Next Generation Science Standards
5th Grade

EARTH SCIENCE **Earth's Systems** **5-ESS2** Earth's Systems **5-PS2** Motion and Stability: Forces and Interactions **5-ESS3** Earth and Human Activity	LIFE SCIENCE **Matter and Energy in Organisms and Ecosystems** **5-LS1** Molecules to Organisms: Structures and Processes **5-PS3** Energy **5-LS2** Ecosystems: Interactions, Energy, and Dynamics	PHYSICAL SCIENCE **Structure and Properties of Matter** **5-PS1** Matter and Its Interactions
5-ESS2-1. Develop a model using an example to describe ways the **geosphere, biosphere, hydrosphere, and/or atmosphere interact**. *[i.e. Influence of the ocean (part of hydrosphere system) on ecosystems, landform shape, or climate; the influence of the atmosphere on landforms or ecosystems through weather and climate; and the influence of mountain ranges (part of geosphere system) on winds and clouds in the atmosphere system. Study interactions between two systems at a time.]* **5-ESS2-2.** Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the **distribution of water on Earth.** *[Focus on water in oceans, lakes, rivers, glaciers, ground water, and polar ice caps. Does not include vapor in the atmosphere.]* **5-ESS3-1.** Obtain and combine information about ways **individual communities use science ideas to protect Earth's resources and environment.** *[Note: could study farming communities efforts to protect soil or local efforts to restore ecosystems or waterways]* ***Continued Next Page***	**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.** *[i.e. Use diagrams or flow charts to show relationships. Note: food chains and webs]* **5-LS1-1.** Support an argument that **plants get the materials they need for growth chiefly from air and water.** *[i.e. Focus on idea that plant matter comes primarily from air and water, not soil. Note: collect data from experiment growing plants in just water vs. soil and water]* **5-LS2-1.** Develop a model to describe **the movement of matter among plants, animals, decomposers, and the environment.** *[Focus on idea that plants change matter from air, water, and minerals in soil into carbon-based matter that is food. Assessment will not include molecular explanations. Note: carbon cycle can be used to study transfer and conversion of matter within organisms, between organisms in food chains, gas exchange between organisms and atmosphere, and through decomposers back to soils.]*	**5-PS1-1.** Develop a model to describe that **matter is made of particles too small to be seen**. *[i.e. Observe using air to expand a basketball (or balloon), compressing air in a syringe, dissolving sugar in water, and evaporating salt water. Note: comparing volumes of alcohol and water before and after mixing is another activity showing molecules mixing that can be illustrated with sand and marble mixture.]* **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 weight of matter is conserved.** *[i.e. Weighing substances before and after phase changes, dissolving, and mixing that forms new substances. (Note: avoid reactions that include gases from atmosphere that may alter weights.) Does not include idea of difference between mass and weight.]* **5-PS1-3.** Make observations and measurements to **identify materials based on their properties**. *[i.e. Using color, hardness, reflectivity, electrical or thermal conductivity, response to magnetic forces, or solubility, to identify different powders (baking soda vs. salt), different metals, or minerals or liquids (water vs vinegar). Does not include density or distinguishing mass and weight.]* **5-PS1-4.** Conduct an investigation to **determine whether the mixing of two or more substances results in new substances**. *[i.e. Study difference between mixtures like sand and water (or salt and water) versus reactions that form new substances (with new properties) like baking soda and*

Space Systems: Stars and the Solar System **5-ESS1** Earth's Place in the Universe **5-PS2-1.** Support an argument that the **gravitational force exerted by Earth on objects is directed down.** *["Down" is a local description of the direction that points toward the center of the spherical Earth.]* **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.** *[Focus on comparison of Sun to all other stars, since brightness of different stars seen from Earth is the result of a variety of factors including relative distances, stellar masses, age, and stage.]* **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.** *[i.e. Collect data on changing position of Sun during day and seasonally that reveal motion of the Earth with respect to the Sun, and study stars that are visible only in particular months (major constellations). Does not include causes of seasons (Earth's tilt).* *Note: physical modeling is helpful teaching approach for this idea.]*		*vinegar (producing gas) or milk and vinegar (producing solid from two liquids).]*

NGSS Engineering - **3-5-ETS1** *Engineering Design*

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.