

MIDDLE SCHOOL SCIENCE	Boardworks Middle School Science Presentation
GRADE 6	
S6E1. Students will explore current scientific views of the universe and how those views evolved.	
a. Relate the Nature of Science to the progression of basic historical scientific models (geocentric, heliocentric) as they describe our solar system, and the Big Bang as it describes the formation of the universe.	The Solar System
b. Describe the position of the solar system in the Milky Way galaxy and the universe.	The Solar System
c. Compare and contrast the planets in terms of: Size relative to the earth; Surface and atmospheric features; Relative distance from the sun; Ability to support life	The Solar System
d. Explain the motion of objects in the day/night sky in terms of relative position.	Days, Years and Seasons
e. Explain that gravity is the force that governs the motion in the solar system.	Gravity
f. <i>Describe the characteristics of comets, asteroids, and meteors.</i>	-
S6E2. Students will understand the effects of the relative positions of the earth, moon and sun.	
a. Demonstrate the phases of the moon by showing the alignment of the earth, moon, and sun.	The Earth, Moon and Sun
b. Explain the alignment of the earth, moon, and sun during solar and lunar eclipses.	The Earth, Moon and Sun
c. Relate the tilt of the earth to the distribution of sunlight throughout the year and its effect on climate.	Days, Years and Seasons
S6E3. Students will recognize the significant role of water in earth processes.	
a. Explain that a large portion of the Earth's surface is water, consisting of oceans, rivers, lakes, underground water, and ice.	The Water Cycle
b. Relate various atmospheric conditions to stages of the water cycle.	The Water Cycle
c. <i>Describe the composition, location, and subsurface topography of the world's oceans.</i>	-
d. Explain the causes of waves, currents, and tides.	Wind and Ocean Currents
S6E4. Students will understand how the distribution of land and oceans affects climate and weather.	
a. Demonstrate that land and water absorb and lose heat at different rates and explain the resulting effects on weather patterns.	Wind and Ocean Currents
b. Relate unequal heating of land and water surfaces to form large global wind systems and weather events such as tornados and thunderstorms.	Wind and Ocean Currents Tornados

c. Relate how moisture evaporating from the oceans affects the weather patterns and weather events such as hurricanes.	Hurricanes
S6E5. Students will investigate the scientific view of how the earth's surface is formed.	
a. Compare and contrast the Earth's crust, mantle, and core including temperature, density, and composition.	The Structure of the Earth
<i>b. Investigate the contribution of minerals to rock composition.</i>	–
c. Classify rocks by their process of formation.	Different Types of Rocks Igneous Rocks Metamorphic Rocks Sedimentary Rocks
d. Describe processes that change rocks and the surface of the earth.	The Rock Cycle What is Plate Tectonics? Plate Boundaries Chemical Weathering Physical Weathering Erosion, Transportation and Deposition
e. Recognize that lithospheric plates constantly move and cause major geological events on the earth's surface.	What is Plate Tectonics? Plate Boundaries Earthquakes
<i>f. Explain the effects of physical processes (plate tectonics, erosion, deposition, volcanic eruption, gravity) on geological features including oceans (composition, currents, and tides).</i>	–
<i>g. Describe how fossils show evidence of the changing surface and climate of the Earth.</i>	–
h. Describe soil as consisting of weathered rocks and decomposed organic material.	Soil
<i>i. Explain the effects of human activity on the erosion of the earth's surface.</i>	–
<i>j. Describe methods for conserving natural resources such as water, soil, and air.</i>	–
S6E6. Students will describe various sources of energy and with their uses and conservation.	
a. Explain the role of the sun as the major source of energy and its relationship to wind and water energy.	What is Light? Wind and Ocean Currents
b. Identify renewable and nonrenewable resources.	Nonrenewable Energy Resources Renewable Energy
GRADE 7	
S7L1. Students will investigate the diversity of living organisms and how they can be compared scientifically.	
a. Demonstrate the process for the development of a dichotomous key.	Classifying Organisms

b. Classify organisms based on physical characteristics using a dichotomous key of the six kingdom system (archaeobacteria, eubacteria, protists, fungi, plants, and animals).	–
S7L2. Students will describe the structure and function of cells, tissues, organs, and organ systems.	
a. Explain that cells take in nutrients in order to grow and divide and to make needed materials.	Animal and Plant Cells
b. Relate cell structures (cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria) to basic cell functions.	Animal and Plant Cells
c. Explain that cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms.	Cells to Organisms
d. Explain that tissues, organs, and organ systems serve the needs cells have for oxygen, food, and waste removal.	Cells to Organisms Respiration and the Circulatory System
e. Explain the purpose of the major organ systems in the human body (i.e., digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, and for protection from disease).	Chemical Digestion Digestion Human Sex Cells and Systems The Respiratory System Respiration and the Circulatory System The Nervous System The Endocrine System The Musculoskeletal System
S7L3. Students will recognize how biological traits are passed on to successive generations.	
a. Explain the role of genes and chromosomes in the process of inheriting a specific trait.	Inheritance Genes and Alleles
b. Compare and contrast that organisms reproduce asexually and sexually (bacteria, protists, fungi, plants & animals).	Types of Reproduction
c. Recognize that selective breeding can produce plants or animals with desired traits.	Selecting Characteristics
S7L4. Students will examine the dependence of organisms on one another and their environments.	
a. Demonstrate in a food web that matter is transferred from one organism to another and can recycle between organisms and their environments.	Food Webs Feeding Types
b. Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism.	Feeding Types Plants as Food

c. Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.	Environmental Change Evolution
d. Categorize relationships between organisms that are competitive or mutually beneficial.	Competition Feeding Types
e. Describe the characteristics of Earth's major terrestrial biomes (i.e. tropical rain forest, savannah, temperate, desert, taiga, tundra, and mountain) and aquatic communities (i.e. freshwater, estuaries, and marine).	Climate Zones
S7L5. Students will examine the evolution of living organisms through inherited characteristics that promote survival of organisms and the survival of successive generations of their offspring.	
a. Explain that physical characteristics of organisms have changed over successive generations (e.g. Darwin's finches and peppered moths of Manchester).	Evolution
b. Describe ways in which species on earth have evolved due to natural selection.	Evolution
c. Trace evidence that the fossil record found in sedimentary rock provides evidence for the long history of changing life forms.	Evolution
GRADE 8	
S8P1. Students will examine the scientific view of the nature of matter.	
a. Distinguish between atoms and molecules.	Elements and Compounds What Are Atoms?
b. Describe the difference between pure substances (elements and compounds) and mixtures.	Elements and Compounds
c. Describe the movement of particles in solids, liquids, gases, and plasmas states.	Particles in Action
d. <i>Distinguish between physical and chemical properties of matter as physical (i.e., density, melting point, boiling point) or chemical (i.e., reactivity, combustibility).</i>	-
e. Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color).	Types of Chemical Reactions
f. Recognize that there are more than 100 elements and some have similar properties as shown on the Periodic Table of Elements.	Elements and Compounds The Periodic Table
g. Identify and demonstrate the Law of Conservation of Matter.	Conservation of Mass
S8P2. Students will be familiar with the forms and transformations of energy.	
a. Explain energy transformation in terms of the Law of Conservation of Energy.	What is Energy?
b. Explain the relationship between potential and kinetic energy.	What is Energy?
c. Compare and contrast the different forms of energy (heat, light, electricity, mechanical motion, sound) and their characteristics.	What is Energy? What is Light? What is Sound? Heat and Temperature

d. Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).	Conduction and Convection Radiation
S8P3. Students will investigate relationship between force, mass, and the motion of objects.	
a. Determine the relationship between velocity and acceleration.	Distance, Time and Speed
b. Demonstrate the effect of balanced and unbalanced forces on an object in terms of gravity, inertia, and friction.	What Are Forces? Calculating Resultant Forces Gravity Friction
c. Demonstrate the effect of simple machines (lever, inclined plane, pulley, wedge, screw, and wheel and axle) on work.	Moments Moment Calculations Hydraulics
S8P4. Students will explore the wave nature of sound and electromagnetic radiation.	
a. Identify the characteristics of electromagnetic and mechanical waves.	Electromagnetic Waves
b. Describe how the behavior of light waves is manipulated causing reflection, refraction diffraction, and absorption.	Reflection Refraction
c. Explain how the human eye sees objects and colors in terms of wavelengths.	What is Light? Color
d. Describe how the behavior of waves is affected by medium (such as air, water, solids).	Speed of Sound Refraction
e. Relate the properties of sound to everyday experiences.	Speed of Sound
f. Diagram the parts of the wave and explain how the parts are affected by changes in amplitude and pitch.	What is Sound?
S8P5. Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature.	
a. Recognize that every object exerts gravitational force on every other object and that the force exerted depends on how much mass the objects have and how far apart they are.	Gravity
b. Demonstrate the advantages and disadvantages of series and parallel circuits and how they transfer energy.	Series Circuits Parallel Circuits Energy Transfer in Circuits
c. Investigate and explain that electric currents and magnets can exert force on each other.	Magnetic Materials Magnetic Fields Electromagnets Uses of Electromagnets