



Course Title:	General Science
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Cycle/Division:	Middle School
Grade Level:	Grade 6
Credit Unit:	1
Duration:	2 semesters / 5 periods per week

Department's Vision:	Create Innovators who can link to life, with scientific understanding and learning.
Department's Mission:	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:

This course will deal with scientific reports in the 3 domains life, physical, and earth sciences. It will introduce new topics and reinforce previous ones in addition to the scientific method and lab investigation skills. It will deal with topics such as plate tectonics and their effects, volcanoes, earthquakes, rock cycle, rock types and minerals, states of matter, atoms, periodic table, atomic theory, elements, compounds, mixtures, levels of organization and few body systems.

General Academic Goals:

To cover the standards and benchmarks required by Michigan State for grade 6 in Science.

To be ready to perform well in International exams assigned by the school.

To be ready academically by the end of 2018-2019 for grade 7 in different fields of Science (Physical, Earth, and Life) involving investigation, experimentation, and

research as their tools.

General Skills:

Evaluation skills: making judgment about knowledge by introducing new text to solve and tackle problems using the related knowledge taught.

Comprehension: given scientific text or diagrams to analyze and answer questions about, summarize, compare, relate, or experiment...

Communication and social skills: Making movies, ppt., projects, interviews, and presenting the work either individually or with a peer or as a group.

Investigative skills: lab work, research, journals, experimentation...

Mathematical skills: related to investigations in the lab and application in projects.

Technological skills used in science and computer labs.

Knowledge skills: list, define, show, demonstrate, invent, relate etc... using the taught concepts.

GENERAL COURSE LEARNING OBJECTIVES:

1. Construct an explanation for how rock formations on Earth's surface have changed over time through physical and chemical processes.
2. Explain how weathering, erosion and deposition have shaped Earth's history and will continue to shape its future.
3. Model the effects of erosion and deposition by water and wind.
4. Describe two ways rocks have been used by humans.
5. Explore how the cycling of matter forms rocks and minerals.
6. Define minerals.
7. Identify that minerals are made up of crystals.
8. List two characteristics of rock that are used to help classify it.
9. Describe four processes that shape Earth's features.
10. Describe how each type of rock changes into another type through the rock cycle.
11. Design a model for the rock cycle.
12. Identify the theory of Plate Tectonics.
13. Describe a tectonic plate.
14. Explain how sea-floor spreading provides away for continents to move.
15. Describe the three types of tectonic plate Boundaries.
16. Explain how scientists know about the structure of the Earth's interior.
17. Explain how sea- floor spreading provides a way for continents to move.
18. Describe how new oceanic lithosphere forms at mid-ocean ridges.
19. Construct an explanation of how Earth's subsystems interact to change a rock formation.
20. Explain where earthquakes take place.
21. Identify the features of a volcano.
22. Describe five ways that different types of fossils form.
23. Explain how fossils can be used to determine the history of changes in environments and organisms.
24. Explain how index fossils can be used to date rock layers to organize Earth's history into geologic time scale.
25. Determine the unconformities.
26. Explain how constellations are used to organize the night sky.

27. Develop and use models to describe the apparent motion of the sun, moon and stars in the Earth-sun-moon system.
28. Analyzing moon phases.
29. Explain what causes the phases of Earth's moon.
30. Describe the difference between a solar eclipse and a lunar eclipse.
31. Explain the difference between rotation and revolution.
32. Apply the knowledge to understand changes in the sunlight and patters of the seasons throughout the year.
33. List the planets in the order in which they orbit the sun.
34. Develop a scale model of the solar system.
35. Describe how distance and mass affect gravitational attraction.
36. List the planets in the order in which they orbit the sun.
37. Describe three ways in which the inner planets and outer planets differ.
38. Explain the difference between a planet's period of rotation and period of revolution.
39. Define Matter.
40. Describe the two properties of all matter.
41. Identify the units used to measure volume and mass.
42. Compare mass and weight.
43. Identify and describe examples of physical and chemical changes
44. Describe how density is used to identify substances.
45. Explain what happens to matter during a physical and chemical change.
46. Distinguish between physical and chemical changes.
47. Identify different types of chemical reactions and conductivity.
48. Describe the properties shared by particles of all matter.
49. Describe three states of matter.
50. Explain the differences between the states of matter.
51. Describe how energy is involved in changes of state.
52. Describe what happens during melting and freezing.
53. Compare evaporation and condensation.
54. Explain what happens during sublimation.
55. Identify the two changes that can happen when a substance loses or gains energy.
56. Describe pure substances.
57. Describe the characteristics of elements and give examples.
58. Explain how elements can be identified.
59. Classify elements according to their properties.
60. Explain how elements make up compounds.
61. Describe the properties of compounds.
62. Explain how a compound can be broken down into its elements.
63. Give examples of common compounds.
64. Describe three properties of mixtures.
65. Describe four methods of separating the parts of a mixture.
66. Analyze a solution in terms of its solute and solvent.
67. Explain how concentration affects a solution.
68. Describe the particles in a suspension.

69. Explain how a colloid differs from a solution and a suspension.
70. Describe some of the experiments that led to the current atomic theory.
71. Compare the different models of the atom.
72. Explain how the atomic theory has changed as scientists have discovered new information about the atom.
73. Describe the size of an atom.
74. Name the parts of an atom.
75. Describe the relationship between number of protons and neutrons and atomic number.
76. State how isotopes differ.
77. Calculate atomic masses
78. Describe the forces within an atom.
79. Explain how elements are arranged in the modern periodic table.
80. Compare metals, non-metals and metalloids based on their properties and on their location in the periodic table.
81. Describe the difference between a period and a group.
82. Explain why elements in a group have similar properties.
83. Describe the properties of the elements in the groups of the periodic table.
84. Conclude that living things are made up of tiny structures called cells.
85. Develop and use models of cells to analyze the structure and function of their various parts.
86. Identify differences between cells.
87. Describe how cells, tissues, organs and organ systems are related.
88. Discover that an organism's body systems are directly dependent on one another to accomplish complex tasks.
89. List five main parts in the kidney.
90. Identify how systems within a plant body interact to perform functions necessary for survival.
91. Analyze animal bodies as systems.
92. Evaluate how the survival needs of animals are met by body systems working together through examining the body systems of the nautilus.
93. List the main parts and the function of digestive, circulatory, muscular, nervous and excretory systems.
94. Explain how the urinary system works.
95. Explain the cause –and- effect relationship between information gathered from the environment and the behavior it produces.
96. Describe the relationship between the central nervous system and the peripheral nervous system.
97. List one function of each part of the brain.
98. Describe forces and explain how forces act on object.
99. Determine the net force when more than one force is acting on an object.
100. Compare between balance and unbalanced force.
101. Explain why friction can be both harmful and helpful.
102. List the two types of friction and give examples of each type.
103. Describe gravity and its effect on matter.
104. Explain the law of universal gravitation.
105. Describe how mass and distance can affect gravity.



106. Explain the effect of gravity and air resistance on falling objects.
107. Explain why objects in orbit are in free fall and appear to be weightless.
108. Identify the variables that affect the strength and direction of the magnetic force.
109. Conclude that magnets can attract or repel each other depending on their orientation.
110. Identify the electric forces.
111. Analyze the factors that determine the strength of the electric force.
112. Conclude that objects can have overall positive, negative or neutral charge.
113. Model magnetic fields.

STANDARDS/BENCHMARKS:

- MS-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.
- MS-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
- MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
- MS-LS1-1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
- MS-LS1-2 Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
- MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- MS-LS1-8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
- MS-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- MS-LS4-1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
- MS-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
- MS-PS1-5 Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.
- MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
- MS-ESS2-2 Construct an explanation based on evidence for how geosciences processes have changed Earth's surface at varying time and spatial scales.
- MS-ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
- MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
- MS-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
- MS-ESS1-2 Develop a model to describe the role of gravity in the motions within galaxies and the solar system.
- MS-ESS1-1 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the



sun and moon, and seasons.

MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.

MS-PS2-2 Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

MS-PS2-1 Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.*

MS-PS2-2 Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

MS-PS2-3 Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.

MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

MS-PS2-5 Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

RESOURCES:

Holt Science book and online resources

One Stop Planner, Linked Lesson presentations, Extended Visual Labs

You Tube movies

E-games and links

Teacher's Extended Handouts

Lab Handouts

COURSE OUTLINE:

1.INTRODUCTION TO GENERAL SCIENCE

2.Earth Science

Module F: Geologic Process & History

Unit 1: The Dynamic Earth

Lesson 1: Weathering, Erosion and Deposition

Hands on Lab: Model Erosion and deposition



Lesson 2: The Rock Cycle.

Lesson 3: Earth's Plate

Hands on Lab: Model the movement of continents.

Lesson 4: Earth's Changing Surface

Unit 2: Earth Through Time

Lesson 1: The Age of Earth's Rocks.

Hands on Lab: Model Rock layers to determine relative age.

Lesson 2: Earth's History

Module H: Space Science

Unit 1: The Patterns in The Solar System

Lesson 1: The Earth- Sun- Moon System

Hands on Lab: 1-Model the apparent motion of the sun.

2- Model Moon Phases.

3- Model Solar and Lunar eclipse.

Lesson 2: Seasons.

Hands on Lab: Model patterns of the sunlight throughout Earth's revolution.

Unit 2 : The Solar System and the Universe

Lesson 2: Earth and the Solar System

Hands on Lab: Model the solar system

3.Physical Science

Module J: Chemistry

Unit 1: The Structure of Matter

Lesson 1: The properties of matter



Lesson 2: Atoms and Elements

Lesson 3: Molecules and Extended Structure

Hands on Lab: Model Molecules

Unit 2: States of Matter and Changes of States

Lesson 1: States of Matter

Lesson 2: Changes State

Hands on Lab: Investigate a Change of State

Module K: Forces, Motion & Fields

Unit 1: Forces and Motion

Lesson 1: Introduction to Forces

Hands on Lab: Observe Everyday Forces.

Lesson 2: Gravity and Friction

Hands on Lab: 1- Investigate Falling Objects: Mass

2- Investigate Friction

Unit 2: Electric and Magnetic Forces

Lesson 1: Magnetic Forces

Hands on Lab: Analyze the Magnetic Force

Lesson 2: Electric Forces

Lesson 3: Fields

Hands on Lab: Model Magnetic Field.

4. Life Science

Module B: Cell & Heredity

Unit 1: Cells



Lesson 1: The Characteristics of Cells

Hands on Lab: Observe Cells with the microscope

Lesson 2: Cell Structures and Function

Unit 2: Organisms as Systems

Lesson 1: Levels of Organization in Organisms

Lesson 2: Plant Bodies as Systems

Lesson 3: Animal Bodies Systems

Lesson 4: Information Processing in Animals

GRADING:

1. 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.

2.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.

3. Research Sessions are done where students can debate as groups and check the internet for resources and answers to support their ideas. This kind of assessment is under **Research /Project/ Lab Sessions /Journals**. They are evaluated to info, creativity, presentation, discussion and relation to the subject.

4.Daily assessments and drop quizzes take place to check the understanding of students.

5. Laboratory work is checked for research, completeness, accuracy, understanding the experiment, group and individual reports and attendance with the lab coats. Every semester has one term practical assessment.

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

Grade Distribution:

SCIENCE DEPARTMENT GRADE DISTRIBUTION	
MIDDLE SCHOOL	
End of semester assessment	30%
Term Quizzes	20%
Skill based Assessment	5%
Project	10%
Research Journal	5%
Individual Lab Reports	5%
Group Lab reports	5%
Lab Practical Assessment	10%
MAP	5%
Drop Quizzes	5%

Cross-Curricular Project(s):

- Once per semester across the disciplines.
- Once as subject activity.