Grade 5 Curriculum Map – Science **2019-2020**

TOPIC & MONTH	CONTENT	SKILLS	ASSESSMENT	Essential Question
Engineering Design Sept W1-Sept W3	• Asking Questions and Defining Problems • Planning and Carrying Out Investigations • Constructing Explanations and Designing Solutions • ETS1.A: Defining and Delimiting Engineering Problems • ETS1.B: Developing Possible Solutions • ETS1.C: Optimizing the Design Solution • readings -"The Scientific Method"	• Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. • Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. • At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. • Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints • **Vocab**: design, hypothesis, analyze, scientific method	• test airplanes to find the best design • partners discuss steps taken to reach final design • discuss scientific method	• When given a scientific question, what are the steps to discover the answer? • What is the best design for a paper airplane?
	STANDARDS: • 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. • 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. • 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.			

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Space Systems: Stars and Solar System (Astronomy revolution, rotation, mass, weight, stars, galaxy, constellation, gravity) Sept W4 - Nov W4	• Analyzing and Interpreting Data • Engaging in Argument from Evidence • PS2.B: Types of Interactions • ESS1.A: The Universe and its Stars • ESS1.B: Earth and the Solar System • readings -"What's Up in Space?" -"Stargazing" "Asteroid Attack" • Textbook pages - UB C2 L3 - UC C4 L2 - notes • Observation Notebook • experiments - Mass vs. weight	• The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. • The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. • The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. • **Vocab**: elliptical, revolution, rotation, constellation, galaxy, space race, cold war, astronaut, cosmonaut	• Challenges - Objects in Space Challenge - Constellation Challenge	• What makes up the solar system? • What is known about stars? • What force exerts itself on Earth? • Why are some stars brighter than others? • What patterns are there in seasonal changes?
	STANDARDS: • 5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. • 5-ESS1-1. Support an argument that differences in the apparent brightness of the Sun compared to other stars is due to their relative distances from Earth. • 5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.			

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Structure and Properties of Matter (atom and elements, molecules and compounds, physical properties, phase changes, chemical reactions and changes) Dec W1 – Jan W4	• Developing and Using Models • Planning and Carrying Out Investigations • Using Mathematics and Computational Thinking • PS1.A: Structure and Properties of Matter • PS1.B: Chemical Reactions • readings -"Chemistry: An Intro to Chemistry" -Chemistry: Atoms and Molecules -The Penny Experiment -"Everyday Compound or Poison? • Experiments - Natural Phenomenon - Atoms: Molecule Models -Physical Properties -mixtures vs. solutions -Exploring Elements • Textbook page -UC C3 L1 -UB C1 L4 - UB C1 L3	• Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. • (NYSED) The total amount of matter is conserved when it changes form, even in transitions in which it seems to vanish. • Measurements of a variety of properties can be used to identify materials. • When two or more different substances are mixed, a new substance with different properties may be formed. • No matter what reaction or change in properties occurs, the total weight of the substances does not change. • **Vocab**: element, periodic table, atom, nucleus, proton, neutron, electron, molecule, compound, mixture, solution, physical property, physical change, chemical property, chemical change, chemical reaction	• Experiments: -Physical Properties -mixture vs. solution -molecules • States of Matter Folder • States of Matter Challenge	• What are elements? • What are compounds? • What are mixtures and solutions? • How can substances be described? • How do substances interact?
	STANDARDS: • 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. • 5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances the total amount of matter is conserved. • 5-PS1-3. Make observations and measurements to identify materials based on their properties. • 5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.			

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Earth's Systems **(Layers of the Earth)** Feb W1 – March W2	• Developing and Using Models • Using Mathematics and Computational Thinking • Obtaining, Evaluating, and Communicating Information • ESS2.A: Earth Materials and Systems • ESS2.C: The Roles of Water in Earth's Surface Processes • ESS3.C: Human Impacts on Earth Systems • readings -"Earth Science: The Weather" -"Why is the Sky Blue?" - "Plate Tectonics" -"A Hole in the Planet!" -"What's the Big Idea . . . about Earth?" • Experiments -"Hydrosphere" • Textbook pages -UC C1 L1 -UC C1 L3	• Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. • Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. • **Vocab**: atmosphere, hydrosphere, lithosphere, crust, mantle, core, plate tectonics, plate, weathering, erosion, deposition	• Notes • Experiments -Hydrosphere • Layers of Earth Folder • Hydrosphere experiment • Challenges - Layers of Earth - Plate Tectonics - Weathering - Protecting Resources	• What are Earth's layers? • How does the Earth's crust move? • What changes the Earth's surface?
	STANDARDS: • 5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. • 5-ESS2-2. Describe and graph the amounts of saltwater and freshwater in various reservoirs to provide evidence about the distribution of water on Earth. • 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect Earth's resources and environment.			

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Matter and Energy in Organisms and Ecosystems (photosynthesis, food chain, consumers, decomposers, producers) March W3 – April W2 and May W3 - June W3	• Developing and Using Models • Engaging in Argument from Evidence • Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena • PS3.D: Energy in Chemical Processes and Everyday Life • LS1.C: Organization for Matter and Energy Flow in Organisms • LS2.A: Interdependent Relationships in Ecosystems • LS2.B: Cycles of Matter and Energy Transfer in Ecosystems • readings -"The Ecosystems of the Forest" -What's the Big Idea About Marine Biology: Life in the Oceans" • Experiments -Owl Pellets -Carbon Dioxide and Photosynthesis • Textbook -UA C4 L3 -UA C4 L2 - UA C4 L4	• The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water) • Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. • Plants acquire their material for growth chiefly from air and water. • The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem • Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. • **Vocab**:	• Notes • Challenges - Biome - Cycles - Plants - Food Chain	• What do plants need to survive? • How do animals get energy? • What cycles are there in nature?
	STANDARDS: • 5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the Sun. • 5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. • 5-LS2-1. Develop a model to describe the movement of matter among plants (producers), animals (consumers), decomposers, and the environment.			

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Science Fair Projects April W3 – May W2	● Textbook ● Science Fair Challenge ● Small Triboards ● Reading -"Inventions that Changed the World" -"How are Rainbows Formed?"	● Research chosen topic and choose important points ● Create presentation ● Design experiment to showcase topic ● In-depth understanding of topic	● Science Fair Challenge and Rubric ● Readings	● How would you teach a science topic to another person?
	STANDARDS: ● 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ● 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. ● 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.			