**Science 8 Pacing Guide**
**2020 – 2021**

| Term 1 (August 12 – October 9, 2020) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **KEY CONCEPTS:** Students will begin understanding wave properties and behaviors. The concepts learned will be reviewed through the year as student further their understanding about Earth. Students will understand that waves have energy and this energy is transferred when they interact with various types of matter. The repeated motion of the wave allows the energy to transfer. When different waves interact with each other it causes changes resonance.<br>**STANDARDS:** P.8.6.1, P.8.6.2, P.8.6.3, P.8.6.4<br>**LEARNING TARGETS** (Instructional Flow):<br>• P.8.6.1- Students will create a foundational understanding of wave properties and behaviors as they collect data through simple investigations of sound and light waves.<br>• P.8.6.1-Students will organize and interpret the data collect and other data from different statistical resources about the characteristics of sound and light waves to construct explanations about the relationships between matter and energy as it relates to waves.<br>• P.8.6.2-Students will learn the basics parts of both sound and light waves (frequency, amplitude, wavelength, and speed) and the different types of waves (longitudinal, transverse, and surface).<br>• P.8.6.2-Students will take their previous learning and investigate research-based mechanisms for capturing and converting wave energy in terms of frequency, amplitude, wavelength, and speed into electrical energy.<br>• P.8.6.3-Students will learn the basic ways different waves perform as they interact with matter (e.g., refraction, reflection, transmission, and absorption) such as (e.g., lenses, mirrors, and prisms).<br>• P.8.6.3- Students will conduct simple investigations about the performance of waves to describe their behaviors using the Claim, Evidence, Reasoning process.<br>• P.8.6.4- Students will use scientific processes to plan and conduct controlled investigations to conclude sound is a wave phenomenon that is characterized by amplitude and frequency. | | 14 | 8/12-8/28 |

| Term 1 (August 12 – October 9, 2020) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **KEY CONCEPTS:** Students will begin understanding wave properties and behaviors. The concepts learned will be reviewed through the year as student further their understanding about Earth. Students will understand that waves have energy and this energy is transferred when they interact with various types of matter. The repeated motion of the wave allows the energy to transfer. When different waves interact with each other it causes changes resonance.<br>**STANDARDS:** P.8.6.5, P.8.6.6, P.8.6.7, P.8.6.8<br>**LEARNING TARGETS** (Instructional Flow):<br>• P.8.6.5- Students will review previous concepts learn and learn what is resonance and how it relates to the behavior of sound.<br>• P.8.6.5- Students make simple musical instruments and then conduct scientific investigations that describe the behavior of sound when resonance changes (e.g., waves in a stretched string and design of musical instruments)<br>• P.8.6.5-Students will adjust their instruments to make the hook or chorus of their favorite songs. (Performance Task) and compete in a class lip-sing battle.<br>• P.8.6.6- Students will learn about the electromagnetic spectrum.<br>• P.8.6.6-Students will obtain and evaluate scientific information to explain the relationship between seeing color (visible light from the electromagnetic spectrum) and the transmission, absorption, or reflection of light waves by various materials.<br>• P.8.6.7- Students will research the historical significance of wave technology to explain how digitized tools have evolved to encode and transmit information (e.g., telegraph, cell phones, and wireless computer networks).<br>• P.8.6.8-Students will compare and contrast the behavior of sound and light waves to determine which types of waves need a medium for transmission. | | 14 | 8/31-9/18 |

| Term 1 (August 12 – October 9, 2020) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **KEY CONCEPTS:** Students will understand that Earth's cycles and systems are characterized by cause and effect relationships. Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. Students will connect their understanding about wave properties and behaviors to the Earth's processes. Students will demonstrate an understanding that Earth's physical processes and Earth's major geological events (e.g., plate movement, volcanic activity, mountain building, weather and erosion) are powered by the Sun and Earth's internal heat that has occurred over millions of years.<br>**STANDARDS:** E.8.9A.2, E.8.9A.1, E.8.9A.5, E.8.9A.3, E.8.9A.4<br>**LEARNING TARGETS** (Instructional Flow):<br>• E.8.9A.2-Students will explore and debate theories of plate tectonics to form conclusions through the Claim, Evidence, and Reasoning, process about past and current movements of rocks at Earth's surface throughout history.<br>• E.8.9A.1-Students will briefly review the layers of the earth (e.g., crust, lithosphere, asthenosphere, outer core, and inner core) its composition of matter and how each layer interacts with the other. Students can conduct simple investigations to deeper their understanding of Earth's layers interactions with each other.<br>• E.8.9A.1-Studnets will investigate and explain how the flow of Earth's internal energy(cause) drives the cycling of matter through convection currents between Earth's Surface and deep interior causing plate movements (effect).<br>• E.8.9A.5-Students will learn the different way the crust layers moves (plate movements, e.g., convergent, divergent, and transform-cause) what effect occurs on Earth.<br>• E.8.9A.4- Student will relate their understanding of plate movement to both constructive and destructive forces. Students will then research and access the credibility of scientific ideas to debate and discuss the constructive and destructive Earth forces(cause) and how Earth's surface has changed (effect) at varying time and special scales. | | 16 | 9/21-10/9 |
| **Benchmark** | | 5 | 10/5-10/9 |

| Term 2 (October 13 – December 18, 2020) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **KEY CONCEPTS:** Students will understand that Earth has natural processes that can cause sudden changes to Earth's systems. Some of these processes negatively impact humans, such as volcanic eruptions or earthquakes. Students will understand that through mapping the historic natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. Students will demonstrate an understanding of natural hazards (volcanic eruptions, severe weather (thunderstorms, hurricanes, tornado, and flood), landslides, earthquakes, and tsunamis) construct explanations for why some hazards are predictable and others are not.<br>**STANDARDS:** E.8.9B.1, E.8.9B.2, E.8.9B.3, P.8.6.4,6<br>**LEARNING TARGETS** (Instructional Flow):<br>• E. 8.9B.1-Students learn the different types of natural hazards that negatively impact humans and they negatively impact society.<br>• E.8.9B.1-Students will research and learn how to map various types of natural hazards. Students will also analyze different types of mapping of natural hazards.<br>• E.8.9B.2-Students will compare, and contrast technologies used to predict natural hazards to identify which types technologies are most effective.<br>• E.8.9B.3-Students will research different ways engineers already try to minimize impact to humans and society when natural hazards occur.<br>• E.8.9B.3-Students will use an engineering design process, create mechanisms to improve community resilience, which safeguard against natural hazards (e.g., building restrictions in flood or tidal zones, regional watershed management, Firewise construction).<br>• P.8.6.4- Students will relate their understand of wave phenomena to natural hazards.<br>• P.8.6.6-Students will relate how waves interact with matter to natural hazards. | | 16 | 10/13-10/30 |

| Term 2 (October 13 – December 18, 2020) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **KEY CONCEPTS:** Students will demonstrate an understanding of geological evidence such as (fossil records, soil formation of sedimentary rock, changes of organisms looking at fossils, radioactive dating) to analyze patterns in Earth's major events, processes, and evolution in history.<br>**STANDARDS:** E.8.7.1, E.8.7.2, E.8.7.3, E.8.7.4, E.8.9A.6, E.8.9A.7<br>**LEARNING TARGETS** (Instructional Flow):<br>• E. 8.7.1- Students will identify and learn the basic types of geological evidence and the process scientists take to record this type of evidence.<br>• E.8.7.1-Students will use scientific evidence to create a timeline of Earth's history that depicts relative dates from index fossil record and layers of rock (strata).<br>• E.8.7.2-Students will learn the different types of rocks (e.g., metamorphic, sedimentary, and igneous) and the processes taken to form those rocks. Students will conduct simple investigations to relate how pressure and forces from the Earth aided to this process.<br>• E.8.7.2-Students will learn the rock cycle and create a model of the processes involved in the rock cycle. Students will also relate this understanding to Earth's Movement and what they have learned about fossil record from scientist (practice reading and creating fossil records).<br>• E. 8.9A.6-Students design and conduct investigations to evaluate the chemical and physical processes involved in the formation of soils.<br>• E.8.9A.7-Students will explain the interconnected relationships between surface water and groundwater as it relates to soil formation.<br>• E.8.7.3-Students will construct and analyze scientific arguments to support claims that most fossil evidence is an indication of the diversity of life that was present on Earth and that relationships exist between past and current life forms through the Claim, Evidence, and Reasoning process.<br>• E.8.7.4-Students will use research and evidence from scientists to document how evolution has been shaped both gradually and through mass extinction by Earth's varying geological conditions (e.g., climate change, meteor impacts, and volcanic eruptions). Students should be also practicing reading, analyzing, and creating maps, graphs, and/or diagrams on these geological conditions. | | 16 | 11/2-11/20 |

| Term 2 (October 13 – December 18, 2020) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **KEY CONCEPTS:** Students will demonstrate an understanding that a decrease in natural resources created by Earth is directly related to the increase in human population and must be conserved (saved). Students will understand that human depend on Earth's land, ocean, atmosphere, and biosphere for many different resources both renewable (constantly replenishing) and nonrenewable (take a long time to replenish- not in our lifetime). Students will relate their learning about Earth's geological events and be able to explain that these events have distributed these resources unevenly around the planet; therefore, technology is needed to harness available resources and create (develop) alternates for conservation.<br>**STANDARDS:** E.10.1, E.10.2, E.10.3, E.10.4, P.8.6.2<br>**LEARNING TARGETS** (Instructional Flow):<br>• E. 10.1-Students will learn the different between renewable and nonrenewable resources, where they come from or produced within the Earth, and the disadvantages and/or advantages between them.<br>• E.10.1-Students will read and evaluate scientific information about advancements in renewable and nonrenewable resources.<br>• E.10.1-Students will propose and defend ways to decrease national and global dependency on nonrenewable resources discuss both the advantages and disadvantages.<br>• E.10.2-Students create and defend a proposal for reducing the environmental effects humans have on Earth's (e.g., population increases, consumer demands chemical pollution, deforestation, and change in average annual temperature). Students need to practice creating, reading, and analyzing graphs, charts, and diagrams with these specific environmental effects.<br>• E.10.3-Students will use scientific data, debate the societal advantages and disadvantages of technological advancements in renewal energy sources.<br>• E.10.4-Students will use the engineering design process to develop a system to capture and distribute thermal energy that makes renewable energy more readily available and reduces human impact on the environment (e.g., building solar water heaters, conserving home energy).<br>• P.8.6.2-Students will use their previous learning about waves energy mechanisms and relate it to their understanding about Earth's natural resources. | | 10 | 11/30-12/11 |
| **Benchmark** | | 5 | 12/14-12/18 |

| Term 3 (January 5 – March 5, 2021) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **Review 1st Semester**<br>Students will review key concepts learned, review science engineering practices used, and relate previous understandings to upcoming learning targets. | | 10 | 1/5-1/15 |
| **KEY CONCEPTS:** Students will demonstrate an understanding of the process of natural selection, in which genetic variations in a population increase some individuals' likelihood of surviving and reproducing in a changing environment. Students will analyze the scientific theory of evolution and how it is connected to biology and provides an explanation for both the diversity of life on Earth and similarities of all organisms at the chemical, cellular, and molecular level. Students will demonstrate an understanding of how similarities and differences among living and extinct species provide evidence that changes have occurred in organisms over time.<br>**STANDARDS:** L.8.4A.2, L.8.4A.1, L.8.4B.1, L.8.4B.4, L.8.2B.1<br>**LEARNING TARGETS** (Instructional Flow):<br>• L.8.4A.2-Students will explore simple illustrations to develop a concept of natural selection.<br>• L.8.4A.2-Students will investigate to form a basic understanding about natural selection using the Claim, Evidence, and Reasoning process. Students will connect growth, survival, and reproduction to genetic factors, environmental factors, food intake, and interactions with other organisms to natural selection.<br>• L.8.4A.1-Students will use various scientific resources to analyze the historical findings of Charles Darwin to explain the basic principles of natural selection which should bring a conclusion to student's Reasoning about natural selection.<br>• L.8.4B.1-Students will analyze and interpret data (e.g., pictures, graphs) to explain how natural selection may lead to increases and decreases of specific traits in populations over time. Students should create, read, and analyze charts, graphs, and diagrams on this topic.<br>• L.8.4B.2- Students will learn the different possible genetic variations of traits that may occur amongst organisms within a population due to evolution (Teacher should not go into depth, but ensure students can list the different types and relate the idea to natural selection (survival) in an environment<br>• L.8.4B.2- Students will construct written and verbal explanations to describe how genetic variations of traits in a population increase some organisms' probability of surviving and reproducing in a specific environment<br>• L.8.4B.4-Students will analyze displays of pictorial data to compare embryological and homologous/analogous structures across multiple species to identify evolutionary relationships.<br>• L.8.2B.1-Students will construct, and argument based on evidence for how environmental and genetic factors influence the growth of organisms in connection with natural selection. | | 14 | 1/18-2/5 |

| Term 3 (January 5 – March 5, 2021) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **KEY CONCEPTS:** Students will review the concept of genetic variation from natural selection. Students will dig further to understand that genetic variation through reproduction. Organisms reproduce either sexually or asexually and transfer their genetic information to their offspring (inheritance). Students will understand that there are advantages and disadvantages within both types of reproduction. Students will demonstrate an understanding of how sexual reproduction results in offspring with genetic variation while asexual reproduction results in offspring with identical genetic information.<br>**STANDARDS:** L.8.2A.1, L.8.2A.2, L.8.2A.3, L.8.2A.4, L.8.4B.2, L.8.4B.3<br>**LEARNING TARGETS** (Instructional Flow):<br>• L.8.2A.1-Students will learn and be able to understand genes, chromosomes, and DNA. Students will learn their structure, function for survival of organisms and their location within the cell.<br>• L.8.2A.1-Students will obtain and communicate information about the relationship of genes, chromosomes, and DNA to construct explanations comparing their relationship to inherited characteristics.<br>• L.8.2A.2-Students will learn the process of mitosis and create diagrams of mitosis and what occurs during each phase.<br>• L.8.2A.2-Students will explain the role of mitosis in asexual reproduction, which results in offspring with identical genetic information.<br>• L.8.2A.3-Students will construct explanations of how genetic information is transferred during both mitosis and meiosis.<br>• L.8.2A.4-Students will engage in discussion using models and evidence to explain that sexual reproduction produces offspring that has a new combination of genetic information different from either parent.<br>• L.8.4B.2-Students will construct written and verbal explanation to describe how genetic variations of traits in a population increase some organisms' probability of surviving and reproducing in a specific environment.<br>• L.8.4B.3-Students will obtain and evaluate scientific information to explain that separated populations, that remain separated, can evolve mutations to become a new species (speciation). | | 16 | 2/8-2/26 |
| **Benchmark** | | 5 | 3/1-3/5 |

| Term 4 (March 8 – May 26, 2021) | | | |
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| **Mississippi College- and Career-Readiness Standards** | **Resources** | **Suggested Instructional Days** | **Target Dates** |
| **KEY CONCEPTS:** Students will demonstrate an understanding of the differences in inherited and acquired characteristics and how environmental factors (natural selection) and the use of technologies (selective breeding, genetic engineering) influence transfer of genetic information. Students will demonstrate an understanding of how sexual reproduction results in offspring with genetic variation. Students will demonstrate an understanding that chromosomes contain many distinct proteins and that each gene holds instructions to produce a specific protein, which in turn affect the traits of an individual.<br>**STANDARDS:** L.8.2B.1-4, L.8.2A.1-5, L.8.2C.1-2<br>**LEARNING TARGETS** (Instructional Flow):<br>• L.8.2B.1-4- (1) Students will construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms using the Claim, Evidence, and Reasoning process. (2) Students will review Gregor's Mendel's basic principles of heredity and study his findings to help form their claim. (3) Students will use mathematical and computational thinking to analyze data and make predictions about the outcome of specific genetic crosses (monohybrid Punnett Squares) involving simple dominant/recessive traits. Students should be able to explain using percentages, ratios, and word form of their calculations. (4) Students will debate the ethics of artificial selection (selective breeding, genetic engineering) and the societal impacts of human changing the inheritance of desired traits in organisms.<br>• L.8.2A.1-5- (1) Students will communicate information about the relations of genes, chromosomes, and DNA. (2) Students will review meiosis and relate genetic variation to the process of meiosis (sexual reproduction). (3/4) Students will review genetic information transferred during meiosis, where within the cell, as DNA is replicated with genetic variation. (5) Students will compare the advantages and disadvantages of sexual reproduction and its connection to genetic variation.<br>• L.8.2C.1-Students will learn the basics of Protein Synthesis by identifying the three steps, what happens in each step, and where does each step occur within the cell. Students will learn that if problems occur in making proteins, mutation occur. Some mutations are harmful and can lead to disease and disorders. Students should learn how to read a codon chart.<br>• L.8.2C.2-Students will construct scientific arguments from evidence to support claims about the potentially harmful, beneficial, or neutral effects of genetic mutations in organisms. | | 12 | 3/15-3/30 |
| Review Standards: All Life | | 16 | 3/31-4/16 |
| Review Standards: All Physical & Earth | | 16 | 4/19-4/30 |