

Middle School Science

Grade 6

<u>Skills & Learning Objectives</u>	<u>Content</u>	<u>BSS Difference</u>
<ul style="list-style-type: none">● 6-8.PS.2. Differentiate between volume and mass. Define density.● 6-8.PS.3. Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g., rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits.● 6-8.PS.5. Recognize that there are more than 100 elements that combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.● 6-8.PS.6. Differentiate between an atom (the smallest unit of an element that maintains the characteristics of that element) and a molecule (the smallest unit of a compound that maintains the characteristics of that compound).● 6-8.PS.7. Give basic examples of elements and compounds.● 6-8.PS.8. Differentiate between mixtures and pure substances.	<ul style="list-style-type: none">● Matter● study of Chemistry● Substance● Physical vs. Chemical Property● element, atom, molecule and compound● chemical formula● Chemical bonds● Mixtures● SI units (Mass, volume, density)● Mass vs. Weight● Physical vs. Chemical Changes● Law of Conservation of Mass● 3 states of matter	<ul style="list-style-type: none">● Students partake in frequent hands-on labs and experiments relating to the content

<ul style="list-style-type: none"> 6-8.PS.10. Differentiate between physical changes and chemical changes. 		
<p>6-8.LS.13. Give examples of ways in which organisms interact and have different functions within an ecosystem that enable the ecosystem to survive.</p> <p>6-8.LS.14. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.</p> <p>6-8.LS.15. Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole.</p>	<ul style="list-style-type: none"> Organisms, species, population, community, ecosystem Abiotic/biotic factors Natural selection - adaptations Interactions among organisms - competition and predation Types of symbiosis Food chain vs. food web Producers, consumers, decomposer Energy pyramid Dynamic equilibrium and stable ecosystems The water cycle, oxygen and carbon cycle, and nitrogen cycle 6 different biomes Natural resources - renewable and nonrenewable, Environmental science Forms of pollution Sustainable use, conservation and ecological footprint 	<ul style="list-style-type: none"> STREAM Project – Eco-cleaner Students partake in frequent hands-on labs and experiments relating to the content

	<ul style="list-style-type: none"> ● Benefits of biodegradable substances and recycling on the Earth ● Impacts of landfills 	
<ul style="list-style-type: none"> ● 6-8.ESS.1. Recognize, interpret, and be able to create models of the earth's common physical features in various mapping representations, including contour maps. ● Identify three main landforms (Mountains, plateaus, plains) ● Understand how weathering and erosion change the shape of Earth's land. ● Identify and recognize difference between agents of Mechanical and Chemical Weathering. ● Identify forms of erosion (wind, water, wave, glacial) and landforms created as a result of each. 	<ul style="list-style-type: none"> ● Features of topography (landforms, relief, elevation) ● Reading and creating topographic maps ● Longitude and latitude ● Reading a map using a key, symbols and scale ● Agents of mechanical and chemical weathering ● Water, wave, wind and glacial erosion. ● Land features created as result of 4 forms of erosion. 	<ul style="list-style-type: none"> ● STREAM - Building for erosion control ● Students partake in frequent hands-on labs and experiments relating to the content

Grade 7

<u>Skills & Learning Objectives</u>	<u>Content</u>	<u>BSS Difference</u>
<ul style="list-style-type: none"> ● What forms mechanical waves. ● Types of mechanical waves. ● Understand the amplitude, wavelength, frequency and speed of a wave. ● Explain how frequency, wavelength and speed of wave are related. ● Identify three things that change the direction of a wave. ● Identify two types of wave interference. ● Explain how standing waves form. ● Explain what sound is and factors that affect the speed of sound. ● Identify factors that affect loudness. ● Explain the Doppler Effect. ● Identify factors that affect pitch. 	<ul style="list-style-type: none"> ● Waves (energy, medium) ● 3 types of mechanical waves (transverse, longitudinal, surface) ● Aspects of 3 waves (crest, trough, compression, rarefaction) ● Properties of waves (amplitude, wavelength, frequency, speed) ● Reflection, refraction and diffraction ● 2 types of wave interference (constructive/destructive) ● Standing wave (nodes/antinodes) ● Resonance ● Factors that affect speed of sound (temperature, density, stiffness of medium) ● Pitch ● Factors affecting loudness (energy, intensity) ● Measuring loudness 	<ul style="list-style-type: none"> ● Students partake in frequent hands-on labs and experiments relating to the content

	<p>(decibel)</p> <ul style="list-style-type: none"> ● Doppler Effect 	
<ul style="list-style-type: none"> ● 6-8.LS.3. Compare and contrast plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, cytoplasm, chloroplasts, mitochondria, vacuoles). ● 6-8.LS.4. Recognize that within cells, many of the basic functions of organisms (e.g., extracting energy from food and getting rid of waste) are carried out. The way in which cells function is similar in all living organisms. ● 6-8.LS.5. Describe the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms. ● 6-8.LS.7. Recognize that every organism requires a set of instructions that specifies its traits. These instructions are stored in the organism's chromosomes. Heredity is the passage of these instructions from one generation to another. 	<ul style="list-style-type: none"> ● Animal vs. Plant Cell (Structure and function) ● Parts of microscope and appropriate use ● Cell theory ● Cell Membrane (passive vs. active transport, endo/exocytosis) ● Heredity ● Traits ● Genetics ● Dominant/recessive allele ● Purebred vs. hybrid ● Homogenous vs. heterogeneous ● Fertilization ● How to determine probability of specific traits being passed to offspring ● How to make and read a Punnett Square ● Phenotype vs. genotype ● Multiple alleles ● Codominance ● Incomplete dominance. 	<ul style="list-style-type: none"> ● STREAM Project - Designing a species. ● Students partake in frequent hands-on labs and experiments relating to the content
<ul style="list-style-type: none"> ● 6-8.ESS.2. Describe the layers of the earth, including the lithosphere, the hot 	<ul style="list-style-type: none"> ● Earth's system (biosphere, hydrosphere, atmosphere, 	<ul style="list-style-type: none"> ● STREAM - Building for Earthquakes

convecting mantle, and the dense metallic core.

- 6-8.ESS.3. Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through the earth's system.
- 6-8.ESS.5. Describe how the movement of the earth's crustal plates causes both slow changes in the earth's surface (e.g., formation of mountains and ocean basins) and rapid ones (e.g., volcanic eruptions and earthquakes).
- 6-8.ESS.6. Describe and give examples of ways in which the earth's surface is built up and torn down by natural processes, including deposition of sediments, rock formation, erosion, and weathering.

geosphere)

- Difference between constructive and destructive forces
- Examples of destructive/constructive forces.
- Earth's interior layers
- Heat Transfer (radiation, conduction, convection)
- Movement of convection currents within the mantle
- The rock cycle
- Process of seafloor spreading and subduction
- Movement of plate tectonics
- Three types of boundaries, faults, and stress in Earth's crust
- Three types of seismic waves
- Instruments used to measure earthquake intensity

- Students partake in frequent hands-on labs and experiments relating to the content

Grade 8

<u>Skills & Learning Objectives</u>	<u>Content</u>	<u>BSS Difference</u>
<ul style="list-style-type: none">● 6-8.PS.1. Differentiate between weight and mass, recognizing that weight is the amount of gravitational pull on an object.● 6-8.PS.11. Explain and give examples of how the motion of an object can be described by its position, direction of motion, and speed.● 6-8.PS.12. Graph and interpret distance vs. time graphs for constant speed.	<ul style="list-style-type: none">● Motion● Using reference point to determine if something is in motion● SI units of measurement● Speed (average and instantaneous)● Velocity● Graphing and being able to read speed and velocity graphs● Calculating slope for speed● Acceleration (being able to graph and read a graph of acceleration)● Force● Calculating net force of an object● Newton (unit of measure)● Newton's laws of motion● Gravity● Various types of friction and being able to identify examples● Mass vs. weight	<ul style="list-style-type: none">● STREAM Project - Building Bridges● Students partake in frequent hands-on labs and experiments relating to the content

	<ul style="list-style-type: none"> ● Inertia 	
<ul style="list-style-type: none"> ● 6-8.LS.5. Describe the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms. ● 6-8.LS.6. Identify the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, excretion, protection from disease, and movement, control, and coordination) and describe ways that these systems interact with each other. 	<ul style="list-style-type: none"> ● Cell structure (membrane, nucleus, cytoplasm) ● Body organization (cell, tissue, organ, organ system) ● Types of tissue (muscle, nervous, connective, epithelial) ● Transporting materials in body (getting food, breathing, moving waste) ● Nutrient (absorption) ● Glands and hormones ● Stimulus and response ● Maintaining homeostasis ● Parts of skeletal system (vertebrae, skeletal muscle, joints, ligament, compact bone, spongy bone, marrow, cartilage) ● Osteoporosis ● Parts of Muscular System (involuntary/voluntary muscle, tendon, smooth/cardiac/striated muscle) ● Features of skin (epidermis, melanin, dermis, pore, follicle) ● Skin Cancer 	<ul style="list-style-type: none"> ● Students partake in frequent hands-on labs and experiments relating to the content

	<ul style="list-style-type: none"> ● Features of nervous system (neuron, nerve impulse, dendrite, axon, nerve, sensory/inter/motor neuron, synapse) ● Functions of central and peripheral Nervous system ● Somatic and autonomic nervous system ● Features of brain (spinal cord, cerebrum, cerebellum, brain stem) 	
<ul style="list-style-type: none"> ● 6-8.ESS.8. Recognize that gravity is a force that pulls all things on and near the earth toward the center of the earth. Gravity plays a major role in the formation of the planets, stars, and solar system and in determining their motions. ● 6-8.ESS.9. Describe lunar and solar eclipses, the observed moon phases, and tides. Relate them to the relative positions of the earth, moon, and sun. ● 6-8.ESS.10. Compare and contrast properties and conditions of objects in the solar system (i.e., sun, planets, and moons) to those on Earth (i.e., gravitational force, distance from the sun, speed, movement, temperature, and atmospheric conditions). ● 6-8.ESS.11. Explain how the tilt of the 	<ul style="list-style-type: none"> ● Earth's movement in space (axis, rotation, revolution, orbit) ● Summer/winter solstice, Autumnal/vernal equinox ● Explanation for seasons ● Newton's first law of motion ● Effects of inertia and gravity on moon and Earth's orbit ● Features and topography of the moon ● Moon phases ● Solar and lunar eclipses ● Space Race ● History of space exploration ● Space shuttles 	<ul style="list-style-type: none"> ● STREAM - Building a space vehicle ● Students partake in frequent hands-on labs and experiments relating to the content

earth and its revolution around the sun result in an uneven heating of the earth, which in turn causes the seasons.

- ISS
- Space probes (orbiters/landers)
- Exploration of objects in solar system
- Features of the 4 inner and 4 outer planets
- Features of Pluto