

PHYSICS

PH:1 TLW demonstrate scientific reasoning and evaluate scientific investigations.

PH:2 TLW learn to analyze one dimensional motion in terms of displacement, time, speed and velocity.

PH:3 TLW use vectors to analyze two dimensional motion and solve problems in which objects are projected into the air.

PH:4 TLW learn to analyze interactions by identifying forces involved.

PH:5 TLW learn about work and different types of energy that are relevant to mechanics.

PH:6 TLW analyze momentum and collisions between two or more objects.

PH:7 TLW learn how to describe circular motion and the forces associated with it, including the force due to gravity.

PH:8 TLW learn about buoyant force, fluid pressure and the basic equations that govern the behavior of fluids.

PH:9 TLW learn the difference between temperature and heat and how different substances change temperature or phase when energy is added or removed the substances.

PH:10 TLW learn how two types of energy transfer-work and heat-serve to change a system's internal energy and learn a new form of the law of energy conservation and will how machine efficiency is limited.

PH:11 TLW study a kind of periodic motion called simple harmonic motion and learn about the relationship between simple harmonic vibrations and waves.

PH:12 TLW study physical aspects of sound, including the nature of sound waves, frequency, intensity, resonance and harmonics.

PH:13 TLW learn about the characteristics of light and other forms of electromagnetic radiation.

PH:14 TLW study optical phenomena associated with the refraction of light as it passes from one transparent medium to another.

PH:15 TLW learn about interference of light.

PH:16 TLW learn about the basic properties of electric charges and to calculate the electric force produced by charges and interpret electric field lines.

PH:17 TLW learn about electric potential and electrical energy and will learn about how capacitors can be used to store electrical energy.

PH:18 TLW explore the basic properties of series and parallel circuits.

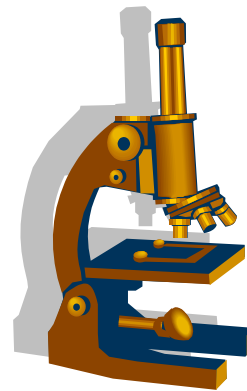
PH:19 TLW learn that a current carrying coil of wire behaves like a magnet and will study the forces exerted on charged particles that are moving in a magnetic field.

PH:20 TLW learn how induction produces and changes alternating currents and explore electromagnetic waves and electromagnetic spectrum.

PH:21 TLW study the atomic nucleus, radioactive decay, and the processes of fission and fusion and learn about the standard model of the universe.

The following high school elective courses are possible options for the required fourth year and/or senior science class.

Integrated Science II
AP Biology
AP Chemistry
Ecology
Environmental Science
Forensic Science
Anatomy and Physiology



The curriculum area represented in this brochure is aligned directly to Michigan's academic core curriculum; known as the High School Content Expectations. If you would like any additional information or have questions, contact your building principal or district office.

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*“Together We’re
A Powerful Team”*

**7th-12th GRADE
SCIENCE
CORE CURRICULUM
2011/2012**

7TH GRADE

SCIENCE PROCESSES

SP7:1 Demonstrate an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems by identifying evidence of chemical change.

PHYSICAL SCIENCE

PH7:1 Classify substances by their physical and chemical properties, and explain the relationship of elements to the periodic table.

PH7:2 Identify examples of waves and explain how waves transfer energy when they interact with matter.

PH7:3 Describe what happens, in terms of Newton's Laws of Motion, when two forces act upon an object.

LIFE SCIENCE

LF7:1 Explain that organisms are made of cells that may specialize for a particular purpose and that cells function in similar ways in all organisms.

LF7:2 Compare sexual and asexual reproduction of organisms for the continuation of genetic characteristics.

LF7:3 Explain the process of photosynthesis.

EARTH SCIENCE

ES7:1 Describe weather conditions and explain the influence of the atmosphere and oceans on weather and climate.

ES7:2 Explain the water cycle and analyze the flow of water in the environment.

ES7:3 Explain how human activities have consequences on the environment.

INTEGRATED SCIENCE

SCIENCE PROCESSES

SP8:1 Understand the nature of science and demonstrate an ability to practice scientific reasoning by applying it to the design, execution, and evaluation of scientific investigations to generate new questions based on those investigations.

PHYSICAL SCIENCE

PH8:1 Identify and explain forms of energy and their transformations.

PH8:2 Predict how electric force varies between charged objects, explain the movement of electrical charges, and identify the common parts and types of circuits.

PH8:3 Explain the properties of mechanical and electromagnetic waves and predict their behavior when interacting with various media.

CHEMISTRY

CH8:1 Describe physical and chemical properties of matter and explain phase changes according to kinetic molecular theory.

CH8:2 Categorize elements of the periodic table and explain how elements, ions, and isotopes differ in atomic structure.

CH8:3 Predict bonding between two atoms of different elements, name the binary compound and write its formula.

CH8:4 Balance, distinguish between, and diagram exothermic and endothermic chemical reactions; classify various solutions as acidic or basic (given their pH), and predict neutralization products.

EARTH SCIENCE

ES8:1 Describe the layers of the Earth, compare the composition and physical characteristics of each layer, describe the lithosphere as being made of mobile tectonic plates, and explain the relationship of plates to earthquakes and volcanoes.

ES8:2 Relate plate and tectonics to the formation of rocks and minerals and use the rock cycle to explain weathering, erosion, the formation of sediments, and how rock types can change over time.

ES8:3 Explain how the Earth and universe formed and evolved, how celestial bodies impact the Earth, and how stars evolve and generate energy.

LIFE SCIENCE

LF8:1 Explain the complex processes and interactions of cells, tissues, and organ systems that allow organisms to maintain a stable internal environment necessary for life.

LF8:2 Predict patterns of inheritance using laws of heredity and analyze these patterns to explain variation.

LF8:3 Analyze the dependence of organisms on environmental resources and how matter and energy are transferred throughout ecosystems.

BIOLOGY

BL:1 TLW demonstrate scientific reasoning and evaluate scientific investigations.

BL:2 TLW explain how cells utilize macromolecules in biological processes.

BL:3 TLW demonstrate the relationship of cell structures, functions and specializations to life processes.

BL:4 TLW describe the processes of photosynthesis and cellular respiration (aerobic & anaerobic) and the role of ATP as it relates to these processes.

BL:5-A TLW analyze the processes of replication and protein synthesis as it relates to DNA/RNA and how this genetic material is passed from cell to cell.

BL:5-B TLW compare/contrast how genetic material is passed from cell to cell by the processes of mitosis and meiosis and explain how these processes relate to asexual and/or sexual reproduction.

BL:6 TLW predict patterns of inheritance using laws of heredity and analyze these patterns to explain variation.

BL:7 TLW explain evolution as the result of genetic changes that occur in constantly-changing environments and that modern evolution includes both the concepts of common descent, natural selection, and biodiversity.

BL:8 TLW recognize the biological classification system, as well as recognizing the similarities and differences among microorganisms.

BL:9 TLW compare and contrast characteristics and life processes of protists, fungi and plants.

BL:10 TLW compare and contrast characteristics and life processes of invertebrates.

BL:11 TLW compare and contrast characteristics and life processes of vertebrates.

BL:12 TLW analyze the dependence of organisms on environmental resources and how matter and energy are transferred throughout ecosystems.

BL:13 TLW explain the complex processes and interactions of cells, tissues, and organ systems that allow organisms to maintain a stable internal environment necessary for life.

CHEMISTRY

CH:1 Students will understand what makes up an atom and describe the process of radioactive decay in terms of energy changes and changes in the nucleus.

CH:2 Students will understand different models of the atom and use quantum mechanics to describe energy positions of electrons.

CH:3 Students will analyze the design of the periodic table and identify general trends that exist within.

CH:4 Students will distinguish and illustrate the different types of bonds formed between atoms and name compounds following a systematic method.

CH:5 Students will predict products, write balanced equations, and describe energy changes during chemical reactions.

CH:6 Students will use stoichiometry to determine the relationships between atoms and molecules in elements, compounds and chemical reactions.

CH:7 Students will measure, calculate, and diagram energy transfer for physical and chemical processes; relate entropy and enthalpy to determine spontaneous reactions, determine how factors such as temperature affect reaction rate, and graph the enthalpy of reactions.

CH:8 Students will use the kinetic molecular theory to describe the behavior of gases.

CH:9 Students will make and test solutions of various concentrations and determine the factors that affect solubility and colligative properties.

CH:10 Students will define equilibrium and apply Le Chatelier's Principle to systems under stress and determine factors affecting reaction rates.

CH:11 Students will use acid-base theory to write equations for various acid-base reactions and determine the pH and concentration of various samples.

CH:12 Students will explain oxidation and reduction and identify examples and uses of oxidation-reduction reactions.

CH:13 Students will draw structural formulas and isomers for simple hydrocarbon chains and recognize biological polymers.