

Options EHS Biology A-OR		Scope and Sequence
Unit	Lesson	Objectives
The Building Blocks of Life		
Characteristics of Life		
		Describe the characteristics of living organisms.
		List the levels of organization within a living organism in hierarchical order.
		Compare and contrast living and nonliving objects.
		Science Practice: Examine how two different scientists could use different experimental designs and have the same outcome.
Elements of Living Organisms		
		Differentiate between elements and substances formed from elements.
		Identify the six most common elements found in living organisms.
		Illustrate the importance of the six most common elements to living organisms.
		Science Practice: Demonstrate how to read a Material Safety Data Sheet (MSDS).
The Importance of Carbon		
		Explain the essential role of carbon within living organisms.
		Describe the steps of the carbon cycle.
		Interpret the importance of the carbon cycle to living organisms.
		Science Practice: Evaluate data to formulate a conclusion.
Carbohydrates		
		Compare the structures of monosaccharides, disaccharides, and polysaccharides.
		Differentiate between the roles of monosaccharides, disaccharides, and polysaccharides in living organisms.
		Identify the role of carbohydrates in living organisms.
		Science Practice: Construct charts, graphs, and tables to organize data.

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	Lipids	
		Compare and contrast the structures of saturated and unsaturated lipids.
		Explain the roles of lipids within living organisms.
		Science Practice: Evaluate data to formulate a conclusion.
	Proteins and Nucleic Acids	
		Recognize essential amino acids found in living organisms.
		Identify the components of proteins and nucleic acids and discuss how they were discovered.
		Explain the roles of proteins and nucleic acids in living organisms.
		Science Practice: Evaluate the impact of science and technology on society.
	Catalysts	
		Relate changes in energy to the rate of a chemical reaction.
		Explain how catalysts affect the energy of a chemical reaction.
		Describe the “lock and key” mechanism of enzymes in chemical reactions.
		Science Practice: Create a laboratory experiment to answer a specific question.
	Lab: Identifying Nutrients	
		Identify carbohydrates, lipids, and proteins found in food samples by conducting chemical tests.
		Describe nutrients found in common foods such as bread, meat, juice, oil, and milk.
		Science Practice: Discuss how to apply safe practices during a lab and/or field investigation.
	Unit Test	
Cell Biology		
	The Function of Organelles	
		Identify the organelles of a cell.

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		Describe the functions of each organelle.
		Science Practice: Construct charts, graphs, and tables to organize data.
	ATP	
		Identify ATP as a source of energy for living organisms.
		Describe the role of ATP in plant processes.
		Describe the role of ATP in living organisms other than plants.
		Science Practice: Evaluate data to formulate a conclusion.
	Light Dependent Reactions in Photosynthesis	
		Outline the steps of the light-dependent reactions in photosynthesis.
		Science Practice: Distinguish between and give examples of observation and inference.
	Light Independent Reactions in Photosynthesis	
		Outline the steps of the light-independent reactions in photosynthesis.
		Compare and contrast the light-dependent and the light-independent reactions of photosynthesis.
		Science Practice: Apply the scientific method to given scenarios.
	Cellular Respiration	
		Describe how cellular respiration converts glucose to energy in the form of ATP.
		Compare and contrast aerobic and anaerobic cellular respiration.
		Explain the importance of cellular respiration to living organisms.
		Science Practice: Organize data using specific grouping methods.
	Unit Test	
Cellular Processes		

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	Cell Theory	<p>Examine the role of microscopes in discovering cells.</p> <p>Compare and contrast the functions of different types of microscopes.</p> <p>Describe the components of cell theory.</p> <p>Science Practice: Analyze how new technologies and experiments affect previous scientific explanations.</p>
	Prokaryotic and Eukaryotic Cells	<p>Describe the basic structure of a cell.</p> <p>Compare and contrast prokaryotic and eukaryotic cells.</p> <p>Explain the endosymbiotic theory.</p> <p>Science Practice: Evaluate past research from investigations similar in design and purpose.</p>
	Cell Homeostasis	<p>Explain how cells maintain homeostasis.</p> <p>Differentiate between diffusion, osmosis, passive transport, and active transport.</p> <p>Describe the importance of homeostasis to living organisms.</p> <p>Science Practice: Generate procedures to utilize charts, graphs, and tables to show data.</p>
	Lab: Diffusion Across a Semi-permeable Membrane	<p>Describe the process of diffusion.</p> <p>Identify materials that are able to pass across a semipermeable membrane by diffusion.</p> <p>Science Practice: Apply the scientific method to given scenarios.</p>
	Mitosis	<p>Describe the steps of mitosis.</p> <p>Explain the importance of mitosis to living organisms.</p>

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		Science Practice: Analyze how new technologies and experiments affect previous scientific explanations.
	Meiosis	
		Illustrate the steps of meiosis.
		Describe the roles of crossing over and independent assortment in meiosis.
		Explain the importance of meiosis to living organisms.
		Science Practice: Examine how a scientist's creativity can lead to scientific discovery.
	Asexual and Sexual Reproduction	
		Relate the processes of mitosis and meiosis to reproduction.
		Differentiate between mitosis and meiosis.
		Compare and contrast sexual and asexual reproduction.
		Science Practice: Outline how to formulate scientific questions using reproduction as a model.
	Cell Differentiation and Specialization	
		Explain the role of differentiation in the creation of specialized cells.
		Describe specialized cells found within living organisms.
		Analyze the effect of changing external conditions on specialized cells.
		Science Practice: Examine how two different scientists could use different experimental designs and have the same outcome.
	Unit Test	
Molecular Genetics		
	Genetic Code	
		Summarize the experiments that led to the discovery of the genetic code.
		Describe the relationship between DNA, genes, and chromosomes.
		Describe the role of DNA replication in transmitting genetic information.

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		Science Practice: Evaluate the impact of science and technology on society.
	DNA and RNA Structure	
		Analyze the similarities and differences between DNA and RNA.
		Explain how the base pairing in DNA and RNA was discovered.
		Science Practice: Give examples of how research affects science, society, and the environment.
	Protein Synthesis	
		Explain the relationship between transcription and gene expression.
		Explain the relationship between translation and gene expression.
		Science Practice: Give examples of how hypotheses lead to new experimental methods.
	Lab: Building Proteins from RNA	
		Describe the role of RNA in the creation of proteins.
		Demonstrate how base pairing builds proteins from RNA.
		Science Practice: Conduct a laboratory experiment to answer a specific question.
	DNA Mutations	
		Describe common types of DNA mutations.
		Explain the effects of DNA mutations on the characteristics of living organisms.
		Analyze the effect of harmful environmental factors on DNA.
		Science Practice: Discriminate scientific claims that are socially accepted but not scientifically based.
	Chromosomes	
		Illustrate the structure of a chromosome and its relationship to DNA.
		Create and label a diagram of homologous chromosome pairs with heterozygous alleles.
		Explain how a karyotype can be used to identify genetic defects.

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		Science Practice: Apply the components of a scientific report.
	Unit Test	
	Heredity	
	Introduction to Genetics	
		Explain the importance of Gregor Mendel to the field of genetics.
		Describe the role of nucleic acids in transmitting genetic information.
		Science Practice: Give examples of how hypotheses lead to new experimental methods.
	Probability of Inheritance	
		Predict possible allele combinations of offspring based on the genetics of the parent.
		Use Punnett squares to create monohybrid and dihybrid crosses.
		Determine genotype and phenotype probabilities from Punnett squares.
		Science Practice: Explain how changing the variables, methods, and timing impacts scientific investigation.
	Laws of Inheritance	
		Describe how the principle of dominance applies to genes.
		Summarize the law of segregation.
		Apply the law of independent assortment.
		Science Practice: Differentiate scientific hypotheses, theories, and laws.
	Non-Mendelian Inheritance	
		Differentiate between incomplete dominance and codominance.
		Explain how blood type is determined.
		Analyze examples of polygenic traits.
		Science Practice: Assess how science and society impact each other.

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	Sex-linked Inheritance	
		Summarize the process of sex-linked inheritance.
		Analyze a pedigree to determine sex-linked traits.
		Science Practice: Give examples of how research affects science, society, and the environment.
	Lab: Mouse Genetics (Two Traits)	
		Demonstrate how alleles are passed independently of one another.
		Use the laws of inheritance to describe how two separate traits are inherited in an organism.
		Science Practice: Evaluate data to formulate a conclusion.
	Unit Test	
Cumulative Exam		
	Cumulative Exam Review	
	Cumulative Exam	