

NGSS GRADE 7 SCIENCE COURSE OVERVIEW

The NGSS Grade 7 Science course has been developed to support Maryland’s adoption of the Next Generation Science Standards (NGSS) and to address the state’s environmental literacy graduation requirement (COMAR 13A.04.17). The course was developed using a three dimensional approach as outlined in the NGSS. The units address Life Science and Physical Science (Disciplinary Core Ideas) with corresponding Science and Engineering Practices and Cross Cutting Concepts.

There are six units written with a problem-based approach. Essential questions of study for each unit are derived from the *A Framework for K-12 Science Education (2012)*. The subsequent driving questions allow students to investigate the science concepts within real-world applications. All units contain culminating events or projects that compel students to construct explanations to scientific phenomenon or design solutions to engineering challenges related to the performance expectations. Learning cycles guide the teacher to the appropriate scope and pacing for student acquisition of the key topics within each unit as well as provide the resources to design daily lesson planning.

The following chart provides a description and tentative pacing guide (based upon a 50 minute class period) for the units:

Unit Title	Unit Summary
S’more Energy (four weeks)	This is a four week unit that allows students to explore the relationships between kinetic energy, thermal energy and temperature. Additionally, students will design investigations in order to provide evidence for how energy is transferred within systems and the conservation of energy. Students will apply the knowledge gained to answer the essential question “How is energy transferred between objects or systems?” In the culminating project, students will design and construct a device that maximizes the transfer of thermal energy in order to melt a s’more.
Form Follows Function (five weeks)	This is a five-week unit focusing on the functions and structures of living things. At the beginning of the unit, students will determine the characteristics of living versus non-living things and analyze and apply the Cell Theory. Students will use their knowledge of cell function to differentiate between unicellular and multicellular organisms. Students will identify the key structures and functions of the animal and plant cell. From there, students will explain the connection between cells, tissues, organs, and organ systems in their bodies. Students will justify how these subsystems work together for specialized body functions. Throughout the course of the unit, students will ask the question, “How does my body work?” At the conclusion of the unit, students will reflect upon activities they do in their daily life, then they will select two organ systems for which they need to design and build a functioning model that demonstrates the interrelatedness of the two organ systems. This model is then used to justify their argument why it is essential for organ systems to work together properly in order for their body to function.
The Chemistry Within Us (six weeks)	This is a six week unit focusing on how substances combine to make new substances. Students will apply this knowledge to investigate how living things (plants and animals) obtain and use matter to produce the food and energy they need to live and grow. In this unit, students will focus on the

	<p>question: “How does my body use sugar?” Students will conduct investigations and use models to discover how cells use matter to obtain energy. Students will focus on natural sugars versus artificial sugars and how the body uses these molecules to release energy in order for the organism to live and grow. In the culminating event students construct an argument identifying whether or not artificial sugars have the same effect on the body as natural sugars.</p>
<p>Survive and Thrive (three weeks)</p>	<p>This life science unit will focus on the factors that contribute to the successful growth, development, and reproduction of organisms, specifically plants and animals. Students will investigate the phenomena that various factors including, environment, genetics, characteristic behaviors, and specialized structures can affect an organism’s ability to survive (grow and develop) and thrive (reproduce). For the culminating event, students will research a plant and animal that is part of the ecosystem at Blackwater Refuge located in Dorchester, Maryland.</p>
<p>Awaken the Force (five weeks)</p>	<p>Throughout this unit, students will learn principles of different forces including magnetic fields, electromagnetic fields, gravitational forces, and potential energy. Each learning cycle has an evaluation, but there is not a separate culminating event. In the first Learning Cycle, students are tasked to create a simple motor to demonstrate their knowledge of electromagnets. In the second Learning Cycle, students will create a Skee ball ramp to get a rolling object into a desired target.</p>
<p>Let Us Entertain You (six weeks)</p>	<p>This six week unit focuses on waves transferring energy and information. In the beginning of the unit, students will use the engineering design process to construct musical instruments. Students will use the instruments throughout the unit to analyze wave components and observable phenomena. At the conclusion of the unit, students will perform a music show (live or recorded) that applies their understanding of light waves, sound waves, and digitized information to produce an entertaining and engaging experience for audience members. Following the performance, students must explain the physics principles behind their show.</p>