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**SUGGESTED**

**INSTRUCTIONAL PLANNING GUIDE**

*for the Mississippi College- and Career-Readiness Standards*

**q SCIENCE**

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| **GRADE K** |

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**INTRODUCTION**

The unprecedented, nationwide school closures in the spring of 2020 due to the COVID-19 pandemic have created a shift in how districts plan for school re-entry. Instead of the traditional brick-and-mortar planning, administrators are now identifying models that will support a variety of instructional delivery scenarios as they plan for school reopening. The traditional methods of planning and delivery are nearly impossible to implement as a stand-alone model; instead, innovative educators are developing and identifying strategies and resources to support a variety of distance learning scenarios as part of their plans. When using new models of delivery, it is important to recognize that the traditional approach to remediation—providing work better suited for earlier grades—may be insufficient. Instead, the conventional approach to remediation will likely compound the problem educators are trying to correct. According to a 2018 study, ***The Opportunity Myth***[[1]](#footnote-2), the approach of “meeting students where they are”, while often well-intended, only widens the achievement gap. Instead of remediation, teachers and administrators are encouraged to look toward acceleration methods to support student growth and close the gaps.

**PURPOSE**

The purpose of the Suggested Mississippi College- and Career-Readiness Standards Instructional Planning Guide is to provide teachers with an assistive tool for planning units of instruction. This tool will provide suggested standards grouping that should facilitate a coherent and logical delivery of related science concepts. Suggested planning sources and tools are included to assist teachers with curating instructional materials, designing and implementing effective lessons and activities, and building content knowledge and pedagogical practices. This tool encourages instructors to maintain a focus on preparing students to master skills and acquire knowledge at their current grade level.

**DEVELOPMENT**

The following suggested Instructional Planning Guide was developed with a focus on the subsequent key areas, Conceptual Connections, Real-World Connections and Phenomena, Embedded Science and Engineering Practices and Crosscutting Concepts, and Core Vocabulary. The standards are grouped into suggested units based on their underlying conceptual relationships. A list of real-world connections and/or phenomena is associated with each unit group. Their purpose is to give teachers and students researchable opportunities that lead to an in-depth and authentic quest for conceptual understanding. The embedded Science and Engineering Practices (SEPs) and Crosscutting Concepts (CCCs) are extracted from the grouped performance objectives and should encourage students to act and think like scientists. The included list of SEPs and CCCs does not indicate that other SEPs and CCCs are not relevant to the respective standard and performance objectives. Core vocabulary terms are included to emphasize terminology that is essential to the conceptual understandings captured in the standards and performance objectives. It is suggested that instructors pace themselves based on student assessment performance and demonstration of skills mastery and knowledge comprehension.

**RESOURCES for CONSIDERATION**

The resources listed below may be referenced to support classroom teachers in the development of lesson plans and instruction at the local level.   This list is not meant to be exhaustive, rather it represents consultative resources that align with the Units/Themes provided in the Instructional Planning Guides.   Educators are encouraged to use these resources in addition to those curriculum materials that meet the needs of the students they serve.

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| **High-Quality****Instructional Material** **(HQIM)** | **Planning and Instruction Resources** | **Assessment** **Resources** | **Professional Development** **Resources** |
| * [**Adopted Science Texts**](https://mdek12.org/OEER/Caravan)
* [**STEM Teaching Tools**](http://stemteachingtools.org/)
 | * [**5 E Science Instructional Model**](http://nextgenerationscience.weebly.com/5-es-of-science-instruction.html)
* [**The Concord Consortium**](https://concord.org/ngss/)
* [**PBS Learning Media**](https://mpb.pbslearningmedia.org/standards/0/)
* [**Teacher Tube**](https://www.teachertube.com/)
* [**Next Generation Science Standards**](https://www.nextgenscience.org/)
* [**Phenomena for Next Generation Science**](https://www.ngssphenomena.com/)
* **[Khan Academy](https://www.khanacademy.org/)**
* [**OpenSciEd**](https://www.openscied.org/)
* [**Science Buddies**](https://www.sciencebuddies.org/)
* [**PhET Interactive Simulations**](https://phet.colorado.edu/)
* [**Phenomenal GRC Lessons**](https://sites.google.com/3d-grcscience.org/going3d/home?authuser=0)
 | * [**MS MAAP Program**](https://mdek12.org/OSA/MAAP)
* [**MS MAAP-A Program**](https://mdek12.org/OSA/SP/MAAP-A)
* [**Access for All Guidance**](https://mdek12.org/sites/default/files/documents/OAE/OAE/2019-access-for-all-guide.pdf)
* [**Problem-Attic**](https://www.problem-attic.com/)
* [**EDInformatics**](https://www.edinformatics.com/testing/testing.htm)
* [**STEM Teaching Tools for Assessments**](http://stemteachingtools.org/tgs/Assessment)
* [**Next Generation Science Assessment**](http://nextgenscienceassessment.org/) **(Middle Focus)**
 | * [**MDE Professional Development**](https://www.mdek12.org/OPD/home)
* [**The Teaching Channel**](https://www.teachingchannel.com/)
* [**California Academy of Sciences**](https://www.calacademy.org/)
* [**Teacher Tube**](https://www.teachertube.com/)
* [**Knowles Teacher Short Courses**](https://knowlesteachers.org/knowles-academy/short-courses)
* [**STEM Teaching Tools OER PD**](http://stemteachingtools.org/pd)
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| **KINDERGARTEN SCIENCE****THEME: Change in the Natural World** |
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| **UNIT OF STUDY**(REAL-WORLD CONNECTIONS and PHENOMENA)**q** | **MS CCR STANDARDSq** | **SCIENCE AND ENGINEERING PRACTICES SCIENCE CROSSCUTTING CONCEPTS** **q** | **VOCABULARY TERMS**CORE ACADEMIC **q** |
| **COURSE INTRODUCTION**In kindergarten, students observe the changes in the natural world and identify how animals use their senses to recognize the changes. As language and vocabulary develops, students recognize that plants and animals change and report findings about the changes throughout the life cycle. Students conduct an investigation to determine the needs of plants to grow and use quantitative measurement to chart growth over time. Students learn that change occurs when plants and animals do not get the food, water, and space needed for growth. Students develop and use models to describe the seasonal changes in the environment. Students develop questions and conduct a structured investigation to determine how sunlight affects the temperature of sand, soil, rocks, and water. Using an engineer design process, students then construct a structure to reduce the temperature of a play area. Students recognize that scientists observe changes in the natural world and use investigations, charts, drawings, sketches, and models to communicate these changes. Students need to recognize that scientists observe the natural world and use investigations, charts, drawings, sketches, and models to communicate ideas.  | **FOUNDATION STATNDARDS*** Identify and select appropriate science and engineering tools to collect, analyze, and communicate science and engineering data and information.
* Demonstrate effective questioning and observation skills
* Communicate science and engineering data using appropriate SI units of measurement
* Identify and discuss science and engineering practices
* Identify and discuss Crosscutting Concepts
 | **SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Analyze and Interpret Data
* Plan and Conduct Investigations
* Use Mathematical and Computational Thinking
* Engage in Scientific Argument from Evidence
* Construct Explanations and Design Solutions
* Obtain, Evaluate, and Communicate Information

**CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Scale, Proportion, and Quantity
* Systems and System Models
* Energy and Matter *(Flows, Cycles, Conservation)*
* Structure and Function
* Stability and Change
 | Science  Engineering Concepts Evidence Argument Observation Independent Variable Dependent Variable SI Units of Measurement Evaluate Patterns Gram Meter Liter   |

| **TERM 1** |
| --- |
| **UNIT OF STUDY**(REAL-WORLD CONNECTIONS and PHENOMENA)**q** | **MS CCR STANDARDSq** | **SCIENCE CROSSCUTTING CONCEPTS** **SCIENCE AND ENGINEERING PRACTICES q** | **VOCABULARY TERMS**CORE ACADEMIC **q** |
| **HIERARCHAL ORGANIZATION****Living and Non-Living Things****REAL-WORLD CONNECTIONS and PHENOMENA*** Using a bird box (video) observe a bird’s nest to watch eggs hatch and baby birds grow.
* Discuss what things workers in a zoo do the help keep animals alive and well.
* Develop a list of characteristics for living things and use this list to identify things as living or non-living.
 | **L.K.1A Students will demonstrate an understanding of living and nonliving things.****L.K.1A.1** With teacher guidance, conduct an investigation of living organisms and nonliving objects in various real-world environments to define characteristics of living organisms that distinguish them from nonliving things (e.g., playground, garden, school grounds).**L.K.1A.2** With teacher support, gain an understanding that scientists are humans who use observations to learn about the natural world. Obtain information from informational text or other media about scientists who have made important observations about living things (e.g. Carl Linnaeus, John James Audubon, Jane Goodall). | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Plan and Conduct Investigations
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Systems and System Models
* Structure and Function
* Stability and Change
 | CharacteristicsEnvironmentLivingNon-LivingObservationOrganism |
| **HIERARCHAL ORGANIZATION****Animal Behaviors****REAL-WORLD CONNECTIONS and PHENOMENA*** Discuss how birds use their beaks to search for food. For example, the hummingbird uses its long tube-like beak to get nectar.
* Discuss the various ways humans can use their body parts. For example, people can use their feet to pick things up.
 | **L.K.1B Students will demonstrate an understanding of how animals (including humans) use their physical features and their senses to learn about their environment.****L.K.1B.1** Develop and use models to exemplify how animals use their body parts to (a) obtain food and other resources, (b) protect themselves, and (c) move from place to place.**L.K.1B.2** Identify and describe examples of how animals use their sensory body parts (eyes to detect light and movement, ears to detect sound, skin to detect temperature and touch, tongue to taste, and nose to detect smell). | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Plan and Conduct Investigations

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Structure and Function
* Stability and Change
 | Body PartsFoodMovementResourceSenses |
| **REPRODUCTION AND HEREDITY:****Life Cycles****REAL-WORLD CONNECTIONS and PHENOMENA*** Discuss the life cycle of frogs and butterflies and various common insects and plants.
* Discuss why litters of puppies, kittens, or other animals may look different.
 | **L.K.2 Students will demonstrate an understanding of how living things change in form as they go through the general stages of a life cycle.****L.K.2.1** Use informational text or other media to make observations about plants as they change during the life cycle (e.g., germination, growth, reproduction, and death) and use models (e.g., drawing, writing, dramatization, or technology) to communicate findings.**L.K.2.2** Construct explanations using observations to describe and model the life cycle (birth, growth, adulthood, death) of a familiar mammal (e.g., dog, squirrel, rabbit, deer).**L.K.2.3** With teacher guidance, conduct a structured investigation to observe and measure (comparison of lengths) the changes in various individuals of a single plant species from seed germination to adult plant. Record observations using drawing or writing.**L.K.2.4** Use observations to explain that young plants and animals are like but not exactly like their parents (i.e., puppies look similar, but not exactly like their parents). | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Analyze and Interpret Data
* Plan and Conduct Investigations
* Use Mathematical and Computational Thinking
* Engage in Scientific Argument from Evidence
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Scale, Proportion, and Quantity
* Energy and Matter *(Flows, Cycles, Conservation)*
* Structure and Function
* Stability and Change
 | AdultAnimalGerminationLife CycleMammalParentPlantYoung |

| **TERM 2** |
| --- |
| **UNIT OF STUDY**(REAL-WORLD CONNECTIONS and PHENOMENA)**q** | **MS CCR STANDARDS****q** | **SCIENCE CROSSCUTTING CONCEPTS** **SCIENCE AND ENGINEERING PRACTICES** **q** | **VOCABULARY TERMS**CORE ACADEMIC **q** |
| **ECOLOGY and INTERDEPENDENCE:****Plant and Animal Needs****REAL-WORLD CONNECTIONS and PHENOMENA*** Explore greenhouses are and how using them can help humans grow and protect various plants and crops.
* Observe via video various animals to determine how they obtain their food and other necessities.
 | **L.K.3A Students will demonstrate an understanding of what animals and plants need to live and grow.****L.K.3A.1** With teacher guidance, conduct a structured investigation to determine what plants need to live and grow (water, light, and a place to grow). Measure growth by directly comparing plants withother objects.**L.K.3A.2** Construct explanations using observations to describe and report what animals need to live and grow (food, water, shelter, and space). | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Analyze and Interpret Data
* Plan and Conduct Investigations
* Use Mathematical and Computational Thinking
* Construct Explanations and Design Solutions

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Structure and Function
 | FoodGrowLightMeasurePlantShelterSoilSpaceWater |
| **ECOLOGY and INTERDEPENDENCE:****Living Things and the Environment****REAL-WORLD CONNECTIONS and PHENOMENA*** View how spiders use their webs to capture food.
* Use images of plants and their parts to show how plants get resources to make their own food.
* Research the sources of food items that are common to our homes.
 | **L.K.3B Students will demonstrate an understanding of the interdependence of living things and the environment in which they live.****L.K.3B.1** Observe and communicate that animals get food from plants or other animals. Plants make their own food and need light to live and grow.**L.K.3B.2** Create a model habitat which demonstrates interdependence of plants and animals using an engineering design process to define the problem, design, construct, evaluate, and improve the habitat. \* **All SEPs and CCCs are applicable.** | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Cause and Effect *(Mechanism and Explanation)*
* Energy and Matter *(Flows, Cycles, Conservation)*
* Structure and Function
* Stability and Change
 | AnimalEnvironmentFoodGrowInterdependencyLightLiving ThingPlant |
| **ADAPTATIONS and DIVERSITY:****Plant and Animal Extinctions****REAL-WORLD CONNECTIONS and PHENOMENA*** Compare how lizards of today look like lizards that are no longer with us.
* Research and explore plants and animals that are endangered and extinct in Mississippi.
 | **L.K.4 Students will demonstrate an understanding that some groups of plants and animals are no longer living (extinct) because they were unable to meet their needs for survival.****L.K.4.1** Obtain information from informational text or other media to document and report examples of different plants or animals that are extinct.**L.K.4.2** Observe and report how some present-day animals resemble extinct animals (i.e., elephants resemble wooly mammoths). | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Energy and Matter *(Flows, Cycles, Conservation)*
* Structure and Function
* Stability and Change
 | AnimalExtinctionNeedsObservePlantSurvival |

| **TERM 3** |
| --- |
| **UNIT OF STUDY**(REAL-WORLD CONNECTIONS and PHENOMENA)**q** | **MS CCR STANDARDSq** | **SCIENCE CROSSCUTTING CONCEPTS** **SCIENCE AND ENGINEERING PRACTICES q** | **VOCABULARY TERMS**CORE ACADEMIC **q** |
| **EARTH and the UNIVERSE:****Seasonal Changes****REAL-WORLD CONNECTIONS and PHENOMENA*** Explain what happens in our environment when the seasons change.
* Discuss how we adjust our behaviors according to the different seasons and changes in the temperature.
 | **E.K.8A Students will demonstrate an understanding of the pattern of seasonal changes on the Earth.****E.K.8A.1** Construct an explanation of the pattern of the Earth’s seasonal changes in the environment using evidence from observations.  | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Engage in Scientific Argument from Evidence
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Stability and Change
 | EnvironmentEvidenceObservePatternSeason |
| **EARTH and the UNIVERSE:****The Sun****REAL-WORLD CONNECTIONS and PHENOMENA*** Discuss with students what happens to the sun at “nighttime.”
* Study the sun’s role in the process of evaporation by measuring the amount of water that disappears from containers left in the sun.
 | **E.K.8B Students will demonstrate an understanding that the Sun provides the Earth with heat and light.****E.K.8B.1** With teacher guidance, generate and answer questions to develop a simple model, which describes observable patterns of sunlight on the Earth’s surface (day and night).**E.K.8B.2** With teacher guidance, develop questions to conduct a structured investigation to determine how sunlight affects the temperature of the Earth’s natural resources (e.g., sand, soil, rocks, and water).**E.K.8B.3** Develop a device (i.e., umbrella, shade structure, or hat) which would reduce heat from the sun (temperature) using an engineering design process to define the problem, design, construct, evaluate, and improve the device. \* **All SEPs and CCCs are applicable.** | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Plan and Conduct Investigations
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Energy and Matter *(Flows, Cycles, Conservation)*
* Stability and Change
 | DayEarthHeatLightNaturalNightPatternResourcesSunSunlightSurfaceTemperature |
| **EARTH’S RESOURCES:****Humans and The Earth’s Resources****REAL-WORLD CONNECTIONS and PHENOMENA*** Start are classroom recycling program in conjunction with city-wide recycling efforts. Explain the importance of recycling efforts in our communities.
* Research conservation programs in our community and discuss the progress of these programs with local officials.
 | **E.K.10 Students will demonstrate an understanding of how humans use Earth’s resources.****E.K.10.1** Participate in a teacher-led activity to gather, organize, and record recyclable materials data on a chart or table using technology. Communicate results.**E.K.10.2** With teacher guidance, develop questions to conduct a structured investigation to determine ways to conserve Earth's resources (i.e., reduce, reuse, and recycle) and communicate results.**E.K.10.3** Create a product from the reused materials that will meet a human need (e.g., pencil holder, musical instrument, bird feeder). Use an engineering design process to define the problem, design, construct, evaluate, and improve the product. \* **All SEPs and CCCs are applicable.** | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Plan and Conduct Investigations
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Cause and Effect *(Mechanism and Explanation)*
* Systems and System Models
* Energy and Matter *(Flows, Cycles, Conservation)*
* Stability and Change
 | ChartEarthHumansMaterialRecordRecycleResource |

| **TERM 4** |
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| **UNIT OF STUDY**(REAL-WORLD CONNECTIONS and PHENOMENA)**q** | **MS CCR STANDARDSq** | **SCIENCE CROSSCUTTING CONCEPTS** **SCIENCE AND ENGINEERING PRACTICES q** | **VOCABULARY TERMS**CORE ACADEMIC **q** |
| **ORGANIZATION of MATTER** **and CHEMICAL INTERACTIONS:****Building Blocks of Matter****REAL-WORLD CONNECTIONS and PHENOMENA*** Explain how big buildings are made from smaller pieces. Explore how carpenters create buildings from small bricks.
* Explore what happens when a car has a flat tire and answer the question as to whether the car is working properly and why or why not.
 | **P.K.5B. Students will demonstrate an understanding of how solid objects can be constructed from a smaller set.****P.K.5B.1** Use basic shapes and spatial reasoning to model large objects in the environment using a set of small objects (e.g., blocks, construction sets).**P.K.5B.2** Analyze a large composite structure to describe its smaller components using drawing and writing.**P.K.5B.3** Explain why things may not work the same if some of the parts are missing. | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Analyze and Interpret Data
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Scale, Proportion, and Quantity
* Energy and Matter *(Flows, Cycles, Conservation)*
* Structure and Function
* Stability and Change
 | EnvironmentExplainObjectSetShapeSolid |
| **ORGANIZATION of MATTER** **and CHEMICAL INTERACTIONS:****States of Matter****REAL-WORLD CONNECTIONS and PHENOMENA*** Demonstrate freezing and melting of various familiar substances, i.e. ice cream, ice cubes, popsicles. Discuss the similarities and differences in the behavior of these substances.
* Describe different types of metals in terms of likes and differences.
* Explain why big things (big boxes) are not always heavy. Compare heaviness of a brick and an empty shoe box.
 | **P.K.5A Students will demonstrate an understanding of the solid and liquid states of matter.****P.K.5A.1** Generate questions and investigate the differences between liquids and solids and develop awareness that a liquid can become a solid and vice versa.**P.K.5A.2** Describe and compare the properties of different materials (e.g., wood, plastic, metal, cloth, paper) and classify these materials by their observable characteristics (visual, aural, or natural textural) and by their physical properties (weight, volume, solid or liquid, and sink or float). | **EMBEDDED SCIENCE and ENGINEERING PRACTICES*** Ask Question and Define Problems
* Develop and Use Models
* Analyze and Interpret Data
* Plan and Conduct Investigations

**EMBEDDED CROSSCUTTING CONCEPTS*** Cause and Effect *(Mechanism and Explanation)*
* Energy and Matter *(Flows, Cycles, Conservation)*
* Stability and Change
 | CharacteristicsCompareDescribeDifferenceInvestigateLiquidMaterialMatterPropertySolid |

1. https://tntp.org/assets/documents/TNTP\_The-Opportunity-Myth\_Web.pdf [↑](#footnote-ref-2)