

COURSE: 15-1 The Living Environment
GRADE LEVEL: 9

MAIN/GENERAL TOPIC:	SUB-TOPIC:	ESSENTIAL QUESTIONS:	WHAT THE STUDENTS WILL KNOW OR BE ABLE TO DO:	SKILLS	WHEN STUDENT DOES IT:	ASSESSMENTS:
WHAT IS SCIENCE?		<ul style="list-style-type: none"> • What is science? • How are scientific observations made? • What are some of the instruments scientists use in their work? 	<ul style="list-style-type: none"> • Make scientific observations • Become familiar with scientific lab equipment 	<ul style="list-style-type: none"> • Recognize and know the uses of scientific lab equipment 	September	<ul style="list-style-type: none"> • Scientific Equipment Observation Lab • Materials of Science Lab
SCIENTIFIC INQUIRY		<ul style="list-style-type: none"> • What are the essential steps of a scientific investigation? • What is meant by a controlled experiment? 	<ul style="list-style-type: none"> • Know the steps of a scientific investigation • Understand what is meant by a controlled experiment • Define the terms hypothesis, theory, and scientific law 	<ul style="list-style-type: none"> • Understand and be able to design experiments 	September	<ul style="list-style-type: none"> • Scientific Inquiry Lab • Scientific Inquiry • Quiz
EVOLUTION		<ul style="list-style-type: none"> • How is the survival of a species through the generations linked to its ability to adapt to a changing environment? • What happens to species that do not adapt to a changing environment? • How are similarities in structure and biochemistry of species evidence of evolution? • What are the six main points of Darwin's Theory of Evolution? 	<ul style="list-style-type: none"> • Understand Charles Darwin's Theory of Evolution • Be able to compare Darwin's theory to those of modern evolution 	<ul style="list-style-type: none"> • Create evolutionary charts 	September/ October	<ul style="list-style-type: none"> • Comparative Anatomy Lab • Evolution Packet • Peanut Variation Lab • Question Sheet • Evolution Quiz #1 • Bird Beak Adaptations • Compare Skulls Lab • Evolution Quiz #2

TAXONOMY		<ul style="list-style-type: none"> Despite many differences, how can organisms be grouped according to common traits? 	<ul style="list-style-type: none"> Explain the function of classification systems Explain how the theory of evolution has affected taxonomy 	<ul style="list-style-type: none"> Use a dichotomous key 	November	<ul style="list-style-type: none"> Salamander Classification Lab
ORGANIC CHEMISTRY		<ul style="list-style-type: none"> How do chemicals in living things play essential roles in the processes of life? 	<ul style="list-style-type: none"> Understand organic and inorganic compounds Identify the four major types of organic compounds found in living things Know how micro molecules make up macromolecules 	<ul style="list-style-type: none"> Perform lab experiments to recognize organic chemicals 	November	<ul style="list-style-type: none"> Molecular Models Lab The Food Lab
ENZYMES		<ul style="list-style-type: none"> What are the functions of enzymes in living cells? 	<ul style="list-style-type: none"> Describe the lock-and-key model of enzyme action Explain the effects of temperature, pH, and enzyme-substrate concentration 	<ul style="list-style-type: none"> Create graphs and data tables 	November	<ul style="list-style-type: none"> The Catalase Lab Enzyme Graphing Lab Lactase Lab
CELLS	Microscope	<ul style="list-style-type: none"> Why is the microscope so important to scientists? 	<ul style="list-style-type: none"> Understand how compound and stereo microscopes work 	<ul style="list-style-type: none"> Focus microscopes and measure specimens under both kinds of scopes 	December	<ul style="list-style-type: none"> Microscope Lab
CELLS		<ul style="list-style-type: none"> What are the basic features of a cell? What are the different levels of organization in organisms? 	<ul style="list-style-type: none"> Understand that cells are the smallest unit of life Know that cells make up tissue Explain the levels of organization: cells-tissues-organs-organ systems-organism 	<ul style="list-style-type: none"> Draw and label plant and animal cells Identify structures and understand functions 	December	<ul style="list-style-type: none"> Cells and Scopes Packet
TRANSPORT		<ul style="list-style-type: none"> How is the internal environment of a cell able to remain relatively constant at all times? 	<ul style="list-style-type: none"> Understand how cells maintain homeostasis with the environment and other cells Distinguish the difference between active and passive transport 	<ul style="list-style-type: none"> Define diffusion and osmosis Draw cells in distilled water and salt water 	December	<ul style="list-style-type: none"> The Diffusion Lab Transport Packet Cells and Transport Quiz NYS Lab: Diffusion and Osmosis

ENERGY		<ul style="list-style-type: none"> How do all living things – animals, plants, and single cells obtain the energy they need to live? 	<ul style="list-style-type: none"> Understand how energy for life is created from the chemical energy in food Describe the role of ATP in energy transfer 	<ul style="list-style-type: none"> Diagram photosynthesis and cellular respiration 	January	<ul style="list-style-type: none"> Energy Transfer ATP Construction Lab
DISEASE		<ul style="list-style-type: none"> What are the lines of defense in the human body against disease causing organisms? 	<ul style="list-style-type: none"> Explain how diseases disrupt homeostasis Understand how the immune system fights viruses, microorganisms, and pathogens 	<ul style="list-style-type: none"> Distinguish characteristics among the various pathogens 	February	<ul style="list-style-type: none"> Immune Response Lab
DNA		<ul style="list-style-type: none"> How does the DNA genetic code determine the traits of all living things? How does DNA control the mechanism for passing on traits to new generations? What roles do DNA and RNA play in making proteins? 	<ul style="list-style-type: none"> Understand why DNA is referred to as a “blueprint” or “code of life” Know that genes are located on chromosomes Know that humans have 46 chromosomes, 23 from each parent Understand dominant/recessive genes 	<ul style="list-style-type: none"> Match DNA bases together Match DNA with RNA 	February/ March	<ul style="list-style-type: none"> DNA Structure Lab DNA Electrophoresis Lab DNA Fingerprint DNA Packet Protein Synthesis Introduction
GENETICS		<ul style="list-style-type: none"> Why do family members often look alike? How are traits passed from parents to offspring? 	<ul style="list-style-type: none"> Differentiate between gene presence and gene expression 	<ul style="list-style-type: none"> Determine the results of genetic crosses 	March	<ul style="list-style-type: none"> Dragon Lab Design a Face Lab Bug Karyotype lab Genetics Quiz
GENETIC ENGINEERING		<ul style="list-style-type: none"> How can scientists alter the DNA of some organisms, controlling the way they function? How can plant and animal breeders improve their crops and animals? What are some ways genetic engineering can be used to benefit people? 	<ul style="list-style-type: none"> Understand that humans and nature can manipulate genes Describe selective breeding Explain different ways that humans are using genetic engineering in treating disorders 	<ul style="list-style-type: none"> Genetically engineer live <i>E. coli</i> bacteria 	March	<ul style="list-style-type: none"> Genetic Engineering Packet Bacteria Glow Lab

REPRODUCTION		<ul style="list-style-type: none"> • What are the different kinds of reproduction? • How do cells reproduce in preparation for reproduction? • What are the body systems and processes involved in human reproduction? 	<ul style="list-style-type: none"> • Compare and contrast asexual and sexual reproduction • Compare and contrast mitosis and meiosis • Understand human reproduction and development 	<ul style="list-style-type: none"> • Calculate chromosome number in cells • Label and know reproduction diagrams 	March	<ul style="list-style-type: none"> • Mitosis Onion Root Tip Lab • Cellular Division Packet • Starfish Development Lab • Cellular Division • Fetal Growth Lab • Cleavage of Zygote • Cellular Division Packet • Sparky Reproduction Story
HUMAN BODY		<ul style="list-style-type: none"> • What are the systems of the human body? • How do the systems of the human body work together to keep the body alive? 	<ul style="list-style-type: none"> • Know all the human body systems and how they interact 	<ul style="list-style-type: none"> • Label human body systems • Measure pulse • Measure muscle fatigue • Prepare a report on a body system 	March/April	<ul style="list-style-type: none"> • Human Body Review • Lung Capacity Lab • Reproduction Quiz • Pig Dissection • NYS Lab: Making Connections
ECOLOGY	Interactions among organisms	<ul style="list-style-type: none"> • What are the jobs that need to be filled in an ecosystem? • What factors make an ecosystem stable? • What are the types of symbiotic relationships? 	<ul style="list-style-type: none"> • Description of ecosystems • Trophic organization of ecosystems • Biotic roles in ecosystems • Stability of ecosystems 	<ul style="list-style-type: none"> • Be able to recognize the various niches organisms belong to • Discuss the characteristics of each biome • Understand the pathways of the oxygen/carbon, water and nitrogen cycles 	April	<ul style="list-style-type: none"> • "Hoo Eats Who?" lab • Pt Go Home • Biome Real Estate advertisement

ECOLOGY	Limiting Factors	<ul style="list-style-type: none"> • Why are there more individuals of plants than predators? • How come deer do not over populate where they live? 	<ul style="list-style-type: none"> • Energy flows through an ecosystem • Atoms and molecules cycle among the living and nonliving factors of an ecosystem • Energy passes through food webs as demonstrated by food pyramids • Carrying capacity is limited by the amount of resources and the amount of nutrient recycling • Organisms compete for resources • Growth and survival depend on physical conditions • Competition limits population size • Relationships between organisms can be competitive or beneficial 	<ul style="list-style-type: none"> • Recognize a limiting factor in an ecosystem • Be able to interpret an energy pyramid • Prepare a report on a habitat 	May	<ul style="list-style-type: none"> • Owl Pellet Lab • Eagle Lab • Energy through an ecosystem quiz • Kaibab Lab
	Succession	<ul style="list-style-type: none"> • What will happen to the front yard of the school if they stopped mowing the lawn? 	<ul style="list-style-type: none"> • The interrelationships of organisms affect ecosystem stability • Organisms may alter the environment • Altered ecosystems may reach stability over time • Secondary succession restores ecosystems 	<ul style="list-style-type: none"> • Predict which community will replace the current community and why this occurs 	May	<ul style="list-style-type: none"> • Succession Quiz
	Species Preservation	<ul style="list-style-type: none"> • What is biodiversity? • Why is biodiversity important to an ecosystem? 	<ul style="list-style-type: none"> • Biodiversity results from evolution and increases the stability of ecosystems • Biodiversity provides for future agricultural and medical discoveries • Biodiversity ensure survival of life in changing environments 	<ul style="list-style-type: none"> • Use the internet to learn about endangered species 	May	<ul style="list-style-type: none"> • Endangered species report
ENVIRONMENTAL ISSUES	Human Impact	<ul style="list-style-type: none"> • How has Humans impacted the environment? 	<ul style="list-style-type: none"> • Humans are stressing the earth's finite resources • Ecosystems provide an array of basic processes that affect 	<ul style="list-style-type: none"> • Debate the pros and cons of various environmental 	June	<ul style="list-style-type: none"> • NYS Required lab: Relationships and Diversity of

			<p>humans</p> <ul style="list-style-type: none"> Human activities can alter the equilibrium in ecosystems 	issues		living organisms
	Technological Development	<ul style="list-style-type: none"> What is extinction? How does extinction change an ecosystem? 	<ul style="list-style-type: none"> Human degradation of ecosystems results in a loss of diversity Serious consequences may result from altered ecosystems Demand for additional energy may impact ecosystems negatively Many factors influence environmental quality 	<ul style="list-style-type: none"> Recognize how energy flow pyramid is disrupted in the presence of Humans 	June	<ul style="list-style-type: none"> Unit test
	Moral and Ethics	<ul style="list-style-type: none"> Do we have a responsibility to fix any environmental problems we created? 	<ul style="list-style-type: none"> By applying ecological principles we may preserve the planet Individuals must assess environmental impact of new technologies 	<ul style="list-style-type: none"> 	June	<ul style="list-style-type: none"> Propose and present a method society may adopt to fix an environmental problem