

**K to 12 BASIC EDUCATION CURRICULUM**  
**SENIOR HIGH SCHOOL – SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) SPECIALIZED SUBJECT**

**Grade:** Grade 11/12  
**Subject Title:** Biology I

**Quarters:** 1st to 2nd Quarter  
**No. of Hours:** 40 hours/10 Weeks per Quarter

**Subject Description:** This subject is designed to enhance the understanding of the principles and concepts in the study of biology, particularly life processes at the cellular and molecular levels. It also covers the transformation of energy in organisms.

Content	Content Standard	Performance Standard	Learning Competencies	Code
Cell	<i>The learners demonstrate an understanding of:</i>  1. Cell Theory 2. Cell Structure and Functions 3. Prokaryotic vs Eukaryotic Cells 4. Cell Types 5. Cell Modifications	<i>The learners shall be able to:</i>  1. construct a 3D model of a plant/animal/ bacterial cell using recyclable materials  2. construct a cell membrane model from indigenous or recyclable materials	<i>The learners...</i> 1. explain the postulates of the cell theory	<b>STEM_BIO11/12-Ia-c-1</b>
			2. describe the structure and function of major and subcellular organelles	<b>STEM_BIO11/12-Ia-c-2</b>
			3. distinguish prokaryotic and eukaryotic cells according to their distinguishing features	<b>STEM_BIO11/12-Ia-c-3</b>
			4. classify different cell types (plant/animal tissues) and specify the function(s) of each	<b>STEM_BIO11/12-Ia-c-4</b>
			5. describe some cell modifications that lead to adaptation to carry out specialized functions (e.g., microvilli, root hair)	<b>STEM_BIO11/12-Ia-c-5</b>
	6. Cell Cycle a. Mitosis b. Meiosis		1. characterize the phases of the cell cycle and their control points	<b>STEM_BIO11/12-Id-f-6</b>
			2. describe the stages of mitosis/meiosis given $2n=6$	<b>STEM_BIO11/12-Id-f-7</b>
			3. discuss crossing over and recombination in meiosis	<b>STEM_BIO11/12-Id-f-8</b>
			4. explain the significance or applications of mitosis/meiosis	<b>STEM_BIO11/12-Id-f-9</b>
			5. identify disorders and diseases that result from the malfunction of the cell during the cell cycle	<b>STEM_BIO11/12-Id-f-10</b>
	7. Transport Mechanisms a. Simple Diffusion		1. describe the structural components of the cell	<b>STEM_BIO11/12-Ig-h-11</b>

**K to 12 BASIC EDUCATION CURRICULUM**  
**SENIOR HIGH SCHOOL – SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) SPECIALIZED SUBJECT**

Content	Content Standard	Performance Standard	Learning Competencies	Code
	b. Facilitated Transport c. Active Transport d. Bulk/Vesicular Transport		membrane	
			2. relate the structure and composition of the cell membrane to its function	<b>STEM_BIO11/12-Ig-h-12</b>
			3. explain transport mechanisms in cells (diffusion osmosis, facilitated transport, active transport)	<b>STEM_BIO11/12-Ig-h-13</b>
			4. differentiate exocytosis and endocytosis	<b>STEM_BIO11/12-Ig-h-14</b>
<b>Biological Molecules</b>	Structures and Functions of Biological Molecules - Carbohydrates - Lipids - Proteins - Enzymes - Nucleic Acids		1. categorize the biological molecules(lipids, carbohydrates, proteins, and nucleic acids) according to their structure and function	<b>STEM_BIO11/12-Ii-j-15</b>
			2. explain the role of each biological molecule in specific metabolic processes	<b>STEM_BIO11/12-Ii-j-16</b>
			3. describe the components of an enzyme	<b>STEM_BIO11/12-Ii-j-17</b>
			4. explain oxidation/reduction reactions	<b>STEM_BIO11/12-Ii-j-18</b>
			5. determine how factors such as pH, temperature, and substrate affect enzyme activity	<b>STEM_BIO11/12-Ii-j-19</b>
<b>Energy Transformation</b>	1. ATP- ADP Cycle 2. Photosynthesis 3. Respiration	prepare simple fermentation setup using common fruits to produce wine or vinegar via microorganisms	1. explain coupled reaction processes and describe the role of ATP in energy coupling and transfer	<b>STEM_BIO11/12-IIa-j-1</b>
			2. describe the major features and chemical events in photosynthesis and respiration	<b>STEM_BIO11/12-IIa-j-2</b>
			3. explain the importance of chlorophyll and other pigments	<b>STEM_BIO11/12-IIa-j-3</b>
			4. describe the patterns of electron flow through light reaction events	<b>STEM_BIO11/12-IIa-j-4</b>
			5. describe the significant events of the Calvin cycle	<b>STEM_BIO11/12-IIa-j-5</b>

**K to 12 BASIC EDUCATION CURRICULUM**  
**SENIOR HIGH SCHOOL – SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) SPECIALIZED SUBJECT**

Content	Content Standard	Performance Standard	Learning Competencies	Code
			6. differentiate aerobic from anaerobic respiration	<b>STEM_BIO11/12 -IIa-j-6</b>
			7. explain the major features and sequence the chemical events of cellular respiration	<b>STEM_BIO11/12 -IIa-j-7</b>
			8. distinguish major features of glycolysis, Krebs cycle, electron transport system, and chemiosmosis	<b>STEM_BIO11/12 -IIa-j-8</b>
			9. describe reactions that produce and consume ATP	<b>STEM_BIO11/12 -IIa-j-9</b>
			10. describe the role of oxygen in respiration and describe pathways of electron flow in the absence of oxygen	<b>STEM_BIO11/12 -IIa-j-10</b>
			11. compute the number of ATPs needed or gained in photosynthesis and respiration	<b>STEM_BIO11/12 -IIa-j-11</b>
			12. explain the advantages and disadvantages of fermentation and aerobic respiration	<b>STEM_BIO11/12 -IIa-j-12</b>

**K to 12 BASIC EDUCATION CURRICULUM**  
**SENIOR HIGH SCHOOL – SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) SPECIALIZED SUBJECT**

**Code Book Legend**

**Sample: STEM\_BIO11/12-IIa-j-12**

LEGEND		SAMPLE	
<b>First Entry</b>	Learning Area and Strand/ Subject or Specialization	Science, Technology, Engineering and Mathematics	<b>STEM_BIO11/12</b>
	Grade Level	Grade 11 or 12	
<b>Uppercase Letter/s</b>	Domain/Content/ Component/ Topic	Biology	
			-
<b>Roman Numeral</b> <i>*Zero if no specific quarter</i>	Quarter	Second Quarter	<b>II</b>
<b>Lowercase Letter/s</b> <i>*Put a hyphen (-) in between letters to indicate more than a specific week</i>	Week	Weeks one to ten	<b>a-j</b>
			-
<b>Arabic Number</b>	Competency	explain the advantages and disadvantages of fermentation and aerobic respiration	<b>12</b>