

BENCHMARK REPORT

SCIENCE GRADE 7



DOMAIN: Science

NGSS/ Aspire Practices	OCS Code:	Standards and Benchmarks	DOK
Strand: MS. Waves and Electromagnetic Radiation: MS-PS4 Waves and Their Applications in Technologies			
Practice 8	MS-PS4-3.	Integrate quantitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	
	7-PS4-3.1a	Define digitized signals, analog signals, encode information, and transmit information	1
	7-PS4-3.2a	Identify characteristics of digital and analog signals	1
	7-PS4-3.3b	Gather evidence on the reliability of digital and analog signals to communicate information	2
	7-PS4-3.4c	Cite evidence to support or refute the claim that digital signals are a more reliable way to communicate than analog signals	3
Strand: MS. Structure, Function, and Information Processing: MS-LS1 From Molecules to Organisms: Structures and Processes			
Practice 3	MS-LS1-1.	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	
	7-LS1-1.1a	Define abiotic, biotic, prokaryotic and eukaryotic	1
	7-LS1-1.2b	Categorize objects as abiotic or biotic	2
	7-LS1-1.3b	Categorize biotic objects as being made up of prokaryotic or eukaryotic cells	2
	7-LS1-1.4d	Plan an investigation to show the differences between biotic objects made up of prokaryotic or eukaryotic cells by following the steps of an experiment	4
	7-LS1-1.5c	Conduct an investigation to show the differences between biotic objects made up of prokaryotic or eukaryotic cells by following the steps of an experiment	3
Practice 2	MS-LS1-2.	Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	
	7-LS1-2.1a	Label the nucleus, cell membrane, cell wall, chloroplasts, and mitochondria of a cell	1
	7-LS1-2.2a	Define the functions of a cell and its different parts	1
	7-LS1-2.3d	Develop a model that describes the contribution of the parts of a cell to the function of the whole cell	4
Practice 7	MS-LS1-3.	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	
	7-LS1-3.1a	Identify the ways that cells differentiate themselves for different functions in a human body	1
	7-LS1-3.2b	Categorize the types of cells and tissues that make up the major organs in a human body	2
	7-LS1-3.3c	Construct an argument supported by evidence that shows how the major organs consist of differentiated cells and tissues that work together with each other	3
Strand: MS. Matter and Energy in Organisms and Ecosystems: MS-LS1 From Molecules to Organisms: Structures and Processes			
Practice 6	MS-LS1-6.	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	
	7-LS1-6.1b	Diagram the process of photosynthesis of a single celled life form, plant, or animal	2
	7-LS1-6.2b	Diagram the flow of carbon, water, and nitrogen in the cycling of matter for a single celled life form, plant, or animal	2
	7-LS1-6.3b	Diagram the flow of energy into and out of a single celled life form, plant, or animal	2
	7-LS1-6.4d	Synthesize information to explain the role of photosynthesis in the cycling of matter and flow of energy into and out of a single celled life form, plant, or animal	4

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Practice 2	MS-LS1-7.	Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	
	7-LS1-7.1a	List the major chemical reactions responsible for breaking down food in a single celled life form, plant, or animal	1
	7-LS1-7.2b	Categorize different ways that food is rearranged through major chemical reactions to form new molecules that support growth in a single celled life form, plant, or animal	2
	7-LS1-7.3d	Create a model that shows the relationship between the rearrangement of food through chemical reactions and the new molecules that are formed to support growth in a single celled life form, plant, or animal	4
Practice 2	MS-LS2-3.	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	
	7-LS2-3.1a	Define abiotic, biotic, cycle of matter, tropic cycle/levels, and ecosystem	1
	7-LS2-3.2b	Gather information about the tropic cycle and its levels	2
	7-LS2-3.3d	Design a food chain based on the tropic cycle that shows the cycling of matter and flow of energy among the biotic (living) and abiotic (nonliving) parts of an ecosystem	4
Strand: MS. Growth, Development, and Reproduction of Organisms: MS-LS1 From Molecules to Organisms: Structures and Processes			
Practice 7	MS-LS1-4.	Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	
	7-LS1-4.1b	Gather examples of characteristic animal behaviors that effect animal reproduction	2
	7-LS1-4.2b	Gather examples of specialized plant structures that effect plant reproduction	2
	7-LS1-4.3b	Categorize ways in which characteristic animal behaviors effect the probability of the successful reproduction of animals	2
	7-LS1-4.4b	Categorize ways in which specialized plant structures effect the probability of the successful reproduction of plants	2
	7-LS1-4.5c	Create an argument to show how characteristic animal behaviors effect the probability of successful reproduction of animals using evidence and scientific reasoning	3
	7-LS1-4.6c	Create an argument to show how specialized plant structures effect the probability of successful reproduction of plants using evidence and scientific reasoning	3
Practice 6	MS-LS1-5.	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	
	7-LS1-5.1c	Gather information on the environmental and genetic factors that specifically effect the growth rate and final size of a single celled life form, plant, or animal	3
	7-LS1-5.2c	Determine how specific environmental and genetic factors effect the growth rate and final size of a single celled life form, plant, or animal	3
	7-LS1-5.3c	Cite scientific evidence for how specific environmental and genetic factors effect the growth rate and final size of a single celled life form, plant, or animal	3
Strand: MS. Growth, Development, and Reproduction of Organisms: MS-LS3 Heredity: Inheritance and Variation of Traits			
Practice 2	MS-LS3-1.	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	
	7-LS3-1.1b	Gather information about genes and chromosomes; DNA mutations and sequences; protein formations; and amino acid sequences	2

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	7-LS3-1.2b	Find examples of DNA mutations that show harmful, beneficial, or neutral effects on the structure and function of a single celled life form, plant, or animal	2
	7-LS3-1.3b	Relate structural changes in genetic sequences (mutations) to changes in amino acid sequences (proteins)	2
	7-LS3-1.4d	Create a model that shows why structural changes in genetic sequences can result in changes to the structure and function of a single celled life form, plant, or animal through changes in the amino acid sequence	4
	7-LS3-1.5d	Use a model to predict the harmful, beneficial, or neutral effects that changes in genetic sequences will have on the structure and function of an unknown single celled life form, plant, or animal	4
Practice 2	MS-LS3-2.	Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	
	7-LS3-2.1a	Define asexual and sexual reproduction	1
	7-LS3-2.2a	Locate information on the characteristics of asexual and sexual reproduction	1
	7-LS3-2.3b	Classify the effects of asexual and sexual reproduction on the transfer of genetic information from parents to offspring	2
	7-LS3-2.4d	Create a model that shows why asexual and sexual reproduction results in offspring with different genetic information	4
	7-LS3-2.5c	Use a model to predict the genetic results of an asexual and sexual reproduction on the genetic information of the offspring	3
Strand: MS. Earth's Systems: MS-EES2 Earth's Systems			
Practice 2	MS-ESS2-1.	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	
	7-ESS2-1.1b	Summarize the materials used in a rock cycle	2
	7-ESS2-1.2b	Find information on the movement of rocks (and the minerals and chemical elements that comprise them) from one form to new forms	2
	7-ESS2-1.3d	Develop a model that describes the process through which energy changes rocks from one form to others	4
Strand: MS. Weather and Climate: MS-EES2 Earth's Systems			
Practice 3	MS-ESS2-5.	Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	
	7-ESS2-5.1a	Define flow of air masses; high and low pressure; and temperature, precipitation, and wind speed	1
	7-ESS2-5.2b	Gather data on changes in temperature, precipitation, and wind speed when an air mass flows from high to low pressure and when high and low pressure air masses collide	2
	7-ESS2-5.3c	Cite evidence that shows the results of changes in high and low pressure on temperature, precipitation, and wind speed	3
Practice 2	MS-ESS2-6.	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	
	7-ESS2-6.1a	Locate information on unequal heating, rotation of the earth, atmospheric circulation, and oceanic circulations	1
	7-ESS2-6.2b	Determine the effects of unequal heating and rotation of the earth on the large-scale movement of air over land or ocean	2
	7-ESS2-6.3d	Create a model that describes changes in a climate as the large scale movement of air over land or over the ocean changes	4
	7-ESS2-6.4c	Use a model to predict changes in a climate as the large scale movement of air over land or an ocean changes	3

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Strand: MS. Human Impacts: MS-ESS3 Earth and Human Activity			
Practice 4	MS-ESS3-2.	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	
	7-ESS3-2.1c	Gather data on the frequency and severity of a geophysical or biological hazard which has caused catastrophic events	3
	7-ESS3-2.2c	Interpret data on the frequency and severity of a geophysical or biological hazard to predict future catastrophic events	3
	7-ESS3-2.3d	Analyze data to determine the needs for better forecasting or mitigating the effects of a geophysical or biological hazard	4
	7-ESS3-2.4d	Evaluate data to determine global or local technologies to address the needs for better forecasting or mitigating the effects of a geophysical or biological hazard	4