Glendale Elementary School District

Science Pacing Guide

2020-2021

7th Grade

Focus on Patterns; Scale, Cause and Effect; Structure and Function

By the end of seventh grade, students will explore how forces cause changes in motion and how energy is transferred in geologic, atmospheric, and environmental processes. Students investigate force and motion in a wide variety of systems, model how heat energy drives cycles in weather and climate, and explain the structure and function of cells. Student investigations focus on collecting and making sense of observational data and measurements using the science and engineering practices: ask questions and define problems, develop and use models, plan and carry out investigations, analyze and interpret data, use mathematics and computational thinking, construct explanations and design solutions, engage in argument from evidence, and obtain, evaluate, and communicate information. While individual lessons may include connections to any of the crosscutting concepts, the standards in seventh grade focus on helping students understand phenomena though patterns, cause and effect, and structure and function.

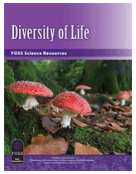
Text Resources shared with 6th - 8th:

McDougal-Littell 2006 Series:

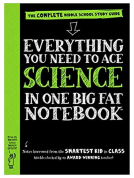
Also: www.classzone.com Click Science (middle school), click state of Az, Click GO (find book). Click on Science Modules and you will have the book series, rubrics, assessments. *Note: It is important to read and review the Chapter Openers in each curriculum book titled, "Big Idea and Big Concepts. Vocabulary will be bolded in this area and throughout each chapter.*

Worldbook

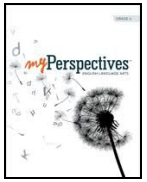
FOSS Kit: Diversity of Life



Science Notebook



My Perspectives



Core Ideas for Knowing Science:

Physical Science

- P1: All matter in the Universe is made of very small particles.
- P2: Objects can affect other objects at a distance.
- P3: Changing the movement of an object requires a net force to be acting on it.
- P4: The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event.

Earth and Space Science

- E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth's surface and its climate.
- E2: The Earth and our solar system are a very small part of one of many galaxies within the Universe.

Life Science

- L1: Organisms are organized on a cellular basis and have a finite life span.
- L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms.
- L3: Genetic information is passed down from one generation of organisms to another.
- L4: The unity and diversity of organisms, living and extinct, is the result of evolution

Core Ideas for using Science:

- U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised.
- U2: The knowledge produced by science is used in engineering and technologies to solve problems and/or create products.
- U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications.

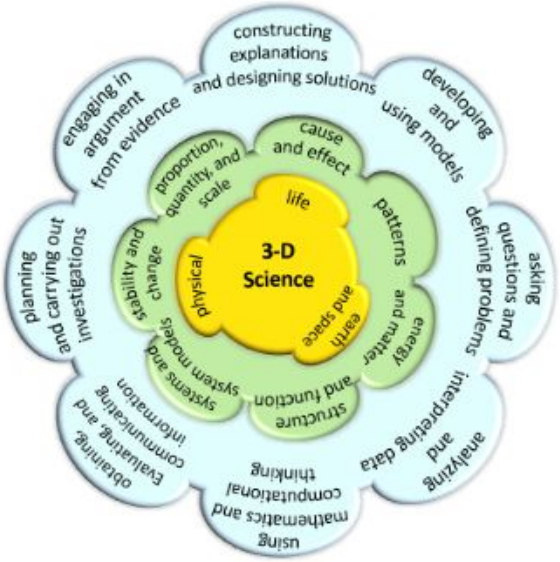
Science and Engineering Practices:

- ask questions and define problems
- develop and use models
- plan and carry out investigations
- analyze and interpret data
- use mathematics and computational thinking
- construct explanations and design solutions
- engage in argument for evidence
- obtain, evaluate, and communicate information

Crosscutting Concepts:

- **Patterns**
- **Cause and Effect**
- **Scale, Proportion, and Quantity**
- Systems and System Models
- Energy and Matter
- Structure and Function
- Stability and Change

Bold concepts are a focus for this grade level. Go to http://bit.ly/CrossCutk8 for detailed information about crosscutting concepts.



Year Snapshot -Units by Quarters			
QUARTER 1 **Earth's Processes** 7.E1U1.5 **Plate Tectonics** 7.E1U1.6	**QUARTER 2** **Living Things & Adaptations** 7.L1U1.11, 7.L2U1.12	**QUARTER 3** **Forces & Motion at a Distance** 7.P2U1.1, 7.P2U1.2 **Forces & Motion** 7.P3U1.4	**QUARTER 4** **Weather & Climate:** 7.E1U2.7 **Cell Theory:** 7.L1U1.8, 7.L1U1.9 **Cell Organization:** 7.L1U1.10

Disciplinary Literacy in Science

Disciplinary literacy in science focuses on how reading, writing, speaking, and listening are used to develop sense-making in science. It emphasizes content knowledge, experiences and skills, and the ability to acquire new knowledge that experts within science disciplines use to apply and generate new knowledge.

Standard	ELA	Rationale
These ELA standards help students gather and analyze sources and information (evidence from text) that can be used to support their reasoning as they develop conceptual understanding of science phenomena. Being able to read and interpret scientific and technical text is a fundamental practice of science and engineering.	RI.1 RI.2 RI.3	Key Ideas and Details standards can be applied to help students: • Find answers to relevant science questions or problems. • Understand and follow a written lab protocol, scientific process or procedure. • Connect new understandings with background knowledge. • Determine which information is important to answering scientific questions. • Pay attention to details, accuracy, and precision when reading/collecting data from scientific instruments. • Interpret diagrams, pictures, charts, graphs, and data to gather information. • Interpret and evaluate quality and quantity of data, evidence, and scientific reasoning. • Determine the credibility of information
These ELA standards help students navigate the norms and conventions of complex science text. Scientific and technical text often contains a variety of text structures, visual representations, and vocabulary that has a very specific meaning across science disciplines (theory) or within a single discipline (precipitation in weather vs. precipitation in chemical reactions).	RI.4 RI.5 RI.6	Craft and Structure standards can be applied to help students: • Use strategies (context clues, linguistic roots and affixes, restatement, examples, contrast, glossary, etc.) to determine the meaning of words and phrases in the text. • Use context to determine meanings of words and differentiate how vocabulary may be used differently in a science context compared to non-science contexts. • Identify structures within a text (headings, sub-headings, bold words, pictures, graphs, data tables, and paragraphs) and explain how they support or supplement information in the paragraph text. • Explain how key terms relate to each other or to broader science concepts and general understanding. • Use information to answer questions and support reasoning and conclusions. • Make meaning out of mathematical symbols and equations; diagrams, flow charts and other visual representations; and abstract ideas.
These ELA standards help students integrate and synthesize scientific knowledge and ideas when obtaining, evaluating, and communicating information. Students integrate information to evaluate the merit, validity, and reliability of ideas, methods, claims, and designs. They use this knowledge to generate their own questions about scientific phenomena or to identify solutions to design problems.	RI.7 RI.8 RI.9	Integration of Knowledge and Ideas standards can be applied to help students: • Extract information from multiple sources and text types; synthesize information to create an understanding that aligns to current scientific explanations and understanding. • Compare multiple representations of information (quantitative data, video, multimedia, articles, books, photographs, infographics, diagrams, etc.) related to the same phenomenon or science concept and explain whether the representations convey similar levels of detail or whether the information supports or contradicts each other. • Interpret data and analyze relationships of variables, using words and visual information. • Accurately depict written or spoken words through a visual representation (graph, chart, picture, etc.); or vice versa. • Synthesize multiple sources of information to support an evaluation of scientific research or reports, their experimental design, data collection methods, analysis, or conclusions.

		• Identify an argument or claim by distinguishing among facts, research findings, inferences, speculation, and reasoning; determine whether the evidence is relevant and sufficient to support the claim.
This ELA standard requires that students engage with different lengths, structures, types, and complexities of science text, appropriate for their grade level. Reading science texts requires a set of discipline-specific skills and strategies. Science texts use scientific vocabulary and present information in multiple formats.	RI.10	Students in science classrooms often read at different levels of proficiency, and even the same student may read at different levels based on text structures or format. Teachers should understand the complexity of the text provided to students and implement appropriate strategies to support student conceptual understanding of science phenomena.
These ELA standards help students write in formats that are typically found in science contexts or may be specific for their content area. Typically, only formal science writing is written in passive/third person voice. It is critical that students know how to incorporate appropriate visual representations to support the scientific explanations and arguments they write.	W.1 W.2 W.3	Text Types and Purposes standards can be applied to help students: • Record thoughts, ideas, sketches, or collected data in science notebooks to be used as evidence or to support reasoning. • Write a claim, evidence-based argument, or explanation that includes logical reasoning, accurate science content, and relevant and sufficient evidence to support the claim. Claims are created with effective word choice, appropriate use of science vocabulary, and writing style. • Write formal or informal texts. The product may include field notes, mind maps, research papers, laboratory reports, functional text, or visual displays of data. • Produce science writing in a voice appropriate for the type of writing and the audience. Objective or academic voice in science is used when a writer wants to deliver information in a neutral, factual, and unbiased way. • Write step-by-step procedures for experiments that are detailed enough that others would be able to replicate their experiments exactly and achieve the same results. • Produce texts that include charts, graphs, timelines, photographs, videos, maps, flowcharts, diagrams, models, or tables to supplement or support the text.
These ELA standards help students develop scientific writing appropriate for task, purpose and audience.	W.4 W.5 W.6	Production and Distribution of Writing standards can be applied to help students: • Develop and strengthen writing; focus on purpose and audience. • Incorporate peer or adult feedback of drafts into writing; the writing process and review of drafts can be used for any writing assignments within the science classroom. • Use technology (Internet, keyboarding skills, formatting, storing) to create a published piece where information and ideas are connected and presented clearly and efficiently. • Use technology (blogs, wikis, smartboards, apps) to support collaborative brainstorming and writing. • Integrate graphs, data tables, drawings or illustrations, or other visual representations of information to support text.
These ELA standards help students synthesize multiple texts, observations, or experiments to answer questions, gather information, reason about the evidence, and communicate findings or conclusions. Final communication products typically follow a formal writing style (documenting or publishing procedures, investigation designs, explanations of models, and research) and are written in academic or passive/third person voice.	W.7 W.8 W.9	Research to Build and Present Knowledge standards can be applied to help students: • Conduct research projects or experimental investigations of differing lengths to provide enough information to construct claims, evidence, and explanations that answer scientific questions or solve a problem. • Integrate information from a variety of credible print and digital sources, taking care to use a consistent voice, avoid plagiarism, and appropriately cite resources in a standard recognized format in both the text and the bibliography. (APA style is most commonly used by scientists) • Use evidence from informational texts (e.g., data sets, credible web sites, news articles, textbooks) to support claims, analyses, reflections, and/or research. • Convert informal writing in drafts while still synthesizing information and developing claims, to a formal academic voice when publishing formal writing of claims.
This ELA standard requires that students produce informal, formal, and persuasive scientific writing across multiple delivery formats and topics, for different purposes and audiences.	W.10	Implementation strategies for this standard are embedded in the previous writing examples. • Writing assignments should be of varying lengths (field or research notes, one paragraph responses, multiple paragraph essays, lab reports or presentations, extended research). • Scientific writing often includes pictures, diagrams, charts, thinking maps, data, or statistics; these can be integrated with text or presented with minimal text.
These ELA standards help students engage in	SL.1	Comprehension and Collaboration standards can be applied to help students:

scientific discourse to gather and evaluate information. Engaging in scientific discourse communities to collaborate and build comprehension is a fundamental practice of science and engineering.	SL.2 SL.3	• Initiate and participate effectively in a range of collaborative discussions (one-on-one, small groups, teacher-led, digitally) to express their own ideas clearly and build on others' ideas. • Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally), evaluating the credibility and accuracy of each source. • Collaboratively plan an investigation or test a design solution, controlling variables and ensuring the data is collected with appropriate tools and in a safe and ethical manner, including considerations of environmental, social, and personal impacts. • Collaboratively conduct investigations; evaluate the types, amounts, and accuracy of data needed to produce reliable measurements; consider limitations on the precision of the data (number of trials, cost, risk, time); and refine the design to meet the goals of the investigation.
These ELA standards help students engage in scientific discourse to informally share ideas and develop understanding of scientific phenomena and provide a formal way to present information appropriate to the audience and task. Engaging in scientific discourse communities to communicate understanding and findings is a fundamental practice of science and engineering.	SL.4 SL.5 SL.6	Presentation of Knowledge and Ideas standards can be applied to help students: • Engage in science discourse with a partner or small group by discussing questions, information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of thinking and reasoning; organization, substance, and style are appropriate to purpose, audience, and task. • Engage in formal presentations to small or large groups of students to share findings and supporting evidence. Presentations should be clear, concise, and logically organized, so listeners can follow the line of reasoning; organization, development, substance, and style are appropriate to purpose, audience, and task. • Use digital media (e.g., textual, graphical, audio, visual, video conferencing, or interactive elements) when presenting findings to support claims, evidence, reasoning, and to add interest.

Quarter 1			
AZ State Standards	**Background Information and Learning Targets**	**Vocabulary**	**Curricular Resources**
Unit Title: Earth's Processes and Plate Tectonics *Earth and Space Sciences: Students develop an understanding of the patterns of energy flow along with matter cycling within and among Earth's systems.*			
7.E1U1.5 Construct a model that shows the cycling of matter and flow of energy in the atmosphere, hydrosphere, and geosphere. Crosscutting Concepts: **Patterns; Cause and Effect**; Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; **Structure**	Background Information: **Earth processes** are the result of **energy** flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce **chemical and physical changes** in Earth's materials and living organisms.[4(p.181)] Radioactive decay of material inside the Earth since it was formed is its internal source of energy. Radiation from the Sun provides the energy that enables plants containing chlorophyll to make glucose through the process of photosynthesis.[2 (p. 24)] The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. **Greenhouse gases** in the atmosphere absorb and retain the energy radiated from land and ocean surfaces, thereby regulating Earth's average surface temperature and keeping it habitable.[4.(p. 188)] ● I can describe the flow of energy in the atmosphere. ● I can describe the flow of energy in the hydrosphere.	earth processes energy chemical changes physical changes greenhouse gases greenhouse effect atmosphere hydrosphere geosphere radiation radiation decay	*McDougal-Littel* Matter and Energy Book: ● Chapters 3 & 4 ● (All of Chapter 3 and 4.1, 4.3) *Note: read XV, XIX. Waves, Sound, and Light Book: ● Chapter 1 (entire chapter). Motion and Forces Book: ● Chapter 4 (Section 4.2). *World Book*: ● Energy movement in ecosystems ● Greenhouse Effect

and Function; Stability and Change	● I can describe that radiation from the sun provides energy for the atmosphere and hydrosphere. ● I can explain the greenhouse effect. ● I can describe the flow of energy in the geosphere. ● I can describe the flow of energy from the sun throughout Earth's spheres. ● I can describe that radioactive decay is the source of energy for the geosphere. ● I can describe the cycling of matter in the atmosphere. ● I can describe the cycling of matter in the hydrosphere. ● I can describe the cycling of matter in the geosphere. ● I can describe the chemical changes that occur as energy and matter flow through the systems. ● I can describe the physical changes that occur as energy and matter flow through the systems. ● I can construct a model that shows the cycling of matter and flow of energy through the atmosphere. ● I can construct a model that shows the cycling of matter and flow of energy through the hydrosphere. ● I can construct a model that shows the cycling of matter and flow of energy through the geosphere.		*My Perspectives:* Pearson Easy Bridge Leveled Readers ● Africa's Changing Landscape *Science Notebook:* ● Chapter 22 - Minerals, Rocks and the Earth's Structure pg. 227 ● Chapter 24 - Weathering and Erosion - pg. 239 ● Chapter 25 - The Earth's Atmosphere and the Water Cycle pg. 259 *Do you have a recommendation for curriculum materials that support teaching these concepts? Please email them to jmoritz@gesd40.org*
7.E1U1.6 Construct a model to explain how the distribution of fossils and rocks, continental shapes, and seafloor structures provides evidence of the past plate motions Crosscutting Concepts: **Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; **Structure and Functio**n; Stability and Change	Background Information: **Plate tectonics** is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geological history. Plate movements are responsible for most **continental** and **ocean** floor features and for the distribution of most **rocks** and **minerals** within **Earth's crust**. Maps of ancient land and water patterns, based on investigations of rocks and **fossils**, make clear how Earth's plates have moved great distances, collided, and spread apart. [4] (p. 183) ● I can explain how the distribution of fossils and rocks provides evidence of the past plate motions ● I can explain how the distribution of continental shapes provides evidence of the past plate motions ● I can explain how the distribution of seafloor structures provides evidence of the past plate motions ● I can explain the theory of plate tectonics ● I can construct a model to explain how the distribution of fossils and rocks provides evidence of the past plate motions ● I can construct a model to explain how the distribution of continental shapes provides evidence of the past plate motions	plate tectonics continental floor ocean floor rocks minerals earth's crust fossils	*McDougal-Littel* Earth's Surface Book: ● Chapters 1 & 2 & 3 & 4 & 5 Section 1.1, 2.3, and all of chapters 3, 4, and 5). The Changing Earth Book: ● Chapters 2 & 3 & 4 (Sections 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3 and all of Chapter 4). Earth's Waters Book: ● Chapters 1 & 3 (Sections 1.1, 1.2, 1.3, 3.1, 3.2) Earth's Atmosphere Book: ● Chapters 1 & 2 & 3 & 4 (Sections 1.1, 1.2, 1.3, 2.2, 2.3, 2.4, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3). Space Science Book: ● Chapter 3 (Sections 3.2, 3.4) *World Book*: ● Paleontology

	● I can construct a model to explain how the distribution of seafloor structures provides evidence of the past plate motions		● Plate tectonics *Science Notebook:* ● Chapter 23 - Earth's Crust in Motion pg. 239 *Do you have a recommendation for curriculum materials that support teaching these concepts? Please email them to jmoritz@gesd40.org*
Quarter 2			
Standard	**Crosscutting Concepts; Background Information and GESD Context and Application of Standards**	**Key Vocabulary**	**Activities and Strategies**
Unit Title: Living Things and Adaptations *Life Sciences: Students develop an understanding of the structure and function of cells.*			
7.L1U1.11-Construct an explanation for how organisms maintain internal stability and evaluate the effect of the external factors on organisms' internal stability. Crosscutting Concepts: **Patterns; Cause and Effect**; Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; **Structure and Function**; Stability and Change	● I can construct an explanation for how organisms maintain internal stability. ● I can evaluate the effect of the external factors on organisms' internal stability·	single cell systems of tissues systems of organs stimuli homeostasis internal stability	*McDougal-Littel* Cells and Heredity Book: ● Chapters 1 & 2 & 3 (Sections 1.2, all of Chapter 2, 3.1, 3.2, 3.3) Diversity of Living Things Book: ● Chapters 1 & 2 (Sections 2.1, and all of Chapter 1). *FOSS Next Generation Diversity of Life* ● IG: Investigation 5 Part 1 and 2 ● SRB: Characteristics of Life; The Water-Conservation Problem ● DOR: Database: Stem Collection, Stomata Collection *FOSS Next Generation Human Systems Interactions* ● IG: Investigation 2 ● SRB: Human Organ Systems

			● DOR:Cardiovascular System, Circulatory and Respiratory systems *My Perspectives:* Pearson Easy Bridge Leveled Readers ● Bills and Beaks *Science Notebook:* ● Chapter 28 Organisms and Biological Classification pg. 292 ● Chapter 29 Cell Theory and Cell Structure pg. 303 *Do you have a recommendation for curriculum materials that support teaching these concepts? Please email them to jmoritz@gesd40.org*
7.L1U1.12-Construct an explanation for how some plant cells convert light energy into food energy.	Background Information: In most cases, the energy needed for life is ultimately derived from the sun through photosynthesis (although in some ecologically important cases, energy is derived from reactions involving inorganic chemicals in the absence of sunlight e.g. chemosynthesis). Plants, algae (including phytoplankton), and other energy-fixing microorganisms use sunlight, water and carbon dioxide to facilitate photosynthesis, which stores energy, forms plant matter, releases oxygen, and maintains plants' activities GESD Context and Applications ● I can explain the purpose of photosynthesis. ● I can explain the process of photosynthesis. ● I can construct an explanation for how some plant cells convert light energy into food energy. ● I can 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.	photosynthesis	*McDougal-Littel* Cells and Heredity Book: ● Chapter 1 (Section 1.2). *FOSS Next Generation Diversity of Life* ● IG: Investigation 5 Part 3 ● SRB: Water, Light, and Energy ● DOR: Levels of Complexity: Plant Vascular System *World Book*: ● Photosynthesis *Science Notebook:* ● Chapter 32 Plant Structure and Reproduction pg. 334

Quarter 3			
Standard	**Crosscutting Concepts; Background Information and GESD Context Application of Standards**	**Key Vocabulary**	**Activities and Strategies**
Unit Title: Force and Motion at a Distance *Physical Sciences: Students will explore how cause and effect take place within and between a wide variety of force and motion systems from forces on individual objects to the forces that shape our Earth.*			
7.P2U1.1-Collect and analyze data demonstrating how electromagnetic forces can be attractive or repulsive and can vary in strength. Cross Cutting Concepts: **Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; **Structure** and Function; Stability and Change **7.P2U1.2-Develop and use a model** to predict how forces act on objects at a distance**.** **7.P3U1.3** Plan and carry out an investigation that can support an evidence-based explanation of how objects on Earth are affected by gravitational force.	Background Information: **Electric** and **magnetic** (**electromagnetic**) **forces** can be **attractive** or **repulsive**, and their sizes depend on the magnitudes of the **charges**, **currents**, or magnetic strengths involved and on the distances between the interacting objects. Gravitational forces are always attractive. There is a **gravitational force** between any two masses, but it is very small except when one or both of the objects have large **mass**—for example, Earth and the sun. Long-range gravitational interactions govern the evolution and maintenance of large-scale systems in space, such as galaxies or the solar system, and determine the patterns of motion within those structures. Forces that act at a distance (gravitational, electric, and magnetic) can be explained by **force fields** that extend through space and can be mapped by their effect on a test object (a ball, a charged object, or a magnet, respectively).[4 (pp. 117-118)] On Earth, it [**gravity**] results in everything being pulled down towards the center of the Earth. We call this downward **attraction** the **weight** of an object. The object pulls the Earth as much as the Earth pulls the object, but because the Earth's mass is much bigger, we observe the resulting motion of the object, not of the Earth.[2 (p. 21)] ● I can collect data demonstrating how electromagnetic forces can be attractive. ● I can collect data demonstrating how electromagnetic forces can be repulsive. ● I can collect data demonstrating how electromagnetic forces can vary in strengths. ● I can explain how distance between the objects impacts the strength of the field. ● I can analyze data demonstrating how electromagnetic forces can be attractive. ● I can analyze data demonstrating how electromagnetic forces can be repulsive. ● I can analyze data demonstrating how electromagnetic forces can vary in strength. ● I can explain gravitational force and what it affects. ● I can develop a model to predict how forces act on objects at a distance. ● I can use a model to predict how forces act on objects at a distance. ● I can plan an investigation to support an evidence based explanation of the effect of gravitational forces on objects on Earth. ● I can conduct an investigation to support an evidence based explanation of the effect of gravitational forces on objects on Earth.	electric forces magnetic forces electromagnetic forces magnet attraction repulsive magnitude charges currents gravitational force mass force fields gravity attraction weight	*McDougal-Littel* Motion and Forces Book: ● Chapter 3 (All Sections) Electricity and Magnetism ● Chapter 3 (All Sections) *World Book*: ● Electromagnetic Waves ● Electromagnet ● Magnetic Field ● Gravitation ● Laws of Motion ● Forces in Motion ● Gravitational Forces *Science Notebook:* ● Chapter 11 Gravity, Friction, and More Forces in Everyday Life pg. 109 ● Chapter 13 Forms of Energy pg 137 ● Chapt 16 Electricity and Magnetism pg. 159 *Other:* ● *Teach Engineering STEM activity for KE/PE* ● *Teach Engineering: Potato Power* *Do you have a recommendation for curriculum materials that support teaching these concepts? Please email them to jmoritz@gesd40.org*

7.P3U1.4-Use non-algebraic **mathematics and computational thinking** to explain Newton's laws of motion. Cross Cutting Concepts: **Patterns**; Cause and Effect; **Scale, Proportion and Quantity; Systems and System Models; Energy and Matter**; Structure and Function; Stability and Change	Background Information: For any pair of interacting objects, the **force** exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first but in the opposite direction. The **motion** of an object is determined by the **sum of the forces** acting on it; if the total force on the object is not zero, its motion will change. The greater the **mass** of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. Forces on an object can also change its **shape or orientation**. All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared. [4 (pp. 115-116)] GESD Context/Application of Standards ● I can explain Newton's First Law of Motion (inertia). ● I can explain how an object will resist change to its motion. ● I can explain Newton's Second Law of Motion. ● I can explain how the sum of the forces cause objects to move. ● I can explain how the greater the mass the greater the force needed to achieve motion. ● I can explain Newton's Third Law of Motion. ● I can explain force exertion between two objects. ● I can use non-algebraic thinking to explain Newton's laws of motion.	force motion mass motion sum of forces shape orientation inertia balanced force unbalanced force Newton's law Isaac newton (no apples please)	*McDougal-Littel* Motion and Forces Book: ● Chapters 1 & 2 & 3 & 4 & 5 (All Sections in each chapter). *World Book*: ● Laws of Motion ● Inertia *Science Notebook:* ● Chapter 10 Force and Newton's Laws of Motion pg. 99 *Do you have a recommendation for curriculum materials that support teaching these concepts? Please email them to jmoritz@gesd40.org*

Quarter 4

Standard	Crosscutting Concepts; Background Information and GESD Context Application of Standards	Key Vocabulary	Activities and Strategies
Unit Title: Earth Science: Weather and Climate *Earth and Space Sciences: Students develop an understanding of the patterns of energy flow along with matter cycling within and among Earth's systems.*			
7.E1U2.7- Analyze and interpret data to construct an explanation for how advances in technology has improved weather prediction. Cross cutting concepts: **Patterns; Cause and Effec**t; Scale,	Background Information: **Weather** and **climate** are influenced by interactions involving **sunlight**, the **ocean**, the **atmosphere**, ice, landforms, and living things. These interactions vary with **latitude**, **altitude**, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. Because these patterns are so complex, weather can be predicted only probabilistically.[4.(p. 188)] Some natural hazards are preceded by phenomena that allow for reliable predictions. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events.[4.(p. 194)] ● I can explain how climate is influenced by sunlight, ocean, atmosphere, ice, landforms, and living things.	weather climate sunlight ocean Atmosphere altitude latitude greenhouse gasses	*World Book*: ● Weather ● Meteorology ● Weather Forecasting ● Meteorology *My Perspectives:* ● 7th Grade Unit 4 - People and the Planet *Science Notebook:*

Proportion and Quantity; Systems and System Models; Energy and Matter; **Structure and Function**; Stability and Change	• I can explain how the ocean exerts a major influence on weather and climate. • I can explain how latitude, altitude, and geography affect flow patterns. • I can explain how weather is predicted on probability due to complex systems. • I can explain how Greenhouse gases in the atmosphere regulate earth's surface temperature. • I can interpret data to support a claim of improved weather prediction due to advances in technology. • I can analyze data to explain how technology has improved weather prediction.		• Chapter 26 - Weather pg. 269 • Chapter 27 - Climate pg. 281 *Do you have a recommendation for curriculum materials that support teaching these concepts? Please email them to jmoritz@gesd40.org*
Unit Title: Cell Theory *Life Sciences: Students develop an understanding of the structure and function of cells.*			
7.L1U1.8-Obtain, evaluate, and communicate information to provide evidence that all living things are made of cells, cells come from existing cells, and cells are the basic structural and functional unit of all living things. Crosscutting Concepts: **Patterns; Cause and Effect**; Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; **Structure and Function**; Stability and Change	Background Information: All living organisms are made of one or more **cells**, which can be seen only through a microscope. All the basic processes of life are the results of what happens inside cells. Cells divide to replace aging cells and to make more cells in growth and in reproduction. Food is the energy source they need in order to carry out these and other functions.[2 (p. 26)] Life is the quality that distinguishes living things - composed of living cells, from nonliving objects or those that have died. While a simple definition of life can be difficult to capture, all living things - that is to say all organisms -can be characterized by common aspects of their structure and functioning.[4 (p.143)] Some cells in **multicellular organisms**, as well as carrying out the **functions** that all cells do, are **specialized**; for example, muscle, blood and nerve cells carry out specific functions within the organism. Cells are often aggregated into tissues, tissues into organs, and organs into **organ systems**. In the human body, systems carry out such key functions as respiration, digestion, elimination of waste and temperature control. The circulatory system takes material needed by cells to all parts of the body and removes soluble waste to the urinary system. Stem cells, which are not specialized, are capable of repairing tissues by being programmed for different functions. Cells function best in certain conditions. Both single cell and multicellular organisms have mechanisms to maintain temperature and acidity within certain limits that enable the organism to survive.[2 (p. 26)] Organisms are complex, organized and built on a hierarchical foundation of elements and atoms, to cells and systems of individual organisms to species and populations living and interacting in complex ecosystems. Organisms range in composition from a **single cell** (unicellular microorganisms) to multicellular organisms, in which different groups of large number of cells work together to form **systems of tissues and organs** (e.g. circulatory, respiratory, nervous, musculoskeletal), that are specialized for particular functions. Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (Boundary: At this grade level, only a few major cell structures should be introduced.)[4 (p. 144)] Organisms respond to **stimuli** from their	cells multicellular organisms single cell organisms functions specialized functions: muscle, blood, nerve cells organ systems stem cells cell division energy	*FOSS Next Generation Diversity of Life* • IG: Investigation 1 All Parts; Investigation 3 All Parts; Investigation 4 All Parts Investigation 9 Part 2 • SRB: Characteristics of Life on Earth; The Amazing Paramecium • SRB: Cells; Viruses: Living or Nonliving? • DOR: Levels of Complexity: Plant Cell, Protist Cell; Database: Elodea Cells, Paramecium Collection; Virtual Microscope • DOR: Bacterial Cell; Flu Attack; Viruses on Attack *World Book*: • Cells • Molecular Biology • Mitosis • Stem Cells • Homeostasis • Physiology • Developmental Biology *Science Notebook:* • Chapter 29 - Cell Theory and Cell Structure pg. 303

	environment and actively maintain their internal environment through **homeostasis**.[4] (p. 143) Plant species have **adaptations** to obtain the water, light, minerals and space they need to grow and reproduce in particular locations characterized by climatic, geological and hydrological conditions. 2 (p. 27) ● I can explain how all living things are made of cell(s) ● I can explain the basic processes of life. ● I can explain how cells divide to replace aging cells, growth, and reproduction. ● I can explain how food is the energy source for cell functions. ● I can explain how cells in multicellular species are specialized in their function. ● I can explain body system functions such as respiratory, digestion, waste elimination, and temperature control. ● I explain the importance of the circulatory system for cell functions. ● I can explain the capabilities of stem cells. ● I can explain the conditions best for cell survival. ● I can evaluate evidence that all living things are made of cells. ● I can communicate evidence that all living things are made of cells. ● I can evaluate evidence that cells come from other cells. ● I can communicate evidence that cells come from other cells. ● I can evaluate evidence that cells are the basic structural and functional unit of all living things. ● I can communicate evidence that cells are the basic structural and functional unit of all living things.		● Chapter 30 - Cellular Transport and Metabolism pg 313 ● Chapter 31 - Cell Reproduction and Protein Synthesis pg. 321 *Do you have a recommendation for curriculum materials that support teaching these concepts? Please email them to jmoritz@gesd40.org*
7.L1U1.9-Construct an explanation to demonstrate the relationship between major cell structures and cell functions (plant and animal).	● I can explain the relationship between cell structures and cell functions. ● I can explain the similarities of plant and animal cells. ● I can explain the differences of plant and animal cells. ● I can explain the relationship between major cell structures and functions in plant and animal cells. ● I can demonstrate the relationship between major cell structures and their functions in plant and animal cells.	cell functions cell structure animal cell plant cell	
Unit Title: Cell Organization			
7.L1U1.10-Develop and use a model to explain how cells, tissues, and organ	● I can develop a model to demonstrate how cells, tissues, and organ systems are related. ● I can explain how animal cells maintain life ● I can explain how animal tissues maintain life ● I can explain how animal organ systems maintain life	organism cell system tissue system: respiratory,	*FOSS Next Generation Diversity of Life* ● IG: Investigation 3 Parts 1, 2 and 3; Investigation 4 Part 1;

systems maintain life (animals).	● I can develop models to show how animal cells maintain life ● I can develop models to show how animal tissues maintain life ● I can develop models to show how animal organ systems maintain life ● I can use models to show how animal cells maintain life ● I can use models to show how animal tissues maintain life ● I can use models to show how animal organ systems maintain life	nervous, muscular organ system single cell	Investigation 5 Part 3; Investigation 8 Part 2 ● SRB: Water, Light, and Energy, Levels of Complexity Research ● DOR: Levels of Complexity *FOSS Next Generation Human Systems Interactions* ● IG: Investigation 1, 2 ● SRB: Human Organ Systems, Aerobic Cellular Respiration ● DOR:Human System Structural Levels *World Book* ● Cells ● Tissue ● Organs *Do you have a recommendation for curriculum materials that support teaching these concepts? Please email them to jmoritz@gesd40.org*