

Notre Dame Academy

Science Curriculum 6th - 8th Grades

Earth Science

Space Systems

Middle school students can examine the Earth's place in relation to the solar system, Milky Way galaxy, and universe. There is a strong emphasis on a systems approach, using models of the solar system to explain astronomical and other observations of the cyclic patterns of eclipses, tides, and seasons.

History of Earth

Students can examine geoscience data in order to understand the processes and events in Earth's history. Important concepts in this topic are "Scale, Proportion, and Quantity" and "Stability and Change," in relation to the different ways geologic processes operate over the long expanse of geologic time.

Earth's Systems

Students understand how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems. Students can investigate the controlling properties of important materials and construct explanations based on the analysis of real geoscience data.

Weather and Climate

Students can construct and use models to develop understanding of the factors that control weather and climate. A systems approach is also important here, examining the feedbacks between systems as energy from the sun is transferred between systems and circulates through the ocean and atmosphere.

Human Impact

Students understand the ways that human activities impacts Earth's other systems. Students can use many different practices to understand the significant and complex issues surrounding human uses of land, energy, mineral, and water resources and the resulting impacts of their development.

Life Science

Structure, Function, and Information Processing

Students understand that all organisms are made of cells, that special structures are responsible for particular functions in organisms, and that for many organisms the body is a system of multiple interacting subsystems that form a hierarchy from cells to the body.

Growth, Development, and Reproduction of Organisms

Students understand how the environment and genetic factors determine the growth of an individual organism. Students begin to understand the ways humans can select for specific traits, the role of technology, genetic modification, and the nature of ethical responsibilities related to selective breeding.

Matter and Energy in Organisms and Ecosystems

Students understand that sustaining life requires substantial energy and matter inputs and the structure and functions of organisms contribute to the capture, transformation, transport, release, and elimination of matter and energy.

Interdependent Relationships in Ecosystems

Students understand that organisms and populations of organisms are dependent on their environmental interactions both with other organisms and with nonliving factors. They also understand the limits of resources influence the growth of organisms and populations, which may result in competition for those limited resources.

Natural Selection and Adaptations

Students investigate how genetic variation among organisms in a species affect survival and reproduction and how the environment influences genetic traits in populations over multiple generations.

Physical Science

Structures and properties of matter

Students will be able to apply understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They will be able to provide molecular level accounts to explain states of matters and changes between states.

Chemical Reactions

Students will be able to provide molecular level accounts to explain that chemical reactions involve regrouping of atoms to form new substances, and that atoms rearrange during chemical reactions.

Forces and interactions

Students will be able to apply Newton's Third Law of Motion to relate forces to explain the motion of objects. Students also apply ideas about gravitational, electrical, and magnetic forces to explain a variety of phenomena including beginning ideas about why some materials attract each other while other repel.

Energy

Students develop their understanding the interactions of objects can be explained and predicted using the concept of transfer of energy from one object or system of objects to another, and that the total change of energy in any system is always equal to the total energy transferred into or out of the system. Students understand that objects that are moving have kinetic energy and that objects may also contain stored (potential) energy, depending on their relative positions. Students will also come to know the difference between energy and temperature, and begin to develop an understanding of the relationship between force and energy.

Waves and Electromagnetic Radiation

Students are able to describe and predict characteristic properties and behaviors of waves when the waves interact with matter. Students can apply an understanding of waves as a means to send digital information.

Students at all middle school grades will develop their own questions and perform investigations allowing for the application of scientific study and the Scientific Method through labs, research and survey.