

# Global Warming

## Grades 7-8-9-10

### National Science Education Standards

#### **SCIENCE AS INQUIRY STANDARDS**

<b>LEVELS 5-8</b>	<b>LEVELS 9-12</b>
Abilities necessary to do scientific inquiry	Abilities necessary to do scientific inquiry
Understanding about scientific inquiry	Understanding about scientific inquiry

#### **PHYSICAL SCIENCE STANDARDS**

<b>LEVELS 5-8</b>	<b>LEVELS 9-12</b>
Properties and changes of properties in matter	Structure and properties of matter
Transfer of energy	Chemical reactions
	Conservation of energy and increase in disorder
	Interactions of energy and matter

#### **LIFE SCIENCE STANDARDS**

<b>LEVELS 5-8</b>	<b>LEVELS 9-12</b>
Populations and ecosystems	Matter, energy, and organization in living systems

#### **EARTH AND SPACE SCIENCE STANDARDS**

<b>LEVELS 5-8</b>	<b>LEVELS 9-12</b>
Structure of the earth system	Energy in the earth system

#### **SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES**

<b>LEVELS 5-8</b>	<b>LEVELS 9-12</b>
Risks and benefits	Environmental quality
Science and technology in society	Science and technology in local, national, and global challenges

#### **HISTORY AND NATURE OF SCIENCE STANDARDS**

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

# Texas Essential Knowledge and Skills

## 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:

- (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 of research on scientific thought, society, and the environment; and
- (E) connect Grade 7 science concepts with careers.

(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.

(6) Science concepts. The student knows that substances have physical and chemical properties.

The student is expected to:

- (A) identify and demonstrate everyday examples of chemical phenomena such as rusting and tarnishing of metals and burning of wood.

- (13) Science concepts. The student knows that natural events and human activity can alter Earth systems. The student is expected to:
- (C) make inferences and draw conclusion about effects of human activity on Earth's renewable, non-renewable, and inexhaustible resources.

## 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.
  - (2) As students learn science skills, they identify the roles of both human activities and natural events in altering Earth systems. Students learn that stars and galaxies are part of the universe, identify light years as a way to describe distance, and learn about scientific theories of the origin of the universe. Cycles within Earth systems are studied as students learn about lunar cycles and the rock cycle.
  - (3) Students examine information on the periodic table to recognize that elements are grouped into families. In addition, students demonstrate that exothermic and endothermic chemical reactions indicate that energy is lost or gained during a chemical reaction. Matter and energy are explored through the interactions in solar, weather, and ocean systems. Students identify the origin of waves and investigate their ability to travel through different media.
  - (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

- (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
- (E) connect Grade 8 science concepts with careers.

(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.

(5) Science concepts. The student knows that there is a relationship between force and motion.

The student is expected to:

- (B) recognize that waves are generated and can travel through different media.

(6) Science concepts. The student knows that substances have physical and chemical properties.

The student is expected to:

- (A) demonstrate that substances may react chemically to form new substances.

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| (7) Science concepts. The student knows that complex interactions occur between matter and energy.         | The student is expected to:<br>(A) describe interactions within solar, weather, and ocean systems.                  |
| (10) Science concepts. The students knows that cycles exist in Earth systems.                              | The student is expected to:<br>(C) predict the results of modifying the Earth's nitrogen, water, and carbon cycles. |
| (12) Science concepts. The student knows that natural events and human activities can alter Earth systems. | The student is expected to:<br>(C) describe how human activities have modified soil, water, and air quality.        |

### **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.
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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:<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. |
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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:

- (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
- (D) describe connections between physics and chemistry, and future careers.

(5) Science concepts. The student knows the effects of waves on everyday life.

The student is expected to:

- (B) demonstrate wave interactions including interference, polarization, reflection, refraction, and resonance within various materials.

(6) Science concepts. The student knows the impact of energy transformations in everyday life.

The student is expected to:

- (A) investigate and demonstrate the movement of heat through solids, liquids, and gases by convection, conduction, and radiation; and
- (F) analyze the effects of heating and cooling processes in systems such as weather, living, and mechanical.

(8) Science concepts. The student knows that changes in matter affect everyday life.

The student is expected to:

- (E) research and describe the environmental and economic impact of the end-products of chemical reactions.

## 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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| <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> <ol 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></ol>  |
| <p>(2) Scientific processes. The student uses scientific methods during fieldwork and laboratory investigations.</p>   | <p>The student is expected to:</p> <ol 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></ol> |

(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) make responsible choices in selecting everyday products and services using scientific information;
- (C) evaluate the impact of research on scientific thought, society, and the environment; and
- (D) describe connections between environmental science and future careers.

(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;
- (C) evaluate the impact of human activity such as methods of pest control, hydroponics, organic gardening, or farming on ecosystems;

(5) Science concepts. The student knows the interrelationships among the resources within the local environmental system.

The student is expected to:

- (A) summarize methods of land use and management;
- (C) document the use and conservation of both renewable and non-renewable resources;
- (E) analyze and evaluate the economic significance and interdependence of components of the environmental system; and
- (F) evaluate the impact of human activity and technology on land fertility and aquatic viability.

(7) Science concepts. The student knows the relationship between carrying capacity and changes in populations and ecosystems.

The student is expected to:

- (A) relate carrying capacity to population dynamics;
- (C) evaluate the depletion of non-renewable resources and propose alternatives; and
- (D) analyze and make predictions about the impact on populations of geographic locales, natural events, diseases, and birth and death rates.

(8) Science concepts. The student knows that environments change.

The student is expected to:

- (A) analyze and describe the effects on environments of events such as fires, hurricanes, deforestation, mining, population growth, and municipal development;
- (B) explain how regional changes in the environment may have a global effect,
- (C) describe how communities have restored an ecosystem; and
- (D) examine and describe a habitat restoration or protection program.

## **Chemistry**

(b) Introduction.

- (1) In Chemistry, students conduct laboratory investigations and fieldwork, use scientific methods during investigations, and make informed decisions using, critical thinking and scientific problem-solving. Chemistry students study a variety of topics that include: characteristics of matter, energy transformations during physical and chemical changes; atomic structure; periodic table of elements; behavior of gases; bonding; nuclear fusion and nuclear fission; oxidation-reduction reactions chemical equations; solutes; properties of solutions; acids and bases; and chemical reactions. Students will investigate how chemistry is an integral part of our daily lives.
  - (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

(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) express and manipulate chemical quantities using scientific conventions 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.

(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) make responsible choices in selecting everyday products and services using scientific information;
- (C) evaluate the impact of research on scientific thought, society, and the environment; and
- (D) describe connections between chemistry and future careers.

(4) Science concepts. The student knows the characteristics of matter.

The student is expected to:

- (B) investigate chemical changes and examine the physical and chemical properties that accompany these changes.

(5) Science concepts. The student knows that energy transformations occur during physical or chemical changes in matter.

The student is expected to:

- (A) identify changes in matter, determine the nature of the change, and examine the forms of energy involved; and
- (C) measure the effects of the gain or loss of heat energy on the properties of solids, liquids, and gases.

## Physics

### (b) Introduction.

- (1) In Physics, students conduct laboratory investigations and fieldwork, use scientific methods during investigations, and make informed decisions using, critical thinking and scientific problem-solving. Physics students study a variety of topics that include: laws of motion; changes within physical systems and conservation of energy and momentum; force; thermodynamics; characteristics and behavior of waves; and quantum physics. This course provides students with a conceptual framework,, factual knowledge, and analytical and scientific skills.
  - (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> <ol 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></ol>   |
| <p>(2) Scientific processes. The student uses scientific methods during fieldwork and laboratory investigations.</p>  | <p>The student is expected to:</p> <ol 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 data;</li><li>(D) communicate valid conclusions;</li><li>(E) graph data to observe and identify relationships between variables; and</li><li>(F) read the scale on scientific instruments with precision.</li></ol> |

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| (3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. | The student is expected to:<br>(A) analyze, review, and critique hypotheses and theories as to their strengths and weaknesses using scientific evidence and information;<br>(C) evaluate the impact of research on scientific thought, society, and the environment; and<br>(D) describe connections between physics and future careers.           |
| (7) Science concepts. The student knows the laws of thermodynamics.   | The student is expected to:<br>(A) analyze and explain everyday examples that illustrate the laws of thermodynamics; and<br>(B) evaluate different methods of heat energy transfer that result in an increasing amount of disorder.  |
| (8) Science concepts. The student knows the characteristics and behavior of waves.                                      | The student is expected to:<br>(A) examine and describe a variety of waves propagated in various types of media and describe wave characteristics such as velocity, frequency, amplitude, and behavior such as reflection, refraction, and interference;<br>(B) identify the characteristics and behaviors of sound and electromagnetic waves; and |

## **Geology, Meteorology, and Oceanography**

### **(b) Introduction.**

- (1) In Geology, Meteorology, and Oceanography, students conduct laboratory investigations and fieldwork, use scientific methods during investigations, and make informed decisions using, critical thinking and scientific problem-solving. Students in Geology, Meteorology, and Oceanography study a variety of topics that include: characteristics and conditions of the Earth; formation and history of the Earth; plate tectonics; origin and composition of minerals and rocks and the rock cycle; processes and products of weathering; natural energy resources; interactions in a watershed; characteristics of oceans; characteristics of the atmosphere; and the role of energy in weather and climate.
- (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:<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 uses scientific methods during fieldwork and laboratory investigations.   | The student is expected to:<br>(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology;<br>(B) collect information by observing and measuring in various ways;<br>(C) organize, analyze, evaluate, make inferences, and predict trends from data; and<br>(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:<br>(A) analyze, review, and critique hypotheses and theories as to their strengths and weaknesses using scientific evidence and information;<br>(B) make responsible choices in selecting everyday products and services using scientific information;<br>(C) evaluate the impact of research on scientific thought, society, and the environment; and<br>(D) describe connections between geology, meteorology, oceanography, and future careers. |
| (4) Science concepts. The student knows the Earth's unique characteristics and conditions.  | The student is expected to:<br>(B) analyze conditions on Earth that enable organisms to survive.   |

(12) Science concepts. The student knows the characteristics of the atmosphere.

The student is expected to:

- (A) identify the atmosphere as a mixture of gases, water vapor, and particulate matter;
- (B) analyze the range of atmospheric conditions that organisms will tolerate including types of gases, temperature, particulate matter, and moisture;
- (B) analyze the range of atmospheric conditions that organisms will tolerate including types of gases, temperature, particulate matter, and moisture; and
- (C) determine the impact on the atmosphere of natural events and human activity.

(13) Science concepts. The student knows the role of energy in governing weather and climate.

The student is expected to:

- (A) describe the transfer of heat energy at the boundaries between the atmosphere, land masses, and oceans resulting in layers of different temperatures and densities in both the ocean and atmosphere;