CASE Benchmark Assessments
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# Mississippi
# 8th GRADE SCIENCE
# 2017-2018 Pacing Guide

| Unit | Objective | Major Topics/Concepts |
|---|---|---|
| **Scientific Inquiry** | 1a<br>1b<br>1c<br>1d<br>1e<br>1f<br>1g<br>1h | Introduce concepts related to experimental design; Control; Dependent vs. independent variable; Hypothesis; Qualitative vs. quantitative observations; Inferences; Units of measurement; Measurement tools (rulers, thermometers, scales, hand lenses, microscopes, balances, clocks, calculators, anemometers, rain gauges, barometers, etc.); Types of data; Sources of research information; Develop and defend conclusions; Solutions for problems; Importance of revising conclusions; Analysis of data and ideas; Value of skepticism; Alternative conclusions<br><br>*These topics do not need to be introduced in consecutive days, but all inquiry concepts will be assessed in the context of the units assessed on the 1st benchmark.* |
| **Chemistry and the Periodic Table** | 2a<br>2b | Law of Conservation of Mass; Patterns found in chemical symbols, formulas, reactions, equations; Formulas of common substances and the symbols for the elements that comprise them: salt, water, sugar, oxygen gas, carbon dioxide, and nitrogen gas; Mass of reactants and products after chemical reaction; Balanced chemical equations (photosynthesis and respiration); Properties and interactions of elements in the periodic table; Metals vs. Nonmetals; Acids vs. Bases; Chemical changes such as rusting, combustion, and food spoilage |
| **Forces and Motion** | 2c | Motion of objects based on position, direction, speed, and acceleration; Create and interpret motion graphs |
| **Newton's Laws of Motion** | 2f | Examples of Newton's three laws; Inertia; Acceleration; Action/Reaction forces |
| **Electrical Energy and Energy Conservation** | 2d<br>4d | Electrical power grids; Electric circuits; Generators; Mississippi power companies and their roles; Conservation of nonrenewable and renewable resources; Justify methods used to decrease human impact on global warming; Greenhouse gases; Relationships among geochemical cycles ($H_2O$, C, $O_2$, $N_2$) |
| **1st Cumulative Benchmark (covering all content to this point)** | | |
| **Scientific Inquiry** | 1a<br>1b<br>1c<br>1d | Introduce concepts related to experimental design; Control; Dependent vs. independent variable; Hypothesis; Qualitative vs. quantitative observations; Inferences; Units of measurement; Measurement tools |

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|---|---|---|
| | 1e<br>1f<br>1g<br>1h | (rulers, thermometers, scales, hand lenses, microscopes, balances, clocks, calculators, anemometers, rain gauges, barometers, etc.); Types of data; Sources of research information; Develop and defend conclusions; Solutions for problems; Importance of revising conclusions; Analysis of data and ideas; Value of skepticism; Alternative conclusions<br><br>*Inquiry concepts should be embedded and reinforced through actual experimentation during the next four units.* |
| **Cell Structure and Function** | 3b | Compare and contrast types of Cells; Plant Cells vs. Animal Cells; Cell structures and functions (nucleus, cytoplasm, cell membrane, cell wall, mitochondrion, and nuclear membrane); Different types of tissues (epithelial, nerve, bone, blood, muscle) |
| **Viruses, Bacteria, Fungi, and Parasites** | 3c<br>3g | Structure of viruses, bacteria, fungi, and parasites; Modes of infection; Impact of viruses, bacteria, fungi, and parasites on normal body function; Investigate the role of single-celled organisms in industry and food production; How microorganisms impact everyday human life |
| **Energy Flow and Ecosystems** | 3e<br>3h | Energy flow in ecosystems; Energy pyramids; Food chains; Food webs; Role of producers, consumers, and decomposers in ecosystems; Distinguish among populations, communities, habitats, niches, ecosystems, and biomes; Respiration to meet energy needs (oxidation and heat) |
| **Genetics and Heredity** | 3d | Heredity of traits from parents to offspring through pairs of genes; Hierarchy of DNA, genes, and chromosomes; Phenotypes vs. Genotypes; Construction, calculations, and analysis of Punnett squares; Predicting genotypes and phenotypes using Punnett squares |
| **2nd Cumulative Benchmark (covering all content to this point)** | | |
| **Scientific Inquiry** | 1a<br>1b<br>1c<br>1d<br>1e<br>1f<br>1g<br>1h | Introduce concepts related to experimental design; Control; Dependent vs. Independent variable; Hypothesis; Qualitative vs. Quantitative observations; Inferences; Units of measurement; Measurement tools (rulers, thermometers, scales, hand lenses, microscopes, balances, clocks, calculators, anemometers, rain gauges, barometers, etc.); Types of data; Sources of research information; Develop and defend conclusions; Solutions for problems; Importance of revising conclusions; Analysis of data and ideas; Value of skepticism; Alternative conclusions<br><br>*Inquiry concepts should be embedded and reinforced through actual experimentation during the next eight units.* |
| **Genetic Engineering** | 3f | Selective breeding; Genetic engineering; Research in Mississippi (Animal Functional Genomics Lab at |

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|---|---|---|
| | | Mississippi State Univ, Stoneville Pedigreed Seed Company, Catfish Genetics Research Unit at Thad Cochran National Warm Water Aquaculture Center); Understand pros and cons of current research |
| **Adaptations and Evolution** | 3a | Role of adaptations in survival and reproduction; Influence of environmental conditions on organisms' abilities to survive and reproduce (desert, aquatic, high altitude); Ecological niche, Evolutionary change; Extinction |
| **Structure and Composition of the Earth** | 4a | Layers of the Earth; Lithosphere vs. asthenosphere; Compare composition, density, and location of continental and oceanic crust; Tectonic forces (faulting and folding) |
| **Movement of the Earth** | 4b | Relationship between composition and movement of lithospheric plates; Use seismic data to study seismic wave velocities of earthquakes and volcanoes; Lithospheric plate boundaries; Location of volcanoes; Continental drift and today's distribution of continents; Pangaea |
| **Weather Patterns and Forecasting** | 4c<br>4h | Use of atmospheric features and technology by meteorologists for weather forecasting; Temperature; Precipitation; Wind (speed and direction); Dew point; Relative humidity; Barometric pressure; Transfer of thermal energy to create vertical and horizontal movement of air masses; Coriolis effect; Global wind patterns (trade winds, westerlies, jet streams); Satellites and computer modeling; Track hurricanes using technology such as satellite imagery; Understand contributions of local resources (John C. Stennis Space Center Applied Research and Technology Project; NOAA, National Weather Service) |
| **The Earth's Position** | 4e | The impact of the Earth's tilt and position in relation to the Sun on climatic zones, seasons, and length of days |
| **Stars, Galaxies, and the Electromagnetic Spectrum** | 4f<br>2e | Hierarchical structure of the universe (stars, clusters, galaxies, galactic clusters); Expansion of the universe; Age and history of universe; Techniques for measuring distances (radio, infrared, ultraviolet, and X-ray); Contrast components of the electromagnetic spectrum (infrared, visible light, ultraviolet); Impact of EM spectrum on living things |
| **Development of Natural Products** | 4g | Importance of research and use of technology of useful natural products; Role of Mississippi research in development and commercialization (Thad Cochran National Center for Natural Products Research, Jamie Whitten Delta States Research Center, the Mississippi Polymer Institute at the University of Southern Mississippi) |
| **Final Comprehensive Benchmark (covering all content)** | | |