

Middle School Science	Boardworks Middle School Presentations
D. The Physical Setting	
D1: Students explain the movements and describe the location, composition, and characteristics of our solar system and universe, including planets, the sun, and galaxies.	
a. Describe the different kinds of objects in the solar system including planets, sun, moons, asteroids, and comets.	The Solar System
b. Explain the motions that cause days, years, phases of the moon, and eclipses.	Days, Years and Seasons The Earth, Moon and Sun
c. Describe the location of our solar system in its galaxy and explain that other galaxies exist and that they include stars and planets.	The Solar System
D2: Students describe the various cycles, physical and biological forces and processes, position in space, energy transformations, and human actions that affect the short-term and long-term changes to the Earth.	
a. Explain how the tilt of Earth's rotational axis relative to the plane of its yearly orbit around the sun affects the day length and sunlight intensity to cause seasons.	Days, Years and Seasons
b. Describe Earth Systems - biosphere, atmosphere, hydrosphere and lithosphere - and cycles and interactions within them (including water moving among and between them, rocks forming and transforming, and weather formation).	The Atmosphere Habitats The Structure of the Earth The Water Cycle The Rock Cycle What is Weather? Wind and Ocean Climates
c. Give several reasons why the climate is different in different regions of the Earth.	Climate Zones What is Weather?
d. Describe significant Earth resources and how their limited supply affects how they are used.	Renewable Energy Nonrenewable Energy Resources
e. Describe the effect of gravity on objects on Earth.	Gravity

f. Give examples of abrupt changes and slow changes in Earth Systems.	Hurricanes Earthquakes What is Plate Tectonics? Plate Boundaries Biological Weathering Chemical Weathering Physical Weathering Erosion, Transportation and Deposition Tornados Tsunami Case Study Flooding
D3: Students describe physical and chemical properties of matter, interactions and changes in matter, and transfer of energy through matter.	
a. Describe that all matter is made up of atoms and distinguish between/among elements, atoms, and molecules.	Elements and Compounds What Are Atoms?
b. Describe how physical characteristics of elements and types of reactions they undergo have been used to create the Periodic Table.	Elements and Compounds The Periodic Table
c. Describe the difference between physical and chemical change.	Types of Chemical Reactions
d. Explain the relationship of the motion of atoms and molecules to the states of matter for gases, liquids, and solids.	Changing State Particles in Action
e. Explain how atoms are packed together in arrangements that compose all substances including elements, compounds, mixtures, and solutions.	Elements and Compounds What is a Mixture? Solutions What Are Atoms?
f. Explain and apply the understanding that substances have characteristic properties, including density, boiling point, and solubility and these properties are not dependent on the amount of matter present.	Changing State Changes of Matter
g. Use the idea of atoms to explain the conservation of matter.	Conservation of Mass
h. Describe several different types of energy forms including heat energy, chemical energy, and mechanical energy.	What is Energy?
i. Use examples of energy transformations from one form to another to explain that energy cannot be created or destroyed.	What is Energy?
j. Describe how heat is transferred from one object to another by conduction, convection, and/or radiation.	Conduction and Convection Radiation

k. Describe the properties of solar radiation and its interaction with objects on Earth.	Radiation Electromagnetic Waves What is Light?
D4: Students describe the force of gravity, the motion of objects, the properties of waves, and the wavelike property of energy in light waves.	
a. Describe the similarities and differences in the motion of sound vibrations, earthquakes, and light waves.	What is Sound? What is Light? Earthquakes
b. Explain the relationship among visible light, the electromagnetic spectrum, and sight.	Electromagnetic Waves What is Light?
c. Describe and apply an understanding of how the gravitational force between any two objects would change if their mass or the distance between them changed.	Gravity
d. Describe and apply an understanding of how electric currents and magnets can exert force on each other.	Magnetic Materials Magnetic Fields Electromagnets Uses of Electromagnets
e. Describe and apply an understanding of the effects of multiple forces on an object, and how unbalanced forces will cause changes in the speed or direction.	What Are Forces? Calculating Resultant Forces
E. The Living Environment	
E1: Students differentiate among organisms based on biological characteristics and identify patterns of similarity.	
a. Compare physical characteristics that differentiate organisms into groups (including plants that use sunlight to make their own food, animals that consume energy-rich food, and organisms that cannot easily be classified as either).	Feeding Types Classifying Organisms
b. Explain how biologists use internal and external anatomical features to determine relatedness among organisms and to form the basis for classification systems.	Classifying Organisms
c. <i>Explain ways to determine whether organisms are the same species.</i>	–
d. Describe how external and internal structures of animals and plants contribute to the variety of ways organisms are able to find food and reproduce.	Adaptations Types of Reproduction
E2: Students examine how the characteristics of the physical, non-living (abiotic) environment, the types and behaviors of living (biotic) organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are part.	
a. List various kinds of resources within different biomes for which organisms compete.	Competition Growing Plants

<p>b. Describe ways in which two types of organisms may interact (including competition, predator/prey, producer/consumer/decomposer, parasitism, and mutualism) and describe the positive and negative consequences of such interactions.</p>	<p>Competition Feeding Types Food Chains Food Webs Pyramids of Number and Biomass</p>
<p>c. Describe the source and flow of energy in the two major food webs, terrestrial and marine.</p>	<p>Food Chains</p>
<p>d. Describe how matter and energy change from one form to another in living things and in the physical environment.</p>	<p>What is Energy? Energy Changes Releasing Energy</p>
<p>e. Explain that the total amount of matter in the environment stays the same even as its form and location change.</p>	<p>Recycling Nutrients</p>
<p>E3: Students describe the hierarchy of organization and function in organisms, and the similarities and differences in structure, function, and needs among and within organisms.</p>	<p style="background-color: #cccccc;"></p>
<p>a. Describe the basic functions of organisms carried out within cells including the extracting of energy from food and the elimination of wastes.</p>	<p>Animal and Plant Cells Releasing Energy Respiration and the Circulatory System</p>
<p>b. Explain the relationship among cells, tissues, organs, and organ systems, including how tissues and organs serve the needs of cells and organisms.</p>	<p>Cells to Organisms Digestion Respiration and the Circulatory System</p>
<p>c. Compare the structures, systems, and interactions that allow single-celled organisms and multi-celled plants and animals, including humans, to defend themselves, acquire and use energy, self-regulate, reproduce, and coordinate movement.</p>	<p>Animal and Plant Cells Releasing Energy Respiration and the Circulatory System The Respiratory System The Nervous System The Endocrine System The Musculoskeletal System Human Sex Cells and Systems Human Behavior Animal Behavior</p>

d. Explain that all living things are composed of cells numbering from just one to millions.	Animal and Plant Cells What are Microbes?
E4: Students describe the general characteristics and mechanisms of reproduction and heredity in organisms, including humans, and ways in which organisms are affected by their genetic traits.	
a. Explain that sexual reproduction includes fertilization that results in the inclusion of genetic information from each parent and determines the inherited traits that are a part of every cell.	Human Sex Cells and Systems Causes of Variation Genes and Alleles Inheritance Types of Reproduction
b. Identify some of the risks to the healthy development of an embryo including mother's diet, lifestyle, and hygiene.	Embryo Development and Birth
c. Describe asexual reproduction as a process by which all genetic information comes from one parent and determines the inherited traits that are a part of every cell.	Types of Reproduction
E5: Students describe the evidence that evolution occurs over many generations, allowing species to acquire many of their unique characteristics or adaptations.	
a. Explain how the layers of sedimentary rock and their contained fossils provide evidence for the long history of Earth and for the long history of changing life.	Sedimentary Rocks Evolution
b. Describe how small differences between parents and offspring can lead to descendants who are very different from their ancestors.	Evolution
c. Describe how variations in the behavior and traits of an offspring may permit some of them to survive a changing environment.	Evolution
d. Explain that new varieties of cultivated plants and domestic animals can be developed through genetic modification and describe the impacts of the new varieties of plants and animals.	Selecting Characteristics