

Indiana Academic Standards for Science - 2010	ESS Presentations
Kindergarten	
Standard 1: Physical Science	
Core Standard: Observe, manipulate, sort and generate questions about objects and their physical properties.	
K.1.1. Use all senses as appropriate to observe, sort and describe objects according to their composition and physical properties, such as size, color and shape. Explain these choices to others and generate questions about the objects.	Marvellous Materials Materials Matter Changing Materials Senses
K.1.2 Identify and explain possible uses for an object based on its properties and compare these uses with other students' ideas.	Materials Matter
Standard 2: Earth and Space Science	
Core Standard: Observe, record, and recognize patterns and generate questions about night and day and the seasons.	
K.2.1 Observe and record during sunny days when the sun shines on different parts of the school building.	Shadows
K.2.2 Describe and compare objects seen in the night and day sky.	Weather
K.2.3 Describe in words and pictures the changes in weather from month to month and season to season.	Weather
Standard 3: Life Science	
Core Standard: Observe living organisms, compare and contrast their characteristics, and ask questions about them.	
K.3.1 Observe and draw physical features of common plants and animals.	Animals and Plants Living Things
K.3.2 Describe and compare living animals in terms of shape, texture of body covering, size, weight, color and the way they move.	Animals and Plants Living Things
K.3.3 Describe and compare living plants in terms of growth, parts, shape, size, color and texture.	Animals and Plants Living Things
Grade 1	
Standard 1: Physical Science	
Core Standard: Describe objects in terms of the materials that compose them and in terms of their physical properties.	
1.1.1 Use all senses as appropriate to identify the component parts of objects and the materials from which they are made.	Marvellous Materials Materials Matter Changing Materials Senses

K-2 Product
3-5 Product

1.1.2 Characterize materials as solid or liquid, investigate their properties, record observations and explain the choices to others based on evidence (i.e., physical properties).	Hot and Cold
1.1.3 Experiment with simple methods for separating solids and liquids based on their physical properties.	
Standard 2: Earth and Space Science	
Core Standard: Observe, describe and ask questions about soil components and properties.	
1.2.1 Observe and compare properties of sand, clay, silt and organic matter. Look for evidence of sand, clay, silt and organic matter as components of soil samples.	Soil
1.2.2 Choose, test and use tools to separate soil samples into component parts.	Soil
1.2.3 Observe a variety of soil samples and describe in words and pictures the soil properties in terms of color, particle size and shape, texture, and recognizable living and nonliving items.	Soil
1.2.4 Observe over time the effect of organisms like earthworms in the formation of soil from dead plants. Discuss the importance of earthworms in soil.	Soil
Standard 3: Life Science	
Core Standard: Observe, describe and ask questions about living things and their relationships to their environments.	
1.3.1 Classify living organisms according to variations in specific physical features (e.g., body coverings, appendages) and describe how those features may provide an advantage for survival in different environments.	Animals and Plants Habitats
1.3.2 Observe organisms closely over a period of time in different habitats such as terrariums, aquariums, lawns and trees. Draw and write about observations.	
1.3.3 Observe and explain that plants and animals have basic needs for growth and survival: plants need to take in water and need light, and animals need to take in water and food and have a way to dispose of waste.	Living Things
1.3.4 Describe how animals' habitats, including plants, meet their needs for food, water, shelter and an environment in which they can live.	Living Things Habitats
1.3.5 Observe and describe ways in which animals and plants depend on one another for survival.	Habitats
Standard 4: Science, Engineering and Technology	
Core Standard: Determine properties of natural and man-made materials and their most important uses.	
1.4.1 Use all senses as appropriate to sort objects as being composed of materials that are naturally occurring, human made or a combination of the two.	Changing Materials
1.4.2 Choose two animals that build shelters within their habitats. Compare the shelters in terms of the materials and tools they use and the type and purpose of shelter they provide.	

1.4.3 Construct a simple shelter for an animal with natural and human-made materials.	
Grade 2	
Standard 1: Physical Science	
Core Standard: Observe and describe that the properties of materials can change, but not all materials respond in the same way to the same action.	
2.1.1. Observe, describe and measure ways in which the properties of a sample of water (including volume) change or stay the same as the water is heated and cooled and then transformed into different states.	Changing State
2.1.2. Predict the result of combining solids and liquids in pairs. Mix; observe, gather, record and discuss evidence of whether the result may have different properties than the original materials.	Separating Mixtures
2.1.3. Predict and experiment with methods (e.g. sieving, evaporation) to separate solids and liquids based on their physical properties.	Separating Mixtures
Core Standard: Observe and describe the motion of an object and how it changes when a force is applied to it.	
2.1.4 Observe, sketch, demonstrate and compare how objects can move in different ways (e.g., straight, zig-zag, back-and-forth, rolling, fast and slow).	Feel the Force
2.1.5 Describe the position or motion of an object relative to a point of reference (e.g., background, another object).	
2.1.6 Observe, demonstrate, sketch and compare how applied force (i.e., push or pull) changes the motion of objects.	Feel the Force
2.1.7 Investigate the motion of objects when they are acted upon at a distance by forces like gravity and magnetism.	Magnets Gravity
Standard 2: Earth Science	
Core Standard: Day to day and over the seasons, observe, measure, record and recognize patterns and ask questions about features of weather.	
2.2.1 Construct and use tools to observe and measure weather phenomena like precipitation, changes in temperature, wind speed and direction.	Weather Predicting the Weather
2.2.2 Experience and describe wind as the motion of the air.	Predicting the Weather
2.2.3 Chart or graph weather observations such as cloud cover, cloud type and type of precipitation on a daily basis over a period of weeks.	
2.2.4 Ask questions about charted observations and graphed data. Identify the day-to-day patterns and cycles of weather. Understand seasonal time scales in terms of temperature and amounts of rainfall and snowfall.	Weather
2.2.5 Ask questions and design class investigations on the effect of the sun heating the surface of the earth.	Weather Predicting the Weather
2.2.6 Learn about, report on and practice severe weather safety procedures.	

Core Standard: Investigate how the position of the sun and moon and the shape of the moon change in observable patterns.	
2.2.7 Investigate how the sun appears to move through the sky during the day by observing and drawing the length and direction of shadows.	Shadows
2.2.8 Investigate how the moon appears to move through the sky during the day by observing and drawing its location at different times.	
2.2.9 Investigate how the shape of the moon changes from day to day in a repeating cycle that lasts about a month.	The Moon
Standard 3: Life Science	
Core Standard: Observe, ask questions about and describe how organisms change their forms and behaviors during their life cycles.	
2.3.1 Observe closely over a period of time and then record in pictures and words the changes in plants and animals throughout their life cycles-including details of their body plan, structure and timing of growth, reproduction and death.	Growing Up Growing Plants Plant Reproduction
2.3.2 Compare and contrast details of body plans and structures within the life cycles of plants and animals.	Growing Up Growing Plants Plant Reproduction
Standard 4: Science, Engineering and Technology	
Core Standard: Describe how technologies have been developed to meet human needs.	
2.4.1 Identify parts of the human body that can be used as tools—like hands for grasping and teeth for cutting and chewing.	
2.4.2 Identify technologies developed by humans to meet human needs. Investigate the limitations of technologies and how they have improved quality of life.	
2.4.3 Identify a need and design a simple tool to meet that need.	
Grade 3	
Standard 1: Physical Science	
Core Standard: Observe and describe how sound is produced by vibrations.	
3.1.1 Generate sounds using different materials, objects and techniques. Record the sounds and then discuss and share the results.	Sounds
3.1.2 Investigate how the loudness and pitch of sound changes when the rate of vibrations changes.	Sounds
3.1.3 Investigate and recognize that sound moves through solids, liquids and gases (e.g., air).	
Core Standard: Observe and describe how light travels from point to point.	
3.1.4 Investigate how light travels through the air and tends to maintain its direction until it interacts with some other object or material.	Shadows Reflection and Refraction

3.1.5 Observe and describe how light is absorbed, changes its direction, is reflected back and passes through objects. Observe and describe that a shadow results when light cannot pass through an object.	Shadows Reflection and Refraction
3.1.6 Describe evidence to support the idea that light and sound are forms of energy.	Energy Forms
Standard 2: Earth Science	
Core Standard: Observe, describe and identify rocks and minerals by their specific properties.	
3.2.1 Examine the physical properties of rock samples and sort them into categories based on size using simple tools such as sieves.	Rocks
3.2.2 Observe the detailed characteristics of rocks and minerals. Identify rocks as being composed of different combinations of minerals.	
3.2.3 Classify and identify minerals by their physical properties of hardness, color, luster and streak.	
3.2.4 Identify fossils and describe how they provide evidence about the plants and animals that lived long ago and the nature of their environment at that time.	Fossils
Core Standard: Observe and describe how natural materials meet the needs of plants and animals (including humans).	
3.2.5 Describe natural materials and give examples of how they sustain the lives of plants and animals.	Habitats
3.2.6 Describe how the properties of earth materials make them useful to humans in different ways. Describe ways that humans have altered these resources to meet their needs for survival.	Rocks Pollution
Standard 3: Life Science	
Core Standard: Observe, describe and ask questions about plant growth and development.	
3.3.1 Identify the common structures of a plant including its roots, stems, leaves, flowers, fruits and seeds. Describe their functions.	Animals and Plants Growing Plants Plant Reproduction
3.3.2 Investigate plant growth over time, take measurements in SI units, record the data and display the data in graphs. Examine factors that might influence plant growth.	Growing Plants Plant Reproduction
Standard 4: Science, Engineering and Technology	
Core Standard: Define a real world problem and list criteria for a successful solution.	
3.4.1 Choose and use the appropriate tools to estimate and measure length, mass and temperature in SI units.	
3.4.2 Define the uses and types of simple machines and utilize simple machines in the solution to a real world problem.	
Grade 4	

Standard 1: Physical Science	
Core Standard: Provide evidence that heat and electricity are forms of energy.	
4.1.1 Describe and investigate the different ways in which heat can be generated.	Energy Forms
4.1.2 Investigate the variety of ways in which heat can be generated and moved from one place to another. Explain the direction the heat moved.	
Core Standard: Design and assemble electric circuits that provide a means of transferring energy from one form or place to another.	
4.1.3 Construct a complete circuit through which an electrical current can pass as evidenced by the lighting of a bulb or ringing of a bell.	Circuits
4.1.4 Experiment with materials to identify conductors and insulators of heat and electricity.	Insulators and Conductors
4.1.5 Demonstrate that electrical energy can be transformed into heat, light, and sound.	Energy Forms
Standard 2: Earth Science	
Core Standard: Observe, investigate and give examples of ways that the shape of land changes over time.	
4.2.1 Demonstrate and describe how smaller rocks come from the breakage and weathering of larger rocks in a process that occurs over a long period of time.	Erosion, Transpiration and Deposition
4.2.2 Describe how wind, water and glacial ice shape and reshape earth's land surface by eroding rock and soil in some areas and depositing them in other areas in a process that occurs over a long period of time.	Erosion, Transpiration and Deposition
4.2.3 Describe how earthquakes, volcanoes and landslides suddenly change the shape of the land.	
Core Standard: Describe how the supply of natural resources is limited and investigate ways that humans protect and harm the environment.	
4.2.4 Investigate earth materials that serve as natural resources and gather data to determine which ones are limited by supply.	Rocks Pollution
4.2.5 Describe methods that humans currently use to extend the use of natural resources.	Pollution
4.2.6 Describe ways in which humans have changed the natural environment. Explain if these changes have been detrimental or beneficial.	Habitats Pollution
Standard 2: Life Science	
Core Standard: Observe, describe and ask questions about structures of organisms and how they affect their growth and survival.	
4.3.1 Observe and describe how offspring are very much, but not exactly, like their parents or one another. Describe how these differences in physical characteristics among individuals in a population may be advantageous for survival and reproduction.	Adaptations
4.3.2 Observe, compare and record the physical characteristics of living plants or animals from widely different environments. Describe how each plant or animal is adapted to its environment.	Adaptations

4.3.3 Design investigations to explore how organisms meet some of their needs by responding to stimuli from their environments.	Adaptations
4.3.4 Describe a way that a given plant or animal might adapt to a change arising from a human or non-human impact on its environment.	Adaptations Interdependence
Standard 4: Science, Engineering and Technology	
Core Standard: Design a moving system and measure its motion.	
4.4.1 Investigate transportation systems and devices that operate on or in land, water, air and space and recognize the forces (lift, drag, friction, thrust and gravity) that affect their motion.	Forces Gravity Friction
4.4.2 Make appropriate measurements to compare the speeds of objects in terms of the distance traveled in a given amount of time or the time required to travel a given distance.	
4.4.3 Investigate how changes in speed or direction are caused by forces: the greater the force exerted on an object, the greater the change.	Forces Gravity
4.4.4 Define a problem in the context of motion and transportation. Propose a solution to this problem by evaluating, reevaluating and testing the design. Gather evidence about how well the design meets the needs of the problem. Document the design so that it can be easily replicated.	
Grade 5	
Standard 1: Physical Science	
Core Standard: Describe the weight and volume and measure the weight and volume of various objects.	
5.1.1 Describe and measure the volume and weight of a sample of a given material.	Gravity
5.1.2 Describe the difference between weight and mass. Understand that weight is dependent on gravity and mass is the amount of matter in a given substance or material.	Gravity
Core Standard: Demonstrate that mass is conserved even when a substance has undergone a change in its state.	
5.1.3 Demonstrate that regardless of how parts of an object are assembled the weight of the whole object is identical to the sum of the weight of the parts; however, the volume can differ from the sum of the volumes.	
5.1.4 Determine if matter has been added or lost by comparing weights when melting, freezing or dissolving a sample of a substance.	
Standard 2: Earth Science	
Core Standard: Observe, describe and ask questions about patterns in the sun-moon-earth system.	
5.2.1 Recognize that our earth is part of the solar system in which the sun, an average star, is the central and largest body. Observe that our solar system includes the sun, moon, seven other planets and their moons, and many other smaller objects like asteroids and comets.	Our Solar System

5.2.2 Observe and use pictures to record how the sun appears to move across the sky in the same general way every day but rises and sets in different places as the seasons change.	Days and Seasons
5.2.3 In monthly intervals, observe and draw the length and direction of shadows cast by the sun at several chosen times during the day. Use the recorded data as evidence to explain how those shadows were affected by the relative position of the earth and sun.	Days and Seasons
5.2.4 Use a calendar to record observations of the shape of the moon and the rising and setting times over the course of a month. Based on the observations, describe patterns in the moon cycle.	The Moon
Standard 3: Life Science	
Core Standard: Observe, describe and ask questions about how changes in one part of an ecosystem create changes in other parts of the ecosystem.	
5.3.1 Observe and classify common Indiana organisms as producers, consumers, decomposers, predator and prey based on their relationships and interactions with other organisms in their ecosystem.	Food Chains
5.3.2 Investigate the action of different decomposers and compare their role in an ecosystem with that of producers and consumers.	
Standard 4: Science, Engineering and Technology	
Core Standard: Design a prototype that replaces a function of a human body part.	
5.4.1 Investigate technologies that mimic human or animal musculoskeletal systems in order to meet a need.	
5.4.2 Investigate the purpose of prototypes and models when designing a solution to a problem and how limitations in cost and design features might affect their construction.	
5.4.3 Design solutions to problems in the context of musculoskeletal body systems. Using suitable tools, techniques and materials, draw or build a prototype or model of a proposed design.	