

Diocese of Madison
Science Education Standards and Benchmarks for Grades K-8

K-2.PS Grades K-2 Physical Science

K-2.PS.1 Physical Science: Structure & Properties of Matter

K-2.PS.1.D Identify different kinds of materials by their observable properties.

K-2.PS.1.F Understand that some changes caused by heating and cooling can be reversed and some cannot.

K-2.PS.2 Physical Science: Forces & Interactions

K-2.PS.2.A Compare the effects of pushes and pulls on an object.

K-2.PS.2.B Explain how a push or pull affects the speed or direction of an object.

K-2.PS.4 Physical Science: Waves & Electromagnetic Radiation

K-2.PS.4.A Understand the effects of placing different materials in the path of a beam of light.

K-2.PS.4.B Understand that vibrating materials can make sound and that sound can make materials vibrate.

K-2.PS.4.C Understand how light or sound can be used to communicate over a distance.

K-2.LS Grades K-2 Life Science

K-2.LS.1 Life Science: Organisms

K-2.LS.1.A Identify living and nonliving things.

K-2.LS.1.B Understand that organisms are comprised of smaller parts.

K-2.LS.1.D Identify that all organisms have in common birth, growth, reproduction, and death (e.g., life cycle).

K-2.LS.1.E Identify and understand the five senses.

K-2.LS.1.F Identify the external parts of the human body.

K-2.LS.1.G Identify common disorders of the human body.

K-2.LS.1.H Identify animal groups and the characteristics of each.

K-2.LS.2 Life Science: Ecosystems

K-2.LS.2.A Understand what plants and animals need to grow.

K-2.LS.2.B Understand that there are many types of life in different habitats.

K-2.LS.2.C Understand how organisms can change the environment to meet their needs.

K-2.LS.3 Life Science: Inheritance and Adaptations

K-2.LS.3.A Understand that young plants and animals are like, but not exactly like, their parents.

K-2.LS.3.G Recognize that organisms alive today may resemble extinct organisms.

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K-2.ES Grades K-2 Earth Science

K-2.ES.1 Earth Science: Earth's Systems

- K-2.ES.1.A Identify landforms and bodies of water.
- K-2.ES.1.B Identify where water is found on earth, and that it can be a solid, liquid, or gas.
- K-2.ES.1.C Understand that the earth provides resources.
- K-2.ES.1.D Identify ways to slow or prevent wind or water from changing the shape of the land.

K-2.ES.2 Earth Science: Weather and Climate

- K-2.ES.2.A Understand local weather patterns.
- K-2.ES.2.B Determine the effect of sunlight on the Earth's surface.
- K-2.ES.2.C Understand the purpose of weather forecasting.

K-2.ES.3 Earth Science: Space Systems

- K-2.ES.3.A Understand that earth's gravity pulls objects down.
- K-2.ES.3.B Identify predictable patterns of sun, moon, and stars.
- K-2.ES.3.C Identify the organization of the solar system.
- K-2.ES.3.D Understand that the sun is a star.

K-2.ES.4 Earth Science: History of Earth

- K-2.ES.4.A Understand that earth events can occur quickly or slowly.
- K-2.ES.4.B Identify properties of earthquakes and volcanoes.

K-2.S Grades K-2 Stream

K-2.S.1 Stream: Engineering Design

- K-2.S.1.A Define a simple problem that can be solved by a new or improved object or tool.
- K-2.S.1.B Identify strengths and limitations of multiple design solutions.
- K-2.S.1.C Identify how the design of an object helps it solve a problem.

K-2.S.2 Stream: Human Impacts

- K-2.S.2.A Identify effects of natural catastrophic events on humans.
- K-2.S.2.B Identify ways an individual protects Earth's resources and environment.
- K-2.S.2.C Identify ways that humans use renewable and non-renewable resources.

K-2.S.3 Stream: Ethics

- K-2.S.3.A Identify the beneficial and harmful effects of scientific experiments and discoveries.
- K-2.S.3.B Understand that life is valuable.
- K-2.S.3.C Understand that medical decisions can be right or wrong.

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3-5.PS Grades 3-5 Physical Science

3-5.PS.1 Physical Science: Structure & Properties of Matter

- 3-5.PS.1.A Describe that matter is made of atoms.
- 3-5.PS.1.B Understand the structure of an atom.
- 3-5.PS.1.C Identify the periodic table of the elements as a tool to organize the elements of matter.
- 3-5.PS.1.D Describe and classify materials based on their properties.
- 3-5.PS.1.E Understand that total weight of matter is conserved regardless of change (e.g., temperature, mixing).
- 3-5.PS.1.F Understand the difference between physical and chemical changes.

3-5.PS.2 Physical Science: Forces and Interactions

- 3-5.PS.2.A Investigate and give evidence of the effects of balanced and unbalanced forces on an object.
- 3-5.PS.2.B Predict the motion of an object using observations and measurements.
- 3-5.PS.2.C Determine cause and effect relationships of electric or magnetic interactions.

3-5.PS.3 Physical Science: Energy

- 3-5.PS.3.A Understand that the speed of an object is related to its energy.
- 3-5.PS.3.B Differentiate between potential and magnetic energy.
- 3-5.PS.3.C Determine cause and effect relationships of electric or magnetic interactions.
- 3-5.PS.3.D Predict outcomes about changes in energy when objects collide.
- 3-5.PS.3.E Understand how energy is converted from one form to another.

3-5.PS.4 Physical Science: Waves & Electromagnetic Radiation

- 3-5.PS.4.A Identify that light waves carry differing amounts of energy.
- 3-5.PS.4.B Identify that sound waves carry differing amounts of energy.
- 3-5.PS.4.C Understand multiple ways to transfer information using waves.

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3-5.LS Grades 3-5 Life Science

3-5.LS.1 Life Science: Organisms

3-5.LS.1.A Understand the needs of living organisms.

3-5.LS.1.B Identify parts of a cell.

3-5.LS.1.C Recognize that the Cell Theory exists.

3-5.LS.1.D Understand that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

3-5.LS.1.E Understand how organisms respond to their environment.

3-5.LS.1.F Identify the external and internal parts of the human body.

3-5.LS.1.G Understand how lifestyle can be affected by disorders of the human body.

3-5.LS.1.H Identify the kingdoms of living organisms and the characteristics of each.

3-5.LS.2 Life Science: Ecosystems

3-5.LS.2.A Understand food chains and food webs.

3-5.LS.2.B Understand that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

3-5.LS.2.C Understand how changes in the environment affect populations and types of organisms.

3-5.LS.3 Life Science: Inheritance and Adaptations

3-5.LS.3.A Understand that plants and animals have traits inherited from parents.

3-5.LS.3.C Understand that organisms within a species will show variations.

3-5.LS.3.D Understand how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

3-5.LS.3.F Understand that traits can be influenced by the environment.

3-5.LS.3.G Explain how extinction may have occurred.

3-5.LS.3.H Understand that fossils provide evidence of previous life forms and can be compared.

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3-5.ES Grades 3-5 Earth Science

3-5.ES.1 Earth Science: Earth's Systems

- 3-5.ES.1.A Use maps to describe patterns of Earth's features.
- 3-5.ES.1.B Describe the cycling of water through Earth's systems, both above and below the surface.
- 3-5.ES.1.C Understand the rock cycle
- 3-5.ES.1.D Understand the effects of weathering on the rate of erosion.

3-5.ES.2 Earth Science: Weather and Climate

- 3-5.ES.2.A Describe typical weather conditions expected during a particular season.
- 3-5.ES.2.B Describe climates in different regions of the world.
- 3-5.ES.2.C Identify and understand the tools used for weather forecasting.

3-5.ES.3 Earth Science: Space Systems

- 3-5.ES.3.A Understand that the gravitational force exerted by Earth is directed towards its center.
- 3-5.ES.3.B Describe the motion of Earth (e.g., rotations, revolutions).
- 3-5.ES.3.C Understand the properties and characteristics of the solar system.
- 3-5.ES.3.D Compare Earth's sun to other stars.

3-5.ES.4 Earth Science: History of Earth

- 3-5.ES.4.A Identify catastrophic events that have occurred over the history of earth.
- 3-5.ES.4.B Understand the movement of Earth's plates.
- 3-5.ES.4.C Understand that fossils are evidence of organisms and the environments in which they lived.

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3-5.S Grades 3-5 Stream

3-5.S.1 Stream: Engineering Design

3-5.S.1.A Define a simple design problem based on given criteria and constraints.

3-5.S.1.B Generate and compare multiple solutions to a design problem.

3-5.S.1.C Identify aspects of a model or prototype that can be improved.

3-5.S.2 Stream: Human Impacts

3-5.S.2.A Generate and compare multiple solutions to lessen the effects of natural catastrophic events.

3-5.S.2.B Identify ways communities protect Earth's resources and environment.

3-5.S.2.C Understand how per-capita consumption of natural resources has an effect on the environment.

3-5.S.3 Stream: Ethics

3-5.S.3.A Understand that science has a morality.

3-5.S.3.B Identify ways to be stewards of God's creation.

3-5.S.3.C Understand the implications of medical decisions.

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6-8.PS Grades 6-8 Physical Science

6-8.PS.1 Physical Science: Structure & Properties of Matter

- 6-8.PS.1.A Understand the Atomic Theory of Matter.
- 6-8.PS.1.B Demonstrate the atomic composition of simple molecules and extended structures.
- 6-8.PS.1.C Understand and apply the periodic table.
- 6-8.PS.1.D Understand the changes in states of matter.
- 6-8.PS.1.E Understand the Law of Conservation of Matter (e.g., balancing chemical equations, observing chemical reactions).
- 6-8.PS.1.F Determine if a chemical reaction has occurred.

6-8.PS.2 Physical Science: Forces & Interactions

- 6-8.PS.2.A Understand and apply Newton's Laws of Motion.
- 6-8.PS.2.B Understand the properties of motion (e.g., speed, displacement, etc.)
- 6-8.PS.2.C Demonstrate that fields exist between objects exerting forces on each other even though the objects are not in contact.
- 6-8.PS.2.D Understand that mass affects the gravitational force of interacting objects

6-8.PS.3 Physical Science: Energy

- 6-8.PS.3.A Describe the relationships of kinetic energy to the mass and speed of an object.
- 6-8.PS.3.B Identify and understand the factors that affect an amount of potential energy and kinetic energy.
- 6-8.PS.3.C Understand the factors that minimize or maximize thermal energy transfer.
- 6-8.PS.3.D Understand that energy transfer occurs when the kinetic energy of an object changes.
- 6-8.PS.3.E Demonstrate the Law of Conservation of Energy.

6-8.PS.4 Physical Science: Waves & Electromagnetic Radiation

- 6-8.PS.4.A Understand and apply properties of light.
- 6-8.PS.4.B Understand and apply properties of sound.
- 6-8.PS.4.C Understand and apply the behaviors of electromagnetic and mechanical waves.
- 6-8.PS.4.D Identify and compare waves on the electromagnetic spectrum.

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6-8.LS Grades 6-8 Life Science

6-8.LS.1 Life Science: Organisms

- 6-8.LS.1.A Understand the characteristics of life.
- 6-8.LS.1.B Understand parts of a cell and their functions.
- 6-8.LS.1.C Understand the Cell Theory.
- 6-8.LS.1.D Understand how a multicellular organism is a system of interacting subsystems composed of groups of cells.
- 6-8.LS.1.E Understand how organisms respond to stimuli (e.g., homeostasis, tropisms).
- 6-8.LS.1.F Understand the structure, function, and interactions between systems of the human body.
- 6-8.LS.1.G Understand symptoms, prognosis, and treatment of diseases / disorders of each system of the human body.
- 6-8.LS.1.H Classify organisms using subclassifications of kingdoms.

6-8.LS.2 Life Science: Ecosystems

- 6-8.LS.2.A Understand the role of photosynthesis and cellular respiration in food chains and food webs.
- 6-8.LS.2.B Understand how changes in the ecosystem affect populations (e.g., resource availability).
- 6-8.LS.2.C Understand the interaction between living and nonliving parts of an ecosystem.

6-8.LS.3 Life Science: Inheritance and Adaptations

- 6-8.LS.3.A Identify differences between sexual reproduction and asexual reproduction regarding genetic variation.
- 6-8.LS.3.B Explain how environmental and genetic factors influence the growth of organisms.
- 6-8.LS.3.C Identify if gene mutations have harmful, beneficial, or neutral effects on an organism.
- 6-8.LS.3.D Describe how genetic variations of traits in a population increase the probability of survival and reproduction.
- 6-8.LS.3.E Understand that natural selection may lead to the increase or decrease of specific traits in a population over time.
- 6-8.LS.3.F Identify ways humans influence the ways of desired traits of organisms.
- 6-8.LS.3.G Using a fossil record, identify the existence, diversity, extinction, and change of life forms throughout the history of life on Earth.
- 6-8.LS.3.H Use comparative anatomy, embryology, and DNA to show relationships among modern organisms.

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6-8.ES Grades 6-8 Earth Science

6-8.ES.1 Earth Science: Earth's Systems

- 6-8.ES.1.A Understand the distribution of water on earth.
- 6-8.ES.1.B Describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
- 6-8.ES.1.C Explain the uneven distributions of Earth's mineral and energy resources.
- 6-8.ES.1.D Describe the cycling of Earth's materials and the flow of energy that drives this process.

6-8.ES.2 Earth Science: Weather and Climate

- 6-8.ES.2.A Understand the effect of air masses on weather conditions.
- 6-8.ES.2.B Understand how unequal heating and rotation of the Earth determines regional climates.
- 6-8.ES.2.C Use weather forecasting tools to make simple weather predictions.

6-8.ES.3 Earth Science: Space Systems

- 6-8.ES.3.A Understand the role of gravity in the motion of the solar system.
- 6-8.ES.3.B Understand lunar phases, eclipses of the sun and moon, seasons, and tides.
- 6-8.ES.3.C Determine scale properties of objects in the solar system.
- 6-8.ES.3.D Understand the life cycle and properties of a star.
- 6-8.ES.3.E Identify the levels of organization of the universe.

6-8.ES.4 Earth Science: History of Earth

- 6-8.ES.4.A Understand how the geologic time scale is organized.
- 6-8.ES.4.B Understand the evidence for the Theory of Plate Tectonics
- 6-8.ES.4.C Understand that patterns in rock layers and fossils are the result of changes in a landscape over time.
- 6-8.ES.4.D Identify ways to determine the age of rocks, fossils, and layers of the Earth.

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6-8.S Grades 6-8 Stream

6-8.S.1 Stream: Engineering Design

- 6-8.S.1.A Define criteria and constraints of a design problem.
- 6-8.S.1.B Evaluate multiple solutions to a design problem.
- 6-8.S.1.C Conduct testing and modification to optimize a design solution.

6-8.S.2 Stream: Human Impacts

- 6-8.S.2.A Understand ways to lessen the effects of natural catastrophic events.
- 6-8.S.2.B Identify ways of monitoring and minimizing human impacts on the environment.
- 6-8.S.2.C Identify ways to reduce per-capita consumption of natural resources.

6-8.S.3 Stream: Ethics

- 6-8.S.3.A Understand how to apply Catholic morality in scientific decision-making.
- 6-8.S.3.B Understand how the greater dignity of human life impacts scientific decision-making.
- 6-8.S.3.C Understand how to apply Catholic morality in biomedicine.