

Middle School Science	Boardworks Middle School Presentations
Grade 6	
Standard 3 - The Physical Setting	
The Universe	
6.3.1 Compare and contrast the size, composition, and surface features of the planets that comprise the solar system, as well as the objects orbiting them. Explain that the planets, except Pluto, move around the sun in nearly circular orbits.	The Solar System
<i>6.3.2 Observe and describe that planets change their position relative to the background of stars.</i>	-
6.3.3 Explain that Earth is one of several planets that orbit the sun, and that the moon, as well as many artificial satellites and debris, orbit around Earth.	Satellites The Solar System The Earth, Moon and Sun
Earth and the Processes That Shape It	
6.3.4 Explain that we live on a planet which appears at present to be the only body in the solar system capable of supporting life.	The Solar System
6.3.5 Use models or drawings to explain that Earth has different seasons and weather patterns because it turns daily on an axis that is tilted relative to the plane of Earth's yearly orbit around the sun. Know that because of this, sunlight falls more intensely on different parts of Earth during the year (the accompanying greater length of days also has an effect) and the difference in heating produces seasons and weather patterns.	Days, Years and Seasons What is Weather?
6.3.6 Use models or drawings to explain that the phases of the moon are caused by the moon's orbit around Earth, once in about 28 days, changing what part of the moon is lighted by the sun and how much of that part can be seen from Earth, both during the day and night.	The Earth, Moon and Sun
6.3.7 Understand and describe the scales involved in characterizing Earth and its atmosphere. Describe that Earth is mostly rock, that three-fourths of its surface is covered by a relatively thin layer of water, and that the entire planet is surrounded by a relatively thin blanket of air.	The Structure of the Earth The Atmosphere The Water Cycle
6.3.8 Explain that fresh water, limited in supply and uneven in distribution, is essential for life and also for most industrial processes. Understand that this resource can be depleted or polluted, making it unavailable or unsuitable for life.	The Water Cycle Acid Rain
6.3.9 Illustrate that the cycling of water in and out of the atmosphere plays an important role in determining climatic patterns.	Climate Zones Wind and Ocean Currents
6.3.10 Describe the motions of ocean waters, such as tides, and identify their causes.	Wind and Ocean Currents
6.3.11 Identify and explain the effects of oceans on climate.	Wind and Ocean Currents
<i>6.3.12 Describe ways human beings protect themselves from adverse weather conditions.</i>	-

6.3.13 Identify, explain, and discuss some effects human activities, such as the creation of pollution, have on weather and the atmosphere.	Greenhouse Gases Flooding
6.3.14 Give examples of some minerals that are very rare and some that exist in great quantities. Explain how recycling and the development of substitutes can reduce the rate of depletion of minerals.	–
6.3.15 Explain that although weathered rock is the basic component of soil, the composition and texture of soil and its fertility and resistance to erosion are greatly influenced by plant roots and debris, bacteria, fungi, worms, insects, and other organisms.	Soil
6.3.16 Explain that human activities, such as reducing the amount of forest cover, increasing the amount and variety of chemicals released into the atmosphere, and farming intensively, have changed the capacity of the environment to support some life forms.	Acid Rain Greenhouse Gases Growing Plants Environmental Change
Matter and Energy	
6.3.17 Recognize and describe that energy is a property of many objects and is associated with heat, light, electricity, mechanical motion, and sound.	What is Energy? What is Light? What is Sound? How Electrical Energy is Useful
6.3.18 Investigate and describe that when a new material, such as concrete, is made by combining two or more materials, it has properties that are different from the original materials.	Making Compounds
6.3.19 Investigate that materials may be composed of parts that are too small to be seen without magnification.	Atomic Structure Elements and Compounds What Are Atoms?
6.3.20 Investigate that equal volumes of different substances usually have different masses as well as different densities.	–
Forces of Nature	
6.3.21 Investigate, using a prism for example, that light is made up of a mixture of many different colors of light, even though the light is perceived as almost white.	Color
6.3.22 Demonstrate that vibrations in materials set up wavelike disturbances, such as sound and earthquake waves, that spread away from the source.	What is Sound?
6.3.23 Explain that electrical circuits provide a means of transferring electrical energy from sources such as generators to devices in which heat, light, sound, and chemical changes are produced.	Energy Transfer in Circuits How is Electrical Energy Useful? Energy Efficiency
Standard 4 - The Living Environment	
Diversity of Life	
6.4.1 Explain that one of the most general distinctions among organisms is between green plants, which use sunlight to make their own food, and animals, which consume energy-rich foods.	Feeding Types

6.4.2 Give examples of organisms that cannot be neatly classified as either plants or animals, such as fungi and bacteria.	What Are Microbes? Classifying Organisms
6.4.3 Describe some of the great variety of body plans and internal structures animals and plants have that contribute to their being able to make or find food and reproduce.	Animal and Plant Cells Leaves and Glucose Adaptations Types of Reproduction
<i>6.4.4 Recognize and describe that a species comprises all organisms that can mate with one another to produce fertile offspring.</i>	–
6.4.5 Investigate and explain that all living things are composed of cells whose details are usually visible only through a microscope.	Animal and Plant Cells
6.4.6 Distinguish the main differences between plant and animal cells, such as the presence of chlorophyll* and cell walls in plant cells and their absence in animal cells.	Animal and Plant Cells
<i>6.4.7 Explain that about two-thirds of the mass of a cell is accounted for by water. Understand that water gives cells many of their properties.</i>	–
Interdependence of Life and Evolution	
6.4.8 Explain that in all environments, such as freshwater, marine, forest, desert, grassland, mountain, and others, organisms with similar needs may compete with one another for resources, including food, space, water, air, and shelter. Note that in any environment, the growth and survival of organisms depend on the physical conditions.	Competition
6.4.9 Recognize and explain that two types of organisms may interact in a competitive or cooperative relationship, such as producer/consumer, predator/prey, or parasite/host.	Competition Feeding Types
6.4.10 Describe how life on Earth depends on energy from the sun.	Feeding Types What is Photosynthesis?
Human Identity	
6.4.11 Describe that human beings have body systems for obtaining and providing energy, defense, reproduction, and the coordination of body functions.	Releasing Energy Human Sex Cells and Systems The Nervous System The Endocrine System The Musculoskeletal System
<i>6.4.12 Explain that human beings have many similarities and differences and that the similarities make it possible for human beings to reproduce and to donate blood and organs to one another.</i>	–
<i>6.4.13 Give examples of how human beings use technology to match or exceed many of the abilities of other species.</i>	–
Grade 7	
Standard 3 - The Physical Setting	
The Universe	

7.3.1 Recognize and describe that the sun is a medium-sized star located near the edge of a disk-shaped galaxy of stars and that the universe contains many billions of galaxies and each galaxy contains many billions of stars.	The Solar System
7.3.2 <i>Recognize and describe that the sun is many thousands of times closer to Earth than any other star, allowing light from the sun to reach Earth in a few minutes. Note that this may be compared to time spans of longer than a year for all other stars.</i>	–
Earth and the Processes That Shape It	
7.3.3 <i>Describe how climates sometimes have changed abruptly in the past as a result of changes in Earth's crust, such as volcanic eruptions or impacts of huge rocks from space.</i>	–
7.3.4 Explain how heat flow and movement of material within Earth causes earthquakes and volcanic eruptions and creates mountains and ocean basins.	What is Plate Tectonics? Plate Boundaries The Structure of the Earth Earthquakes
7.3.5 Recognize and explain that heat energy carried by ocean currents has a strong influence on climate around the world.	Wind and Ocean Currents
7.3.6 <i>Describe how gas and dust from large volcanoes can change the atmosphere.</i>	–
7.3.7 Give examples of some changes in Earth's surface that are abrupt, such as earthquakes and volcanic eruptions, and some changes that happen very slowly, such as uplift and wearing down of mountains and the action of glaciers.	Earthquakes Erosion, Transportation and Deposition Plate Boundaries
7.3.8 Describe how sediments of sand and smaller particles, sometimes containing the remains of organisms, are gradually buried and are cemented together by dissolved minerals to form solid rock again.	The Rock Cycle Sedimentary Rock
7.3.9 Explain that sedimentary rock, when buried deep enough, may be reformed by pressure and heat, perhaps melting and recrystallizing into different kinds of rock. Describe that these reformed rock layers may be forced up again to become land surface and even mountains, and subsequently erode.	Sedimentary Rock Metamorphic Rock
7.3.10 Explain how the thousands of layers of sedimentary rock can confirm the long history of the changing surface of Earth and the changing life forms whose remains are found in successive layers, although the youngest layers are not always found on top, because of folding, breaking, and uplifting of layers.	Sedimentary Rock
Matter and Energy	
7.3.11 Explain that the sun loses energy by emitting light. Note that only a tiny fraction of that light reaches Earth. Understand that the sun's energy arrives as light with a wide range of wavelengths, consisting of visible light and infrared and ultraviolet radiation.	What is Light? Electromagnetic Waves Radiation
7.3.12 <i>Investigate how the temperature and acidity of a solution influences reaction rates, such as those resulting in food spoilage.</i>	–
7.3.13 Explain that many substances dissolve in water. Understand that the presence of these substances often affects the rates of reactions that are occurring in the water as compared to the same reactions occurring in the water in the absence of the substances.	Solutions

7.3.14 Explain that energy in the form of heat is almost always one of the products of an energy transformation, such as in the examples of exploding stars, biological growth, the operation of machines, and the motion of people.	What is Energy?
7.3.15 Describe how electrical energy can be produced from a variety of energy sources and can be transformed into almost any other form of energy, such as light or heat.	How is Electrical Energy Useful?
7.3.16 Recognize and explain that different ways of obtaining, transforming, and distributing energy have different environmental consequences.	Renewable Energy Nonrenewable Energy Resources Fossil Fuels Greenhouse Gases
7.3.17 Investigate that an unbalanced force, acting on an object, changes its speed* or path of motion or both, and know that if the force always acts toward the same center as the object moves, the object's path may curve into an orbit around the center.	What Are Forces? Calculating Resultant Forces Gravity
7.3.18 Describe that light waves, sound waves, and other waves move at different speeds in different materials.	Speed of Sound Refraction
7.3.19 Explain that human eyes respond to a narrow range of wavelengths of the electromagnetic spectrum.	Electromagnetic Waves
7.3.20 Describe that something can be "seen" when light waves emitted or reflected by it enter the eye just as something can be "heard" when sound waves from it enter the ear.	What is Light? What is Sound? The Ear and Hearing
Standard 4 - The Living Environment	
Diversity of Life	
7.4.1 Explain that similarities among organisms are found in external and internal anatomical features, including specific characteristics at the cellular level, such as the number of chromosomes. Understand that these similarities are used to classify organisms since they may be used to infer the degree of relatedness among organisms.	Adaptations Classifying Organisms
<i>7.4.2 Describe that all organisms, including the human species, are part of and depend on two main interconnected global food webs, the ocean food web and the land food web.</i>	–
7.4.3 Explain how, in sexual reproduction, a single specialized cell from a female merges with a specialized cell from a male and this fertilized egg carries genetic information from each parent and multiplies to form the complete organism.	Causes of Variation Human Sex Cells and Systems Types of Reproduction
7.4.4 Explain that cells continually divide to make more cells for growth and repair and that various organs and tissues function to serve the needs of cells for food, air, and waste removal.	Where Do Cells Come From? Cells to Organisms
7.4.5 Explain that the basic functions of organisms, such as extracting energy from food and getting rid of wastes, are carried out within the cell and understand that the way in which cells function is similar in all organisms.	Animal and Plant Cells Releasing Energy
Interdependence of Life and Evolution	

7.4.6 Explain how food provides the fuel and the building material for all organisms.	Releasing Energy
7.4.7 Describe how plants use the energy from light to make sugars from carbon dioxide and water to produce food that can be used immediately or stored for later use.	What is Photosynthesis? Leaves and Glucose
7.4.8 Describe how organisms that eat plants break down the plant structures to produce the materials and energy that they need to survive, and in turn, how they are consumed by other organisms.	Plants as Food Pyramids of Number and Biomass Food Chains Food Webs
7.4.9 Understand and explain that as any population of organisms grows, it is held in check by one or more environmental factors. These factors could result in depletion of food or nesting sites and/or increased loss to increased numbers of predators or parasites. Give examples of some consequences of this.	Feeding Types Competition
Human Identity	
7.4.10 Describe how technologies having to do with food production, sanitation, and disease prevention have dramatically changed how people live and work and have resulted in changes in factors that affect the growth of human population.	Fighting Disease
<i>7.4.11 Explain that the amount of food energy (calories) a person requires varies with body weight, age, sex, activity level, and natural body efficiency. Understand that regular exercise is important to maintain a healthy heart/lung system, good muscle tone, and strong bone structure.</i>	–
7.4.12 Explain that viruses, bacteria, fungi, and parasites may infect the human body and interfere with normal body functions. Recognize that a person can catch a cold many times because there are many varieties of cold viruses that cause similar symptoms.	How Microbes Cause Disease
7.4.13 Explain that white blood cells engulf invaders or produce antibodies that attack invaders or mark the invaders for killing by other white blood cells. Know that the antibodies produced will remain and can fight off subsequent invaders of the same kind.	Fighting Disease
7.4.14 Explain that the environment may contain dangerous levels of substances that are harmful to human beings. Understand, therefore, that the good health of individuals requires monitoring the soil, air, and water as well as taking steps to keep them safe.	Acid Rain Growing Plants
Grade 8	
Standard 3 - The Physical Setting	
The Universe	
<i>8.3.1 Explain that large numbers of chunks of rock orbit the sun and some of this rock interacts with Earth.</i>	–
Earth and the Processes That Shape It	
<i>8.3.2 Explain that the slow movement of material within Earth results from heat flowing out of the deep interior and the action of gravitational forces on regions of different density.</i>	–

8.3.3 Explain that the solid crust of Earth, including both the continents and the ocean basins, consists of separate plates that ride on a denser, hot, gradually deformable layer of earth. Understand that the crust sections move very slowly, pressing against one another in some places, pulling apart in other places. Further understand that ocean-floor plates may slide under continental plates, sinking deep into Earth, and that the surface layers of these plates may fold, forming mountain ranges.	What is Plate Tectonics? Plate Boundaries The Structure of the Earth
8.3.4 Explain that earthquakes often occur along the boundaries between colliding plates, and molten rock from below creates pressure that is released by volcanic eruptions, helping to build up mountains. Understand that under the ocean basins, molten rock may well up between separating plates to create new ocean floor. Further understand that volcanic activity along the ocean floor may form undersea mountains, which can thrust above the ocean's surface to become islands.	What is Plate Tectonics? Plate Boundaries The Structure of the Earth Earthquakes
8.3.5 Explain that everything on or anywhere near Earth is pulled toward Earth's center by a gravitational force.	Gravity
8.3.6 <i>Understand and explain that the benefits of Earth's resources, such as fresh water, air, soil, and trees, are finite and can be reduced by using them wastefully or by deliberately or accidentally destroying them.</i>	–
8.3.7 <i>Explain that the atmosphere and the oceans have a limited capacity to absorb wastes and recycle materials naturally.</i>	–
Matter and Energy	
8.3.8 Explain that all matter is made up of atoms which are far too small to see directly through an optical microscope. Understand that the atoms of any element are similar but are different from atoms of other elements. Further understand that atoms may stick together in well-defined molecules or may be packed together in large arrays. Also understand that different arrangements of atoms into groups comprise all substances.	What Are Atoms? Atomic Structure Elements and Compounds
8.3.9 Demonstrate, using drawings and models, the movement of atoms in a solid, liquid, and gaseous state. Explain that atoms and molecules are perpetually in motion.	Particles in Action
8.3.10 Explain that increased temperature means that atoms have a greater average energy of motion and that most gases expand when heated.	Changing State
8.3.11 Describe how groups of elements can be classified based on similar properties, including highly reactive metals, less reactive metals, highly reactive nonmetals, less reactive nonmetals, and some almost completely nonreactive gases.	The Periodic Table Metals and Nonmetals Metalloids
8.3.12 Explain that no matter how substances within a closed system interact with one another, or how they combine or break apart, the total mass of the system remains the same. Understand that the atomic theory explains the conservation of matter: if the number of atoms stays the same no matter how they are rearranged, then their total mass stays the same.	Conservation of Mass
8.3.13 Explain that energy cannot be created or destroyed but only changed from one form into another.	What is Energy?
8.3.14 Describe how heat can be transferred through materials by the collision of atoms, or across space by radiation, or if the material is fluid, by convection currents that are set up in it that aid the transfer of heat.	Heat and Temperature Conduction and Convection Radiation
8.3.15 Identify different forms of energy that exist in nature.	What is Energy?

Forces of Nature	
8.3.16 Explain that every object exerts gravitational force on every other object and that the force depends on how much mass the objects have and how far apart they are.	Gravity
8.3.17 Explain that the sun's gravitational pull holds Earth and the other planets in their orbits, just as the planets' gravitational pull keeps their moons in orbit around them.	Gravity
8.3.18 Investigate and explain that electric currents and magnets can exert force on each other.	Magnetic Materials Electromagnets Uses of Electromagnets
8.3.19 Investigate and compare series and parallel circuits.	Series Circuits Parallel Circuits
8.3.20 Compare the differences in power consumption in different electrical devices.	Energy Efficiency
Standard 4 - The Living Environment	
Diversity of Life	
8.4.1 Differentiate between inherited traits, such as hair color or flower color, and acquired skills, such as manners.	Genes and Alleles Inheritance Human Behavior
8.4.2 Describe that in some organisms, such as yeast or bacteria, all genes come from a single parent, while in those that have sexes, typically half of the genes come from each parent.	Types of Reproduction
8.4.3 Recognize and describe that new varieties of cultivated plants, such as corn and apples, and domestic animals, such as dogs and horses, have resulted from selective breeding for particular traits.	Selecting Characteristics
8.4.4 Describe how matter is transferred from one organism to another repeatedly and between organisms and their physical environment.	Food Chains Food Webs Feeding Types
8.4.5 Explain that energy can be transferred from one form to another in living things.	Feeding Types Pyramids of Number and Biomass
8.4.6 Describe how animals get their energy from oxidizing their food and releasing some of this energy as heat.	Releasing Energy
8.4.7 Recognize and explain that small genetic differences between parents and offspring can accumulate in successive generations so that descendants are very different from their ancestors.	Evolution
8.4.8 Describe how environmental conditions affect the survival of individual organisms and how entire species may prosper in spite of the poor survivability or bad fortune of individuals.	Evolution
Human Identity	
8.4.9 Recognize and describe that fossil evidence is consistent with the idea that human beings evolved from earlier species.	-