

Syllabus: Accelerated Science 8

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I. Course Description: Accelerated Science 8 is a year-long comprehensive earth and space science course which integrates basic high school physics and planetary motion concepts with an emphasis on astronomy and geology along with the history and nature of science. It introduces basic science concepts and skills through science inquiry, laboratory investigations, and scientific models. This course is designed for students with a strong interest in science that desire a more in-depth science experience. Accelerated Science 8 prepares students for high school science courses.

Our Study of Science will be:

- **HOLISTIC** – We will use other disciplines to help us understand the story of earth and earth's systems.
- **INTERCULTURAL** – We will examine a variety of viewpoints and consider alternative perspectives that frame scientific topics from an international perspective.
- **COMMUNICATIVE** – We will expand our communication competencies in critical reading, speaking, and writing. As the final step in the scientific method, communication skills are necessary to be able to share all ideas that have been studied.

This course helps students prepare for success in the IB Middle Years Program (MYP) by developing conceptual understanding in global contexts. Conceptual understanding is the significance of which goes beyond particular origins, subject matter, or place in time. Concepts represent the vehicle for students' inquiry into the issues and ideas of personal, local and global significance, providing the means by which they can explore the essence of the sciences. The key concepts contributed by the study of sciences are **change, relationships, and systems**.

The study of science is a natural laboratory for developing in students' identity and habits of mind that support the IB LEARNER PROFILE. Throughout the year we learn using real-world problems, inquiry lab experiments, analysis of scientific data. Scientific notebooks will be used as a record of learning as students become inquirers, knowledgeable, thinkers, communicators, principled, open minded, risk-takers, balanced, caring, and reflective.

II. Units of Study:

- 1) Engineering- *How do I as a scientist create, discover, and share new things?*
Topics covered: Engineering design cycle
- 2) Matter – *What is everything made of?*
Topics covered: Atoms, molecules, density
- 3) Rocks and Minerals – *What makes up the world around me?*
Topics covered: Identification
- 4) Earth Structures & Processes – *How does the Earth work?*
Topics covered: Plate tectonics, earthquakes, volcanoes, tsunamis, and mountains
- 5) Astronomy – *What is out there?*
Topics covered: Planets, moons, stars, universe, and seasons
- 6) Forces & Motion – *How do things move?*
Topics covered: Inertia, gravity, Newton's laws, calculating forces
- 7) Energy – *How does change happen?*
Topics covered: Types of energy, energy transformation, work, power, electricity, and magnetism

III. Approaches to Learning:

Each unit will be approached using selected skills foci called Approaches to Learning: *communication, collaboration, organization, affective, reflection, information literacy, media literacy, critical thinking, creative thinking, and transfer.*

IV. Texts:

Primary Text = *Science Explorer: Earth Science*, Pearson/Prentice Hall, 2009

Science Explorer: Motion, Forces and Energy, Pearson/Prentice Hall, 2009

Science Explorer: Electricity and Magnetism, Pearson/Prentice Hall, 2009

Science Explorer: Chemical Building Blocks, Pearson/Prentice Hall, 2009

Students will check out the *Earth Science* book in October from the library to bring home and leave at home.

V. Methodology:

In the MYP science instruction, a variety of media will be used to access information with a focus on inquiry methods and collaborative group work.

VI. Methods of Assessment:

Students are assessed on a set of MYP criteria and state standards. The academic success of the student is measured and communicated as **Levels of Achievement**, which is outlined in rubric format. A heavier emphasis is placed upon **SUMMATIVE ASSESSMENTS** such as projects, tests, quizzes, and lab investigations resulting in **100% of the final grade**. **FORMATIVE ASSESSMENTS**, including homework, daily work, lab activities, etc., are used to help students and teachers gauge where students are at in the learning process as they prepare to apply their learning on the summative assessments. While formative assessments are not factored into the final grade, they are the pathways to success on the summative assessments.*

FEEDBACK is primarily communicated immediately and verbally in class; although some submitted work will receive written feedback. Students should make changes in a timely manner before (re)submitting work.

Grading and Reporting:

The school year at Highland Park Middle School is divided into four grading periods, or quarters, with a mid-term progress report and a final grade report for each quarter. Each criterion is separated into 8 levels of achievement, which equate to a non-traditional percentage and letter grade. Student achievement on summative assessments will be based on the following MYP criteria:

MYP Objectives/Criteria*:

A: Knowing and understanding – Students develop scientific knowledge and apply it to solve problems and express scientifically supported judgments.

B: Inquiring and designing – Intellectual and practical skills are developed through designing and performing scientific investigations.

C: Processing and evaluating – Students collect, process and interpret qualitative and/or quantitative data, and explain conclusions that have been appropriately reached.

D: Reflecting on the impacts of science – Students gain global understanding of science by evaluating the implications of scientific developments and their applications to a specific problem or issue.

*A minimum of two of each criterion will be assessed each year. The student's final grade will be determined by the results of their summative assessments (100% of their grade).

**Please see the HPMS Assessment Policy at https://highlandms.spps.org/preview_our_assessment_policy.html for further information.

SPPS Power benchmarks

The Nature of Science and Engineering Standards

The Practice of Science:

(8.1.1.1) The student will understand that science is a way of knowing about the natural world and is characterized by empirical data, logical argument, and skeptical review.

(8.1.1.2) The student will understand that scientific inquiry uses multiple interrelated processes to investigate questions and propose explanations about the natural world.

Interactions among Science, Technology, Engineering, Math and Society:

(8.1.3.2) The student will understand that men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry.

(8.1.3.3) The student will understand that science and engineering operate in the context of society and both influence and are influenced by this context.

(8.1.3.4) The student will understand that current and emerging technologies have enabled humans to develop and use models to understand and communicate how natural and designed systems work and interact.

Physical Science 8 Standards

Matter:

(8.2.1.1) The student will understand that pure substances can be identified by properties which are independent of the sample of the substance and the properties can be explained by a model of matter that is composed of small particles.

(8.2.1.2) The student will understand that substances can undergo physical and / or chemical changes which may change the properties of the substance but do not change the total mass in a closed system.

Energy:

(8.2.3.1) The student will understand that waves involve the transfer of energy without the transfer of matter.

Earth and Space Science Standards

Earth Structure and Processes:

(8.3.1.1) The student will understand that the movement of tectonic plates results form interactions among the lithosphere, mantle and core.

(8.3.1.2) The student will understand that landforms are the result of the combination of constructive and destructive processes.

(8.3.1.3) The student will understand that rocks and rock formations indicate evidence of the materials and conditions that produced them.

The Universe:

(8.3.3.1) The student will understand that the Earth if the third planet from the sun in a system that includes the moon, the sun, seven other planets and their moons, and smaller objects.

Physical Science 9 Standards

Forces & Motion:

(9.2.2.2) The student will understand that an object's mass and the forces on it affect the motion of an object.

Energy:

(9.2.3.2) The student will understand that energy can be transformed within a system or transferred to other systems or the environment, but is always conserved.

MYP Science Aims and Objectives

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

** We will address **MYP Science Objectives** through each state content standards: *Knowing and understanding, Inquiring and designing, Processing and evaluating, and Reflecting on the impacts of science.*

For a description of these objectives, see section VI of this syllabus (Grading and Reporting).