7th Grade Science Curriculum
Elevate Science Course 2 Copyright 2019
Summer 2023

Topic 1- The Cell System

MS-LS1-1, MS-LS1-2, MS-LS1-3, MS-LS1-6, MS-LS1-7, MS-LS2-3, DCI LS1.1, CCC.3, CCC.5, CCC.6, SEP. 2, SEP. 3, SEP. 6.

ADDITIONAL STANDARDS

ELA	MATH	SEL
RH.6-8.2,RI. 6.2, RI.6.7, RST.6-8.1 RST 6-8.2, WHST.6-8.2B,	6.EE.C.9 8.F.B.5 7.RP.A.1	SEL PK-12 4.1, 5.2, 2.2, 3.3, 3.4, 1.4

Objectives

- Recognize the components of cell theory
- Understand that cells are the basic unit of life
- Explore the concept that cells of all living things extract energy from food, get rid of waste, and reproduce
- Provide evidence that all living things are made up of cells
- Distinguish between living and nonliving things based on the presence or absence of cells
- Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function
- Identify the parts of a cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall
- Describe how each part of a cell contributes to the function of the cell as a whole
- Compare and contrast the structure and function of major parts of plant and animal cells
- Use a model to describe how cells obtain energy and remove waste materials through the cell membrane
- Restate the four functions of cell division
- Describe and explain each phase of the cell cycle
- Explain cause and effect relationships of cell division
- Analyze and interpret data to identify patterns in the process of cell division
- Calculate the number of cells when provided the number of divisions
- Ask questions related to cell division when provided an image of a cell
- Construct an end explanation to explain how plants and other organisms use photosynthesis to make food
- Explain the roles of light, carbon dioxide, water, and chlorophyll and photosynthesis

- Cite evidence to support the role of photosynthesis in the cycling of materials and energy through ecosystems
- Describe how organisms use cellular respiration to break down food to provide energy
- Explain how cells can release energy without using oxygen
- Find evidence to support the fact that living systems follow the Laws of Conservation of Mass and Energy

Extended: Explore how to use a microscope to observe specimens under different magnifications

Quest: Design an experiment to investigate if unknown samples are living or nonliving

Topic 2 Human Body Systems
MS-LS1-3, DCI LS1.A, CCC.4, SEP. 7,

ADDITIONAL STANDARDS

ELA	MATH	SEL
RST.6-8.1, RST.6-8.2, RST.6-8.6,	**6.EE.C.9**	**SEL PK-12 4.1, 5.2, 2.2, 3.3, 3.4, 1.4**

- Use textual evidence to list the levels of organization in the body
- Describe the organization of body systems
- Describe the functions of cells, tissue, organs, and body systems
- Use evidence to construct and support arguments in order to compare the structure and function of body systems to other systems (e.g. car, invertebrates)
- Explain the general functions of body systems, including how they work together to function
- Describe stimulus-response situations
- Explain how the glands of the endocrine system control body processes
- Explain how systems interact to maintain homeostasis
- Use evidence to predict and describe what may happen if one body system stops interacting with another
- Explain how blocked blood vessels affect cells
- Describe how healthy choices affect organ systems
- Identify the important nutrients a body needs to carry out the processes
- Explain how the body's systems process the foods you eat
- Develop arguments to explain why some food choices are healthier than others

- Explain how food becomes materials the body can use
- Analyze proportional relationships to determine the total recommended daily allowances of nutrients
- Use evidence to explain how body systems interact to transport materials throughout the body
- Analyze diagrams in order to explain how the respiratory system interacts with other systems to exchange gases
- Interpret photos and text to Explain how other body systems interact with the excretory system to remove waste
- Use textual evidence to explain what systems control processes and the human body
- Use visuals to explain how nerve signals travel
- Develop and use models to demonstrate how the body senses and reacts to surroundings

Extended: Identify criteria, constraints, and materials that are needed to be considered when building an artificial limb

Gifted and Talented: Work in groups to design and build a functional model of a lung. Evaluate and refine models

Topic 3- Reproduction and Growth

MS-LS3-2, DC LS1.B, DCI LS3.A, DCI LS3.B, CCC.2, SEP. 2, SEP. 6, SEP. 7

ADDITIONAL STANDARDS

ELA	MATH	SEL
W.7.2, RI.7.1, 7.SPC.8, MS-LS-4, RST.6-8.1, RST.6-8.2, RST.6.8.4, RST.6.8.5 WHST.6-8.1,	**7.SP.B.4, 6.EE.B.5**	**SEL PK-12 4.1, 5.2, 2.2, 3.3, 3.4, 1.4**

- Analyze and investigate how organisms reproduce either sexually or asexually and how these reproductive processes result in the transfer of genetic information to their offspring
- Develop and use models to describe how asexual reproduction results in offspring that are genetically identical while sexual reproduction results and offspring with genetic variation
- Analyze the cause and effect relationship between the inheritance of half of an offspring's genes from each parent and how this leads to variation and traits
- Explain and compare reproductive cycles in plants
- Cite textual evidence to identify aspects of the text that lead to conceptual understanding of plant reproduction and seed dispersal.
- Create model drawings to illustrate the structures and sequence of events in plant reproduction.
- Make observations and generalizations about how animals use Behavior to increase chances of survival and reproduction
- Develop and use models to convey information about types of mating systems
- Compare animal migration patterns with human movement patterns
- Draw comparisons and make inferences about the relationship between fertilization strategies and parental investment
- Describe the cause and effect relationship for environmental factors that influence an organism's growth
- Describe genetic factors that influence an organism's growth
- Construct explanations to identify methods to stimulate plant growth
- Identify the mechanisms that factor and control plant and animal growth

Extended: Work in groups to design, build, and present a lunar growth chamber for plants. Consider the constraints to their design due to reduced gravity.

Gifted and Talented: Assess the impact of a construction project on plants

Topic 4 Ecosystems
MS-LS2-1, DCI LS2.A, CCC.2, SEP. 4, MS-LS2-3, DCI LS2.B, CCC.5, SEP.2, WHST.6-8.4, 7.RP.A.2b, RST.6-8.4, WHST.6-8.2.D, 6.EE.C.9

ADDITIONAL STANDARDS

ELA	MATH	SEL
WHST.6-8.2.b, RH.6-8.4, RST.6-8.1, RST.6-8.2 WHST.6-8.4, RST.6-8.4, WHST.6-8.2.D,	**7.SP.A.1., 7.RP.A.2b, 6.EE.C.9**	**SEL PK-12 4.1, 5.2, 2.2, 3.3, 3.2, 1.4**

- Analyze data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem
- Interpret data to provide evidence for the effects of resource availability on organisms in an ecosystem
- Understand that organisms and populations of organisms are dependent on their environmental interactions both with other living things and with non-living factors
- Analyze how patterns can be used to identify cause and effect relationships
- Use learned knowledge to predict how cause and effect relationships may use to infer phenomena
- Determine the central ideas or conclusions of a text
- Provide an accurate summary of the text distinct from prior knowledge or opinions
- Explain what a point on the graph of a proportional relationship means in terms of the situation
- Construct an explanation that includes quantitative or qualitative relationships between variables that predict and/or describe phenomena
- Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based
- Identify the benefits and limitations of the use of scientific models
- Write arguments to support claims with clear reasons and relevant evidence
- Determine two or more central ideas in a text and analyze their development over the course of the text
- Provide an objective summary of the text
- Evaluate competing design solutions for maintaining biodiversity and ecosystem services
- Develop model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem
- Evaluate competing design solutions for maintaining biodiversity and ecosystem services
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Extended: Design your own method to clean up an oil spill

Gifted and Talented: Build composters to see bio-remediation and action

Topic 5
Populations, Communities, and Ecosystems

MS-LS2-1, MS-LS2-2, MS-LS2-3, MS-LS2-4, MS-LS2-5

ADDITIONAL STANDARDS

ELA	MATH	SEL
RST.6-8.2	**7.RP.A.2d**	**SEL PK-12 4.1, 5.2, 2.2, 3.3, 3.2, 1.4**

- Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem
- Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems
- Understand that organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving factors
- Understand how patterns can be used to identify cause and effect relationships
- Analyze how cause and effect relationships may be used for addict phenomena and natural or Design Systems
- Construct and explanation that includes qualitative or quantitative relationships between variables that predict and or describe phenomena
- Evaluate competing design solutions for maintaining biodiversity and ecosystem services
- Analyze and interpret data for patterns and the fossil record that documents be existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past
- Understand how changes and biodiversity and influence humans resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on- for example, water purification and recycling
- Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem

Extended: Build a model of a biome structure

Gifted and Talented: Design, plan, and prepare a model of a wildlife crossing

Topic 6 Distribution of Natural Resources
MS-ESS3-1, MS-ESS3-3, MS-ESS3-4

ADDITIONAL STANDARDS

ELA	MATH	SEL
RST.6-8-1 **RST 6-8.2** **RST.6-8.5**	**7.EE.B.4a** **MP.2** **7.RP.A.3**	**SEL PK-12 4.1, 5.2, 2.2, 3.3, 3.4, 1.4**

- Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
- Construct an argument supported by evidence for how increases in human population and per capita consumption of Natural Resources impact Earth Systems
- Understand that humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources
- Determine cause and effect relationships and how they may be used to predict phenomena and natural or designed systems

Extended: Research different types of renewable energy resources, or renewables, and the cost and benefits of using them.

Gifted and Talented: Work in pairs to design a method to use hydropower on a small scale to generate power.

Topic 7 Human Impact on the Environment
MS-ESS3-4, DCI ESS3.C, CCC.2
Sep.7

ADDITIONAL STANDARDS

ELA	MATH	SEL
RSt-6-8.2 **WHST.6-8.9**	**6.RP.A.1**	**SEL PK-12 4.1, 5.2, 2.2, 3.3, 3.4, 1.4**

- Construct an argument supported by evidence for how increases in human population and per capita consumption of Natural Resources impact Earth Systems
- Understand the negative impacts on Earth unless the activities and Technologies involved are engineered otherwise
- Compare and contrast the cause and effect relationships that may be used to predict phenomena and natural or Design Systems
- Construct, use, and or present an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem
- Understand how scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions to society takes
- Understand that all human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment

Extended: Design a model for recycling wastewater or rainwater from your school

Gifted and Talented: Investigate ways to work together to reduce waste for the benefit of the environment. Design, evaluate, and implement waste reduction plans

Topic 8 Waves and Electromagnetic Radiation
MS-PS4-1, MS-PS4-2, DCI PS4.A,
CCC.1,
SEP.5

ELA	MATH	SEL
RH.6-8.7 **WHST.6-8.1.b** **WHST.6-8.2.d**	**6.RP.A.2**	**SEL PK-12 4.1, 5.2, 2.2, 3.3, 3.4, 1.4**

- Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave
- understand that a simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude
- Analyze graphs, charts, and images that can be used to identify patterns and data.
- Use mathematical representations to describe and or support scientific conclusions and/or design solutions
- Recognize that science knowledge is based upon logical and conceptual connections between evidence and explanations

- integrate visual information with other information and print and digital texts
- support claims with logical reasoning and relevant, accurate data and evidence that demonstrate and understanding of the topic or text, using credible sources
- use precise language and domain specific vocabulary to inform about or explain a topic
- understand the concept of a unit rate associated with a ratio and use rate language in the context of a ratio relationship

Extended: Build a simple camera using a box.

Gifted and Talented: Explore models to observe how light interacts with different objects

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	x	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	x	Standards in Action: *Climate Change*