

Science - Year 3

Course Description

Using the NC Standard Course of Study and the MYP objectives as our guidelines, science in the MYP Program will focus on the nature of science, science as inquiry, science and technology, and personal and social perspectives. These courses will examine instructional design, connections to mathematics, social sciences, and daily applications of science as they pertain to a student's life.

Students will design technological solutions, based on scientific data, and analyze the benefits and risks of such experiences. Students will be encouraged to take the initiative in exploring the world around them and developing a confidence to pursue their goals.

Aims

- develop inquiring minds and curiosity about science and the natural world
- acquire knowledge, conceptual understanding and skills to solve problems and make informed decisions in scientific and other contexts
- develop skills of scientific inquiry to design and carry out scientific investigations and evaluate scientific evidence to draw conclusions
- communicate scientific ideas, arguments and practical experiences accurately in a variety of ways
- think analytically, critically, and creatively to solve problems, judge arguments and make decisions in scientific and other contexts
- appreciate the benefits and limitations of science and its application in technological developments
- understand the international nature of science and the interdependence of science, technology and society, including the benefits, limitations, and implications imposed by social, economic, political, environmental, cultural and ethical factors
- demonstrate attitudes and develop values of honesty and respect for themselves, others, and their shared environment

Objectives

By the end of the course, students will be able to:

One World

- describe and discuss ways in which science is applied and used to solve local and global problems
- describe and evaluate the benefits and limitations of science and scientific applications as well as their effect on life and society
- describe and evaluate the benefits and limitations of science and scientific applications as well as their affect on life and society
- discuss how science and technology are interdependent and assist each other in the development of knowledge and technological design

Communication in science

- communicate scientific information using a range of scientific language (mastered)
- communicate scientific information using appropriate modes of communication (mastered)

- demonstrate honesty when handling data and information, acknowledging sources as appropriate
- present scientific information in a variety of formats, acknowledging sources as appropriate

Knowledge and understanding of science

- recognize and recall scientific information
- analyze scientific information by identifying components, relationships and patterns, both in experimental data and idea
- discuss and evaluate scientific information from different sources (Internet, newspaper articles, television, scientific texts and publications)
- explain and apply scientific information to solve problems in familiar and unfamiliar situations

Scientific Inquiry

- define the problem or research questions to be tested by a scientific investigation
- formulate a hypothesis and explain it using logical scientific investigation
- design scientific investigations that include variables and controls, material/equipment needed, a method to be followed, data to be collected, and suggestions for its analysis (beginning/developing)
- evaluate the method, commenting on its reliability and/or validity
- suggest improvements to the method

Processing Data

- collect and record data using appropriate units of measurement
- organize and transform data into numerical and diagrammatic forms, including mathematical calculations and visual representation (tables, graphs, and charts)
- present data in a variety of ways using appropriate communication modes and conventions(units of measurement)
- analyze and interpret data by identifying trends, patterns and relationships
- draw conclusions supported by scientific explanations and a reasoned interpretation of the analysis of data

Attitudes in science

During the course, students should:

- carry out scientific investigations using material and techniques safely and skillfully
- work effectively as members of a team collaborating, acknowledging and supporting others as well as insuring a safe work environment
- show respect for themselves and others, and deal responsibly with the living and nonliving environment

Areas of Interaction

- Human Ingenuity (HI) - Why and how do we create? What are the consequences? In the MYP science curriculum allows students the opportunity to assess scientific and technological developments and innovations from a social, economic, political, environmental, cultural and ethical perspective. In addition, students are encouraged to consider consequences of these developments/innovations for the world in which they live.
- Approaches to Learning (ATL) - How do I learn best? How do I know? How do I communicate my understanding? Specific skills developed through science include: organization, critical thinking, analyzing, scientific inquiry, reasoning, reflection, etc.
- Health and Social Education (HSE) - How do I think and act? How am I changing? How can I look after myself and others? Understanding how health-related issues can threaten or enhance health is an important aspect of the MYP science program. Awareness of this subject can improve healthy living habits and behaviors. In addition, discussion will also focus on psychological, sociological, economic, and ethical aspects of health.
- Environments (E) - Where do we live? What resources do we have or need? What are my responsibilities? MYP science provides students with the skills necessary to understand local and global environmental problems and evolve informed opinions regarding these topics. Ultimately, this produces global-minded citizens that realize, and accept, responsibility for the choices they make that impact their world.
- Community and Service (CS) - How do we live in relation to each other? How can I contribute to the community? How can I help others? In MYP science, emphasis is placed on helping the students to develop community awareness and a sense of responsibility in order that they may be empowered to recognize, and respond, to the needs of the community in which they live. Learners will utilize current events read in periodicals to research and consider choices made by scientists that impact both local and global communities.

Student Resources

Textbook – Holt Science & Technology: Life Science
Holt Science & Technology: Earth Science
Holt Science & Technology: Physical Science

Library - A wide variety of periodicals and encyclopedias are available for the students' use for research and to sustain curiosity in science and scientific issues.

Laboratory - Students are provided a wide variety of laboratory equipment including microscopes, measuring devices, chemical substances, scientific models, etc. Safety is always a priority and the appropriate materials are provided for student use during laboratory experiences.

Methodology

The sciences and their methods of investigation offer a way of learning through inquiry that can contribute to the development of an analytical and critical way of thinking. While these skills are essential to success in the scientific classroom, they are also transferable to other areas of study. Through collaboration with other subjects, and the areas of interaction, students learn to appreciate the importance of science, and its' influence on our everyday lives. In addition, students become increasingly aware of their importance as individuals and collective members of society and the natural environment.

Topics

Hydrosphere
Cell Theory
Chemistry
Microbiology
Evolution

Assessment

Through the implementation of formative and summative assessments, students will be assessed utilizing the IB criteria on laboratory experiments and reports, or oral/written presentations. Students will also receive standardized scores on tests, quizzes, and homework assignments. Projects and investigations will be scored using IB criteria and a standardized grading system.

Criterion	Maximum	Assessment Methods
A - One World	6	Reflection paragraphs/essays, news reports, debates, and projects
B - Communication in Science	6	tests, quizzes, media presentations, and lab reports
C - Knowledge and Understanding of Science	6	Tests, lab procedures, written and oral reflections
D - Scientific Inquiry	6	laboratory experiments and field studies
E - Processing Data	6	development and execution of laboratory experiments, and lab reports
F - Attitudes in Science	6	observation of students working in science, individually and in groups

Curriculum Map

Year 1 – 6 th Grade	Year 2 – 7 th Grade	Year 3 – 8 th Grade
<p>LIFE SCIENCE Cycling of Matter -transfer of matter and energy -photosynthesis: the process, movement of energy, significance and sustainability for cycle of life -AOI: (H&S) Population Dynamics -interaction of organisms with each other and with non-living parts of the environment -adaptations that aid in survival -impacts of overpopulation -investigation of processes which have led to the diversification -AOI: (C&S)</p> <p>EARTH SCIENCE Solar System -cycles of the solar system -compare/contrast Earth to other planets -gravitational effects on storms and tides -analysis of costs/benefits of space exploration and technology -AOI: (E) Lithosphere -examine the structure of the earth -investigate the changing nature of the earth, including tectonic plate movement and the formation of earthquakes and volcanoes -analyze the rocks and materials that are present in the earth's crust -discuss soil properties and effects of human activity -AOI: (HI)</p> <p>PHYSICAL SCIENCE Energy Transfer and Transformation -discuss the basic concept of energy and relate this to the Law of Conservation of Energy -thermal energy -light -sound -alternate sources of energy and their risk/benefit -AOI: (ATL)</p>	<p>LIFE SCIENCE Human Anatomy & Physiology -form and function of organ system -homeostasis and environmental influences -physical and chemical processes -technological advancements that improve the quality of life -forensics -AOI: (H&S), (E) Heredity and Genetics -sexual versus asexual reproduction -dominant and recessive genes -Mendel -patterns in human genetics -relation of probability and statistics to gene therapy -assessing environmental factors and lifestyle choices on heredity -AOI: (C&S)</p> <p>EARTH SCIENCE Earth's Atmosphere -layers and composition of the atmosphere -water cycle, clouds, fronts, and isotherms -instruments used for forecasting weather – technological impact -reading a weather map -human impact and air quality -cultural impact of climates -AOI: (ATL)</p> <p>PHYSICAL SCIENCE Motion and Forces -importance of reference points for motion -use of energy -reducing motion with friction -Newton's laws of motion -balanced and unbalanced forces -measurements of motion and forces -simple and complex machines -AOI: (HI)</p>	<p>LIFE SCIENCE Cell Theory - prokaryotic versus eukaryotic cells -structures within a cell and their functions -comparison of plant and animal cells -discuss specialization with regard to cell organelles -cell processes -importance of homeostasis -AOI: (H&S) Microbiology -compare and contrast microorganisms (bacteria, viruses, and protists) -diseases and disease transmission -benefits of microorganisms in our ecosystem -biotechnology -bioterrorism -responsibilities as global citizens -AOI: (ATL) Evolution -review natural selection and adaptation -evolutionary theories -evolution of the earth as we know it -human evolution -compare and contrast micro- and macroevolution -significance of evolution and resulting groups and cultures -AOI: (C&S)</p> <p>EARTH SCIENCE Hydrosphere - what makes water unique – properties of water -aquatic food webs -compare different bodies of water and their properties -water quality measurements -human impact on water quality -technology's impact on Earth's water – both helpful and harmful -AOI: (E)</p> <p>PHYSICAL SCIENCE Chemistry -the atom: structure and function -elements and compounds -physical/chemical properties and changes -periodic table -impact on human health -risk/benefit analysis of chemicals -AOI: (HI)</p>

*Approaches to learning will be a continued focus throughout the curriculum.