

Paper Towel Testing

Grades 5-6-7-8-9

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

PHYSICAL SCIENCE STANDARDS

LEVELS 5-8	LEVELS 9-12
Properties and changes of properties in matter	Structure and properties of matter
Motion and forces	Motions and forces

SCIENCE AND TECHNOLOGY STANDARDS

LEVELS 5-8	LEVELS 9-12
Abilities of technological design	Abilities of technological design
Understanding about science and technology	Understanding about science and technology

SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

LEVELS 5-8	LEVELS 9-12
Science and technology in society	Science and technology in local, national, and global challenges

HISTORY AND NATURE OF SCIENCE STANDARDS

LEVELS 5-8	LEVELS 9-12
Science as a human endeavor	Science as a human endeavor
Nature of science	Nature of scientific knowledge

Texas Essential Knowledge and Skills

Grade 5 Science

(a) Introduction.

- (1) In Grade 5, the study of science includes planning and implementing laboratory investigations and fieldwork using scientific methods, analyzing information, making informed decisions, and using tools such as nets, cameras, and computers to collect and organize information.
 - (2) As students learn science skills, they identify structures and functions of Earth systems including the crust, mantle, and core and the effect of weathering on landforms. Students learn that growth, erosion, and dissolving are examples of how some past events have affected present events. Grade 5 students learn about magnetism, physical states of matter, and conductivity as properties that are used to classify matter. In addition, students learn that light, heat, electricity, and magnetism are all forms of energy.
 - (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

- | | |
|--|--|
| <p>(1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices.</p> | <p>The student is expected to:</p> <p>(A) demonstrate safe practices during laboratory investigations and fieldwork; and</p> <p>(B) make wise choices in the use and conservation of resources and the disposal of materials</p> |
| <p>(2) Scientific processes. The student uses</p> | <p>The student is expected to:</p> |

scientific methods during fieldwork and laboratory investigations.

- (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;
 - (C) represent the physical world using models and identify their limitations;
 - (D) evaluate the impact or research on scientific thought, society, and the environment; and
 - (F) connect Grade 5 science concepts with the history of science and contributions of scientists.

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

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

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

- The student is expected to:
- (A) classify matter based on its physical properties including magnetism, physical

sate, and the ability to conduct or insulate heat, electricity, and sound.

- (11) Science concepts. The student knows that certain past events affect present and future events. The student is expected to:
- (A) identify and observe actions that require time for changes to be measurable, including growth, erosion, dissolving, weathering, an flow.

Grade 6 Science

(a) Introduction.

- (1) In Grade 6, the study of science includes conducting laboratory investigations and fieldwork using scientific methods, analyzing information, making informed decisions, and using tools such as beakers, test tubes and spring scales to collect, analyze, and record information.
 - (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 ad 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.
-

(b) Knowledge and skills

- (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate, and ethical practices. The student is expected to:
- (A) demonstrate safe practices during laboratory investigations and fieldwork; and
 - (B) make wise choices in the use and conservation of resources and the disposal

of materials.

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

The student is expected to:

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

(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.

The student is expected to:

- (A) analyze, review, and critique hypotheses and theories as to their strengths and weaknesses using scientific evidence and information;
- (B) draw inferences based on information related to promotional material for products and services;
- (C) represent the physical world using models and identify their limitations;
- (D) evaluate the impact or research on scientific thought, society, and the environment; and
- (F) connect Grade 6 science concepts with the history of science and contributions of scientists.

(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.

- (5) Science concepts. The student knows that there is a relationship between force and motion.
- The student is expected to:
(A) identify and describe the changes in position, direction of motion, and speed of an object when acted upon by force;

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.
-

(b) Knowledge and skills

- (1) Scientific processes. The student conduct laboratory investigations and fieldwork using safe, environmentally appropriate,
- The student is expected to:
(A) demonstrate safe practices during laboratory investigations and fieldwork;

and ethical practices.

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

(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.

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

and

(B) make wise choices in the use and conservation of resources and the disposal of materials.

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.

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;
- (D) evaluate the impact or research on scientific thought, society, and the environment; and
- (F) connect Grade 7 science concepts with the history of science and contributions of scientists.

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.

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.
-

(b) Knowledge and skills

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

The student is expected to:

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

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

The student is expected to:

- (A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;

- (B) collect information by observing and measuring in various ways;
- (C) organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct graphs, tables, and charts to organize, examine, and evaluate information.
- (3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions.
- The student is expected to:
- (A) analyze, review, and critique hypotheses and theories as to their strengths and weaknesses using scientific evidence and information;
- (B) draw inferences based on information related to promotional material for products and services;
- (C) represent the physical world using models and identify their limitations;
- (D) evaluate the impact or research on scientific thought, society, and the environment; and
- (F) connect Grade 8 science concepts with the history of science and contributions of scientists.
- (4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.
- The student is expected to:
- (A) collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, heating apparatuses, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, graphing calculators, field equipment, compasses, computers, computer probes, water test kits,, timing devices; and
- (B) extrapolate from collected information to make predictions.
- (6) Science concepts. The student knows that substances have physical and chemical properties.
- The student is expected to:
- (D) identify that physical and chemical properties that influence the development and application of everyday materials such

as cooking surface, insulation, adhesives,
and plastics.

Integrated Physics and Chemistry

(b) Introduction.

- (1) In Integrated Physics and Chemistry, students conduct laboratory investigations and fieldwork, use scientific methods during investigations, and make informed decisions using, critical-thinking and scientific problem-solving. This course integrates the disciplines of physics and chemistry in the following topics: motion, waves, energy transformations, properties of matter, changes in matter, and solution chemistry.
 - (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.

(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;
- (C) represent the physical world using models and identify their limitations; and
- (E) research and describe the history of physics, chemistry, and contributions of scientists.