

# On Sandy Shores

## Grades 2-3-4

### 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

Light, heat, electricity, and magnetism

#### LIFE SCIENCE STANDARDS

##### LEVELS K-4

Characteristics of organisms

Organisms and environments

#### EARTH AND SPACE SCIENCE STANDARDS

##### LEVELS K-4

Properties of earth materials

Changes in earth and sky

#### SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

##### LEVELS K-4

Types of resources

Changes in environments

Science and technology in local challenges

# Texas Essential Knowledge and Skills

## 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:</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) 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.   |
| (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>(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.  |

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| (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>(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.

(b) Knowledge and skills

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

The student is expected to:

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

(2) Scientific processes. The student uses scientific methods during fieldwork and laboratory investigations.

The student is expected to:

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

(3) Scientific processes. The student knows that information, critical thinking, and scientific problem solving are used in making decisions.

The student is expected to:

- (A) analyze, review, and critique hypotheses and theories as to their strengths and weaknesses using scientific evidence and information;
- (B) draw inferences based on information related to promotional material for products and services; 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, 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.

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| (5) Science concepts. The student knows that systems exist in the world.  | The student is expected to:<br>(A) observe and identify simple systems such as a sprouted seed and a wooden toy car; and<br>(B) observe a simple system and describe the role of various part such as a yo-yo an string.   |
| (6) Science concepts. The student knows that forces cause change.   | The student is expected to:<br>(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; and<br>(B) identify that forces such as in earthquakes and movement of glaciers can change the surface of the Earth.   |
| (7) Science concepts. The student knows that matter has physical properties.  | The student is expected to:<br>(A) gather information about the physical properties of matter including temperature, magnetism, hardness, and weight using appropriate instruments; and<br>(B) identify matter as liquids, solids, and gases.  |
| (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:<br>(A) observe and describe the habitats of organisms within an ecosystem;<br>(B) observe and identify organisms with similar needs that compete with one another for resources such as oxygen, water, food, an space; and<br>(C) describe environmental changes in which some organisms would relocate, survive, or perish. |
| (10) Science concepts. The student knows that species have different adaptations that help them survive.  | The student is expected to:<br>(A) observe and identify adaptations of various species; and<br>(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 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.

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

The student is expected to:

- (A) collect and analyze information using tools including calculators, safety goggles, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, meter sticks, timing devices, balances, and compasses; and
- (B) demonstrate that repeated investigations may increase the reliability of results.

- (5) Science concepts. The student knows that systems exist in the world. The student is expected to:  
(A) identify and describe the roles of some organisms in living systems such as fish in an aquarium and plants in a terrarium, and  
(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:  
(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:  
(A) observe and record changes in the states of matter caused by the addition or reduction of heat; and  
(B) conduct tests, compare data, and draw conclusions about physical properties of matter including states of matter, conduction, and buoyancy.
- (9) Science concepts. The student knows that adaptations may increase the survival of members of a species. The student is expected to:  
(A) compare adaptations of various species; and  
(B) gather information to identify the diversity of organisms that lived in the past.
- (10) Science concepts. The student knows that certain past events affect present and future events. The student is expected to:  
(A) identify and observe effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering, and flow.
- (11) Science concepts. The student knows structures and functions of Earth systems. The student is expected to:  
(A) test properties of soils including texture, capacity to retain water, and ability to support life; and  
(B) summarize the effects of the oceans on land.