

Mapping Fish Habitats

Grades 6-7-8-9-10

National Science Education Standards

SCIENCE AS INQUIRY STANDARDS

LEVELS 5-8	LEVELS 9-12
Abilities necessary to do scientific inquiry	Abilities necessary to do scientific inquiry
Understanding about scientific inquiry	Understanding about scientific inquiry

LIFE SCIENCE STANDARDS

LEVELS 5-8	LEVELS 9-12
Regulation and behavior	Interdependence of organisms
Populations and ecosystems	Matter, energy, and organization in living systems
Diversity and adaptations of organisms	Behavior of organisms

SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

LEVELS 5-8	LEVELS 9-12
Populations, resources, and environments	Population growth
	Environmental quality

Texas Essential Knowledge and Skills

Grade 6 Science

(a) Introduction.

- (1) In Grade 6, the study of science includes conducting laboratory investigations and fieldwork using scientific methods, analyzing information, making informed decisions, and using tools such as beakers, test tubes and spring scales to collect, analyze, and record information.
- (4) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.
- (5) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.

(6) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions build from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the physical world.

(b) Knowledge and skills

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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 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:
(C) represent the physical world using models and identify their limitations; and
(D) evaluate the impact or research on scientific thought, society, and the environment. |
| (4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry. | The student is expected to:
(A) collect, analyze, and record information using tools including beakers, petri dishes, metric-meter sticks, graduated cylinders, weather instruments, timing devices, heating apparatuses, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers, and computer probes; and
(B) identify patterns in collected information using percent, average, range, and frequency. |

- (11) Science concepts. The students knows that the responses of organisms are caused by internal or external stimuli. The student is expected to:
- (A) identify responses to internal stimuli such as hunger or thirst; and
 - (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.
 - (2) As students learn science skills, they identify gravity and phases of the moon as components of the solar system and explore the effects of events such as hurricanes on the Earth. Students use pulleys and levers to understand the relationship between force and motion. Students then relate the concept to processes in the human organism such as the movement of blood. In addition, Grade 7 students study chemical and physical properties of substances, examine the tarnishing of metal or burning of wood as example of chemical processes, and identify physical properties used to place elements on the periodic table.
 - (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:

- (C) represent the physical world using models and identify their limitations; and
- (D) evaluate the impact or research on scientific thought, society, and the environment.

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

The student is expected to:

- (A) collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, heating apparatuses, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, graphing calculators, field equipment, compasses, computers, computer probes, timing devices, magnets, and compasses; and
- (B) analyze collected information to recognize patterns such as rates of change.

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

The student is expected to:

- (A) analyze changes in organisms such as a fever or vomiting that may result from internal stimuli; and
- (B) observe and identify changes in organisms resulting from external stimuli such as an earthworm being touched or a pant responding to light.

(11) Science concepts. The students knows that there is a relationship between organisms and the environment.

The student is expected to:

- (A) identify components of an ecosystem;
- (B) observe and describe how organisms including producers, consumers, and decomposers live together in an environment and use existing resources; and
- (C) describe how different environments support different varieties of organisms.

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

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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 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:
(C) represent the physical world using models and identify their limitations; and
(D) evaluate the impact or research on scientific thought, society, and the environment. |

(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.

(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.

Biology

(b) Introduction.

(1) In Biology, students conduct laboratory investigations and fieldwork, use scientific methods during investigations, and make informed decisions using, critical-thinking and scientific problem-solving. Students in Biology study a variety of topics that include: structures and functions of cells and viruses, growth and development of organisms; cells, tissues, organs, nucleic acids, and genetics; biological evolution; taxonomy, metabolism and energy transfers in living organisms; living systems; homeostasis; ecosystems; and plants and the environment.

(2) 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.

(3) 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.

(4) 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.

(c) Knowledge and skills

(1) Scientific processes. The student , for at least 40% of instructional time, conducts 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.

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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; 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:
(C) represent the physical world using models and identify their limitations; and
(E) evaluate models according to their adequacy in representing biological objects or events. |
| (11) Science concepts. The student knows that organisms maintain homeostasis. | The student is expected to:
(B) investigate and identify how organisms, including humans, respond to external stimuli;
(C) analyze the importance of nutrition, environmental conditions, and physical exercise on health; and
(D) summarize the role of microorganisms in maintaining and disrupting equilibrium including diseases in plant and animals and decay in an ecosystem. |
| (12) Science concepts. The student knows that interdependence and interactions occur within an ecosystem. | The student is expected to:
(A) analyze the flow of energy through various cycles including the carbon, oxygen, nitrogen,, and water cycles;
(B) interpret interactions among organisms exhibiting predation, parasitism, commensalism, and mutualism. |

Environmental Systems

(b) Introduction.

- (1) In Environmental Systems, students conduct laboratory investigations and fieldwork, use scientific methods during investigations, and make informed decisions using, critical thinking and scientific problem-solving. Students in Environmental Systems study a variety of topics that include: biotic and abiotic factors in habitats; ecosystems and biomes; interrelationships among resources and an environmental system; sources and flow of energy through an environmental system; relationships between carrying capacity and changes in populations and ecosystems; and changes in environments.
- (2) 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.
- (3) 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.

- (4) 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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(c) Knowledge and skills

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| (1) Scientific processes. The student, for at least 40% of instructional time, conducts 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:
(C) evaluate the impact of research on scientific thought, society, and the environment. |
| (4) Science concepts. The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes. | The student is expected to:
(B) make observations and compile data about fluctuations in abiotic cycles and evaluate the effects of abiotic factors on local ecosystems and biomes. |

Aquatic Science

(b) Introduction.

- (1) In Aquatic Science, students conduct laboratory investigations and fieldwork, use scientific methods during investigations, and make informed decisions using, critical thinking and scientific problem-solving. Students in Aquatic Science study a variety of topics that include: components of an aquatic ecosystem; relationships among aquatic habitats and ecosystems; roles of cycles within an aquatic environment; adaptations of aquatic organism; changes within aquatic environments, geological phenomena an fluid dynamics affects; and origin and use of water in a watershed.

- (2) 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.
- (3) 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.
- (4) 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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(c) Knowledge and skills

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| <p>(1) Scientific processes. The student , for at least 40% of instructional time, conducts 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">(A) demonstrate safe practices during laboratory investigations and fieldwork; and(B) make wise choices in the use and conservation of resources and the disposal of materials. |
| <p>(2) Scientific processes. The student uses scientific methods during fieldwork and laboratory investigations.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none">(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;(B) collect information by observing and measuring in various ways;(C) express and manipulate quantities using mathematical procedures such as dimensional analysis, scientific notation, and significant figures;(D) organize, analyze, evaluate, make inferences, and predict trends from data; and(E) communicate valid conclusions. |
| <p>(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.</p> | <p>The student is expected to:</p> <ul style="list-style-type: none">(C) evaluate the impact of research on scientific thought, society, and the environment. |

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| (4) Science concepts. The student knows the components of aquatic ecosystems. | The student is expected to:
(B) research and identify biological, chemical, geological, and physical component of an aquatic ecosystem; and
(C) collect and analyze baseline quantitative data such as pH, salinity, temperature, mineral content, nitrogen compounds, and turbidity from an aquatic environment. |
| (5) Science concepts. The student knows the relationships within and among the aquatic habitats and ecosystems in an aquatic environment. | The student is expected to:
(A) observe and compile data over a period of time from an established aquatic habitat documenting seasonal changes and the behavior of organisms; and
(D) evaluate trends in data to determine the factors that impact aquatic ecosystems. |
| (6) Science concepts. The student knows the roles of cycles in an aquatic environment. | The student is expected to:
(A) identify the role of various cycles such as carbon, nitrogen, water, and nutrients, in an aquatic environment. |
| (7) Science concepts. The student knows environmental adaptations of aquatic organisms. | The student is expected to:
(C) predict adaptations of an organism prompted by environmental changes. |
| (8) Science concepts. The student knows that aquatic environments change. | The student is expected to:
(A) predict effects of chemical, organic, physical, and thermal changes on the living and nonliving components of an aquatic ecosystem. |