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.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.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.
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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 I 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.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.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.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.C  Identify how the design of an object helps it solve a problem.
K-2.S.2  Stream: Human Impacts
  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.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.
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.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.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.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.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.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.C Understand how to apply Catholic morality in biomedicine.