

Main Criteria: AP Environmental Science Course Description

Secondary Criteria: JoVE

Subject: Science

Grade: 9-12

Correlation Options: Show Correlated

Adopted: 2010

Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	I.	Earth Systems and Resources
Outline Level 3	I.A.	Earth Science Concepts
Outline Level 4	I.A.1.	<p>(Geologic time scale; plate tectonics, earthquakes, volcanism; seasons; solar intensity and latitude)</p> <p>JoVE</p> <ul style="list-style-type: none"> • An Overview of Alkenone Biomarker Analysis for Paleothermometry • An Overview of bGDGT Biomarker Analysis for Paleoclimatology • Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry • Determining Spatial Orientation of Rock Layers with the Brunton Compass • Igneous Intrusive Rock • Igneous Volcanic Rock • Making a Geologic Cross Section • Purification of a Total Lipid Extract with Column Chromatography • Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry • Using Topographic Maps to Generate Topographic Profiles
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	I.	Earth Systems and Resources
Outline Level 3	I.B.	The Atmosphere
Outline Level 4	I.B.1.	<p>(Composition; structure; weather and climate; atmospheric circulation and the Coriolis Effect; atmosphere-ocean interactions; ENSO)</p> <p>JoVE</p> <ul style="list-style-type: none"> • Igneous Intrusive Rock

		<ul style="list-style-type: none"> • Igneous Volcanic Rock • Using Topographic Maps to Generate Topographic Profiles
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	I.	Earth Systems and Resources
Outline Level 3	I.C.	Global Water Resources and Use
Outline Level 4	I.C.1.	<p>(Freshwater/saltwater; ocean circulation; agricultural, industrial, and domestic use; surface and groundwater issues; global problems; conservation)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Dissolved Oxygen in Surface Water • Introduction to Mass Spectrometry • Making a Geologic Cross Section • Nutrients in Aquatic Ecosystems • Turbidity and Total Solids in Surface Water • Water Quality Analysis via Indicator Organisms
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	I.	Earth Systems and Resources
Outline Level 3	I.D.	Soil and Soil Dynamics
Outline Level 4	I.D.1.	<p>(Rock cycle; formation; composition; physical and chemical properties; main soil types; erosion and other soil problems; soil conservation)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • An Overview of Alkenone Biomarker Analysis for Paleothermometry • An Overview of bGDGT Biomarker Analysis for Paleoclimatology • Analysis of Earthworm Populations in Soil • Bacterial Growth Curve Analysis and its Environmental Applications • Carbon and Nitrogen Analysis of Environmental Samples • Community DNA Extraction from Bacterial Colonies • Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry • Culturing and Enumerating Bacteria from Soil Samples • Determination of Moisture Content in Soil • Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction • Filamentous Fungi • Gram Staining of Bacteria from Environmental Sources • Igneous Intrusive Rock • Igneous Volcanic Rock • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Purification of a Total Lipid Extract with Column Chromatography

		<ul style="list-style-type: none"> • Quantifying Environmental Microorganisms and Viruses Using qPCR • Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry • Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium • Solid-Liquid Extraction • Sonication Extraction of Lipid Biomarkers from Sediment • Soxhlet Extraction of Lipid Biomarkers from Sediment • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	II.	The Living World
Outline Level 3	II.B.	Energy Flow
Outline Level 4	II.B.1.	<p>(Photosynthesis and cellular respiration; food webs and trophic levels; ecological pyramids)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • An Introduction to Cell Metabolism • An Introduction to Drosophila melanogaster • An Introduction to the Chick: Gallus gallus domesticus • Analysis of Earthworm Populations in Soil • Bacterial Growth Curve Analysis and its Environmental Applications • Biofuels: Producing Ethanol from Cellulosic Material • C. elegans Maintenance • Carbon and Nitrogen Analysis of Environmental Samples • Culturing and Enumerating Bacteria from Soil Samples • Detecting Reactive Oxygen Species • Dissolved Oxygen in Surface Water • Filamentous Fungi • Quantifying Environmental Microorganisms and Viruses Using qPCR • RNA Analysis of Environmental Samples Using RT-PCR • The ATP Bioluminescence Assay • Zebrafish Maintenance and Husbandry • Zebrafish Reproduction and Development
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	II.	The Living World
Outline Level 3	II.C.	Ecosystem Diversity
Outline Level 4	II.C.1.	<p>(Biodiversity; natural selection; evolution; ecosystem services)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • An Introduction to the Chick: Gallus gallus domesticus

		<ul style="list-style-type: none"> • An Overview of Genetic Analysis • Analysis of Earthworm Populations in Soil • Carbon and Nitrogen Analysis of Environmental Samples • Community DNA Extraction from Bacterial Colonies • Culturing and Enumerating Bacteria from Soil Samples • Detecting Environmental Microorganisms with the Polymerase Chain Reaction and Gel Electrophoresis • Detection of Bacteriophages in Environmental Samples • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Determination of Moisture Content in Soil • Dissolved Oxygen in Surface Water • Enzyme Assays and Kinetics • Filamentous Fungi • Gas Chromatography (GC) with Flame-Ionization Detection • Gram Staining of Bacteria from Environmental Sources • Isolation of Fecal Bacteria from Water Samples by Filtration • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Measuring Tropospheric Ozone • Nutrients in Aquatic Ecosystems • Quantifying Environmental Microorganisms and Viruses Using qPCR • RNA Analysis of Environmental Samples Using RT-PCR • Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Turbidity and Total Solids in Surface Water • Using GIS to Investigate Urban Forestry • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy • Water Quality Analysis via Indicator Organisms • Zebrafish Maintenance and Husbandry
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Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	II.	The Living World
Outline Level 3	II.D.	Natural Ecosystem Change
Outline Level 4	II.D.1.	(Climate shifts; species movement; ecological succession) <u>JoVE</u> <ul style="list-style-type: none"> • An Overview of Genetic Analysis • Biofuels: Producing Ethanol from Cellulosic Material
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	II.	The Living World
Outline Level 3	II.E.	Natural Biogeochemical Cycles

Outline Level 4	II.E.1.	<p>(Carbon, nitrogen, phosphorus, sulfur, water, conservation of matter)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • An Overview of Alkenone Biomarker Analysis for Paleothermometry • An Overview of bGDGT Biomarker Analysis for Paleoclimatology • Analysis of Earthworm Populations in Soil • Bacterial Growth Curve Analysis and its Environmental Applications • Carbon and Nitrogen Analysis of Environmental Samples • Conversion of Fatty Acid Methyl Esters by Saponification for Uk'37 Paleothermometry • Culturing and Enumerating Bacteria from Soil Samples • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Extraction of Biomarkers from Sediments - Accelerated Solvent Extraction • Filamentous Fungi • Fundamentals of Breeding and Weaning • Metabolic Labeling • Nutrients in Aquatic Ecosystems • Purification of a Total Lipid Extract with Column Chromatography • Removal of Branched and Cyclic Compounds by Urea Adduction for Uk'37 Paleothermometry • Soil Nutrient Analysis: Nitrogen, Phosphorus, and Potassium • Sonication Extraction of Lipid Biomarkers from Sediment • Soxhlet Extraction of Lipid Biomarkers from Sediment • Using GIS to Investigate Urban Forestry
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	III.	Population
Outline Level 3	III.A.	Population Biology Concepts
Outline Level 4	III.A.1.	<p>(Population ecology; carrying capacity; reproductive strategies; survivorship)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • An Introduction to Caenorhabditis elegans • An Introduction to Cell Division • An Introduction to Saccharomyces cerevisiae • An Introduction to the Chick: Gallus gallus domesticus • An Introduction to the Laboratory Mouse: Mus musculus

		<ul style="list-style-type: none"> • An Introduction to the Zebrafish: <i>Danio rerio</i> • Analysis of Earthworm Populations in Soil • Aseptic Technique in Environmental Science • Bacterial Growth Curve Analysis and its Environmental Applications • Bacterial Transformation: Electroporation • Bacterial Transformation: The Heat Shock Method • Basic Mouse Care and Maintenance • <i>C. elegans</i> Chemotaxis Assay • <i>C. elegans</i> Development and Reproduction • <i>C. elegans</i> Maintenance • Culturing and Enumerating Bacteria from Soil Samples • Detection of Bacteriophages in Environmental Samples • Development and Reproduction of the Laboratory Mouse • Development of the Chick • Dissolved Oxygen in Surface Water • <i>Drosophila</i> Development and Reproduction • <i>Drosophila</i> Maintenance • <i>Drosophila melanogaster</i> Embryo and Larva Harvesting and Preparation • Filamentous Fungi • Fundamentals of Breeding and Weaning • Genetic Crosses • Isolation of Fecal Bacteria from Water Samples by Filtration • Passaging Cells • Plasmid Purification • Quantifying Environmental Microorganisms and Viruses Using qPCR • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Yeast Maintenance • Yeast Reproduction • Yeast Transformation and Cloning • Zebrafish Breeding and Embryo Handling • Zebrafish Reproduction and Development
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Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	III.	Population
Outline Level 3	III.B.	Human Population
Outline Level 4	III.B.1.	Human population dynamics
Outline Level 5	III.B.1.a.	<p>(Historical population sizes; distribution; fertility rates; growth rates and doubling times; demographic transition; age-structure diagrams)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Nutrients in Aquatic Ecosystems
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	III.	Population

Outline Level 3	III.B.	Human Population
Outline Level 4	III.B.2.	Population size
Outline Level 5	III.B.2.a.	(Strategies for sustainability; case studies; national policies) <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Nutrients in Aquatic Ecosystems
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	III.	Population
Outline Level 3	III.B.	Human Population
Outline Level 4	III.B.3.	Impacts of population growth
Outline Level 5	III.B.3.a.	(Hunger; disease; economic effects; resource use; habitat destruction) <u>JoVE</u> <ul style="list-style-type: none"> • Analysis of Earthworm Populations in Soil • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Measuring Tropospheric Ozone • Nutrients in Aquatic Ecosystems • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Turbidity and Total Solids in Surface Water • Visualizing Soil Microorganisms via the Contact Slide Assay and Microscopy • Water Quality Analysis via Indicator Organisms
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.A.	Agriculture
Outline Level 4	IV.A.1.	Feeding a growing population
Outline Level 5	IV.A.1.a.	(Human nutritional requirements; types of agriculture; Green Revolution; genetic engineering and crop production; deforestation; irrigation; sustainable agriculture) <u>JoVE</u> <ul style="list-style-type: none"> • An Overview of Genetic Engineering • Biofuels: Producing Ethanol from Cellulosic Material • Determination of Moisture Content in Soil

		<ul style="list-style-type: none"> • Solid-Liquid Extraction • Testing For Genetically Modified Foods
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.B.	Forestry
Outline Level 4	IV.B.1.	<p>(Tree plantations; old growth forests; forest fires; forest management; national forests)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Using GIS to Investigate Urban Forestry
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.C.	Rangelands
Outline Level 4	IV.C.1.	<p>(Overgrazing; deforestation; desertification; rangeland management; federal rangelands)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.D.	Other Land Use
Outline Level 4	IV.D.1.	Urban land development
Outline Level 5	IV.D.1.a.	<p>(Planned development; suburban sprawl; urbanization)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Nutrients in Aquatic Ecosystems
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.D.	Other Land Use
Outline Level 4	IV.D.2.	Transportation infrastructure
Outline Level 5	IV.D.2.a.	<p>(Federal highway system; canals and channels; roadless areas; ecosystem impacts)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.D.	Other Land Use
Outline Level 4	IV.D.3.	Public and federal lands
Outline Level 5	IV.D.3.a.	<p>(Management; wilderness areas; national parks; wildlife refuges; forests; wetlands)</p>

		<u>JoVE</u> <ul style="list-style-type: none"> • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Using GIS to Investigate Urban Forestry
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.D.	Other Land Use
Outline Level 4	IV.D.4.	Land conservation options
Outline Level 5	IV.D.4.a.	(Preservation; remediation; mitigation; restoration) <u>JoVE</u> <ul style="list-style-type: none"> • Self-report vs. Behavioral Measures of Recycling
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.D.	Other Land Use
Outline Level 4	IV.D.5.	Sustainable land-use strategies <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.E.	Mining
Outline Level 4	IV.E.1.	(Mineral formation; extraction; global reserves; relevant laws and treaties) <u>JoVE</u> <ul style="list-style-type: none"> • Physical Properties Of Minerals I: Crystals and Cleavage • Physical Properties Of Minerals II: Polymineralic Analysis • Purification of a Total Lipid Extract with Column Chromatography
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	IV.	Land and Water Use
Outline Level 3	IV.G.	Global Economics
Outline Level 4	IV.G.1.	(Globalization; World Bank; Tragedy of the Commons; relevant laws and treaties) <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Lead Analysis of Soil Using Atomic Absorption Spectroscopy
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	V.	Energy Resources and Consumption

Outline Level 3	V.A.	Energy Concepts
Outline Level 4	V.A.1.	(Energy forms; power; units; conversions; Laws of Thermodynamics) <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Proton Exchange Membrane Fuel Cells • Raman Spectroscopy for Chemical Analysis
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	V.	Energy Resources and Consumption
Outline Level 3	V.B.	Energy Consumption
Outline Level 4	V.B.1.	History
Outline Level 5	V.B.1.a.	(Industrial Revolution; exponential growth; energy crisis) <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Fractional Distillation • Measuring Tropospheric Ozone • Proton Exchange Membrane Fuel Cells • Raman Spectroscopy for Chemical Analysis
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	V.	Energy Resources and Consumption
Outline Level 3	V.B.	Energy Consumption
Outline Level 4	V.B.2.	Present global energy use <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Proton Exchange Membrane Fuel Cells
Outline Level 4	V.B.3.	Future energy needs <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Proton Exchange Membrane Fuel Cells
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	V.	Energy Resources and Consumption
Outline Level 3	V.C.	Fossil Fuel Resources and Use
Outline Level 4	V.C.1.	(Formation of coal, oil, and natural gas; extraction/purification methods; world reserves and global demand; synfuels; environmental advantages/

		disadvantages of sources) <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Fractional Distillation • Proton Exchange Membrane Fuel Cells
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	V.	Energy Resources and Consumption
Outline Level 3	V.F.	Energy Conservation
Outline Level 4	V.F.1.	(Energy efficiency; CAFE standards; hybrid electric vehicles; mass transit) <u>JoVE</u> <ul style="list-style-type: none"> • Bacterial Growth Curve Analysis and its Environmental Applications • Biofuels: Producing Ethanol from Cellulosic Material • Proton Exchange Membrane Fuel Cells • Raman Spectroscopy for Chemical Analysis
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	V.	Energy Resources and Consumption
Outline Level 3	V.G.	Renewable Energy
Outline Level 4	V.G.1.	(Solar energy; solar electricity; hydrogen fuel cells; biomass; wind energy; small-scale hydroelectric; ocean waves and tidal energy; geothermal; environmental advantages/disadvantages) <u>JoVE</u> <ul style="list-style-type: none"> • Bacterial Growth Curve Analysis and its Environmental Applications • Biofuels: Producing Ethanol from Cellulosic Material • Proton Exchange Membrane Fuel Cells
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VI.	Pollution
Outline Level 3	VI.A.	Pollution Types
Outline Level 4	VI.A.1.	Air pollution
Outline Level 5	VI.A.1.a.	(Sources--primary and secondary; major air pollutants; measurement units; smog; acid deposition--causes and effects; heat islands and temperature inversions; indoor air pollution; remediation and reduction strategies; Clean Air Act and other relevant laws) <u>JoVE</u> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Gas Chromatography (GC) with Flame-Ionization

		Detection <ul style="list-style-type: none"> • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Measuring Tropospheric Ozone • Using GIS to Investigate Urban Forestry
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VI.	Pollution
Outline Level 3	VI.A.	Pollution Types
Outline Level 4	VI.A.2.	Noise pollution
Outline Level 5	VI.A.2.a.	(Sources; effects; control measures) <u>JoVE</u> <ul style="list-style-type: none"> • The Staircase Procedure for Finding a Perceptual Threshold
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VI.	Pollution
Outline Level 3	VI.A.	Pollution Types
Outline Level 4	VI.A.3.	Water pollution
Outline Level 5	VI.A.3.a.	(Types; sources, causes, and effects; cultural eutrophication; ground-water pollution; maintaining water quality; water purification; sewage treatment/septic systems; Clean Water Act and other relevant laws) <u>JoVE</u> <ul style="list-style-type: none"> • Algae Enumeration via Culturable Methodology • Biofuels: Producing Ethanol from Cellulosic Material • Detection of Bacteriophages in Environmental Samples • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Determining the Solubility Rules of Ionic Compounds • Dissolved Oxygen in Surface Water • Gram Staining of Bacteria from Environmental Sources • Introduction to Mass Spectrometry • Isolation of Fecal Bacteria from Water Samples by Filtration • Le Châtelier's Principle • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Making a Geologic Cross Section • Nutrients in Aquatic Ecosystems • Quantifying Environmental Microorganisms and Viruses Using qPCR • RNA Analysis of Environmental Samples Using RT-PCR • Self-report vs. Behavioral Measures of Recycling • Turbidity and Total Solids in Surface Water • Water Quality Analysis via Indicator Organisms • Zebrafish Maintenance and Husbandry
Outline Level 1	AP.ES.	Environmental Science Topic Outline

Outline Level 2	VI.	Pollution
Outline Level 3	VI.A.	Pollution Types
Outline Level 4	VI.A.4.	Solid waste
Outline Level 5	VI.A.4.a.	(Types; disposal; reduction) <u>JoVE</u> • Self-report vs. Behavioral Measures of Recycling
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VI.	Pollution
Outline Level 3	VI.B.	Impacts on the Environment and Human Health
Outline Level 4	VI.B.1.	Hazards to human health
Outline Level 5	VI.B.1.a.	(Environmental risk analysis; acute and chronic effects; dose-response relationships; air pollutants; smoking and other risks) <u>JoVE</u> • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Introduction to Mass Spectrometry • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Measuring Tropospheric Ozone • Nutrients in Aquatic Ecosystems • Peripheral Vascular Exam Using a Continuous Wave Doppler • Respiratory Exam I: Inspection and Palpation • Turbidity and Total Solids in Surface Water • Water Quality Analysis via Indicator Organisms
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VI.	Pollution
Outline Level 3	VI.B.	Impacts on the Environment and Human Health
Outline Level 4	VI.B.2.	Hazardous chemicals in the environment
Outline Level 5	VI.B.2.a.	(Types of hazardous waste; treatment/disposal of hazardous waste; cleanup of contaminated sites; biomagnification; relevant laws) <u>JoVE</u> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Introduction to Mass Spectrometry • Isolation of Fecal Bacteria from Water Samples by Filtration • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Nutrients in Aquatic Ecosystems

		<ul style="list-style-type: none"> • Self-report vs. Behavioral Measures of Recycling • Turbidity and Total Solids in Surface Water
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VI.	Pollution
Outline Level 3	VI.C.	Economic Impacts
Outline Level 4	VI.C.1.	<p>(Cost-benefit analysis; externalities; marginal costs; sustainability)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Measuring Tropospheric Ozone • Proton Exchange Membrane Fuel Cells • Using GIS to Investigate Urban Forestry
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VII.	Global Change
Outline Level 3	VII.A.	Stratospheric Ozone
Outline Level 4	VII.A.1.	<p>(Formation of stratospheric ozone; ultraviolet radiation; causes of ozone depletion; effects of ozone depletion; strategies for reducing ozone depletion; relevant laws and treaties)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Measuring Tropospheric Ozone
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VII.	Global Change
Outline Level 3	VII.B.	Global Warming
Outline Level 4	VII.B.1.	<p>(Greenhouse gases and the greenhouse effect; impacts and consequences of global warming; reducing climate change; relevant laws and treaties)</p> <p><u>JoVE</u></p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Measuring Tropospheric Ozone
Outline Level 1	AP.ES.	Environmental Science Topic Outline
Outline Level 2	VII.	Global Change
Outline Level 3	VII.C.	Loss of Biodiversity
Outline Level 4	VII.C.1.	Habitat loss; overuse; pollution; introduced species; endangered and extinct species

		<p>JoVE</p> <ul style="list-style-type: none"> • Analysis of Earthworm Populations in Soil • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Dissolved Oxygen in Surface Water • Introduction to Mass Spectrometry • Lead Analysis of Soil Using Atomic Absorption Spectroscopy • Measuring Tropospheric Ozone • Nutrients in Aquatic Ecosystems • Tree Identification: How To Use a Dichotomous Key • Tree Survey: Point-Centered Quarter Sampling Method • Turbidity and Total Solids in Surface Water • Water Quality Analysis via Indicator Organisms
Outline Level 4	VII.C.2.	<p>Maintenance through conservation</p> <p>JoVE</p> <ul style="list-style-type: none"> • Self-report vs. Behavioral Measures of Recycling
Outline Level 4	VII.C.3.	<p>Relevant laws and treaties</p> <p>JoVE</p> <ul style="list-style-type: none"> • Biofuels: Producing Ethanol from Cellulosic Material • Determination Of Nox in Automobile Exhaust Using UV-VIS Spectroscopy • Lead Analysis of Soil Using Atomic Absorption Spectroscopy