



Course Title:	
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Cycle/Division:	High school
Grade Level(s):	9
Credit Unit:	1
Duration:	2 semesters / 5 periods per week
Course Prerequisites:	General Science grade 8

<u>Department's Vision:</u>	Create Innovators who can link to life, with scientific understanding and learning.
<u>Department's Mission:</u>	Provide students with the proper knowledge, skills and scientific principles through hands-on activities, research and experimentations, and thus creating young innovators who are ready for real life challenges and problem solving.

COURSE DESCRIPTION/OVERVIEW:

It is an integrated course introducing students to general basic concepts in Physics, Biology, Chemistry & Earth sciences. Under physics, students will have the opportunity to learn about measuring units, significant figures, errors in measurements, motion in one dimension (distance, displacement, velocity, acceleration and falling object), the three laws of Newton (tension, normal, weight, friction), free body diagram & everyday forces. Moreover, it extends even further to the study of life where they have an encounter with biochemical reactions, cell theory, cell organelles, energy in the ecosystems, and relations among organisms, nervous and endocrine systems, digestive system. Then, a general view about chemistry, starting with basics such as the atom and its parts, the elements of periodic table, to end by the differences between physical and chemical changes. Finally, it ends with concepts in earth science about the universe and our planet earth. It will include the life and the Death of the Stars, the Milky Way and other Galaxies.

GENERAL COURSE LEARNING OBJECTIVES:

- List basic SI units and the quantities they describe.



- Convert measurements into scientific notation.
- Distinguish between accuracy and precision.
- Contrast between human, method, and instrument errors in measurements .
- Rounding off the digits according to the significant figures and rounding rules.
- Describe motion in terms of frame of reference, displacement, time, and velocity.
- Calculate the displacement of an object traveling at a known velocity for a specific time interval.
- Construct and interpret graphs of position versus time.
- Describe motion in terms of changing velocity.
- Compare graphical representations of accelerated and non-accelerated motions.
- Identify the physics areas .
- Apply kinematic equations to calculate distance, time, or velocity under conditions of constant acceleration.
- Relate the motion of a freely falling body to motion with constant acceleration.
- Calculate displacement, velocity, and time at various points in the motion of a freely falling object.
- Describe how force affects the motion of an object.
- Interpret and construct free-body diagrams.
- Explain the relationship between the motion of an object and the net external force acting on the object.
- Determine the net external force on an object.
- Calculate the force required to bring an object into equilibrium.
- Describe an object's acceleration in terms of its mass and the net force acting on it.
- Explain the difference between mass and weight.
- Find magnitude and direction of normal, and friction forces.
- Define the cell and label the main parts of the cell.
- Compare between animal and plant cell.
- Describe the parts of the cell.
- Describe the different types of prokaryotes.
- Explain the difference between the eukaryotic and prokaryotic cell.
- Determine the structure and function of dermis.
- Describe the temperature regulation and list examples.
- Define some damages could occur in the integumentary system such as cutting
- List the causes of skin cancer.
- Label the main parts of skeletal system.



- Describe the structure of bone, list the main functions of skeletal system.
- Describe the structure for each type of joint and the type of movement.
- Define involuntary and voluntary muscles.
- describe how the three types of muscle cells support essential functions of life.
- Explain the functions of muscles.
- Explain how positive and negative feedback loops help an organism to maintain homeostasis.
- Define autotroph, heterotroph, herbivores, carnivores and omnivores.
- Summarize the levels of organizations.
- Identify biotic and abiotic factors in an ecosystem.
- Define food chains and food webs and ecological pyramids are models used to show how energy moves through ecosystems.
- Describe the function and structure for central and peripheral nervous system.
- List one function of each part of the brain.
- Determine the function of neuron (motor neuron and sensory neuron).
- Compare between electrical and chemical impulse in the neurons
- Interpret the graph of potential action.
- Define endocrine glands and hormones.
- Identify the five glands in the endocrine system and describe what their hormones do.
- Describe the organs of the digestive system.
- Summarize the difference between mechanical and chemical digestion.
- List the enzymes in the process of the digestion.
- Identify the physics areas.

- Apply kinematic equations to calculate distance, time, or velocity under conditions of constant acceleration.
- Relate the motion of a freely falling body to motion with constant acceleration.
- Calculate displacement, velocity, and time at various points in the motion of a freely falling object.
- Describe how force affects the motion of an object.
- Interpret and construct free-body diagrams.
- Explain the relationship between the motion of an object and the net external force acting on the object.
- Determine the net external force on an object.
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- Describe an object's acceleration in terms of its mass and the net force acting on it.
- Explain the difference between mass and weight.
- Find magnitude and direction of normal, and friction forces.



- Define atom and its parts.
- Determine the atomic mass, the mass number for the elements.
- Identify the period, the group of the elements in the periodic table.
- Define chemical and physical reactions.
- Compare the properties of a substance before and after a chemical reaction.
- The life cycle of a star depends on units mass.
- Compare between homogenous and heterogenous mixtures.
- Contrast between atoms, elements , molecules and compounds.
- Identify the differences between chemical and physical changes.
- Determine the atomic number and the mass number of an atom
- Explain the isotopes
- Describe the properties of alkali metals, alkaline earth metals, transitions metals, halogens, noble gases.
- Identify the name and symbols of elements.
- Compare and contrast endocytosis and exocytosis transport materials across the membrane in vesicles.
- Determine proteins can transport materials against a concentration gradient.
- Determine some covalent compounds area network with no single molecules.
- Calculate the number of protons, electrons and neutrons.
- Find the molar mass.

I

STANDARDS/BENCHMARKS:

HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms

HS-LS1-3. Plan and conduct an investigation to provide evidence those feedback mechanisms maintain homeostasis.

HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

HS-PS2-2 Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.



HS-PS2-3 Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*

HS-PS2-4 Use mathematical representations of Newton’s Law of Gravitation and Coulomb’s Law to describe and predict the gravitational and electrostatic forces between objects.

HS-PS2-5 Plan and investigate to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.

HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun’s core to release energy that eventually reaches Earth in the form of radiation.

HS-ESS1-2 Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion.

HS-ESS1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements.

HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

RESOURCES:

Holt McDougal

Lab Handouts

One Stop Planner.

Linked Lesson presentations.

FrogOS site

YouTube videos



E-games and links.

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COURSE SCHEDULE/TIMELINE:

Semester 1:

<u>Chapter's #</u>	<u>Chapter</u>	<u>Lesson(s)</u>
Chapter 1	The science of physics	<ul style="list-style-type: none"> Section 1: What's physics Section 2: The standards of measurement
Chapter 3	Two-dimensional motion and vectors	<ul style="list-style-type: none"> Section1: Introduction to vectors
Chapter 2	Motion in one dimension	<ul style="list-style-type: none"> Section 1: Displacement and velocity
Chapter 4	Forces and laws of motion	<ul style="list-style-type: none"> Section 1: Changes in motion Section 2 Newton's first law Section 3 Newton's Second and Third laws
Chapter 9	Heat	<ul style="list-style-type: none"> Section 1: Temperature and thermal Section 2: Defining heat
Chapter 12	Sound	<ul style="list-style-type: none"> Section 1: Sound waves Section 2: Sound intensity and resonance

Semester 2:

<u>Chapter's #</u>	<u>Chapter</u>	<u>Lesson(s)</u>
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Chapter 1	Matter and change	Section 1 Chemistry is a physical science. Section 2 Matter and its properties Section 3: Elements
Chapter 3	The building blocks of matter	Section 1: The atom Section 2 The structure of the atom Section 3: Counting Atoms
Chapter 6	Chemical bonding	Section 1 Introduction to chemical bonding
Chapter 7	Chemical formulas and chemical compounds	Section 1 Chemical names and Formulas
Chapter 1	Biology in the 21st century	Section 1: The study of Life Section 2: Unifying Themes of Biology
Chapter 3	Cell structure and function	Section 1: Cell theory Section 2: Cell membrane Section 4: Diffusion and Osmosis Section 5 : Active Transport, Endocytosis and Exocytosis
Chapter5	Cell growth and division	Section 1: The Cell Cycle Section 2. Mitosis and Cytokinesis Section 4 Asexual Reproduction

GRADING:

- Quizzes /tests** are given every other week as assigned by school. **Our tests and assessments** consist of multiple-choice, short answer, direct application problems, critical thinking situations, refer to figures, texts, graphs and/or open response items. They are aligned with Michigan benchmarks. A student failing any of his quizzes would have to sit for a **support class and retest** to achieve his 60% which is our passing mark. **A progress report is sent to the parent eventually after sitting for the make up exam.** 40 % is given to students that do not have a medical excuse for missing such an assessment. The department considers the highest 2 grades out of 3 exams.
- Skill Based Assignments** are done in class where a student has his resources all opened in front of him to answer a set of questions under verbal, nonverbal, quantitative, and spatial domains.
- Research Sessions** are done under where students can debate as groups and check the internet for resources and answers to support their ideas. This kind of Assessment is lined under **Research Lab Sessions or the copybook Journals**. They are evaluated to info, creativity, presentation, discussion and relation to the subject.
- Daily assessments and drop quizzes** take place to check the understanding of students.
- Laboratory work** is checked for research, completeness, accuracy, understanding the experiment, group work, and reports submitted completed. The general lab course has a



separate grade than the subject labs. The policy of the general lab is attached within the manual itself.

6. **Projects** are integrated across and assigned for every term. They are evaluated to accuracy, creativity, info and relation to the subject.

Grade Distribution:

Category	Assessment	Announced/ Unannounced	Frequency	Platform	Weight	
Classroom Management	Active Participation	N/A	Daily	N/A	5%	5%
Ongoing Assessments	Exit Slip	Unannounced	5	Kahoot, Mentimeter, Padlet, Pear Deck, Flipgrid, online book, microsoft forms	5%	30%
	Drop Quiz	Unannounced	2	Formative/ Paper-based/ online book	10%	
	Labs & Investigation	Announced	1	Varies	5%	
	Quiz	Announced	2		10%	
Interim Assessments	MAP	N/A	Thrice/year	MAP NWEA	5%	5%
Summative Assessments	Mid-semester Assessment	Announced	1	Formative	25%	60%
	End of Semester Assessment	Announced	1	Formative	25%	
	Integrated Project (2 subjects at least)	Announced	1	Varies	10%	
						100%

STEM

Bonus Policy (optional):

2 bonus points per semester to be given either on Midterm or Final
 2 bonus points to be given for a bonus project

Cross-Curricular Project (optional for non-core subjects):

Not Applicable