NOBLESVILLE SCHOOLS CURRICULUM

Science

7th Grade Units of Study

The Indiana Academic Standards for Grades K-12 Science are based on A Framework for K-12 Science Education (NRC, 2012) and Next Generation Science Standards (NGSS Lead States, 2013). The following conceptual shifts reflect what is new about these science standards. The K-12 Science Indiana Academic Standards:

- Reflect science as it is practiced and experienced in the real world;
- Build logically from kindergarten through grade 12;
- Focus on deeper understanding as well as application of content; and
- Integrate practices, crosscutting concepts, and core ideas.
  (Indiana Dept of Education)

These shifts in the K-12 Science Indiana Academic Standards means students are not just learning science facts—they are learning to think, talk, and act like scientists.

What Science Looks Like in Middle School
In Noblesville, students in grades 6-8 use high-quality, hands-on units from OpenSciEd, a nationally recognized science program designed to actively engage students in the process of doing science. Our units are centered around big, real-world questions that spark curiosity. In each unit, students investigate real phenomena, collect and analyze data, and use models to explain their ideas. Instruction is active, collaborative, and grounded in evidence-based thinking.

Why the Units Are Taught in This Order
The Indiana standards provide a clear list of science concepts to be mastered by 8th grade. In Noblesville, we intentionally follow the instructional sequence developed by OpenSciEd, with some careful rearranging in order to maintain each grade level's standards as much as possible. This sequence is based on how students best build their understanding over time.In 7th grade science, students explore how forces affect motion, starting with collisions and friction. They then apply those ideas to Earth, learning how plate movement shapes the surface over time. Later units focus on how cells and body systems work together, and how humans impact the planet through the use of natural resources. The year ends with students exploring gravity and magnetism to understand how objects can interact without touching.*This progression helps students make deeper connections between concepts and supports stronger long-term understanding.*

Science

7th Grade Units of Study

Unit Description	**Indiana 2023 Academic Standards** *Note: Standards with gray shading and an "E" are identified by the Indiana Department of Education as essential for mastery by the end of the grade level.*
Unit 1: Contact Forces **Essential Question:** *Why do things sometimes get damaged when they hit each other?* This unit focuses on understanding how objects interact when they collide, specially investigating why things sometimes get damaged during collisions. The unit asks students to explore things that influence damage, like force, mass, and speed. *This introductory unit also guides students through the classroom routines they will continue all year: Using a Driving Question Board to practice asking strong scientific questions, discussing concepts in a scientist circle, and drawing models to explain a scientific phenomenon.*	MS-PS2-1:Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. MS-PS2-2:Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. MS-PS3-1:Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. MS-LS1-8:Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for storage as memories. MS-ETS1-2:Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. MS-ETS1-3:Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Unit Description	**Indiana 2023 Academic Standards** *Note: Standards with gray shading and an "E" are identified by the Indiana Department of Education as essential for mastery by the end of the grade level.*
Unit 2: Rock Cycling and Plate Tectonics **Essential Question:** *What causes Earth's surface to change?* This unit focuses on understanding how Earth's surface is shaped by active processes. Students investigate phenomena like earthquakes, volcanoes, and mountain formation, exploring how these relate to the movement of Earth's tectonic plates.	MS-ESS2-1:Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. MS-ESS1-4:Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. MS-ESS2-2:Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. MS-ESS2-3:Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
Unit 3: Cells and Systems **Essential Question:** *How do Living Things Heal?* Unit 3 focuses on the fundamental concept that all living things are made of cells, which are the basic units of life. Students investigate how these cells work together to form tissues and organs, and how these structures enable living things to heal and function.	MS-LS1-1:Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells. MS-LS1-2:Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. MS-LS1-3:Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. MS-LS1-8:Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

NOBLESVILLE SCHOOLS CURRICULUM

Science

7th Grade Units of Study

Unit Description	**Indiana 2023 Academic Standards** *Note: Standards with gray shading and an "E" are identified by the Indiana Department of Education as essential for mastery by the end of the grade level.*
Unit 4: Natural Resources and Human Impact **Essential Question:** *How do changes in Earth's system impact our communities and what can we do about it?* This unit on Earth's resources and human impact begins with students observing news stories and headlines of drought and flood events across the United States.Students consider how Earth's system changes impact communities and gather data on various natural climate variables, such as precipitation and atmospheric gas concentration.	MS-ESS3-1:Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. MS-ESS-3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. MS-ETS1-1:Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. MS-ETS1-2:Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. PS4-3 Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

NOBLESVILLE SCHOOLS CURRICULUM

Science

7th Grade Units of Study

Unit Description	**Indiana 2023 Academic Standards** *Note: Standards with gray shading and an "E" are identified by the Indiana Department of Education as essential for mastery by the end of the grade level.*
Unit 5: Forces at a Distance **Essential Question:** *How can a magnet move another object without touching it?* In this unit, students start by studying the vibration of a sound speaker and asked to think about what caused the vibration. Students investigate the cause of the vibration, dissecting speakers to explore the inner workings and build homemade cup speakers. They identify important characteristics of all speakers, examining how the technology can be altered for other systems.	MS-PS2-3: Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. MS-PS2-5: Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. MS-PS3-2:Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

Please note: These 5 units are used across both schools. However, grade-level teacher teams at both middle schools in Noblesville have flexibility to add additional lessons, activities, and projects as time allows.