

Integrated Science (Grades 9th-10th)

Two-Semesters Course

Prerequisite: Concurrent enrollment in a math course is suggested. Completion of the eighth grade.

This course consists of introductions to four main disciplines. They are earth science, environmental science, chemistry and physics. This is a required science class for graduation. Students explore each discipline with text, labs, discussions and projects. Students are exposed to a broad spectrum of science topics that can be helpful for problem solving developing goals for future science course selections

Standard 1 - Students will develop an understanding of how populations develop, grow and change over time.

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- 1.1 *The students will understand how life has developed over time.*
- 1.1.a The students will identify how the earth has been home to life for 3.8 billion years through testing.
- 1.1.b The students will identify that species change over time through worksheets.
- 1.1.c The students will show that many types of evidence support evolution through research projects.
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- 1.2 *The students will learn how living things are classified.*
- 1.2.a The students will demonstrate knowledge of taxonomic systems and why they're necessary through diagrams and models.
- 1.2.b The students will demonstrate knowledge of the Linnaean system of of classification through model worksheets.
- 1.2.c The students will identify how the systems of classifications change as new information becomes known through research of history.
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- 1.3 *Students will recognize and discuss how populations are characterized and how they respond to change.*
- 1.3.a The students will identify the characteristics of populations through tables and worksheets.

- 1.3.b The students will demonstrate how populations respond to pressure by conducting simulation labs.
 - 1.3.c The students will explain how humans have responded to pressure as a species through research projects.
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Standard 2 - Students will develop an understanding of how ecosystems are organized, their dynamics and what impact humans have on it.

2.1 *The students will understand how ecosystems are organized*

- 2.1.a The students will discuss how ecosystems are organized through testing.
 - 2.1.b The students will demonstrate knowledge of how matter cycles through an ecosystem by making diagrams.
 - 2.1.c The students will identify and describe how energy flows through a system through labs.
 - 2.1.d The students will compare and contrast what the different biomes are through testing.
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2.2 *The students will understand how and why organisms interact within an ecosystem*

- 2.2.a The students will describe where organisms interact within an ecosystem through testing.
 - 2.2.b The students will describe how organisms interact within an ecosystem through testing.
 - 2.2.c The students will explain how ecosystems change through worksheets.
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2.3 *Students will explain what impact humans have on an ecosystem through research.*

- 2.3.a The students will identify what kinds of challenges human population growth presents to the ecosystem.
- 2.3.b The students will demonstrate how human activities affect the environment through simulation labs.
- 2.3.c The students will discuss how people are working to protect the ecosystem through current events activities.

Standard 3 - The students will understand how matter and energy are classified and organized.

3.1 *The students will learn the definition of matter.*

- 3.1.a The students will demonstrate that matter has mass and volume and how their measured through labs.
- 3.1.b The students will describe the building block of matter through testing.
- 3.1.c The students will demonstrate how matter combines through labs.
- 3.1.d The students will identify the different states in matter and their properties through models and worksheets.

3.2 *The students will understand the physical / chemical properties and changes of matter*

- 3.2.a The students will demonstrate physical and chemical properties through labs.
- 3.2.b The students will describe the differences of physical and chemical changes through worksheets.
- 3.2.c The students will demonstrate how characteristic properties can be used to identify substances through labs.

3.3 *Students will identify and describe the forms and means of transformation of energy.*

- 3.3.a The students will recognize and explain the different forms in energy through worksheets.
 - 3.3.b The students will demonstrate the ways in which energy is transformed from one form to another through laboratory practices.
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Standard 4 - The students will understand the building blocks of elements, how they fit into the periodic table and how they bond to form compounds

4.1 *The students will learn the structure of the atom and how it predicts the placement of an element on the periodic table*

- 4.1.a The students will describe the structure of the atom and how they become ions by making diagrams models.
- 4.1.b The students will identify and explain how the periodic table is read and organized through worksheets.
- 4.1.c The students will explain why the periodic table is “periodic” through testing.

4.2 *The students will learn how elements bond to form compounds and their subsequent properties.*

4.2.a The students will identify elements for compounds and why through worksheets.

4.2.b The students will demonstrate knowledge of chemical bonds through testing.

4.2.c The students will identify which properties of elements can be predicted by which type of bond through worksheets.

Standard 5 - The students will understand how the soil of the earth is formed from rocks which are, in turn, formed from minerals.

5.1 *The students will understand that the earth is made of four systems*

5.1.a The students will describe the four major parts of the earth system through testing.

5.2 *The students will understand minerals, their identification and properties.*

5.2.a The students will explain how minerals are part of soil through labs.

5.2.b The students will show how minerals are identified through testing.

5.2.c The students will demonstrate how minerals are used through labs.

5.3 *Students will analyze how rocks are formed by comparing examples.*

5.3.a The students will explain and describe the rock cycle through testing.

5.3.b The students will compare and contrast how igneous, metamorphic and sedimentary rocks differ by examining each type.

5.4 *The students will identify how weathering and erosion figure into soil formation through laboratory practice.*

5.4.a The students will demonstrate how mechanical and chemical weathering work through testing.

5.4.b The students will explain how weathering forms soil by creating diagrams and illustrations.

Standard 6 - The students will understand what role plate tectonics plays in the dynamic nature of the earth.

- 6.1 *The students will understand how plate tectonics explains the dynamic nature of the earth.*
- 6.1.a The students will demonstrate knowledge of the Earth's surface through testing.
 - 6.1.b The students will explain how the continents change position over time through worksheets.
 - 6.1.c The students will demonstrate how plates pull apart through simulation labs.
 - 6.1.d The students will explain that plates converge or scrape against each other through testing.
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Standard 7 - The students will understand the structures of the Earth-Moon system and the Solar System.

- 7.1 *The students will learn how the Earth-Moon system works.*
- 7.1.a The students will explain Earth's tilt and solar orbit and how they affect Earth's seasons through testing.
 - 7.1.b The students will describe our Moon's structure and composition by creating a model.
 - 7.1.c The students will identify how the Moon's position and orbit affect the Earth through testing.
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- 7.2 *The students will understand the structure and composition of the Solar System.*
- 7.2.a The students will describe the structure of the solar system through models.
 - 7.2.b The students will describe the inner solar system through models.
 - 7.2.c The students will describe the outer solar system through models.
 - 7.2.d The students will identify what the composition of the solar system's bodies through diagrams.
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Standard 8 - The students will understand how motion and forces affect bodies physically.

- 8.1 *The students will learn how bodies move*
- 8.1.a The students will explain how motion is a change of position through labs.

- 8.1.b The students will describe how speed measures a change of position through labs.
- 8.1.c The students will identify how acceleration measures how fast velocity changes through quizzes.

8.2 *The students will understand what forces are how they work*

- 8.2.a The students will identify the kinds of forces through worksheets.
- 8.2.b The students will demonstrate Newton's three laws through labs.
- 8.2.c The students will demonstrate how forces transfer momentum through labs.

8.3 *Students will demonstrate the nature of gravity, friction and pressure through labs.*

- 8.3.a The students will identify and explain the nature of gravity through worksheets.
- 8.3.b The students will identify and explain the nature of friction through worksheets.
- 8.3.c The students will recognize the nature of pressure as a physical force by conducting labs.
- 8.3.d. The students will report how fluids exert forces through demonstrations in the classroom.