

# Build It! Festival

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

### National Science Education Standards

#### UNIFYING CONCEPTS AND PROCESSES STANDARDS

- System, order, and organization
- Evidence, models, and explanation
- Change, constancy, and measurement
- Evolution and equilibrium
- Form and function

#### SCIENCE AS INQUIRY STANDARDS

##### LEVELS K-4

Abilities necessary to do scientific inquiry  
Understanding about scientific inquiry

##### LEVELS 5-8

Abilities necessary to do scientific inquiry  
Understanding about scientific inquiry

#### PHYSICAL SCIENCE STANDARDS

##### LEVELS K-4

Properties of objects and materials

##### LEVELS 5-8

Properties and changes of properties in matter

#### SCIENCE AND TECHNOLOGY STANDARDS

##### LEVELS K-4

Abilities of technological design  
Understanding about science and technology

##### LEVELS 5-8

Abilities of technological design  
Understanding about science and technology

#### SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

##### LEVELS K-4

Science and technology in local challenges

##### LEVELS 5-8

Science and technology in society

### 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:<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 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.  |

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| (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; and<br>(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:<br>(A) sort objects according to their parts; and<br>(E) manipulate parts of objects such as toys, vehicles, or construction sets that, when put together, can do things they cannot do by themselves.     |
| (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.  |

## **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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| <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:<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</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:<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.</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:<br/>(A) make decisions using information, and<br/>(B) discuss and justify the merits of decisions.</p>  |
| <p>(5) Science concepts. The student knows that objects have properties and patterns.</p>  | <p>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.</p>   |
| <p>(6) Science concepts. The student knows that objects have parts.</p>  | <p>The student is expected to:<br/>(A) sort objects according to their parts and characteristics;<br/>(C) manipulate parts of objects such as toys, vehicles, or construction sets that, when separated from the whole, may result in the part or the whole not working; and,<br/>(D) identify parts that, when put together, can do things they cannot do by themselves, such as a working a camera with film, a car moving with a motor, and an airplane flying with fuel.</p> |
| <p>(7) Science concepts. The student knows that many types of change occur.</p>  | <p>The student is expected to:<br/>(A) observe, measure, and record changes in size, weight, color, position, quantity, sound, and movement.</p>   |
| <p>(10) Science concepts. The student knows that the natural world includes rocks, soil, and water.</p>  | <p>The student is expected to:<br/>(C) identify the importance and uses of natural and human-made materials.</p>   |

## 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.
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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>  |
| <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> <ul style="list-style-type: none"><li>(A) ask questions about objects and events;</li><li>(B) plan and conduct simple investigations</li><li>(C) compare results of investigations with what students and scientists know about the world;</li><li>(D) gather information using simple equipment and tools to extend the senses; and</li><li>(F) communicate findings about simple investigations.</li></ul> |
| <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> <ul style="list-style-type: none"><li>(A) make decisions using information, and</li><li>(B) discuss and justify the merits of decisions.</li></ul>   |

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| (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.  |
| (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; and<br>(B) manipulate, predict, and identify parts that, when put together, can do things they cannot do by themselves, such as a guitar and guitar strings. |
| (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.  |

### **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.

(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; and
- (D) communicate valid conclusions.

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

(5) Science concepts. The student knows that systems exist in the world.

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 parts such as a yo-yo and string.

(6) Science concepts. The student knows that forces cause change.

The student is expected to:

- (A) measure and record changes in the position an direction of motion of an object to which a force such as a push or pull has been applied.

## 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

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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>   |
| <p>(2) Scientific processes. The student uses scientific methods during fieldwork and laboratory investigations.</p>   | <p>The student is expected to:</p> <ul style="list-style-type: none"><li>(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;</li><li>(B) collect information by observing and measuring in various ways;</li><li>(C) organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence; and</li><li>(D) communicate valid conclusions.</li></ul> |

(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.

(7) Science concepts. The student knows that matter has physical properties.

The student is expected to:

- (B) conduct tests, compare data, and draw conclusions about physical properties of matter including states of matter, conduction, and buoyancy.

## 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.
- (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; and
- (D) communicate valid conclusions.

(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.

## 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.
  - (3) In addition, Grade 6 students identify changes in objects including position, direction, and speed when acted upon by a force. Students classify substances by their chemical properties and identify the water cycle and decay of biomass as examples of the interactions between matter and energy.
  - (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; and
- (D) communicate valid conclusions.

(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.