

MONTGOMERY COUNTY PUBLIC SCHOOLS
Biology II (Ecology) Curriculum Pacing Guide

Time	SOL Objectives	Lab/Activity
<p>90 Minute Class: 3 Weeks</p> <p>45 Minute Class: 6 Weeks</p>	<p><u>INTRODUCTION</u></p> <ul style="list-style-type: none"> • Define environmental science, and compare environmental science with ecology. • List the 5 major fields of study that contribute to environmental science. • Describe and map the geography and hydrology and the NRV and of the State of Virginia. • Describe the major environmental effects of hunter-gathers, the agricultural revolution, and the industrial revolution. • Distinguish between renewable and nonrenewable resources. • Classify environmental problems into 3 major categories. • Describe the tragedy of the commons. • Explain the law of supply and demand. • List 3 differences between developed and developing countries. • Explain what sustainability is, and describe why it is a goal of environmental science. 	<p>Lorax Video Chaos Theory Handout Virginia State map exercise Watershed map</p>
<p>90 Minute Class: 2 Weeks</p> <p>45 Minute Class: 4 Weeks</p>	<p><u>HUMAN POPULATION</u></p> <ul style="list-style-type: none"> • Describe the 3 main properties of a population. • Describe exponential growth. • Describe population pyramids. • Describe TFR and fertility rates. • Describe the impact of human population growth in terms of natural resource acquisition, pollution (land, air, water) disease, poverty, food production, and climate change. • Report on the demographics of one of the world's country in terms of fetrility rates, average educational attainment, literacy rates (male and female), and per capita income. 	<p>How big is a Billion? Exponential growth Statsitics, coorelations World Country Report using UN OECD data.</p>

<p>90 Minute Class: 1 Week</p> <p>45 Minute Class: 2 Weeks</p>	<p><u>FOOD RESOURCES</u></p> <ul style="list-style-type: none"> Worldwide food production availability Wealth Gap 	<p>World Food Report</p>
<p>90 Minute Class: 2 Weeks</p> <p>45 Minute Class: 4 Weeks</p>	<p><u>WATER RESOURCES</u></p> <ul style="list-style-type: none"> Describe water sources world-wide, and scarcity and availability. Study water use in the Columbia River basin and above the Ogallala Aquifer. Describe water diversion projects and their impacts. Compare ground water to surface water, salt to fresh. Describe dams and their impacts to aquatic environments. Describe water treatment, both drinking and waste. Trace and discuss the flow of water in both the New River and Crab Creek. 	<p>Water testing crab creek. Water treatment plant New River watershed Montgomery County watersheds, map Student water use lab</p>
<p>90 Minute Class: 1 Week</p> <p>45 Minute Class: 2 Weeks</p>	<p><u>WATER POLLUTION</u></p> <ul style="list-style-type: none"> Distinguish between point-source pollution and non-point Source pollution. Identify 10 sources of each locally. Describe water pollution from mining, agriculture, and industry and water remediation efforts associated with each. Experience first-hand a meaningful watershed experience on Crab Creek in Christiansburg and with-in one-half mile of joining the New River. 	<p>Drinking water treatment plant Field trip. Water testing, town branch CreekSide Monitoring (4 trips)</p>

<p>90 Minute Class: 3 Weeks</p> <p>45 Minute Class: 6 Weeks</p>	<p><u>ENERGY RESOURCES / NONRENEWABLE</u></p> <p>Fossil Fuels:</p> <ul style="list-style-type: none"> • List 5 factors that influence the value of a fuel. • Explain how fuels are used to generate electricity. • Identify patterns of energy consumption and production in the USA. • Explain how fossil fuels form and how they are used. • Compare the advantages and disadvantages of fossil-fuel use. • List 3 factors that influence predictions of fossil-fuel production. • Describe nuclear fission. • Describe how a nuclear power plant works. • List 3 advantages and 3 disadvantages of nuclear power 	<p>Energy Videos, Demonstration generator, Student electricity use lab</p>
<p>90 Minute Class: 2 Weeks</p> <p>45 Minute Class: 4 Weeks</p>	<p><u>ENERGY RESOURCES / RENEWABLE</u></p> <p>Alternative Energies:</p> <ul style="list-style-type: none"> • List 6 forms of renewable energy, and compare their advantages and disadvantages. • Describe the differences between passive, active and photovoltaic solar energy. • Describe the current state of wind energy technology. • Explain the differences in biomass fuel use between developed and developing countries. • Describe how hydroelectric energy, geothermal and heat pumps work. • Describe 3 alternative energy technologies. • Identify 2 ways that H could be used as a fuel source in the future. • Explain the difference between energy efficient and energy conservation. • Describe 2 forms of energy efficient transportation. • Identify 3 ways that you can conserve energy. 	<p>Hybrid car Solar panels/generator Alt Energy report</p>

<p>90 Minute Class: 1 Weeks</p> <p>45 Minute Class: 2 Weeks</p>	<p><u>RECYCLING AND WASTE</u></p> <ul style="list-style-type: none"> ● Recycling centers trip, material processing Energy savings ● Production capacity/pollution, landfill field trip 	<p>Montgomery Regional Solid Waste Authority field trip.</p>
<p>90 Minute Class: 2 Weeks</p> <p>45 Minute Class: 4 Weeks</p>	<p><u>CLIMATE CHANGE</u></p> <ul style="list-style-type: none"> ● Describe how energy is transferred from the sun to producers and then to consumers food chain. ● Explain how energy is stored in fossil fuels. ● Describe the long and short term process of the carbon cycle. ● Identify ways that humans are affecting the carbon cycle. ● Explain the difference between weather and climate. ● Identify 4 major factors that determine climate. ● Explain how the ozone layer shields the Earth from much of the sun's harmful rays. ● Explain how CFC's damage the ozone layer. ● Explain why Earth's atmosphere is like the glass in a greenhouse. ● Explain why carbon dioxide in the atmosphere is increasing and the historical connection between FF and climate change. ● Explain why many scientists think that the Earth's climate is becoming increasingly warmer. ● Examine and explain the IPCC report on climate change. ● Describe what a warmer Earth might be like. Describe 15 steps that humanity can take to alleviate the adverse effects of global warming (Socalow and Pacala). 	<p>Computer Modeling, forecasting exercise, Climate change video, Copy of IPCC report summation via PowerPoint</p>