



# **Biology 1 End-of-Course Assessment Achievement Level Descriptions**

**Biology 1 EOC Assessment Reporting Category – Molecular and Cellular Biology**

Students performing at the mastery level of this reporting category will be able to compare prokaryotic and eukaryotic cells, differentiate between mitosis and meiosis, relate the structures and functions of the four major categories of biological macromolecules, and differentiate reactants, products, and functions of photosynthesis and cellular respiration.

Achievement Level	Achievement Level Descriptions
<b>Level 5</b>	<p><u>Students will consistently be able to</u></p> <ul style="list-style-type: none"><li>• interpret, analyze, and synthesize data to determine causal relationships in a complex investigation;</li><li>• evaluate the reliability of other sources of information, to make predictions and defend conclusions based on experimental design or scientific argumentation;</li><li>• use scientific reasoning to justify abstract explanations;</li><li>• make sound scientific inferences based on natural phenomena;</li><li>• differentiate science from nonscience and pseudoscience using appropriate criteria;</li><li>• analyze the development of a scientific theory and contrast theories and laws;</li><li>• compare structures and describe related functions in different types of cells;</li><li>• apply knowledge of gene and chromosomal mutations and interpret how these mutations may or may not result in a phenotypic change;</li><li>• distinguish among the cellular processes of DNA replication, transcription, and translation;</li><li>• show that the basic components of DNA are universal in organisms and how similarities in the genetic codes of organisms are due to common ancestry;</li><li>• differentiate the processes of mitosis and meiosis and/or show how these processes may contribute to or limit genetic variation;</li><li>• relate specific events occurring to each of the stages of the cell cycle;</li><li>• assess how uncontrolled cell growth may result from mutations that affect the proteins that regulate the cell cycle;</li><li>• summarize the basic molecular structure and the primary function of macromolecules in organisms;</li><li>• analyze how enzymes speed up the rate of a biochemical reaction and describe the effect of environmental factors on enzyme activity;</li><li>• formulate how the processes of photosynthesis and cellular respiration are interrelated;</li><li>• compare the processes of aerobic and anaerobic respiration;</li><li>• connect the role of ATP to energy transfers within the cell; and</li><li>• summarize the properties of water and analyze how these properties make water essential for life on Earth.</li></ul>

<p style="text-align: center;"><b>Level 4</b></p>	<p><u>Students will usually be able to</u></p> <ul style="list-style-type: none"> <li>• analyze data and the reliability of other sources of information to make predictions and defend conclusions;</li> <li>• analyze the development of a scientific theory and the differences between theories and laws;</li> <li>• differentiate science from nonscience and pseudoscience using appropriate criteria;</li> <li>• compare structures and describe related functions in different types of cells;</li> <li>• apply knowledge of gene and chromosomal mutations and explain how these mutations may or may not result in a phenotypic change;</li> <li>• differentiate the cellular processes of DNA replication, transcription, and translation;</li> <li>• recall that the basic components of DNA are universal in organisms and formulate how similarities in the genetic codes of organisms are due to common ancestry;</li> <li>• differentiate the processes of mitosis and meiosis and describe how these processes may contribute to or limit genetic variation;</li> <li>• relate specific events occurring to each of the stages of the cell cycle;</li> <li>• assess how uncontrolled cell growth may result from mutations that affect the proteins that regulate the cell cycle;</li> <li>• summarize the basic molecular structure and the primary function of macromolecules in organisms;</li> <li>• recognize that enzymes speed up the rate of a biochemical reaction and/or relate the effect of environmental factors on enzyme activity;</li> <li>• show how the processes of photosynthesis and cellular respiration are interrelated;</li> <li>• identify the reactants, products, and basic functions of aerobic and anaerobic respiration;</li> <li>• connect the role of ATP to energy transfers within the cell; and</li> <li>• summarize the properties of water and how these properties make water essential for life on Earth.</li> </ul>
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<p style="text-align: center;"><b>Level 3</b></p>	<p><u>Students will generally be able to</u></p> <ul style="list-style-type: none"> <li>• analyze data and the reliability of other sources of information to make predictions and defend conclusions;</li> <li>• identify the criteria that differentiate science from nonscience and pseudoscience;</li> <li>• apply knowledge of the development of a scientific theory and/or recognize the differences between theories and laws;</li> <li>• compare the structures and functions in different types of cells;</li> <li>• identify gene and chromosomal mutations and/or state that mutations may or may not result in a phenotypic change;</li> <li>• differentiate the cellular processes of DNA replication, transcription, and/or translation;</li> <li>• recall that the basic components of DNA are universal in organisms and that similarities in the genetic codes of organisms are due to common ancestry;</li> <li>• contrast the processes of mitosis and meiosis and specify if these processes may contribute to or limit genetic variation;</li> <li>• connect specific events to specific stages of the cell cycle;</li> <li>• state that mutations that affect the proteins that regulate the cell cycle may result in uncontrolled cell growth;</li> <li>• identify the basic molecular structure and describe the primary function of macromolecules in organisms;</li> <li>• state how enzymes speed up the rate of a biochemical reaction and identify the effects of environmental factors on enzyme activity;</li> <li>• show the interrelatedness of photosynthesis and cellular respiration;</li> <li>• identify the reactants, products, or basic functions of aerobic and anaerobic respiration;</li> <li>• connect the role of ATP to energy transfers within the cell; and</li> <li>• summarize the properties of water and relate how these properties make water essential for life on Earth.</li> </ul>
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<p style="text-align: center;"><b>Level 2</b></p>	<p><u>Students may be able to demonstrate limited ability to</u></p> <ul style="list-style-type: none"> <li>• interpret data and recognize that data from some sources are more reliable than data from other sources;</li> <li>• recognize science from nonscience and pseudoscience;</li> <li>• recognize the differences between theories and laws;</li> <li>• identify related functions of structures in different types of cells;</li> <li>• choose the correct cellular process of DNA replication;</li> <li>• recognize that the basic components of DNA are universal in organisms;</li> <li>• recognize that mitosis and meiosis are different processes that have different outcomes;</li> <li>• identify specific events that occur in each of the stages of the cell cycle;</li> <li>• recall that uncontrolled cell growth may result in cancer;</li> <li>• identify the primary function of macromolecules in organisms;</li> <li>• recognize that enzymes speed up the rate of a biochemical reaction and identify which environmental factors affect enzyme activity;</li> <li>• recognize that photosynthesis and cellular respiration are related;</li> <li>• identify the reactants, products, or basic functions of aerobic and anaerobic respiration;</li> <li>• recognize the importance of ATP to energy transfers within the cell; and</li> <li>• identify some properties of water that make water essential for life on Earth.</li> </ul>
<p style="text-align: center;"><b>Level 1</b></p>	<p>Performance at this level indicates an inadequate level of success with the challenging content of the <i>Next Generation Sunshine State Standards</i> for science.</p>

**Biology 1 EOC Assessment Reporting Category — Classification, Heredity, and Evolution**

Students performing at the mastery level of this reporting category will be able to identify evidence that supports the scientific theory of evolution, classify organisms into domains or kingdoms, identify scientific explanations of the origin of life, determine conditions required for natural selection, and analyze patterns of inheritance.

Achievement Level	Achievement Level Descriptions
<b>Level 5</b>	<p><u>Students will consistently be able to</u></p> <ul style="list-style-type: none"><li>• interpret, analyze, and synthesize data to determine causal relationships in a complex investigation;</li><li>• evaluate the reliability of other sources of information to make predictions and defend conclusions based on experimental design or scientific argumentation;</li><li>• use scientific reasoning to justify abstract explanations;</li><li>• make sound scientific inferences based on natural phenomena;</li><li>• differentiate science from nonscience and pseudoscience using appropriate criteria;</li><li>• analyze the development of a scientific theory and contrast theories and laws;</li><li>• evaluate the multiple bodies of evidence that support the scientific theory of evolution;</li><li>• analyze information to determine basic trends in hominid evolution;</li><li>• analyze how and why organisms are hierarchically classified based on evolutionary relationships;</li><li>• analyze scientific explanations of the origin of life on Earth;</li><li>• analyze conditions required for natural selection that result in differential reproductive success;</li><li>• assess the scientific mechanisms resulting in evolutionary change;</li><li>• relate mutation and genetic recombinations to an increase in genetic variation;</li><li>• use Mendel’s laws to analyze patterns of inheritance; and</li><li>• analyze and predict inheritance patterns caused by various modes of inheritance.</li></ul>

<p style="text-align: center;"><b>Level 4</b></p>	<p><u>Students will usually be able to</u></p> <ul style="list-style-type: none"> <li>• analyze data and the reliability of other sources of information to make predictions and defend conclusions;</li> <li>• analyze the development of a scientific theory and the differences between theories and laws;</li> <li>• differentiate science from nonscience and pseudoscience using appropriate criteria;</li> <li>• assess some of the multiple bodies of evidence that support the scientific theory of evolution;</li> <li>• analyze information to determine basic trends in hominid evolution;</li> <li>• determine how and why organisms are hierarchically classified based on evolutionary relationships;</li> <li>• evaluate scientific explanations of the origin of life on Earth;</li> <li>• evaluate conditions required for natural selection that result in differential reproductive success;</li> <li>• summarize the scientific mechanisms resulting in evolutionary change;</li> <li>• relate how mutation and genetic recombination increase genetic variation;</li> <li>• use Mendel’s laws to analyze patterns of inheritance; and</li> <li>• predict inheritance patterns caused by various modes of inheritance.</li> </ul>
<p style="text-align: center;"><b>Level 3</b></p>	<p><u>Students will generally be able to</u></p> <ul style="list-style-type: none"> <li>• evaluate data and assess sources of information for reliability;</li> <li>• apply knowledge of the development of a scientific theory and/or recognize the differences between theories and laws;</li> <li>• identify the criteria that differentiate science from nonscience and pseudoscience;</li> <li>• identify some bodies of evidence that support the scientific theory of evolution;</li> <li>• identify basic trends in hominid evolution;</li> <li>• show how and why organisms are hierarchically classified based on evolutionary relationships;</li> <li>• summarize scientific explanations of the origin of life on Earth;</li> <li>• relate the conditions required for natural selection to differential reproductive success;</li> <li>• recognize some of the scientific mechanisms resulting in evolutionary change;</li> <li>• relate that mutation and genetic recombination increase genetic variation; and</li> <li>• identify inheritance patterns caused by various modes of inheritance, including Mendel’s laws.</li> </ul>

<p><b>Level 2</b></p>	<p><u>Students may be able to demonstrate limited ability to</u></p> <ul style="list-style-type: none"> <li>• identify reliable sources for scientific information;</li> <li>• recognize the differences between theories and laws;</li> <li>• recognize science from nonscience and pseudoscience;</li> <li>• identify some bodies of evidence that support the scientific theory of evolution;</li> <li>• identify basic trends in hominid evolution;</li> <li>• recognize that organisms are hierarchically classified based on evolutionary relationships;</li> <li>• recognize scientific explanations of the origin of life on Earth;</li> <li>• identify the conditions required for natural selection;</li> <li>• recognize one scientific mechanism that results in evolutionary change;</li> <li>• recall that mutation and genetic recombination increase genetic variation; and</li> <li>• identify inheritance patterns caused by various modes of inheritance.</li> </ul>
<p><b>Level 1</b></p>	<p>Performance at this level indicates an inadequate level of success with the challenging content of the <i>Next Generation Sunshine State Standards</i> for science.</p>



**Biology 1 EOC Assessment Reporting Category — Organisms, Populations, and Ecosystems**

Students performing at the mastery level of this reporting category will be able to relate structures and functions of organs and tissues in plants and animals, identify the structures and functions of organs in the human reproductive system, vascular system, central nervous system, and immune system, evaluate factors contributing to changes in population size, determine consequences of the loss of biodiversity, and evaluate the impact of biotechnology.

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<p align="center"><b>Level 5</b></p>	<p><u>Students will consistently be able to</u></p> <ul style="list-style-type: none"> <li>• interpret, analyze, and synthesize data to determine causal relationships in a complex investigation;</li> <li>• evaluate the reliability of other sources of information to make predictions and defend conclusions based on experimental design or scientific argumentation;</li> <li>• use scientific reasoning to justify abstract explanations;</li> <li>• make sound scientific inferences based on natural phenomena;</li> <li>• differentiate science from nonscience and pseudoscience using appropriate criteria;</li> <li>• analyze the development of a scientific theory and contrast theories and laws;</li> <li>• relate structures of plant tissues and organs directly to their roles in physiological processes;</li> <li>• identify factors that affect blood flow and analyze how these factors affect blood flow through the cardiovascular system;</li> <li>• summarize the basic functions of the human immune system, vaccines, and antibiotics;</li> <li>• relate the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspective of both individual and public health;</li> <li>• evaluate the impact of biotechnology on the individual, society, and environment;</li> <li>• relate the basic anatomy to the physiology of the human reproductive system;</li> <li>• evaluate the major changes that occur during each trimester of human development;</li> <li>• analyze data and information about population dynamics and limiting factors to explain a change in carrying capacity, the effect on population size, or the distribution of species in various types of ecosystems;</li> <li>• predict potential changes to an ecosystem resulting from seasonal variations, climate changes, and succession;</li> <li>• predict positive and/or negative consequences that may result from a reduction in biodiversity;</li> <li>• analyze the energy pathways through the different trophic levels of a food web or energy pyramid;</li> <li>• analyze the movement of matter through different biogeochemical cycles;</li> <li>• predict how the actions of humans may impact environmental systems and affect sustainability in the short and long term; and</li> <li>• analyze possible environmental impacts resulting from the use of renewable and nonrenewable resources.</li> </ul>

<p style="text-align: center;"><b>Level 4</b></p>	<p><u>Students will usually be able to</u></p> <ul style="list-style-type: none"> <li>• analyze data and the reliability of other sources of information to make predictions and defend conclusions;</li> <li>• analyze the development of a scientific theory and the differences between theories and laws;</li> <li>• differentiate science from nonscience and pseudoscience using appropriate criteria;</li> <li>• relate the structures of plant tissues and organs to their roles in physiological processes;</li> <li>• identify factors that affect blood flow and/or evaluate how these factors affect blood flow through the cardiovascular system;</li> <li>• summarize the basic functions of the human immune system, vaccines, and antibiotics;</li> <li>• relate the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspective of both individual and public health;</li> <li>• evaluate the impact of biotechnology on the individual, society, and/or environment;</li> <li>• relate the basic anatomy to the physiology of the human reproductive system;</li> <li>• summarize the major changes that occur during each trimester of human development;</li> <li>• evaluate data and information about population dynamics and limiting factors to account for a change in carrying capacity, the effect on population size, or the distribution of species in various types of ecosystems;</li> <li>• predict potential changes to an ecosystem resulting from seasonal variations, climate changes, and succession;</li> <li>• predict positive and negative consequences that may result from a reduction in biodiversity;</li> <li>• evaluate the energy pathways through the different trophic levels of a food web or energy pyramid;</li> <li>• trace the movement of matter through different biogeochemical cycles;</li> <li>• predict how the actions of humans may impact environmental systems and affect sustainability; and</li> <li>• evaluate possible environmental impacts resulting from the use of renewable and nonrenewable resources.</li> </ul>
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<b>Level 3</b>	<p><u>Students will generally be able to</u></p> <ul style="list-style-type: none"><li>• use data from reliable sources to make predictions and conclusions;</li><li>• identify criteria that differentiate science from nonscience and pseudoscience;</li><li>• apply knowledge of the development of a scientific theory and/or recognize the differences between theories and laws;</li><li>• relate the structures of plant tissues and organs to their roles in physiological processes;</li><li>• identify factors that affect blood flow and/or relate these factors to how they affect blood flow through the cardiovascular system;</li><li>• identify the basic functions of the human immune system, vaccines, and antibiotics;</li><li>• relate the significance of genetic factors, environmental factors, and pathogenic agents to both individual and public health;</li><li>• recognize impacts of biotechnology on the individual, society, and/or environment;</li><li>• identify the basic anatomy and physiology of the human reproductive system;</li><li>• relate the major changes that occur during each trimester of human development;</li><li>• identify limiting factors and other population dynamics;</li><li>• recognize potential changes to an ecosystem resulting from seasonal variations, climate changes, and/or succession;</li><li>• identify positive and/or negative consequences that result from a reduction in biodiversity;</li><li>• trace the energy pathways through the different trophic levels of a food web or energy pyramid;</li><li>• trace the movement of matter through different biogeochemical cycles;</li><li>• relate how the actions of humans may impact environmental systems and/or affect sustainability; and</li><li>• identify possible environmental impacts resulting from the use of a nonrenewable resource.</li></ul>
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<p style="text-align: center;"><b>Level 2</b></p>	<p><u>Students may be able to demonstrate limited ability to</u></p> <ul style="list-style-type: none"> <li>• identify sources of information that are reliable;</li> <li>• recognize science from nonscience and pseudoscience;</li> <li>• recognize the differences between theories and laws;</li> <li>• identify the structures and functions of plant tissues and organs;</li> <li>• identify factors that affect blood flow through the cardiovascular system;</li> <li>• identify the basic functions of the human immune system, vaccines, and antibiotics;</li> <li>• recognize the significance of genetic factors, environmental factors, and pathogenic agents to both individual and public health;</li> <li>• identify some of the impacts of biotechnology on the individual, society, and/or environment;</li> <li>• identify the basic anatomy of the human reproductive system;</li> <li>• identify the major changes that occur during each trimester of human development;</li> <li>• identify the potential changes to an ecosystem resulting from seasonal variations, climate changes, or succession;</li> <li>• recognize positive and/or negative consequences that result from a reduction in biodiversity;</li> <li>• identify from where a certain trophic level gets its energy;</li> <li>• trace the movement of matter through the carbon cycle;</li> <li>• recognize that an action of humans may impact the environment; and</li> <li>• identify possible environmental impacts that may result from the use of nonrenewable resources.</li> </ul>
<p style="text-align: center;"><b>Level 1</b></p>	<p>Performance at this level indicates an inadequate level of success with the challenging content of the <i>Next Generation Sunshine State Standards</i> for science.</p>