

Science



[MST Standards](#)

STANDARD 4

Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Physical Setting

Key Ideas & Performance Indicators:

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Living Environment

Key Ideas & Performance Indicators:

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Alternate Assessment Standards for Students with Severe Disabilities

Standard 1: [Scientific Inquiry](#)

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Standard 4

Science

Physical Setting

Students will: understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Key Ideas: Numbers

Performance Indicators: Bullets

Students will:

Elementary

Intermediate

Commencement

1. The Earth and celestial phenomena can be described by principles of relative motion and perspective.

• describe patterns of daily, monthly, and seasonal changes in their environment

• explain daily, monthly, and seasonal changes on earth

• explain complex phenomena, such as tides, variations in day length, solar insolation, apparent motion of the planets, and annual traverse of the constellations

• describe current theories about the origin of the universe and solar system

2. Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

• describe the relationships among air, water, and land on Earth

• explain how the atmosphere (air), hydrosphere (water), and lithosphere (land) interact, evolve, and change

• describe volcano and earthquake patterns, the rock cycle, and weather and climate changes

• use the concepts of density and heat energy to explain observations of weather patterns, seasonal changes, and the movements of the Earth's plates

• explain how incoming solar radiations, ocean currents, and land masses affect weather and climate

3. Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

- observe and describe properties of materials using appropriate tools

- describe chemical and physical changes, including changes in states of matter

- observe and describe properties of materials, such as density, conductivity, and solubility

- distinguish between chemical and physical changes

- develop their own mental models to explain common chemical reactions and changes in states of matter

- explain the properties of materials in terms of the arrangement and properties of the atoms that compose them

- use atomic and molecular models to explain common chemical reactions

- apply the principle of conservation of mass to chemical reactions

- use kinetic molecular theory to explain rates of reactions and the relationships among temperature, pressure, and volume of a substance

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Key Ideas: Numbers

Performance Indicators: Bullets

Students will:

Elementary

Intermediate

Commencement

4. Energy exists in many forms, and when these forms change energy is conserved.

- describe a variety of forms of energy (e.g., heat, chemical, light) and the changes that occur in objects when they interact with those forms of energy
- observe the way one form of energy can be transformed into another form of energy present in common situations (e.g., mechanical to heat energy, mechanical to electrical energy, chemical to heat energy)

- describe the sources and identify the transformations of energy observed in everyday life
- observe and describe heating and cooling events
- observe and describe energy changes as related to chemical reactions
- observe and describe the properties of sound, light, magnetism, and electricity
- describe situations that support the principle of conservation of energy

- observe and describe transmission of various forms of energy
- explain heat in terms of kinetic molecular theory
- explain variations in wavelength and frequency in terms of the source of the vibrations that produce them, e.g., molecules, electrons, and nuclear particles
- explain the uses and hazards of radioactivity

5. Energy and matter interact through forces that result in changes in motion.

- describe the effects of common forces (pushes and pulls) on objects, such as those caused by gravity, magnetism, and mechanical forces
- describe how forces can operate across distances

- describe different patterns of motion of objects
- observe, describe, and compare effects of forces (gravity, electric current, and magnetism) on the motion of objects

- explain and predict different patterns of motion of objects (e.g., linear and angular motion, velocity and acceleration, momentum and inertia)
- explain chemical bonding in terms of the motion of electrons
- compare energy relationships within an atom's nucleus to those outside the nucleus

Standard 4 Science

The Living Environment

Students will: understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Key Ideas: Numbers
Performance Indicators: Bullets

Students will:

Elementary

Intermediate

Commencement

1. Living things are both similar to and different from each other and nonliving things.

- describe the characteristics of and variations between living and nonliving things
- describe the life processes common to all living things

- compare and contrast the parts of plants, animals, and one-celled organisms
- explain the functioning of the major human organ systems and their interactions

- explain how diversity of populations within ecosystems relates to the stability of ecosystems
- describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles)
- explain how a one-celled organism is able to function despite lacking the levels of organization present in more complex organisms

2. Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.

- recognize that traits of living things are both inherited and acquired or learned
- recognize that for humans and other living things there is genetic continuity between generations

- describe sexual and asexual mechanisms for passing genetic materials from generation to generation
- describe simple mechanisms related to the inheritance of some physical traits in offspring

- explain how the structure and replication of genetic material result in offspring that resemble their parents
- explain how the technology of genetic engineering allows humans to alter the genetic makeup of organisms

3. Individual organisms and species change over time.

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| <ul style="list-style-type: none">• describe how the structures of plants and animals complement the environment of the plant or animal• observe that differences within a species may give individuals an advantage in surviving and reproducing | <ul style="list-style-type: none">• describe sources of variation in organisms and their structures and relate the variations to survival• describe factors responsible for competition within species and the significance of that competition | <ul style="list-style-type: none">• explain the mechanisms and patterns of evolution |
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Standard 4

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The Living Environment

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Key Ideas: Numbers

Performance Indicators: Bullets

Students will:

Elementary

Intermediate

Commencement

4. The continuity of life is sustained through reproduction and development.

<ul style="list-style-type: none"> • describe the major stages in the life cycles of selected plants and animals • describe evidence of growth, repair, and maintenance, such as nails, hair, and bone, and the healing of cuts and bruises 	<ul style="list-style-type: none"> • observe and describe the variations in reproductive patterns of organisms, including asexual and sexual reproduction • explain the role of sperm and egg cells in sexual reproduction • observe and describe developmental patterns in selected plants and animals (e.g., insects, frogs, humans, seed-bearing plants) • observe and describe cell division at the microscopic level and its macroscopic effects 	<ul style="list-style-type: none"> • explain how organisms, including humans, reproduce their own kind
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5. Organisms maintain a dynamic equilibrium that sustains life.

<ul style="list-style-type: none"> • describe basic life functions of common living specimens (guppy, mealworm, gerbil) • describe some survival behaviors of common living specimens • describe the factors that help promote good health and growth in humans 	<ul style="list-style-type: none"> • compare the way a variety of living specimens carry out basic life functions and maintain dynamic equilibrium • describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth and explain the need for a constant input of energy for living organisms 	<ul style="list-style-type: none"> • explain the basic biochemical processes in living organisms and their importance in maintaining dynamic equilibrium • explain disease as a failure of homeostasis • relate processes at the system level to the cellular level in order to explain dynamic equilibrium in multicelled organisms systems, tissues, cells, organelles)
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6. Plants and animals depend on each other and their physical environment.

<ul style="list-style-type: none"> • describe how plants and animals, including humans, depend upon each other and the nonliving environment • describe the relationship of the sun as an energy source for living and nonliving cycles 	<ul style="list-style-type: none"> • describe the flow of energy and matter through food chains and food webs • provide evidence that green plants make food and explain the significance of this process to other organisms 	<ul style="list-style-type: none"> • explain factors that limit growth of individuals and populations • explain the importance of preserving diversity of species and habitats • explain how the living and nonliving environments change over time and respond to disturbances
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7. Human decisions and activities have had a profound impact on the physical and living environment.

<ul style="list-style-type: none"> • identify ways in which humans have changed their environment and the effects of those changes 	<ul style="list-style-type: none"> • describe how living things, including humans, depend upon the living and nonliving environment for their survival • describe the effects of environmental changes on humans and other populations 	<ul style="list-style-type: none"> • describe the range of interrelationships of humans with the living and nonliving environment • explain the impact of technological development and growth in the human population on the living and nonliving environment • explain how individual choices and societal actions can contribute to improving the environment
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STANDARD 1

Scientific Inquiry

Science



Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

Key Idea: The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

ALTERNATE ASSESSMENT

Performance Indicators--Students:

- learn to ask "why" questions to seek greater understanding concerning objects and events they have observed and heard about
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STANDARD 4

Physical Setting

Science



Students will: understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

ALTERNATE ASSESSMENT

1. Key Idea: The Earth and celestial phenomena can be described by principles of relative motion and perspective.

Performance Indicators--Students:

- recognize patterns of daily, monthly and seasonal changes in their environment

2. Key Idea: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Performance Indicators--Students:

- observe the relationships among air, water, and land on Earth

3. Key Idea: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

Performance Indicators--Students:

- observe and describe properties of materials using appropriate tools

- observe chemical and physical changes, including changes in states of matter

4. Key Idea: Energy exists in many forms, and when these forms change energy is conserved.

Performance Indicators--Students:

- observe a variety of forms of energy (e.g., heat, chemical, light) and the changes that occur in objects when they interact with those forms of energy

5. Key Idea: Energy and matter interact through forces that result in changes in motion.

Performance Indicators--Students:

- investigate the use of common forces (pushes and pulls) on objects, such as those caused by gravity, magnetism, and mechanical forces
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STANDARD 4

The Living Environment

Science



Students will: understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

ALTERNATE ASSESSMENT

1. Key Idea: Living things are both similar to and different from each other and nonliving things.

Performance Indicators--Students:

- explore the characteristics of and differences between living and nonliving things
- identify simple life processes common to all living things

2. Key Idea: Individual organisms and species change over time.

Performance Indicators--Students:

- explore how living things change over their lifetime
- observe that differences within a species may give individuals an advantage in surviving

3. Key Idea: The continuity of life is sustained through reproduction and development.

Performance Indicators--Students:

- observe the major stages in the life cycles of selected plants and animals.
- observe evidence of growth, repair, and maintenance, such as nails, hair and bone, and the healing of cuts and bruises

4. Key Idea: Organisms maintain a dynamic equilibrium that sustains life.

Performance Indicators--Students:

- identify a few basic life functions of common living specimens (guppy, mealworm, gerbil).
- identify some survival behaviors of common living specimens
- participate in activities that help promote good health and growth in humans

5. Key Idea: Plants and animals depend on each other and their physical environment.

Performance Indicators--Students:

- participate in activities that demonstrate how plants and animals, including humans, depend

upon each other and the nonliving environment

- participate in activities that demonstrate the relationship of the sun as an energy source for living and nonliving cycles

6. Key Idea: Human decisions and activities have had a profound impact on the physical and living environment.

Performance Indicators--Students:

- participate in activities which show how humans have changed their environment and the effects of those changes
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