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**SUGGESTED**

**INSTRUCTIONAL PLANNING GUIDE**

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

**q SCIENCE**

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| **GRADE 1** |

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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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| **GRADE 1 SCIENCE****THEME: Discovering Patterns and Constructing Explanations** |
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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 Grade 1, students build on the language, vocabulary, and mathematical concepts developed in kindergarten to construct explanations stemming from patterns observed in the natural environment. Students conduct investigations to determine what plants need to live and grow. They test predictions, discover patterns in plant and animal life cycles, and construct explanations about plant needs for growth and survival. Students use an engineering design process to solve the problem of plant overcrowding in a garden. Students observe plant adaptations, such as trees shedding leaves, or leaves turning toward the sun, and establish the cause and effect relationship between adaptations and environmental changes. Students describe, compare, and analyze daily weather data to determine weather patterns in different seasons. They use an engineering design process to create a system to better plan and respond to severe weather. Students investigate light and sound to find materials that light passes throughand materials that change sound. They construct a device that uses light and/or sound to communicate over a distance. Students develop investigations and make predictions about patterns in the natural world. Acting as scientists, students 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

**SCIENCE 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 AND ENGINEERING PRACTICES SCIENCE CROSSCUTTING CONCEPTS****q** | **VOCABULARY TERMS**CORE ACADEMIC **q** |
| **HEIRARCHAL ORGANIZATION:****Plans Structures and Functions****REAL-WORLD CONNECTIONS and PHENOMENA*** Discuss the parts of plants that provide food sources for animals to include humans and discuss what kinds of plants human eat. and what part of the plant do humans eat
* Demonstrate, with food coloring, how water travels through a plant.
* Examine tree bark and explore how important it is to a tree. Look at different types of bark and compare them.
 | **L.1.1 Students will demonstrate an understanding of the basic needs and structures of plants.****L.1.1.1** Construct explanations using first-hand observations or other media to describe the structures of different plants (i.e., root, stem, leaves, flowers, and fruit). Report findings using drawings, writing, or models.**L.1.1.2** Obtain information from informational text and other media to describe the function of each plant part (roots absorb water and anchor the plant, leaves make food, the stem transports water and food, petals attract pollinators, flowers produce seeds, and seeds produce new plants).**L.1.1.3** Design and conduct an experiment that shows the absorption of water and how it is transported through the plant. Report observations using drawings, sketches, or models.**L.1.1.4** Create a model which explains the function of each plant structure (roots, stem, leaves, petals, flowers, seeds).**L.1.1.5** With teacher support, gain an understanding that scientists are humans who use observations and experiments to learn about the natural world. Obtain information from informational text or other media about scientists who have made important observations about plants (e.g., Theophrastus, Gregor Mendel, George Washington Carver, Katherine Esau). | **EMBEDDED SCIENCE and ENGINEERING PRATICES*** Ask Question and Define Problems
* Develop and Use Models
* Analyze and Interpret Data
* Plan and Conduct Investigations
* Engage in Scientific Argument from Evidence
* Construct Explanations and Design Solutions
* 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
 | AbsorbFlowerFruitLeafPetalPlantRootSeedSoilStemWater |
| **REPRODUCTION and HEREDITY:****Understanding Life Cycles****REAL-WORLD CONNECTIONS and PHENOMENA*** Plant seeds and journal the process of plant growth.
* Discuss what happens as wasps grow.
* Discuss what happens within a wasp’s nest.
 | **L.1.2 Students will demonstrate an understanding of how living things change in form as they go through the general stages of a life cycle.****L.1.2.1** Investigate, using observations and measurements (non-standard units), flowering plants (pumpkins, peas, marigolds, or sunflowers) as they change during the life cycle (i.e., germination, growth, reproduction, and seed dispersal). Use drawings, writing, or models to communicate findings.**L.1.2.2** Obtain, evaluate, and communicate information through labeled drawings, the life cycle (egg, larva, pupa, adult) of pollinating insects (e.g., bees, butterflies). | **EMBEDDED SCIENCE and ENGINEERING PRATICES*** Ask Question and Define Problems
* Develop and Use Models
* Analyze and Interpret Data
* Plan and Conduct Investigations
* Use Mathematical and Computational Thinking
* 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
 | AdultEggFlowerGerminationLarvaLife CycleLivingPollinationPupaReproduction |

| **TERM 2** |
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| **UNIT OF STUDY**(REAL-WORLD CONNECTIONS and PHENOMENA)**q** | **MS CCR STANDARDS****q** | **SCIENCE AND ENGINEERING PRACTICES** **SCIENCE CROSSCUTTING CONCEPTS** **q** | **VOCABULARY TERMS**CORE ACADEMIC **q** |
| **ECOLOGY and INTERDEPENDENCE:****Plant Growth****REAL-WORLD CONNECTIONS and PHENOMENA*** Using various media sources, discuss conditions that would allow plants to grow in some very unusual places, i.e. flowers in the snow.
* Discuss what is involved when attempting to repair plant parts, i.e. stems. To ask, ‘can a broken stem be mended?
 | **L.1.3A Students will demonstrate an understanding of what plants need from the environment for growth and repair.****L.1.3A.1** Conduct structured investigations to make and test predictions about what plants need to live, grow, and repair including water, nutrients, sunlight, and space. Develop explanations, compare results, and report findings. | **EMBEDDED SCIENCE and ENGINEERING PRATICES*** Ask Question and Define Problems
* Develop and Use Models
* Plan and Conduct Investigations
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Stability and Change
* Structure and Function
* Energy and Matter *(Flows, Cycles, Conservation)*
 | Body PartsEnvironmentGrowthNutrientPlantSpaceSunlightWater |
| **ECOLOGY and INTERDEPENDENCE:****Plant Pollination****REAL-WORLD CONNECTIONS and PHENOMENA*** Research and discuss the pollinator population in our state and how a decline would impact plant life.
 | **L.1.3B Students will demonstrate an understanding of the interdependence of flowering plants and pollinating insects.****L.1.3B.1** Identify the body parts of a pollinating insect (e.g., bee, butterfly) and describe how insects use these parts to gather nectar or disburse pollen. Report findings using drawings, writing, or models. | **EMBEDDED SCIENCE and ENGINEERING PRATICES*** Ask Question and Define Problems
* Develop and Use Models
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Structure and Function
 | Body PartsDisperseEnvironmentFlowerGrowthInterdependencyPlantPollinatePollen |
| **ECOLOGY and INTERDEPENDENCE:****Plant Adaptations****REAL-WORLD CONNECTIONS and PHENOMENA*** Discuss ways plants adapt to their environments. Why are some plants tall and why are some plants low to the ground?
* Examine the leaves of plants to feel their waxiness and research and discuss why this feature is necessary for plants.
 | **L.1.4 Students will demonstrate an understanding of the ways plants adapt to their environment in order to survive.****L.1.4.1** Explore the cause and effect relationship between plant adaptations and environmental changes (i.e., leaves turning toward the sun, leaves changing color, leaves wilting, or treesshedding leaves).**L.1.4.2** Describe how the different characteristics of plants help them to survive in distinct environments (e.g., rain forest, desert, grasslands, forests).**L.1.4.3** Create a solution for an agricultural problem (i.e. pollination, seed dispersal, over-crowding).Use an engineering design process to define the problem, design, construct, evaluate, and improve the solution. \* **All SEPs and CCCs are applicable.** | **EMBEDDED SCIENCE and ENGINEERING PRATICES*** 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)*
* Energy and Matter *(Flows, Cycles, Conservation)*
* Structure and Function
* Stability and Change
 | AdaptationChangeCharacteristicsDescribeEffectEnvironmentPlantProblemSurvive |

| **TERM 3** |
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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** |
| **EARTH SYSTEM and CYCLES:****Weather Patterns and Conditions****REAL-WORLD CONNECTIONS and PHENOMENA*** Discuss bad weather events in your local community and community response to weather events.
* Discuss weather conditions with regional weather persons and journal daily weather.
 | **E.1.9A Students will demonstrate an understanding of the patterns of weather by describing, recording, and analyzing weather data to answer questions about daily and seasonal weather patterns.****E.1.9A.1** Analyze and interpret data from observations and measurements to describe local weather conditions (including temperature, wind, and forms of precipitation).**E.1.9A.2** Develop and use models to predict weather conditions associated with seasonal patterns and changes.**E.1.9A.3** Construct an explanation for the general pattern of change in daily temperatures by measuring and calculating the difference between morning and afternoon temperatures.**E.1.9A.4** Obtain and communicate information about severe weather conditions to explain why certain safety precautions are necessary. | **EMBEDDED SCIENCE and ENGINEERING PRATICES*** 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)*
* Systems and System Models
* Energy and Matter *(Flows, Cycles, Conservation)*
* Stability and Change
 | ChangeConditionPatternPrecipitationSeasonSevere WeatherTemperatureWeatherWind |
| **EARTH SYSTEM and CYCLES:****Water and Land Resources****REAL-WORLD CONNECTIONS and PHENOMENA*** Discuss bodies of water and water sources in MS and their importance to local environments.
* Research icebergs and how they affect conditions and behaviors of surrounding bodies of water.
 | **E.1.9B Students will demonstrate an understanding of models (drawings or maps) to describe how water and land are distributed on Earth.****E.1.9B.1** Locate, classify, and describe bodies of water (oceans, rivers, lakes, and ponds) on the Earth’s surface using maps, globes, or other media.**E.1.9B.2** Generate and answer questions to explain the patterns and location of frozen and liquid bodies of water on earth using maps, globes, or other media.**E.1.9B.3** With teacher guidance, plan and conduct a structured investigation to determine how the movement of water can change the shape of the land on earth. | **EMBEDDED SCIENCE and ENGINEERING PRATICES*** Ask Question and Define Problems
* Develop and Use Models
* Engage in Scientific Argument from Evidence

**EMBEDDED CROSSCUTTING CONCEPTS*** Patterns
* Cause and Effect *(Mechanism and Explanation)*
* Systems and System Models
* Energy and Matter *(Flows, Cycles, Conservation)*
* Stability and Change
 | Bodies of WaterEarthFreezeLakeLandLiquidMapOceanPondRiverShapeWater |
| **EARTH SYSTEM and CYCLES:****Renewable Water Resources****REAL-WORLD CONNECTIONS and PHENOMENA*** Research how clean and usable water gets into our homes. Seek information from local water treatment plants.
* Research sources of water pollution and contamination and the role humans play in destroying water resources.
 | **E.1.10 Students will demonstrate an understanding of human dependence on clean and renewable water resources.****E.1.10.1** Obtain and evaluate informational texts and other media to generate and answer questions about water sources and human uses of clean water.**E.1.10.2** Communicate solutions that will reduce the impact of humans on the use and quality of water in the local environment.**E.1.10.3** Create a device that will collect free water to meet a human need (e.g., household drinking water, watering plants/animals, cleaning). Use 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 PRATICES*** Ask Question and Define Problems
* 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
 | CommunicationDependDevicesEnvironmentHumansImpactNeedsResourceSolutionSourceWater |

| **TERM 4** |
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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** |
| **MOTION FORCE ENERGY:** **Behavior of Light****REAL-WORLD CONNECTIONS and PHENOMENA*** Observe and collect data on shadows and how they are formed.
* Discuss how sun dials are used to tell time.
 | **P.1.6A Students will demonstrate an understanding that light is required to make objects visible.****P.1.6A.1** Construct explanations using first-hand observations or other media to describe how reflected light makes an object visible.**P.1.6A.2** Use evidence from observations to explain how shadows form and change with the position of the light source. | **EMBEDDED SCIENCE and ENGINEERING PRATICES*** Ask Question and Define Problems
* Develop and Use Models
* Plan and Conduct Investigations
* Engage in Scientific Argument from Evidence
* Obtain, Evaluate, and Communicate Information

**EMBEDDED CROSSCUTTING CONCEPTS*** Cause and Effect *(Mechanism and Explanation)*
* Energy and Matter *(Flows, Cycles, Conservation)*
 | ReflectionLightTransparentShadow SourcePositionLight Source |
| **MOTION FORCE ENERGY:** **Behavior of Sound****REAL-WORLD CONNECTIONS and PHENOMENA*** Research how different instruments are made to create a variety of sounds.
* Research how animals create their very distinctive sounds.
 | **P.1.6B Students will demonstrate an understanding of sound.****P.1.6B.1** Conduct an investigation to provide evidence that vibrations create sound (e.g., pluck a guitar string) and that sound can create vibrations (e.g., feeling sound through a speaker).**P.1.6B.2** Create a device that uses light and/or sound to communicate over a distance (e.g., signal lamp with a flashlight). Use 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 PRATICES*** 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)*
* Systems and System Models
* Energy and Matter *(Flows, Cycles, Conservation)*
* Stability and Change
 | VibrationSoundDistance |

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