

SCOPE AND SEQUENCE

COURSE TITLE: 10th Grade Biology (Trimester 1)

UNIT/TOPIC	RESOURCES/CHAPTERS	Essential Learning Outcomes/ I can Statements	ACTIVITIES/HOW	ASSESSMENT	Standards/Benchmarks	Technology Integrated
Unit 1: Intro/Chemistry	Chapter 1, Chapter 2	1) Students will list the steps of the scientific process. 2) Students will describe the characteristics of living things. 3) Students will list and describe the levels of classification. 4) Students will describe what an element is and what it is composed of. 5) Students will describe the types of bonds. 6) Students will describe how water is a polar molecule and how it affects living things. 7) Students will describe the different types of macromolecules.	1) Chapter 1 study guide 2) Chapter 1 Powerpoint notes 3) Scientific process lab. 4) Chapter 2 study guide 5) Chapter 2 Powerpoint Notes. 6) Oil/water lab	1) Open note chapter 1.1/1.2, 1.3, 1.4, 1.5 quizzes. 2) Chapter 1 test. 3) Open note chapter 2.1, 2.2, 2.3, 2.4/2.5 quizzes. 4) Chapter 2 test. 5) Discussion 6) informal questioning	9.1.1.1.2 Understand that scientists conduct investigations for a variety of reasons, including: to discover new aspects of the natural world, to explain observed phenomena, to test the conclusions of prior investigations, or to test the predictions of current theories. 9.1.1.1.3 Explain how the traditions and norms of science define the bounds of professional scientific practice and reveal instances of scientific error or misconduct. <i>For example:</i> The use of peer review, publications and presentations. 9.1.1.1.4 Explain how societal and scientific ethics impact research practices. <i>For example:</i> Research involving human subjects may be conducted only with the informed consent of the subjects.	1) PowerPoint 2) Moodle 3) Chromebooks

					<p>9.1.1.1.6</p> <p>Describe how changes in scientific knowledge generally occur in incremental steps that include and build on earlier knowledge.</p> <p>9.1.1.1.7</p> <p>Explain how scientific and technological innovations—as well as new evidence—can challenge portions of, or entire accepted theories and models including, but not limited to: cell theory, atomic theory, theory of evolution, plate tectonic theory, germ theory of disease, and the big bang theory.</p> <p>9.4.1.2.1</p> <p>Recognize that cells are composed primarily of a few elements (carbon, hydrogen, oxygen, nitrogen, phosphorus, and sulfur), and describe the basic molecular structures and the primary functions of carbohydrates, lipids, proteins and nucleic acids.</p> <p>9.4.1.2.2</p> <p>Recognize that the work of the cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the</p>	
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					<p>shape it takes as a consequence of the interactions between those amino acids.</p> <p>9.1.3.1.3</p> <p>Describe how positive and/or negative feedback occur in systems.</p> <p><i>For example:</i> The greenhouse effect.</p> <p>9.1.3.4.2</p> <p>Determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts.</p> <p><i>For example:</i> Consideration of chemical and biological hazards in the lab.</p>	
Unit 2: The cell	Chapter 3	<p>1) Students will describe the Cell Theory.</p> <p>2) Students will describe why cells are small.</p> <p>3) Students will contrast between eukaryotic and prokaryotic cells.</p> <p>4) Students will describe the plasma membrane.</p> <p>5) Students will describe the process of diffusion, osmosis, facilitated diffusion and active transport.</p> <p>6) Students will name and describe the</p>	<p>1) Chapter 3 Study Guide</p> <p>2) Chapter 3 Powerpoint notes.</p> <p>3) Diffusion/ osmosis lab.</p> <p>4) Animal/plant cell coloring worksheet.</p> <p>5) Cell model project.</p> <p>6) Cell video.</p>	<p>1) Open note chapter 3.1, 3.2, 3.3/3.4, 3.5 quizzes.</p> <p>2) Cell model project presentations.</p> <p>3) Chapter 3 Test.</p> <p>4) Discussion</p> <p>5) informal questioning</p>	<p>9.4.1.1.1</p> <p>Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.</p> <p>9.4.1.1.2</p> <p>Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.</p> <p>9.4.1.2.3</p>	<p>1) PowerPoint</p> <p>2) Moodle</p> <p>3) Chromebooks</p> <p>4) YouTube</p>

		organelles of a cell.			<p>Describe how viruses, prokaryotic cells and eukaryotic cells differ in relative size, complexity and general structure.</p> <p>9.4.1.2.4 Explain the function and importance of cell organelles for prokaryotic and/or eukaryotic cells as related to the basic cell processes of respiration, photosynthesis, protein synthesis and cell reproduction.</p> <p>9.4.1.2.5 Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.</p> <p>9.1.3.4.2 Describe how technological problems and advances often create a demand for new scientific knowledge, improved mathematics and new technologies.</p>	
Unit 3: Photosynthesis	Chapter 4.1-4.3	<p>1) Students will describe how light travels both as a wave and particle.</p> <p>2) Students will describe how pigments such as chlorophyll absorb light.</p> <p>3) Students will describe the light dependent reaction.</p>	<p>1) Chapter 4 Study Guide</p> <p>2) Chapter 4 Powerpoint notes.</p> <p>3) Photosynthesis lab</p> <p>4) Photosynthesis diagrams.</p> <p>5. Photosynthesis video.</p>	<p>1) Open notes Chapter 4.1, 4.2, 4.3 quizzes.</p> <p>2) Chapter 4.1-4.3 Test</p> <p>4) Discussion</p> <p>5) informal questioning</p>	<p>9.4.1.2.4 Explain the function and importance of cell organelles for prokaryotic and/or eukaryotic cells as related to the basic cell processes of respiration, photosynthesis, protein synthesis and cell reproduction.</p> <p>9.4.2.2.1</p>	<p>1) PowerPoint</p> <p>2) Moodle</p> <p>3) Chromebooks</p> <p>4) Online Lab</p> <p>5) YouTube</p>

		<p>4) Students will describe the calvin cycle.</p>			<p>Use words and equations to differentiate between the processes of photosynthesis and respiration in terms of energy flow, beginning reactants and end products.</p> <p>9.1.3.1.2 Identify properties of a system that are different from those of its parts but appear because of the interaction of those parts.</p> <p>9.1.3.1.1 Describe a system, including specifications of boundaries and subsystems, relationships to other systems, and identification of inputs and expected outputs. <i>For example: A power plant or ecosystem.</i></p> <p>9.1.1.2.1 Formulate a testable hypothesis, design and conduct an experiment to test the hypothesis, analyze the data, consider alternative explanations and draw conclusions supported by evidence from the investigation.</p> <p>9.1.1.2.2 Evaluate the explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, pointing</p>	
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					<p>out statements that go beyond the scientifically acceptable evidence, and suggesting alternative scientific explanations.</p> <p>9.1.3.4.2 Determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts. <i>For example:</i> Consideration of chemical and biological hazards in the lab.</p>	
Unit 4: Cellular Respiration	Chapter 4.4-4.6	<p>1) Students will describe how cells make ATP.</p> <p>2) Students will describe what is made in glycolysis, Krebs' Cycle, and Electron transport chain.</p> <p>3) Students will describe the difference between aerobic and anaerobic.</p> <p>4) Students will name how much ATP is made in each step of cellular respiration.</p> <p>5) Students will describe what happens during fermentation.</p>	<p>1) Chapter 5 Study Guide</p> <p>2) Chapter 5 Powerpoint notes.</p> <p>3) Cellular respiration lab.</p> <p>4) Cellular respiration diagrams.</p> <p>5) Cellular respiration video.</p>	<p>1) Open note chapter 4.4, 4.6, 4.7 quizzes.</p> <p>2) Chapter 4.4-4.6 test.</p> <p>3) Discussion</p> <p>4) informal questioning</p>	<p>9.4.1.2.4 Explain the function and importance of cell organelles for prokaryotic and/or eukaryotic cells as related to the basic cell processes of respiration, photosynthesis, protein synthesis and cell reproduction.</p> <p>9.4.2.2.1 Use words and equations to differentiate between the processes of photosynthesis and respiration in terms of energy flow, beginning reactants and end products.</p> <p>9.1.3.1.2 Identify properties of a system that are different from those of its parts but appear because of the interaction of those parts.</p>	<p>1) PowerPoint</p> <p>2) Moodle</p> <p>3) Chromebooks</p> <p>4) Online Lab</p> <p>5) YouTube</p>

					<p>9.1.3.1.1 Describe a system, including specifications of boundaries and subsystems, relationships to other systems, and identification of inputs and expected outputs. <i>For example:</i> A power plant or ecosystem.</p> <p>9.1.3.4.2 Determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts. <i>For example:</i> Consideration of chemical and biological hazards in the lab.</p>	
Unit 5: Protein Synthesis/ DNA	Chapter 8	<p>1) Students will describe what makes up a nucleotide..</p> <p>2) Students will describe the structure of DNA and RNA.</p> <p>3) Students will describe what nucleotides pair with each other in DNA and RNA.</p> <p>4) Students will describe how DNA replicates.</p> <p>5) Students will describe how DNA and RNA produce proteins through transcription and translation.</p>	<p>1) Chapter 8 study guide</p> <p>2) Powerpoint notes.</p> <p>3) DNA sequences lab/worksheets.</p> <p>4) DNA video.</p> <p>5) Protein synthesis lab</p> <p>6) Protein synthesis video</p>	<p>1) Open Notes 8.1/8.2, 8.3, 8.4/8.5 quizzes</p> <p>2) Chapter 8 Test</p> <p>3) Discussion</p> <p>4) informal questioning</p> <p>5) Worksheets/Labs</p>	<p>9.4.1.2.4 Explain the function and importance of cell organelles for prokaryotic and/or eukaryotic cells as related to the basic cell processes of respiration, photosynthesis, protein synthesis and cell reproduction.</p> <p>9.4.3.1.1 Explain the relationships among DNA, genes and chromosomes.</p> <p>9.4.3.1.3 Describe the process of DNA replication and the role of DNA and RNA in assembling protein molecules.</p>	

					<p>9.4.3.2.1 Use concepts from Mendel's Laws of Segregation and Independent Assortment to explain how sorting and recombination (crossing over) of genes during sexual reproduction (meiosis) increases the occurrence of variation in a species.</p> <p>9.1.3.2.1 Provide examples of how diverse cultures, including natives from all of the Americas, have contributed scientific and mathematical ideas and technological inventions.</p>	
Unit 6: Mitosis/ Meiosis	Chapter 5	<p>1) Students will describe binary fission in prokaryotes.</p> <p>2) Students will describe the cell cycle in eukaryotes.</p> <p>3) Students will name and describe the stages of mitosis.</p> <p>4) Students will describe what crossing over and independent assortment are in meiosis.</p> <p>5) Students will describe why cells go through two divisions in meiosis.</p> <p>6) Students will describe the difference</p>	<p>1) Chapter 5 study guide</p> <p>2) Powerpoint notes</p> <p>3) Mitosis microscope lab.</p> <p>4) Mitosis video.</p> <p>5) Meiosis chromosome lab.</p> <p>6) Meiosis video.</p>	<p>1) Open Notes chapter 5.1, 5.2, 5.3/ 5.4, 5.5 quizzes.</p> <p>2) Chapter 5 Test</p> <p>3) Discussion</p> <p>4) informal questioning</p>	<p>9.4.1.2.6 Explain the process of mitosis in the formation of identical new cells and maintaining chromosome number during asexual reproduction.</p> <p>9.4.3.2.2 Use the processes of mitosis and meiosis to explain the advantages and disadvantages of asexual and sexual reproduction.</p> <p>9.4.4.2.5 Recognize that a gene mutation in a cell can result in uncontrolled cell division called cancer, and how exposure of cells to</p>	<p>1) PowerPoint</p> <p>2) Moodle</p> <p>3) Chromebooks</p> <p>4) Microscopes</p> <p>5) YouTube</p>

		between a haploid and diploid cell.			<p>certain chemicals and radiation increases mutations and thus increases the chance of cancer.</p> <p>9.1.1.2.1 Formulate a testable hypothesis, design and conduct an experiment to test the hypothesis, analyze the data, consider alternative explanations and draw conclusions supported by evidence from the investigation.</p> <p>9.1.3.3.2 Communicate, justify and defend the procedures and results of a scientific inquiry or engineering design project using verbal, graphic, quantitative, virtual or written means.</p>	
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SCOPE AND SEQUENCE

COURSE TITLE: 10th Grade Biology (Trimester 2)

UNIT/TOPIC	RESOURCES/CHAPTERS	OBJECTIVES/GOALS	ACTIVITIES/HOW	ASSESSMENT	Standards/Benchmarks	Technology Integrated
Unit 7: Genetics	Chapter 19/20	<p>1) Students will understand the process Gregor Mendel went through to understand the genetics of the garden pea.</p> <p>2) Students will complete a monohybrid and</p>	<p>1) Genetics Study Guide</p> <p>2) Chapter Powerpoint notes.</p> <p>3) Punnett Square worksheet packet.</p> <p>4) Pedigree worksheets.</p> <p>5) Discussion</p> <p>6) Informal questions</p>	<p>1) Genetics quizzes</p> <p>2) Genetics test</p> <p>3) Discussion</p> <p>4) informal questioning</p>	<p>9.4.3.1.1 Explain the relationships among DNA, genes and chromosomes.</p> <p>9.4.3.1.2 In the context of a monohybrid cross, apply the terms phenotype, genotype, allele, homozygous and heterozygous.</p>	

		<p>dihybrid punnett square.</p> <p>3) Students will describe what a phenotype and genotype are.</p> <p>4) Students will know the difference between homozygous and heterozygous is.</p> <p>5) Students will describe and complete punnett squares of sex linked traits.</p> <p>6) Students will complete and analyze pedigree charts.</p> <p>7) Students will understand genetic disorders and what causes them.</p>			<p>9.4.3.2.3 Explain how mutations like deletions, insertions, rearrangements or substitutions of DNA segments in gametes may have no effect, may harm, or rarely may be beneficial, and can result in genetic variation within a species.</p> <p>9.4.4.2.1 Describe how some diseases can sometimes be predicted by genetic testing and how this affects parental and community decisions.</p> <p>9.4.4.2.5 Recognize that a gene mutation in a cell can result in uncontrolled cell division called cancer, and how exposure of cells to certain chemicals and radiation increases mutations and thus increases the chance of cancer.</p>	
Unit 8: Evolution	Chapter 10	<p>1) Students will understand how Darwin developed his theory.</p> <p>2) Students will describe how the theory of natural selection.</p> <p>3) Students will describe how the finches on the Galapagos Islands show evidence of natural selection.</p> <p>4) Students will describe how the fossil record shows evidence of</p>	<p>1) Chapter 10 study guide</p> <p>2) Chapter 10 Powerpoint notes.</p> <p>3) Evolution/natural selection lab.</p> <p>4) Cladogram worksheet.</p> <p>5) Types of natural selection worksheet.</p> <p>6) Discussion</p> <p>7) Informal questions</p>	<p>1) Open Notes</p> <p>10.1/10.2, 10.3, 10.4, 10.5 quizzes.</p> <p>2) Chapter 10 Test.</p> <p>3) Discussion</p> <p>4) informal questioning</p>	<p>9.4.3.3.1 Describe how evidence led Darwin to develop the theory of natural selection and common descent to explain evolution.</p> <p>9.4.3.3.2 Use scientific evidence, including the fossil record, homologous structures, and genetic and/or biochemical similarities, to show evolutionary</p>	<p>1) PowerPoint</p> <p>2) Moodle</p> <p>3) Chromebooks</p>

		<p>evolution through time.</p> <p>5) Students will describe how comparative anatomy and comparative embryology show common ancestry.</p> <p>6) Students will describe how evolutionary trees and cladograms show common ancestry.</p>			<p>relationships among species.</p> <p>9.4.3.3.3 Recognize that artificial selection has led to offspring through successive generations that can be very different in appearance and behavior from their distant ancestors.</p> <p>9.4.3.3.4 Explain why genetic variation within a population is essential for evolution to occur.</p> <p>9.4.3.3.5 Explain how competition for finite resources and the changing environment promotes natural selection on offspring survival, depending on whether the offspring have characteristics that are advantageous or disadvantageous in the new environment.</p> <p>9.4.3.3.6 Explain how genetic variation between two populations of a given species is due, in part, to different selective pressures acting independently on each population and how, over time, these differences can lead to the development of new species.</p>	
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<p>Unit 9: Ecology</p>	<p>Chapter 13, 14</p>	<p>1) Understand what a population, community, ecosystem, and biosphere are. 2) Describe what is necessary for populations to grow exponentially. 3) Describe what affects carrying capacity and population numbers. 4) Describe the three types of population dispersion, uniform, random, clumped. 5) Draw and describe a survivorship curve showing the three types of survivorship. 6) Describe how communities interact by competition, predation, commensalism, mutualism, parasitism. 7) Describe mutualism, commensalism, and parasitism. 8) Describe how energy flows through an ecosystem. 9) Produce a food web of an ecosystem.</p>	<p>1) Chapter 13 & 14 Study Guide 2) Chapter 13 & 14 Powerpoint notes. 3) ecosystem/ food web project</p>	<p>1) Open notes 13.1/13.2, 13.3/13.4/13.5 , 13.6/14.1/14.2 , 14.3/14.4/14.5 quizzes 2) Project presentations. 3) Chapter 13 & 14 test.</p>	<p>9.4.2.1.1 9.4.2.1.2 9.4.2.2.2 9.1.3.1.1</p>	
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Unit 10: Human Interactions	No chapter-	<p>1) Describe an environmental problem caused by humans that affects ecosystems.</p> <p>2) Describe genetic engineering in terms of gene transfer using restriction enzymes and plasmids.</p> <p>3) Describe contributions from diverse cultures, including Minnesota American Indian tribes and communities, to the understanding of interactions among humans and living systems.</p>	<p>1) Human interactions project</p> <p>2) Genetic Engineering Powerpoint notes.</p> <p>3) Human Interactions Powerpoint notes.</p>	<p>1) Genetic engineer quiz.</p> <p>2) Human Interactions project presentations.</p> <p>3) Human Interactions test.</p>	<p>9.4.4.1.1</p> <p>9.4.4.1.2</p> <p>9.4.4.1.3</p>	
Unit 11 MCA Review	No Chapter	<p>1) Restate and describe the standards studied throughout the year.</p> <p>2) Cover the immune system</p>	<p>1) MCA study packet</p> <p>2) Computer practice test</p> <p>3) PowerPoint notes</p>	<p>1) informal discussion of standards.</p> <p>2) Practice test</p>	<p>9.4.4.2.2</p> <p>9.4.4.2.3</p>	
Unit 12 Dissection / Lab activities	No Chapter	<p>1) Name the structures of a clam, perch, frog, and fetal pig.</p> <p>2) collect or report insects and group them into their correct order.</p>	<p>1) Fill-in worksheets for each of the dissected organisms.</p> <p>2) presentation on insect orders found in the area.</p>	<p>1) Lab test on dissections.</p> <p>2) Insect presentations.</p>	<p>9.1.3.1.1</p> <p>9.1.3.4.2</p>	

