. |
| (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; and
(B) observe and describe the parts of plants and animals. |

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| (7) Science concepts. The student knows that many types of change occur. | The student is expected to:
(A) observe, measure, and record changes in size, weight, color, position, quantity, sound, and movement; and
(D) observe and record stages in the life cycle or organisms. |
| (8) Science concepts. The student distinguishes between living and nonliving objects. | The student is expected to:
(A) group and compare living objects; and
(B) group and compare nonliving objects. |
| (9) Science concepts. The student knows that living things have basic needs. | The student is expected to:
(A) identify and describe how living things meet their basic needs;
(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:
(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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| <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> |
| <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:
(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.</p> |
| <p>(3) Scientific processes. The student knows that information and critical thinking are used in making decisions.</p> | <p>The student is expected to:
(A) make decisions using information, and
(B) discuss and justify the merits of decisions.</p> |
| <p>(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.</p> | <p>The student is expected to:
(A) collect information using tools including rulers, meter sticks, measuring cups, clocks, hand lenses, computers, thermometers, and balances.</p> |
| <p>(5) Science concepts. The student knows hat objects have properties and patterns.</p> | <p>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.</p> |
| <p>(6) Science concepts. The student knows that objects have parts.</p> | <p>The student is expected to:
(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;
(C) observe and record the functions of plant parts; and
(D) observe and record the functions of animal parts.</p> |

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| (7) Science concepts. The student knows that many types of change occur. | The student is expected to:
(A) observe, measure, record, analyze, predict, and illustrate changes in size, weight, temperature, color, position, quantity, sound, and movement. |
| (8) Science concepts. The student distinguishes between living and nonliving objects. | The student is expected to:
(A) identify characteristics of living objects; and
(B) identify characteristics of nonliving objects. |
| (9) Science concepts. The student knows that living things have basic needs. | The student is expected to:
(A) compare the lifelong needs of plants and animals; and
(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:
(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, and 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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| <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> |
| <p>(2) Scientific processes. The student uses scientific methods during fieldwork and laboratory investigations.</p> | <p>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.</p> |
| <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:
(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;
(E) connect Grade 3 science concepts with careers.</p> |
| <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, 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.</p> |
| <p>(5) Science concepts. The student knows that systems exist in the world.</p> | <p>The student is expected to:
(A) observe and identify simple systems such as a sprouted seed and a wooden toy car; and
(B) observe a simple system and describe the role of various part such as a yo-yo an string.</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.

The student is expected to:

- (A) observe and describe the habitats of organisms within an ecosystem;
- (B) observe and identify organisms with similar needs that compete with one another for resources such as oxygen, water, food, an space; and
- (C) describe environmental changes in which some organisms would relocate, survive, or perish.

(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:

- (B) identify add record properties of soils such as color and texture, capacity to retain water, and ability to support the growth of plants.