A Correlation of Pearson Earth Science ©2017 to the Mississippi College-and-Career-Readiness Standards for Science – Earth and Space Science

Mississippi College and Career Readiness Standards Earth and Space Science	Pearson Earth Science ©2017
Earth and Space Science	
ESS.1 Earth in the Universe	
Conceptual Understanding: The planet Earth is a very small part of a very large universe that has developed over a huge expanse of time.	
ESS.1.A Students will develop an understanding of the universe, its development, immense size, and composition.	
ESS.1A.1 Describe the Big Bang theory and summarize observations (e.g., cosmic microwave background radiation, Hubble's law, and redshift caused by the Doppler effect) as evidence to support the formation and expansion of the universe.	**SE/TE:** 6 - Earth's Place in the Universe 720-721 - The Big Bang 718-719 - Expanding Universe **TE Only:** 698C-698D - The Birth of the Universe 720 - Address Misconception
ESS.1A.2 Interpret information from the Hertzsprung -Russell diagram to differentiate types of stars, including our sun, according to size, magnitude, and classification.	**SE/TE:** 704-706 - Hertzsprung-Russell Diagram 726 - Analyze Data - #26-28 **TE Only:** 704 - Use Visual & Facts and Figures
ESS.1A.3 Organize and interpret data sets for patterns and trends to compare and contrast stellar evolution in order to explain and communicate how a star changes during its life.	**SE/TE:** 707-714 - Stellar Evolution 709 - Life Cycle of a Sun-like Star - Figure 10 710 - Stellar Evolution - Figure 11 712 - Table 2 - Summary of Evolution for Starts of Various Masses 714 - 25.5 Assessment - Questions 5-7 **TE Only:** 709 - Facts and Figures 710 - Facts and Figures
ESS.1A.4 Research and explain how nuclear fusion in stars and supernova lead to the formation of all other elements.	**SE/TE:** 648 - Figure 4 Materials That Formed the Planets 712 - Nucleosynthesis

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Conceptual Understanding: The sun, moon, and planets have predictable patterns that are explained by forces and laws. Patterns of motion in the solar system can be described and predicted based on observations and an understanding of gravity.	
ESS.1.B Students will develop an understanding of Earth, the solar system, and the laws that predict the motion of celestial bodies.	
ESS.1B.1 Read and evaluate scientific information for mechanisms/results (e.g., the solar nebular theory) to explain how the solar system was formed. Cite evidence and develop a logical argument.	**SE/TE:** 4 - 5 - Formation of Earth 645 - Table 1 - Planetary Data 647-648 - Formation of the Solar System
ESS.1B.2 Compare and contrast celestial bodies (e.g., planets, natural satellites, comets, asteroids, and the Oort cloud) and their motion in our solar system (e.g., revolution and rotation). Build an Analemma calendar.	**SE/TE:** 481 - Earth-Sun Relationship 645 - Table 1 - Planetary Data 645-646 - The Planets: An Overview 649-653 - Terrestrial Planets 654-659 - The Outer Planets 660-664 - Minor Members of the Solar System **TE Only:** 481 - Angles and Seasons 645 - Differentiate Instruction - Planet chart 645 - Compare and Contrast
ESS.1B.3 Design a model (e.g., a gravity simulation using PVC and a neoprene screen) to demonstrate Kepler's laws and the relationships of the orbits of objects in our solar system. Relate them to Newton's law of universal gravitation and laws of motion.	**SE/TE:** 618 - Johannes Kepler 620 - Sir Isaac Newton & Universal Gravitation **TE:** 618 - Visualizing Planetary Orbits

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ESS.2 Earth Structure and History	
Conceptual Understanding: Earth's interior is divided into a solid inner core, a liquid outer core, a pliable mantle, and a solid crust. Even though the crust is solid, it is always in motion and is recycled through time.	
ESS.2.A Students will develop an understanding of the structure and composition of Earth and its materials.	
ESS.2A.1 Analyze and interpret data to explain and communicate the differentiation of Earth's internal chemical structure (e.g., core, mantle, and crust) using the production of internal heat from the radioactive decay of unstable isotopes and gravitational energy.	**SE/TE:** 233-237 - Earth's Layered Structure **TE Only:** 233 - Facts and Figures - Core-Mantle Boundary
ESS.2A.2 Analyze and interpret data to explain and communicate the differentiation of Earth's physical divisions (e.g., lithosphere and asthenosphere) using data from seismic waves and Earth's magnetic field.	**SE/TE:** 234-235 - Layers Defined by Physical Properties 233 - Figure 15 - Paths of Seismic Waves 235 - Figure 17 - Earth's Magnetic Field 236 - Discovering Earth's Layers & Figure 18 - Earth's Interior
ESS.2A.3 Investigate the physical and/or chemical characteristics of mineral specimens to identify minerals and mineral deposits/groups (e.g., oxides, carbonates, halides, sulfides, sulfates, silicates, and phosphates). Include the relationship between chemical bonds, chemical formulas, mineral use, and mineral properties.	**SE/TE:** 40-43 - Types of Chemical Bonds 44-49 - Minerals **TE Only:** 45 - Teacher Demo - Crystallization of Sulfur 46 - Teacher Demo - Precipitation of a Mineral 46 - Facts and Figures 48 - Use Models - Build models of various silicate structures

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ESS.2A.4 Investigate the physical and/or chemical characteristics of rock specimens to identify and categorize igneous, sedimentary, and metamorphic rocks. Include the processes that generate the transformation of rocks.	**SE/TE:** 50-55 - Properties of Minerals 58-59 - Inquiry: Mineral Identification 65 - Inquiry - What are some similarities and differences among rocks? 67-69 - Rock Cycle 70-74 - Igneous Rocks 75-79 - Sedimentary Rocks 80-84 -Metamorphic Rocks **TE Only:** 72 - Teacher Demo: Crystal Formation 73 -Facts and Figures - Magma 78 - Facts and Figures – Coal

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Conceptual Understanding: Radioactive decay lifetimes and isotopic content in rocks provide a way of dating rock formations and thereby fixing the scale of geological time. Plate tectonics is the unifying theory that explains the movements of rocks on Earth's surface and provides a comprehensive account of its geological history. Physical and chemical weathering is a result of the interactions of Earth's geosphere, hydrosphere, atmosphere, and biosphere.	
ESS.2.B Students will develop an understanding of the history and evolution of the earth.	
ESS.2B.1 Research, analyze, and evaluate the contributions of William Smith, James Hutton, Nicolaus Steno, Charles Lyell, and others to physical geology.	**SE/TE:** 337-338 - Relative Dating 344 & 347 - The Fossil Record & Early Geologists 336-337 - Uniformitarianism **TE Only:** 1C - Earth Science Refresher
ESS.2B.2 Apply different techniques (e.g., superposition, original horizontality, cross-cutting relationships, lateral continuity, principle of inclusions, fossil succession, and unconformities) to analyze and interpret the relative age of actual sequences, models, or photographs.	**SE/TE:** 334-340 - Relative Dating 338 - Figure 3 - Cross Cutting Relationships 339 - Figure 4 - Angular Unconformity 339 - Figure 5 - Unconformities 341 - Assessment - #9 - Describe 344-345 - The Fossil Record 344 - Figure 10 - Correlating with Fossils **TE Only:** 334C - Common Themes: Forces and Motion 339 - Facts and Figures 339 - Cross-Cutting Relationships 340 - Use Visuals - Figure 7 – Inclusions
ESS.2B.3 Use mathematical concepts to calculate the absolute age of earth materials using actual or simulated isotope ratios.	**SE/TE:** 347-351 - Dating with Radioactivity 349 - Inquiry - Apply It! 349 - Table 1 - Radioactive Isotopes 351 - Assessment - #8-Apply Concepts **TE Only:** 348 - Build Science Skill - Figure 14 350 - Relate Cause and Effect

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ESS.2B.4 Research, analyze, and explain the origin of geologic features and processes that result from plate tectonics, including sea floor spreading, earthquake activity, volcanic activity, mountain building, and location of natural resources.	**SE/TE:** 254-260 - Sea Floor Spreading 257 - Figure 10 - Sea-Floor Spreading and Subduction 261-268 - Theory of Plate Tectonics 730 - Stem Activity - Plate Tectonics **TE Only:** 259 - Figure 13 - Interpret Diagrams 256 - Integrate History
ESS.2B.5 Use mathematical representations to interpret seismic graphs to triangulate the location of an earthquake's epicenter and magnitude and to correlate the frequency and magnitude of an earthquake.	**SE/TE:** 222-223 - Seismic Waves 223 - Figure 4 - Seismic Waves 227 - Figure 8 - Locating an Earthquake 225 - Measuring Earthquakes **TE Only:** 223 - Teacher Demo - Seismic Waves 226 - Integrate Math
ESS.2B.6 Plan and conduct a scientific investigation to determine how factors (e.g., wind velocity, water velocity, ice, and temperature) may affect the rate of weathering.	**SE/TE:** 125 - Try It! - What Causes Weathering 126-132 - Weathering 150 - Exploration Lab - Effect of Temperature on Chemical Weathering **TE Only:** 127 - Build Science Skills - Design Experiments
ESS.2B.7 Enrichment: Use an engineering design process to design a model to simulate the formation of caves and karst topography by groundwater.*	See supporting citations: **SE/TE:** 178-179 - Karst Topography 179 - Assessment - #8 - Analyze Concepts 181 - Inquiry: Exploration Lab - Investigating Permeable Soils **TE Only:** 178 - Integrate Chemistry

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ESS.3 Earth's Systems and Cycles	
Conceptual Understanding: Earth's surface is comprised of the geosphere, hydrosphere, atmosphere, and biosphere, all of which are interconnected. The complex and dynamic interactions between these systems have shaped Earth, influenced climate, and shaped the evolution of life.	
ESS.3 Students will develop an understanding of Earth's systems and cycles.	
ESS.3.1 Use mathematical representations (e.g., latitude, longitude, and maps) to calculate the angle of noon solar incidence and relate the value to day length, distribution of sunlight, and seasonal change.	**SE/TE:** 471 - Inquiry - Try It! - Modeling the Angle of the Sun 481 - Earth-Sun Relationship 482 - Assessment - #7 - Explain 488-489 - Why Temperatures Vary 489 - Table 1 489-491 - Figures 15-18 - Mean Monthly Temperatures 493 - Figure 20 - World Isothermal Map **TE Only:** 481 - Teacher Demo - Angles and Seasons
ESS.3.2 Enrichment: Use an engineering design process to explore the concepts of passive solar architecture to design a structure that best utilizes solar incidence.*	This enrichment standard falls outside of the program curriculum.
ESS.3.3 Explain how temperature and density of ocean water influence circulation.	**SE/TE:** 448-453 Ocean Circulation 450 - Ocean Currents and Climate 451 - Deep Ocean Currents 452 - Figure 7 - Deep Ocean Circulation **TE Only:** 450 - Building Science Skills - Applying Concepts 451 - Teacher Demo - Creating Density Currents

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ESS.3.4 Research and communicate information to explain the importance of the transfer of thermal energy among the hydrosphere, geosphere, and atmosphere. Include the unique physical and chemical properties of water, the water cycle, and energy transfer within the rock cycle.	**SE/TE:** 67-68 - Rock Cycle 158-159 - Water Cycle 479-487 - Height & Structure of the Atmosphere, Earth-Sun Relationship, Heating the Atmosphere 487 - Assessment - #8 - Big Idea - Relate Cause and Effect **TE Only:** 68 - Use Visuals 159 - Build Science Skills: Use Models 474C - Matter and Energy 484 - Teacher Demo - Heat Conduction 486 - Use Visuals - Figure 12
ESS.3.5 Analyze and interpret weather data using maps and global weather systems to explain and communicate the relationships among air masses, pressure systems, and frontal boundaries.	**SE/TE:** 532-536 - Understanding Air Pressure 537-542 - Pressure Centers and Winds 543-548 - Regional Wind Systems 550-551 - Inquiry - Exploration Lab - Observing Wind Patterns 558-563 - Air Masses 565-570 - Fronts **TE Only:** 556C - Space and Time - Air Masses 559 - Teacher Demo 560 - Use Visuals - Figure 3 - Types of Air Masses 565 - Use Visuals - Figure 10- Formation of a Warm Front 566 - Address Misconceptions - Warm and Cold Fronts

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ESS.3.6 Construct an explanation from data sets to obtain and evaluate scientific information to construct scientific arguments on changes in climate caused by various natural factors (e.g., plate tectonics and continent location and Milankovitch cycles) versus anthropogenic factors (e.g., fossil fuel use and agricultural factors).	**SE/TE:** 587 - Inquiry: Try It! - Global Climate Change: What's Causing It 588-591 - Factors that Affect Climate 593-599 - World Climates 600-603 - Climate Changes 606-607 - Inquiry - Exploration Lab - Human Impact on Climate Change and Weather 611 - Standardized Test Prep **TE Only:** 586C - Common Themes & The History of Climate 586 - Teacher Demo - Heating and Angles 600 - Address Misconceptions
ESS.3.7 Cite evidence and develop logical arguments to identify the cause and effect relationships of the evolutionary milestones (e.g., photosynthesis and the atmosphere, the evolution of multicellular animals, the development of shells, and the colonization of terrestrial environments by plants and animals) that most profoundly shaped Earth's systems.	**SE/TE:** 365 - The Atmosphere Evolves 367 - Precambrian Life & Photosynthetic Organisms 369-376 - The Paleozoic Era 386 - Inquiry-Exploration Lab - Modeling the Geologic Timescale 428 - Classification of Marine Organisms 494 - How Earth Works **TE Only:** 362C - Common Themes & The Evolution of Life 367 - Facts and Figures 367 - Integrate Biology
ESS.3.8 Analyze and interpret the record of shared ancestry, evolution, and extinction as related to natural selection using fossils.	**SE/TE:** 335 - Inquiry - Try It! - What can become a fossil? 342-346 - Fossils: Evidence of Past Life 346 - Assessment #9 - Connect Concepts 354 - Structure of Time Scales 356-357 - Inquiry - Exploration Lab - Fossil Occurrence and the Age of Rocks **TE Only:** 334C - Earth as a System

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ESS.4 Earth's Resources and Human Activity	
Conceptual Understanding: The dynamic Earth impacts human society. Natural hazards and other geologic events have shaped the course of human history. In addition, humans also impact the Earth through resource extraction and land use.	
ESS.4 Students will develop an understanding of Earth's resources and the impact of human activities.	
ESS.4.1 Research, evaluate, and communicate about how human life on Earth shapes Earth's systems and responds to the interaction of Earth's systems (e.g., geosphere, hydrosphere, atmosphere, and biosphere). Examine how geochemical and ecological processes interact through time to cycle matter and energy and how human activity alters the rates of these processes.	**SE/TE:** 20-21 - People and the Environment 110 - Pollution in the Air 111-112 - Land Resources 113-117 - Protecting Resources 122 - Think Critically 602-603 - Human Impact on Climate **TE Only:** 113 - Integrate Biology - Oil Spills 114 - Teacher Demo - Making an Oil Slick
ESS.4.2 Research, assess, and communicate how Earth's systems influence the distribution of life, including how various natural hazards and geologic events (e.g., volcanic eruptions, earthquakes, landslides, tornadoes, and hurricanes) have shaped the course of human history.	**SE/TE:** 21-22 - Environmental Problems 228-232 - Earthquake Hazards 294 - Volcanic Hazards 573 - Tornadoes 575 - Hurricanes **TE Only:** 22 - Build Science Skills - Infer 216D - Earthquake Hazards: Present Everywhere 574 - Integrate Social Studies 576 - Build Science Skills
ESS.4.3 Analyze earthquake and volcanic data to determine patterns that can lead to predicting such hazards and mitigating impact to humans.	**SE/TE:** 231 - Reducing Earthquake Damage 295 - Volcanic Hazards **TE Only:** 231 - Build Science Skills - Read Maps - Figure 13 294 - Build Science Skill - Use Internet