GCS Curriculum Map for 7th Grade Science
Year at a Glance

Module	1	2	3	4	5
Module Title	Earth Systems & Earth and Human Activity	Motion and Stability: Forces and Interactions	Energy	"From Molecules to Organisms- Structures and Processes	"Heredity- Inheritance and Variation of Traits"
Time Frame	Quarter 1	Quarter 1	Quarter 1/2	Quarter 2	Quarter 3
Standards	ESS.7.1.1 ESS.7.1.2 ESS.7.1.3 ESS.7.1.4 ESS.7.1.5 ESS.7.2.1 ESS.7.2.2 ESS.7.2.3	PS 7.1.1 PS 7.1.2 PS 7.1.3 PS 7.1.4	PS 7.2.1 PS 7.2.2 PS. 7.2.3 PS. 7.2.4	LS.7.1.1 LS.7.1.2 LS.7.1.3 LS.7.1.4	LS.7.2.1 LS.7.2.2 LS.7.2.3
Discovery ED Tech Book Unit	Unit 5	Unit 1	Unit 2	Unit 3	Unit 4
Essential Questions	ESS.7.1.1: How do the different layers of Earth's	PS.7.1.1: How can we describe the motion of an	PS.7.2.1: How do kinetic and potential energy	LS.7.1.1: How do the structures of single-celled	LS.7.2.1: How do genes on chromosomes

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	atmosphere vary in composition, temperature, and pressure? ESS.7.1.2: How do the Sun's energy and Earth's gravity drive the water cycle and influence weather patterns? ESS.7.1.3: How do the movement of air masses and pressure systems determine weather conditions? ESS.7.1.4: How can we use observations and models to predict weather conditions? ESS.7.1.5:	object in terms of its position, direction, and speed relative to another object? PS.7.1.2: How do balanced and unbalanced forces affect the motion of an object, including the roles of friction, gravity, and magnetism? PS.7.1.3: How can graphical data be used to summarize and interpret the motion of an object, showing changes in position over time? PS.7.1.4: How can graphical data help us	contribute to the total mechanical energy of an object? PS.7.2.2: How can energy be transformed from one form to another, specifically from potential energy to kinetic energy, and what are some real-life examples of these transformations? PS.7.2.3: How can we investigate and conclude that energy is transferred from one system to another when objects push or pull on each other over a	organisms enable them to perform all the basic functions of life? LS.7.1.2: How do the structures within plant, animal, and bacterial cells function to support life? LS.7.1.3: How does the hierarchical organization from cells to tissues to organs to systems enable multicellular organisms to sustain life? LS.7.1.4: How do the major systems of the human body interact to support life?	contribute to an organism's traits? LS.7.2.2: How do asexual and sexual reproduction result in different genetic outcomes in offspring? LS.7.2.3: How can we use models like Punnett squares to predict the inheritance of traits from parents to offspring?

	How do convection currents, global winds, and the jet stream affect weather and climate? **ESS.7.2.1:** **How does maintaining good air quality and monitoring the atmosphere contribute to human and environmental health?** **ESS.7.2.2:** **How do changes in the atmosphere's structure and composition affect the greenhouse effect and global temperatures?** **ESS.7.2.3:** **What impacts do hazardous environmental**	**understand the changes in distance over time for an object moving at constant speed versus variable motion?**	**distance (work)?** **PS.7.2.4:** **How do simple machines improve efficiency, and what advantages do they offer for particular tasks, including inclined planes, pulleys, levers, and wheel and axle systems?**		

	factors and storms have on humans, and what strategies can mitigate these effects?				
ELD Question STEMS	**ESS.7.1.1** "The data shows that the _____has more _____ than the _____." "The model shows that ..." "The model shows that the _____ energy causes _____to evaporate and rise, forming _____." ESS.7.1.3 **"**The data shows that when a _____ _____ moves in, it	**PS.7.1.1** How would changing the force impact the object? How can I use the knowledge of balanced and unbalanced forces to predict an object's motion? The forces acting on the object are (*balanced*) because…(*the object remains at rest, moving at a constant velocity, etc.*)	**PS.7.2.1** If increase/decrease the kinetic energy of an object, it will impact the potential energy by_____ Where in the system are the kinetic/potential energy changing? How do potential or kinetic energy affect an object's mechanical energy? Using a given	**LS.7.1.1** What structures are found in single-celled organisms to allow them to_____? **LS.7.1.2** How does the _____ _____, and _____that are present in _____relate to this cell function? How does a _____ aid the	**LS.7.2.1** This genotype explains why you have this phenotype traits because_____ How are alleles and genes related? **LS.7.2.2** What caused the patterns of _____ offspring vs _____diverse offspring? What led to the _____ variation

	can lead to ____ and cooler _____." **ESS.7.1.4** This region will be experiencing_____, _____ system, what weather will be occurring? What do _____tell us about air pressure? How are stationary, occluded fronts different?_____ What would you expect to happen to a town's temperature and precipitation if a	The forces acting on the object are (*unbalanced*) because…(*the object speeds up, slows down, changes direction, etc.*) From my observations of my investigation, this motion changed because of (describe the forces interaction and its relations to changing the object's motion) What does the pattern of data you see allow you to conclude from the experiment	model, summarize how the kinetic/potential energy will vary. How might mechanical energy be affected by	_____ in supporting life? **LS.7.1.3** We/I think that (e.g., single cell organism, animal cell, cardiac muscle) belongs in the (e.g., cell, tissue) level of organization because ... How does (e.g., cells) relate to (e.g., organs)? How does the hierarchical organization of multicellular organisms function together to support life? **LS.7.1.4**	in this organism? How do you know if _____ variation is the result of _____ _____? What would happen in the system if the _____ were changed? What _____ do you observe in the data collected from the _____ _____? Does the _____ support the observable _____? Which model

	(cold front moved over the town? _____ What would you predict would happen if a (continental, maritime) air mass moved toward this (maritime, continental) air mass?_____ _ How do _____ affect weather/climate ? How can a change in the jet stream have a big effect on weather/climate ?	about balanced and unbalanced forces? What do you predict would happen if the motion of the object being observed was impacted by friction? Does the pattern in the data support the conclusion that magnetic forces are impacted by distance between magnets? Why or why not? **PS.7.1.3** This change in the graph shows an unbalanced force acted upon the object because____		How do the structures in _____ and _____ (e.g., reproductive,and endocrine) function together to support life? How can a change in one system have an effect on another system?	exhibits _____% probability of a _____ trait?

	What would you predict would happen if the location of the jet stream changed? How do the parts of convection currents work together to cause wind patterns? What is the correlation between the Coriolis Effect and wind patterns? **ESS.7.2.1** What effect does monitoring the atmosphere and maintaining air quality have on	A negative slope shows the object motion being___If I change (force) in the system, the object is affected. My graph shows this by _____ What patterns do you observe in the data presented in the graph? What are some similarities and differences of the objects' motion in the graph? Represent through a model, of the forces acting on			

	human health? Looking at the AQI data, what can you conclude about air quality? Why is monitoring of air quality important to human health? How can stewardship impact air quality? What is the role of the _____in local air quality management? "The data shows that an _____in _____ _____ leads to higher _____temperatures.	the object and how it changes. " **PS.7.1.4** How would increased friction impact the speed of the object? The steepness of the slope is used to determine how fast/slow the object is moving (e.g., the lower the slope, the slower the speed). What patterns of motion do you observe in the data presented in the graph? What can you conclude from the data about			

	Using the data chart, how has the use of fossil fuels impact the atmosphere? **"ESS.7.2.3** "The information shows that ____ UV _____ levels can _____ the risk of ____ _____" _____	the forces acting on the object? What can you predict about the changing forces that are acting on the object based on the graph? How can a small change to the forces acting on the object have a big effect on the motion of the objec …			
Performance Events	**Students will Investigate and Argue the importance of air quality monitoring for human and**	Students will demonstrate their understanding of motion,	Students will demonstrate their understanding of motion,	Students will demonstrate their understanding of the structures and functions of single-celled and multicellular	Students will create cookies with different "genetic traits" to model inheritance

	environmental health.	forces, and energy transformations by designing and conducting experiments, creating models, and presenting their findings.	forces, and energy transformations by designing and conducting experiments, creating models, and presenting their findings.	organisms by creating models, conducting experiments, and presenting their findings.	patterns.
Assessment Criteria:	***-Content Mastery***:Accuracy and depth of research, understanding of atmospheric science concepts, and clarity in explaining relationships and arguments. ***- Data Analysis:*** Competence in analyzing air quality data, identifying trends, and drawing conclusions	**Experiment Design: Creativity and scientific accuracy in designing and conducting experiments.** **Model Creation: Effectiveness in demonstrating the impact of forces and energy transformations**	**Experiment Design: Creativity and scientific accuracy in designing and conducting experiments.** **Model Creation: Effectiveness in demonstrating the impact of forces and energy transformations**	**Accuracy and detail of the models and explanations of cell structures and functions.** **Scientific accuracy, clarity, and thoroughness in the experiment report.** **Effectiveness and clarity of the presentation,**	**Evaluate the accuracy of trait predictions based on the Punnett squares.** **- Assess the creativity and clarity of how students represent genetic traits and variations using edible items.** **- Discuss and reflect on how**

	supported by evidence. ***- Scientific Communication:*** Ability to present findings and arguments effectively, including use of visuals, clarity of explanations, and engagement with the audience. **Reflection and Feedback:** - After the presentations, students will engage in peer feedback sessions and receive constructive feedback from teachers and possibly external evaluators. - They will reflect on their learning journey throughout the unit, identifying	**using models.** **Data Analysis: Accuracy and clarity in interpreting graphical data and explaining changes in motion.** **Presentation: Clarity, organization, and ability to effectively communicate findings and concepts.**	**using models.** **Data Analysis: Accuracy and clarity in interpreting graphical data and explaining changes in motion.** **Presentation: Clarity, organization, and ability to effectively communicate findings and concepts.**	**including the ability to answer questions.** **Understanding of the interactions between different levels of biological organization and systems in multicellular organisms.** **Reflection and Feedback:** - After the presentations, students will engage in peer feedback sessions and receive constructive feedback from teachers and possibly external evaluators. - They will reflect on their learning	**the activity models the concepts of heredity, inheritance, and variation of traits.**

	strengths and areas for improvement in their research, analysis, and presentation skills.			journey throughout the unit, identifying strengths and areas for improvement in their research, analysis, and presentation skills.	

GCS Curriculum Map for 7th Grade Science

Module 1: "Earth Systems" & "Earth and Human Activity" **Essential Question:** **How do the various atmospheric processes and patterns, driven by the Sun's energy and Earth's physical properties, influence weather and climate?** **How do human activities and natural processes affect the atmosphere and environment, and what can we do to monitor and mitigate these impacts to ensure health and sustainability?**	**Timeline:** Quarter 1 **Discovery ED UNIT: 5**
Performance Event: Students will write an informational essay about how people find the courage to face their fears.	
SWBAT: (Mastery Objectives) ***ESS.7.1 Understand the atmosphere and how the cycling of water relates to Earth's weather and climate.*** ESS.7.1.1 Analyze and interpret data to compare the composition, properties and structure of Earth's atmosphere to include: mixtures of gasses and differences in temperature and pressure within layers. ESS.7.1.2 Use models to explain how the energy of the Sun and Earth's gravity drive the cycling of water, including changes of state, as it moves through multiple pathways in Earth's systems and relates to weather patterns on Earth. ESS.7.1.3 Analyze and interpret data to explain the relationship between the movement of air masses, high and low pressure systems, frontal boundaries and weather conditions that may result.	

ESS.7.1.4 Use models to predict weather conditions based on observations (including clouds, air masses, fronts), measurements (wind speed and direction, air temperature, humidity and air pressure), weather maps, satellites and radar.

ESS.7.1.5 Use models to explain the influence of convection, global winds, and the jet stream on weather and climatic conditions.

ESS.7.2 Understand the reciprocal relationship between the atmosphere and humans.

ESS.7.2.1 Engage in argument from evidence to explain that the good health of humans and environment requires: monitoring of the atmosphere, maintaining air quality and stewardship.

ESS.7.2.2 Analyze and interpret data to explain how changes in the structure and composition of the atmosphere affects the greenhouse effect and global temperatures.

ESS.7.2.3 Obtain, evaluate, and communicate information to explain the impacts on humans and mitigation strategies of potentially hazardous environmental factors (including air quality index, UV index, Heat Index, Wildfires) and storms (hurricanes, blizzards, tornadoes, severe thunderstorms, floods).

Vertical Alignment		
Previous Grade Level Standards	**Grade Level Standards**	**Next Grade Level Standards**
Grade 6 Scien…	**Grade 7 Science: 2023 Support Document**	Grade 8 Science: 202…
Instructional Resources		
Tier III Vocabulary:	**Performance Tasks:**	**Additional Resources (Time Permits)...**

ESS.7.1 "Earth's Systems" **ESS.7.1.1** **Tier 2 Vocabulary:** - Composition - Properties - Structure - Atmosphere - Mixtures - Gasses - Temperature - Pressure - Layers **Tier 3 Vocabulary:** - Stratosphere - Troposphere - Mesosphere - Thermosphere - Ozone layer - Greenhouse gasses - Atmospheric pressure **ESS.7.1.2** **Tier 2 Vocabulary:** - Models - Cycling - Changes of state	**Title: Investigating and Arguing the Importance of Air Quality Monitoring for Human and Environmental Health** **Objective:** Students will present their findings, explanations, and arguments in a culminating performance event that integrates research, data analysis, and scientific communication skills. **Event Description:** - Format: This performance event will be structured as a symposium or a series of presentations. - Audience: Peers, teachers, and possibly invited experts or community members interested in environmental health. -Components: ***Task 1. Research and Data Analysis Presentation:*** - Each student or group will present their research on the impacts of air quality on human health and environmental conditions. - They will showcase their analysis of pollutants such as CO2, NO2, and particulate matter, highlighting trends and correlations found in the data. ***Task 2. Explanations about Atmospheric Relationships:*** - Students will explain the relationships between atmospheric layers, weather patterns, and climate based on their collected data. - They will demonstrate understanding of how changes in atmospheric composition influence global climate patterns and local weather conditions. ***Task 3. Scientific Argument Presentation:*** - Each student or group will present a scientific argument advocating for the importance of maintaining air quality through	**NOAA Education Resources** *(NOAA Education Website: Provides a wealth of resources including lesson plans, multimedia, and interactive activities on topics such as weather, climate, oceans, and atmospheric science.)* ***NOAA Education Website: [NOAA Education](https://www.noaa.gov/education)*** **. NASA Earth Observing System Data and Information System (EOSDIS)** ***NASA Earth Science Education: [NASA Earth ScienceEducation]*** *(Provides access to satellite data, climate models, visualizations, and educational resources related to Earth's atmosphere, weather patterns, and climate change.)* ***(https://climate.nasa.gov/education*** ***education***

- Pathways - Weather patterns **Tier 3 Vocabulary:** - Evaporation - Condensation - Precipitation - Water cycle - Condensation nuclei **ESS.7.1.3** **Tier 2 Vocabulary:** - Air masses - High-pressure systems - Low-pressure systems - Frontal boundaries - Weather conditions **Tier 3 Vocabulary:** - Cyclone - Anticyclone - Warm front - Cold front - Occluded front **ESS.7.1.4**	regular monitoring and effective mitigation strategies. - They will support their argument with analyzed data, scientific evidence, and examples of the impacts of poor air quality on human health and environmental sustainability.	****National Weather Service Education**** National Weather Service Education: Offers educational resources, weather safety information, data tools, and climate education materials for students and educators. ***(https://www.weather.gov/education/)*** **Environmental Protection Agency (EPA)** **EPA Student Center:** *(Provides educational resources on air quality, water quality, climate change, and environmental health. Includes interactive tools, lesson plans, and educational games.)* ***(https://www.epa.gov/students)***

Tier 2 Vocabulary - Predict - Observations - Measurements - Weather maps - Satellites - Radar **Tier 3 Vocabulary:** - Isobar - Barometer - Anemometer - Doppler radar - Satellite imagery **ESS.7.1.5** **Tier 2 Vocabulary** - Convection - Global winds - Jet stream - Climatic conditions -**Tier 3 Vocabulary:** - Hadley cell - Ferrel cell - Polar cell - Coriolis Effect **ESS.7.2.1** **Tier 2 Vocabulary:**		

- Engage - Argument - Evidence - Monitoring - Air quality - Stewardship **Tier 3 Vocabulary:** - Environmental stewardship - Pollutants - Emissions - Monitoring stations - Public health **ESS.7.2.2** **Tier 2 Vocabulary:** - Structure - Composition - Greenhouse effect - Global temperatures **Tier 3 Vocabulary:** - Greenhouse gasses Methane (CH_4) - Global warming potential - Climate change		

ESS.7.2.3 **Tier 2 Vocabulary:** - Obtain - Evaluate - Communicate - Impacts - Mitigation strategies - Environmental factors - Storms **Tier 3 Vocabulary** - Air quality index (AQI) - Ultraviolet (UV) index - Heat Index - Wildfires - Hurricane - Blizzard - Tornado - Severe thunderstorm - Flood mitigation		

Remediation Skills, Extensions and Considerations: **Extension Activities**	**<u>ELD Standard addressed in this unit:</u>** **ELD-SC.6-8.Explain.Expressive**:**

****Activity: Advanced Research and Debate**** **1. **Advanced Research Projects:**** ● Have students research the long-term trends in global CO2 levels and their impacts on climate change. Provide access to complex datasets from NASA or NOAA. ● Encourage students to explore advanced topics such as carbon capture technologies or policies aimed at reducing air pollution. **2. **Debate and Argumentation:**** ● Organize a debate on the effectiveness of current air quality regulations. Students must use evidence from their research to support their arguments. ● Have students develop and present a proposal for a new air quality regulation, backed by data and scientific reasoning. ● Encourage students to participate in science fairs or environmental competitions, where they can present their research and findings. ***Remediation*** **Activity: Simplified Data Analysis*** **1. **Interactive Simulations:**** ● Use an interactive simulation to demonstrate how pollutants affect air quality and health. Websites like PhET Interactive Simulations can be helpful.	❖ Construct scientific explanations that describe valid and reliable evidence from sources about a phenomenon. ❖ Analyze and interpret data to explain the relationship between phenomena**.** **ELD-SC.6-8.Predict.Expressive:** Use models to predict phenomena based on observations and measurements. **ELD-SC.6-8.Argue.Expressive**:** Construct scientific arguments that support or refute a claim based on data and evidence. ****ELD-SC.6-8.Communicate.Expressive****: Obtain, evaluate, and communicate information about phenomena.

● Allow students to manipulate variables in the simulation to see how changes in pollutant levels affect air quality. **2. **Scaffolded Activities:**** ● Provide a graphic organizer that helps students structure their data analysis, such as a table to record observations and a flowchart to outline their conclusions. ● Scaffolded worksheets with step-by-step instructions for analyzing a simple dataset and forming conclusions.	
LIS strategies identified	

Module 2 & 3 "Motion and Stability: Forces and Interactions" **&** **"Energy"** **Essential Questions:** ****How do the principles of motion, forces, and energy transformation explain the behavior of objects and systems in our world?****	**Timeline:** Quarter 1/2 **DISCOVERY ED UNITS: 1 & 2**
Performance Event: Students will demonstrate their understanding of motion, forces, and energy transformations by designing and conducting experiments, creating models, and presenting their findings.	
SWBAT: (Mastery Objectives) • ***PS.7.1 Understand motion, the effects of forces on motion, and the graphical representations of motion.*** • PS.7.1.1 Construct an explanation to summarize the motion of an object by its position, direction of motion, and speed in respect to some other object. • PS.7.1.2 Use models to illustrate the effects of balanced and unbalanced forces acting on an object (including friction, gravity, and magnetism). • PS.7.1.3 Analyze and interpret graphical data to summarize the motion of an object to show a change in position over a period of time. • PS.7.1.4 Analyze and interpret graphical data to summarize the motion of an object to show a change in distance over a period of time for constant speed and variable motion. • PS.7.2.1 Construct an explanation to summarize how kinetic and potential energy contribute to the mechanical energy of an object.	

- PS.7.2.2 Engage in argument from evidence to explain how energy can be transformed from one form to another, specifically potential energy and kinetic energy (models could include roller coasters, pendulums, or cars on ramps as examples).
- PS.7.2.3 Carry out investigations to conclude that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) in a mechanical system using qualitative data.
- PS.7.2.4 Carry out investigations to compare the efficiency of simple machines in relation to their advantages for particular purposes (to include inclined planes, pulleys, levers and wheel and axles) using qualitative data.

Vertical Alignment		
Previous Grade Level Standards	**Grade Level Standards**	**Next Grade Level Standards**
Grade 6 Scie…	**Grade 7 Science: 2023 Support Document**	Grade 8 Sc…
Instructional Resources		
Tier III Vocabulary: **1. **Kinetic Energy** - The energy an object has due to its motion.	**Performance Tasks:** **"Motion Magic: Unveiling Energy Transformations"** **Task:** 1. **Experiment Design and Conduct:** ○ **Kinetic and Potential Energy Investigation:** ■ **Objective: Explore how kinetic and potential energy contribute to the mechanical energy of an object.**	**Additional Resources** **PhET Interactive Simulations: Energy Forms and Changes"** - ***https://phet.colo***

Potential Energy - The stored energy of an object due to its position or state. **Mechanical Energy** - The sum of kinetic and potential energy in a system. **Force** - A push or pull that can change the motion of an object. **Friction** - The resistance that one surface or object encounters when moving over another. . **Gravity** - The force that attracts objects toward the center of the Earth or another celestial body. **Balanced Forces** - Forces	■ **Task: Design and conduct an experiment using simple machines (e.g., ramps, levers) to investigate the transformation between potential and kinetic energy. For example, roll a ball down a ramp and measure its speed at different points to observe changes in energy.** 2. **Force and Motion Model:** ○ **Objective: Illustrate the effects of balanced and unbalanced forces on an object.** ○ **Task: Create a physical or digital model demonstrating how forces like gravity, friction, and magnetism affect the motion of an object. Use materials like toy cars, magnets, and inclined planes to show examples of balanced and unbalanced forces in action.** 3. **Graphical Data Analysis:** ○ **Objective: Analyze graphical data to summarize changes in motion.** ○ **Task: Given a set of motion data (e.g., position vs. time or distance vs. time graphs), interpret the data to explain changes in an object's motion. Create your own graphs based on experimental data collected from the kinetic and potential energy investigation.** 4. **Energy Transformation Demonstration:** ○ **Objective: Explain how energy transforms from one form to another.** ○ **Task: Build a simple machine or system (e.g., a pendulum or roller coaster) that demonstrates energy transformations. Create a presentation or report detailing how energy is transformed within the system, highlighting key principles of energy conservation and transformation.** 5. **Presentation:** ○ **Objective: Communicate findings and explain concepts clearly.**	***rado.edu/en/simulations*** ****"Khan Academy: Forces and Motion"** - ***https://www.khanacademy.org/science/physics/forces-newtons-laws*** ****"NASA's Energy and Motion Activities"** - ***https://www.nasa.gov/education/materials/energy-and-motion*** **Labster Virtual Labs: Physics of Motion"** - ***https://www.labster.com*** **Study Island** **Virtual Labs** **Balancing Acts** **Friction** **Gravity Force**

that are equal in size but opposite in direction, resulting in no change in motion. **Unbalanced Forces** - Forces that are not equal in size or opposite in direction, causing a change in motion. **Energy Transformation** - The process of changing energy from one form to another. **Mechanical Advantage** - The factor by which a machine multiplies the force put into it. . **Work** - The energy transferred to an object when a force is applied over a distance.	○ **Task: Prepare a presentation that summarizes your experiments, models, and data analysis. Discuss how the principles of motion, forces, and energy transformations were applied in your work. Be ready to answer questions and engage in a discussion about your findings.** **Materials Needed:** ● **Toy cars, motorcycles, trucks, balls** ● **ramps** ● **levers** ● **Magnets** ● **Digital clocks (mobile device, timers)** ● **Graph paper and data recording tools** ● **Simple machine kits or materials** ● **Presentation tools (e.g., poster board, PowerPoint, or digital tools)** ● **Household materials (toilet tissue, paper towel holders, fishing/metal wire, clothes hangers, wood)**	**Under Pressure**

Power - The rate at which work is done or energy is transferred. **Newton's Laws of Motion** - The three laws formulated by Sir Isaac Newton that describe the relationship between the motion of an object and the forces acting on it. **Speed** - The rate at which an object moves, calculated as distance traveled over time. **Acceleration** - The rate at which an object's velocity changes over time.		
ELD Standards:		

.***ELD-SC.6-8.Explain.Expressive**:**

- ❖ Construct scientific explanations that describe valid and reliable evidence from sources about a phenomenon.
- ❖ Use models to illustrate the effects of forces on an object.

ELD-SC.6-8.Analyze.Expressive:**

- ❖ Analyze and interpret data to summarize motion.

ELD-SC.6-8.Argue.Expressive:

- Construct scientific arguments that support or refute a claim based on data and evidence.

***ELD-SC.6-8.Compare.Expressive**:**

- Carry out investigations to compare phenomena.

Remediation Skills, Extensions and Considerations:

****Remediation Skills:****

Basic Force and Motion Concepts:

- Use simple diagrams and hands-on activities (e.g., toy cars on ramps) to clarify basic concepts of force and motion.

Energy Transformations Practice:

- Provide additional examples and guided practice with real-life scenarios (e.g., swinging pendulums) to reinforce how energy changes form.

Graph Interpretation:

- Offer practice with simplified graphs and visual aids to help students understand motion data and graphical

analysis.

Extensions:

Real-World Applications:

- Explore real-world applications of forces and energy, such as in sports or engineering, to make concepts more relevant.

Engineering Challenges:

- Engage students in building simple machines or designing experiments to apply concepts of forces and energy in creative ways.

Considerations:

Visual and Hands-On Learning:

- Incorporate visual aids and hands-on activities to support different learning styles and make abstract concepts more concrete.

Pacing and Scaffolding:

- Adjust the pace of instruction and provide scaffolding as needed to ensure all students grasp fundamental concepts before moving on.

Language Support:

- Provide glossaries and simplified explanations for students who need additional support with technical vocabulary.

LIS strategies identified

Module 4: "From Molecules to Organisms- Structures and Processes" **Essential Questions:** **How do the structures and functions of cells, genetic mechanisms, and systems within organisms work together to sustain life and determine traits?**	**Timeline:** Quarter 2 **DISCOVERY ED UNIT: 3**
Performance Event: Students will demonstrate their understanding of the structures and functions of single-celled and multicellular organisms by creating models, conducting experiments, and presenting their findings.	

SWBAT: (Mastery Objectives)

- ***LS.7.1 Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.***

- LS.7.1.1 Construct an explanation to conclude how the structures of single-celled organisms carry out all of the basic functions of life including: Euglena, Amoeba, Paramecium, Volvox.
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- LS.7.1.2 Use models to explain how the relevant structures within cells (including cell membrane, cell wall, nucleus, mitochondria, chloroplasts, and vacuoles) function to support the life of plant, animal, and bacterial cells.
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- LS.7.1.3 Use models to explain how the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms functions to support life.
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- LS.7.1.4 Construct an explanation to summarize how the major systems of the human body interact with each other to support life (including digestion, respiration, reproduction, circulation, excretion, nervous).

Vertical Alignment		
Previous Grade Level Standards	**Grade Level Standards**	**Next Grade Level Standards**
Grade 6 S...	**Grade 7 Science: 2023 Support Document**	* Grade 8 Scie…
Instructional Resources		
Tier III Vocabulary: **LS.7.1.1: Single-Celled Organisms** 1. **Euglena** - A single-celled organism that moves using a flagellum and can perform photosynthesis. 2. **Amoeba** - A type of single-celled organism that moves and engulfs food using pseudopodia. 3. **Paramecium** - A single-celled organism that uses	**Performance Tasks:** **Task:** 1. **Model Creation:** ○ **Single-celled Organism Model: Students will create a detailed 3D model of a single-celled organism (e.g., Euglena, Amoeba, Paramecium, Volvox). The model should include all relevant cell structures and an explanation of how each structure contributes to the organism's basic functions of life.** ○ **Multicellular Organism Model: Students will create a 3D model or diagram showing the hierarchical organization of a multicellular organism, from cells to tissues to organs to systems. They should highlight specific structures within plant, animal, and bacterial cells (e.g., cell membrane, nucleus, mitochondria) and explain their functions.** 2. **Experiment:** ○ **Students will design and conduct a simple experiment to observe the interaction of at least two major systems of the human body (e.g., how exercise affects the respiratory and circulatory systems). They will collect**	**Additional Resources (Time Permitting)...** **Interactive Simulations and Models:** - **ExploreLearning Gizmos:** - **www.PhET Interactive Simulations:com**. **Educational Videos:** - **Khan Academy:** Videos on cell biology, including

cilia to move and sweep food into its oral groove. 4. **Volvox** - A colony of single-celled organisms that live in a spherical shape and use flagella for movement. 5. **Flagellum** - A long, whip-like structure used for movement by certain single-celled organisms. 6. **Pseudopodia** - Temporary, foot-like extensions of the cell membrane used by amoebas to move and capture food. 7. **Cilia** - Short, hair-like structures that beat in coordinated waves to move the cell or move fluid past the cell.	**data on their observations, such as heart rate and breathing rate before and after exercise.** ○ **Students will write a report summarizing their experiment, including the purpose, procedure, data collected, and conclusions. They should explain how the observed interactions support life.** **3. Presentation:** ○ **Students will prepare a presentation (e.g., PowerPoint, poster, video) to explain their models and experiment. They should cover:** ■ **How the structures of single-celled organisms carry out the basic functions of life.** ■ **How the structures within cells function to support life in multicellular organisms.** ■ **How the hierarchical organization of cells, tissues, organs, and systems supports life.** ■ **How major systems of the human body interact to support life.** ○ **During the presentation, students should be prepared to answer questions from peers and the teacher, demonstrating a deep understanding of the content.**	**structures of single-celled organisms and human body systems.** ***www.CrashCourse.com:**** ****Virtual Lab Activities:**** ***www.Labster.com:**** **Virtual lab simulations for exploring cellular structures and functions.** ***www.BioManBiology.com*** **Online virtual labs and interactive activities related to cell biology.** ****Books and Textbooks:**** **- ****"Cells and Heredity" by Kenneth R. Miller and Joseph Levine:**** Detailed explanations and

****LS.7.1.2: Cell Structures**** 1. **Cell Membrane** - The semipermeable membrane surrounding the cytoplasm of a cell. 2. **Cell Wall** - A rigid layer that gives protection, support, and shape to cells in plants, algae, fungi, and bacteria. 3. **Nucleus** - The organelle that contains the cell's genetic material and controls the cell's activities. 4. **Mitochondria** - The organelles that generate most of the cell's supply of ATP, used as a source of chemical energy. 5. **Chloroplasts** - Organelles found in plant cells and some other organisms that		**illustrations of cell structures and functions.** **- **"The Human Body: An Illustrated Guide to Every Part of the Body and How It Works" by Steve Parker:** Provides insights into the human body systems with illustrations.** ***Educational Websites:**** ***www.National Geographic Kids.com*** ***www.Discovery.com***

conduct photosynthesis. 6. **Vacuoles** - Storage bubbles found in cells; in plant cells, they are large and store water, nutrients, and waste products. **LS.7.1.3: Hierarchical Organization** 1. **Cells** - The basic building blocks of all living organisms. 2. **Tissues** - Groups of similar cells that perform a specific function in an organism. 3. **Organs** - Structures made up of different types of tissues that work together to perform a specific activity. 4. **Organ Systems** - Groups of organs that work together		

to perform complex functions in the body. 5. **Organisms** - Individual living entities that can carry out life processes independently. ****LS.7.1.4: Human Bo**dy Systems** 1. **Digestive System** - The system that breaks down food into nutrients that can be absorbed into the bloodstream. 2. **Respiratory System** - The system responsible for taking in oxygen and expelling carbon dioxide. 3. **Circulatory System** - The system that circulates blood and lymph through the body, delivering nutrients and oxygen to cells.		

4. **Excretory System** - The system that removes waste products from the body. 5. **Nervous System** - The system that transmits nerve impulses between parts of the body. 6. **Reproductive System** - The system of organs involved in producing offspring.		

Remediation Skills, Extensions and Considerations: **Remediation Skills:** **Basic Cell Structure Review:** Use simplified diagrams and hands-on models to reinforce understanding of cell parts and their functions. **Interactive Games:** Incorporate educational games that focus on cell structures and functions to engage students in a low-stress environment. . **Visual Aids:** Use charts and labeled diagrams to help students visualize and remember cell components and	**ELD Standards:** **ELD-SC.6-8.Explain.Expressive**:** ❖ Construct scientific explanations that describe valid and reliable evidence from sources about a phenomenon. ❖ Use models to explain how the relevant structures within cells function to support life. ❖ Use models to explain the hierarchical organization of multicellular organisms. ❖ Construct scientific explanations to summarize how major systems of the human body interact.

their roles. ****Extensions:**** **Advanced Models:** Encourage students to create more detailed models of cells or organ systems using craft materials or digital tools. **Real-World Applications:** Explore how cell biology applies to real-life scenarios, such as medical research or environmental science. . **Field Trips:** Plan visits to science museums or labs where students can see practical applications of cell biology. ****Considerations:**** **Learning Styles:** Adapt materials and activities to cater to different learning styles (visual, auditory, kinesthetic) to ensure all students grasp the concepts. **Pacing:** Adjust the pace of lessons to accommodate students who may need additional time to understand complex concepts. **Language Support:** Provide additional language support for English Language Learners (ELLs), such as simplified explanations and bilingual resources.	

Module 5: "Heredity- Inheritance and Variation of Traits"	**Timeline:** Quarter 2

Essential Questions: ****How do genes and environmental factors interact to determine the inheritance and variation of traits in living organisms?****	**DISCOVERY ED UNIT 4**

Performance Event: Students will demonstrate their understanding of how genes and environmental factors influence the inheritance and variation of traits by creating models, conducting experiments, and presenting their findings.

SWBAT: (Mastery Objectives)

- ***LS.7.2 Understand the relationship of the mechanisms of reproduction, patterns of inheritance, and potential variation among offspring.***
- LS.7.2.1 Construct an explanation supported with scientific evidence to summarize the role of genes on chromosomes as inherited cellular structures which contribute to an organism's traits (not to include the structure of DNA).
- LS.7.2.2 Use models to explain how asexual reproduction results in offspring with identical genetic information while sexual reproduction results in offspring with genetic variation (not to include specific phases of mitosis and meiosis).
- LS.7.2.3 Use models (Punnett squares) to infer and predict patterns of the inheritance of single genetic traits from parent to offspring (including dominant and recessive traits).

Vertical Alignment

Previous Grade Level Standards	**Grade Level Standards**	**Next Grade Level Standards**
Grade 6 Sc…	Grade 7 Science: 2023 Support Document	Grade 8 Sci…

Instructional Resources		
Tier III Vocabulary: **Genetics** - The study of heredity and the variation of inherited characteristics. **Chromosome** - A thread-like structure composed of DNA and proteins that carries genetic information. **Gene** - A segment of DNA that determines a specific trait or function in an organism. **Allele** - One of the different forms of a gene that can exist at a given locus.	**Performance Tasks:** . **Genetic Trait Cookies:** **Task:** -1. Prepare (store bought) plain sugar cookies with various "traits" (e.g., different colors of icing for dominant and recessive traits, or different shapes for different alleles). - Use a Punnett square to predict the traits of the cookies produced from a simulated "genetic cross" (e.g., mixing two types of cookie dough). - Decorate the cookies to represent the predicted traits and explain how the different traits (e.g., color, shape) represent genetic inheritance. **2. **Trait Variation Fruit Salad:** - **Objective:** Students will create a fruit salad to explore how genetic and environmental factors can affect traits. - **Task:** - Select a variety of fruits with different colors, textures, and flavors (representing different traits). - Create a fruit salad with a variety of fruit combinations to show trait variation. - Discuss how the different fruit characteristics (e.g., ripeness, color) can represent genetic variation and how environmental factors (e.g., growing conditions) influence these traits. **3. **Punnett Square Cupcakes:** - **Objective:** Students will bake and decorate cupcakes to represent different genetic traits using Punnett squares. - **Task:** - Bake cupcakes and use different colored frostings or toppings to represent different alleles (e.g., dominant and recessive traits).	**Additional Resources** **Genetics Lab: Exploring Heredity" by The Biology Project** http://www.biology.arizona.edu **Genetics: Understanding Inheritance" by HHMI Biointeractive** https://www.biointeractive.org **Khan Academy: Genetics"** - Khan Academy Genetics** https://www.khanacademy.org **National Center for Biotechnology Information**

Dominant Trait - A trait that is expressed when at least one dominant allele is present in the genotype. **Recessive Trait** - A trait that is expressed only when two recessive alleles are present in the genotype. **Punnett Square** - A tool used to predict the probability of certain traits being inherited by offspring. **Homozygous** - Having two identical alleles for a particular gene (e.g., AA or aa).	- Create Punnett squares to predict the traits of the cupcakes produced from different "genetic crosses." - Decorate the cupcakes based on the predictions and explain how the cupcake traits correspond to the genetic traits modeled in the Punnett squares. **4. **Inheritance Ice Cream Sundaes:** - **Objective:** Students will use ice cream sundaes to model the inheritance of traits. - **Task:** - Provide a variety of ice cream flavors and toppings to represent different traits. - Create sundae "families" by combining different flavors and toppings to show possible trait combinations (e.g., dominant and recessive traits). - Use these combinations to explain how genetic inheritance affects traits, and discuss how environmental factors (e.g., temperature) might influence the final appearance and taste of the sundae. **5. **Trait Variation Jello:** - **Objective:** Students will create layered Jello to demonstrate the concept of genetic variation. - **Task:** - Make Jello in different colors and layers to represent different traits. - Layer the Jello to create a "genetic profile" and cut it to reveal different trait combinations. - Discuss how each layer represents different alleles and how variations in traits can occur. **<u>Materials Needed:** (student donations fo extra credit grades)</u> - Ingredients for cookies, cupcakes, fruit salad, ice cream sundaes, or Jello - Food coloring and toppings - Mixing bowls and utensils - Punnett square worksheets	**(NCBI) Genetics Home Reference"** - [NCBI Genetics Home Reference] https://ghr.nlm.nih.gov ***Discovery.com***

Heterozygous - Having two different alleles for a particular gene (e.g., Aa). **Phenotype** - The observable physical or physiological traits of an organism, determined by the genotype and environmental factors. **Genotype** - The genetic constitution of an organism, including all the alleles it possesses. **Inheritance** - The process by which genetic information is passed from parents to offspring.		

Mutation - A change in the DNA sequence that may lead to variations in traits. **Environmental Factors** - External influences that can affect the expression of genetic traits, such as temperature, nutrition, and exposure to chemicals. **Trait Variation** - Differences in physical or biochemical characteristics among individuals of the same species due to genetic diversity and environmental factors.		

Remediation Skills, Extensions and Considerations: ● ****Remediation Skills:**** **Punnett Square Practice:** ● - Provide additional practice problems and guided exercises to help students understand how to set up and interpret Punnett squares. **Hands-On Activities:** ● - Incorporate simple, hands-on activities like using colored beads to model alleles and traits. This can help make abstract concepts more tangible. ****Extensions:**** **Genetic Engineering Discussion:** ● - Explore how genetic engineering can modify traits. Discuss real-world applications and ethical considerations to deepen understanding. **Case Studies:** ● - Analyze case studies or historical examples of genetic research, such as Mendel's pea plant experiments, to connect theory with real-world applications. ● ****Considerations:**** **Diverse Learning Styles:**	**ELD Standards:** ****ELD-SC.6-8.Explain.Expressive**:** ● Use models to explain how reproduction results in offspring with genetic informatio**n.** ● Construct scientific explanations that describe valid and reliable evidence from sources about a phenomenon. ● Use models to explain how reproduction results in offspring with genetic information. ****ELD-SC.6-8.Predict.Expressive**:** ● Use models to infer and predict patterns of inheritance.	

● - Adapt instruction to cater to different learning styles. Use visual aids, interactive activities, and discussions to accommodate various preferences. **Language Support:** ● - Provide additional support for English Language Learners (ELLs), such as simplified explanations, glossaries of key terms, and bilingual resources. **Pacing:** ● - Adjust the pace of instruction based on students' understanding. Allow additional time for practice and review for students who need it. . **Real-Life Relevance:** ● - Connect genetic concepts to real-life examples and personal experiences to make learning more engaging and relatable.	
LIS strategies identified	

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