

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title		<i>Environmental Research and Technology</i>		Course Code	<i>[Office use only]</i>
Transcript Title:		Grades Levels:	11 th	Board Adoption Date:	
Content Area:	Science/CTE	GPA Scale:	4	Date Course Submitted:	3/18/2011
Credential Req:		Graduation Subject Areas:	Applied Skills	Elective	
UC/CSU "A-G" Area Approvals:	G		School Site that wrote and submitted the course:	CMHS	
Prerequisite(s):	Intro to Environmental Studies				
Next course(s):	Environmental Field Studies				

COURSE DESCRIPTION (catalog summary): Environmental Research and Technology is a highly relevant interdisciplinary course that focuses on research and technology applied to environmental issues. Projects are real world and geared towards current local and global topics. Air and water quality, natural resource management, environmental impact analysis, environmentally conscious product development, and energy management are some of the topics that will be included in this class. Research efforts will include working with other learning institutions on-line and/or in the field to gather and share experimental data. Emphasis will be placed on career preparation and 21st century job skills. Internship opportunities are available in this course.

GOALS (expected performance outcomes for students): Students will develop an understanding of environmental issues, current research results and methods, how to perform their own "action" research, and the importance of environmental issues to Southern California, to our global economy, and to the students themselves. Students will conduct their own community-based research project and present their results to peers and to the public. Students will produce their own environmental journal by combining and compiling project results in a scientific journal/binder for others to use. The journal will be used to monitor student participation and growth. Students will investigate multiple career opportunities in environmentally related fields and post descriptions of these in their journal. Students will apply language arts and mathematical skills to their environmental studies. Students will develop the skills to transfer their science knowledge to new situations and applications, including the professional world. Students will understand environmental principles and be able to apply them to social, economic, and ethical issues; students will be responsible for making decisions about their own health and environment. Students will continue to develop and maintain an ePortfolio in preparation for Senior Exit Projects, CTE Medallion application, and post-secondary career opportunities.

CALIFORNIA CONTENT STANDARDS (how the course aligns with California and/or national curriculum standards): CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l, 1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3. (Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and 12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7, 1.8, 2.5, 2.6. ELA Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4.

Foundation standards for Career Planning and Management, Technology, Problem Solving and Critical Thinking, Health and Safety, Responsibility and Flexibility, Ethics and Legal Responsibilities, Leadership and Teamwork, Technical Knowledge and Skills, and Demonstration and Application.

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CTE Standards for the Agriscience Pathway (C): 1.5, 2.0-2.5, 3.2-3.4, 4.3, 5.0-5.4, 6.0-6.2, 7.0-7.5, 10.0-10.4, 11.0-11.6, 12.0-12.3, 13.0-13.3.

CTE Standards for the Forestry and Natural Resources Pathway (E): 1.0-1.5, 2.0-2.6, 3.0-3.5, 4.2-4.3, 5.0-5.7, 6.0-6.6, 7.1-7.2, 7.4-7.5, 8.0-8.4, 9.1-9.3, 10.1-10.4, 11.2, 11.4, 13.0-13.4.

EVALUATION (how the effectiveness of the course will be monitored and assessed): Students will be evaluated based on individual and group formative and summative assessments. No state assessments exist for this course at this time.

Unit 1	Length of Unit: 4 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Research in Environmental Science	Experiment Observation Case study Validity Reproducibility Sample size Variability Outliers Control Variable Quantitative data Qualitative data Nominal Ordinal Interval Ratio Precision Accuracy Statistics Academic integrity Citing sources Abstract Introduction Methods Results Discussion Bibliography	CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l, 1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3. (Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and 12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7, 1.8, 2.5, 2.6. ELA Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4. Foundation standards for Career Planning and Management, Technology, Problem Solving and Critical Thinking, Health and Safety, Responsibility and Flexibility, Ethics	Salinization experiment Field observations project Mapping our World – population Analyzing our World – geology Analyzing our World – transportation Wooly Worm Lab Academic Research Project	<u>Environmental Science</u> by Botkin & Keller <u>Mapping Our World</u> by ESRI Press <u>Analyzing Our World</u> by ESRI Press <u>Making Spatial Decisions</u> by ESRI Press <u>A Beginner's Guide to the Scientific Method</u> by S.S. Carey <u>Scientific Writing and Communication</u> by A.H. Hofmann <u>Focus in High School Mathematics: Statistics and Probability</u> by NCTM <u>Green Jobs for a New Economy</u> by Peterson's USGBC website ArcGIS 10 PASCO probes Microsoft Office Library databases Microscopes Stereoscopes

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presentations		and Legal Responsibilities, Leadership and Teamwork, Technical Knowledge and Skills, and Demonstration and Application. CTE Standards for the Agriscience Pathway (C): 3.2-3.4, 13.0-13.3. CTE Standards for the Forestry and Natural Resources Pathway (E): 11.2, 11.4.		Water quality tests Air quality tests Soil quality tests
Differentiation	Support -- for students who are struggling with the content	Content: Modified reading assignments Process: Extended time, scaffold instructions, partner work, peer tutoring, modified assignments Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, artistic design, lab design, and mode of presentation. Students can also study similar topics at varying degrees of depth and complexity.		
	Extension – for high achieving students.	Content: Modified reading assignments Process: Extension activities, autonomous investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater depth of research into a given topic		
Evaluation	Formative Assessments (ongoing & mid-lesson): Periodic checking for understanding; progress checks for projects; review of laboratory set-up, purpose, and hypothesis prior to beginning experiments; worksheets; submission of research summaries; student surveys; ePortfolio progress checks			
	Summative Assessments (unit final evaluation): Project evaluations by peers and teacher; formal laboratory reports; technology proficiency tests; formal presentations; ePortfolio final evaluation			

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Unit 2	Length of Unit: 4 to 5 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Technology and the Environment What to use How to use it Impact on Environmental Science Using technology to solve SoCal problems Using technology to solve global problems	Microscope Oil immersion microscope Stereoscope Digital probe Geographic information systems ArcGIS Global positioning system Remote sensing Biotechnology Genetics DNA fingerprinting Radio tagging Surveying Topography Navigation	CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l, 1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3. (Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and 12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7, 1.8, 2.5, 2.6. ELA Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4. Foundation standards for Career Planning and Management, Technology, Problem Solving and Critical Thinking, Health and Safety, Responsibility and Flexibility, Ethics and Legal Responsibilities, Leadership and Teamwork, Technical Knowledge and Skills, and Demonstration and Application. CTE Standards for the Agriscience Pathway (C): 3.2-3.4, 13.0-13.3. CTE Standards for the Forestry and	Analyzing our World – Millenium Development Goals Analyzing our World – Population Growth Making Spatial Decisions – Demography Mapping Hazardous Materials Corridors Water Quality Analysis and Reporting Remote Sensing Applications	<u>Environmental Science</u> by Botkin & Keller <u>Mapping Our World</u> by ESRI Press <u>Analyzing Our World</u> by ESRI Press <u>Making Spatial Decisions</u> by ESRI Press <u>A Beginner's Guide to the Scientific Method</u> by S.S. Carey <u>Scientific Writing and Communication</u> by A.H. Hofmann <u>Focus in High School Mathematics: Statistics and Probability</u> by NCTM <u>Green Jobs for a New Economy</u> by Peterson's USGBC website ArcGIS 10 PASCO probes Microsoft Office Library databases Microscopes

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		Natural Resources Pathway (E): 11.2, 11.4.		Stereoscopes Water quality tests Air quality tests Soil quality tests
Differentiation	Support -- for students who are struggling with the content	Content: Modified reading assignments Process: Extended time, scaffold instructions, partner work, peer tutoring, modified assignments Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, artistic design, lab design, and mode of presentation. Students can also study similar topics at varying degrees of depth and complexity.		
	Extension – for high achieving students.	Content: Modified reading assignments Process: Extension activities, autonomous investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater depth of research into a given topic		
Evaluation	Formative Assessments (ongoing & mid-lesson): Periodic checking for understanding; progress checks for projects; review of laboratory set-up, purpose, and hypothesis prior to beginning experiments; worksheets; submission of research summaries; student surveys; ePortfolio progress checks			
	Summative Assessments (unit final evaluation): Project evaluations by peers and teacher; formal laboratory reports; technology proficiency tests; formal presentations; ePortfolio final evaluation			

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Unit 3	Length of Unit: 4 to 5 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Natural Resources and Energy Renewable and nonrenewable resources Alternative Energy Energy in Southern California Distribution Ownership Use Degradation	Forms of energy Renewable Nonrenewable Nuclear fission Nuclear fusion Oil shale Tar sands Hydrofracking Photovoltaic Passive solar design Solar heat collectors Turbine Generator Transformer Degradation	CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l, 1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3. (Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and 12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7, 1.8, 2.5, 2.6. ELA Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4. Foundation standards for Career Planning and Management, Technology, Problem Solving and Critical Thinking, Health and Safety, Responsibility and Flexibility, Ethics and Legal Responsibilities, Leadership and Teamwork, Technical Knowledge and Skills, and Demonstration and Application. CTE Standards for the Agriscience Pathway (C): 1.5, 2.4-2.5, 13.0-13.3. CTE Standards for the Forestry and	Forms of Energy – Investigation SoCal Energy Generation Project Solar Cooker Design Project Mapping the Change – historic and present natural resource distribution	<u>Environmental Science</u> by Botkin & Keller <u>Mapping Our World</u> by ESRI Press <u>Analyzing Our World</u> by ESRI Press <u>Making Spatial Decisions</u> by ESRI Press <u>A Beginner's Guide to the Scientific Method</u> by S.S. Carey <u>Scientific Writing and Communication</u> by A.H. Hofmann <u>Focus in High School Mathematics: Statistics and Probability</u> by NCTM <u>Green Jobs for a New Economy</u> by Peterson's USGBC website ArcGIS 10 PASCO probes Microsoft Office Library databases Microscopes Stereoscopes Water quality tests Air quality tests Soil quality tests

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		Natural Resources Pathway (E): 1.0-1.5, 10.1-10.4, 11.2, 11.4.		
Differentiation	Support -- for students who are struggling with the content	Content: Modified reading assignments Process: Extended time, scaffold instructions, partner work, peer tutoring, modified assignments Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, artistic design, lab design, and mode of presentation. Students can also study similar topics at varying degrees of depth and complexity.		
	Extension – for high achieving students.	Content: Modified reading assignments Process: Extension activities, autonomous investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater depth of research into a given topic		
Evaluation	Formative Assessments (ongoing & mid-lesson): Periodic checking for understanding; progress checks for projects; review of laboratory set-up, purpose, and hypothesis prior to beginning experiments; worksheets; submission of research summaries; student surveys; ePortfolio progress checks			
	Summative Assessments (unit final evaluation): Project evaluations by peers and teacher; formal laboratory reports; technology proficiency tests; formal presentations; ePortfolio final evaluation			

Unit 4	Length of Unit: 4 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Pollutants and Waste	Point source Nonpoint source Heavy metals Chemical waste RCRA CERCLA Hazardous waste	CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l,	Making Spatial Decisions – Hazardous materials decisions Waste Management/Recycling Facility Tour Landfill Simulation project	<u>Environmental Science</u> by Botkin & Keller <u>Mapping Our World</u> by ESRI Press <u>Analyzing Our World</u> by ESRI Press

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Effects on the environment	Criteria air pollutants	1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3. (Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and 12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7, 1.8, 2.5, 2.6. ELA Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4.	Leachate Treatment experiment		<u>Making Spatial Decisions</u> by ESRI Press
Pollution reduction and prevention	e-waste		Exporting Harm: an E-Waste project		<u>A Beginner's Guide to the Scientific Method</u> by S.S. Carey
Types and Sources	Ppt		Land application – Phytoremediation study		<u>Scientific Writing and Communication</u> by A.H. Hofmann
Measuring concentration	Ppm				<u>Focus in High School Mathematics: Statistics and Probability</u> by NCTM
Methods for disposal	Ppb				<u>Green Jobs for a New Economy</u> by Peterson's
History of disposal success	Integrated waste management				USGBC website
Disposal alternatives	Incineration				ArcGIS 10
	Deep-well disposal				PASCO probes
	Surface impoundment				Microsoft Office
	Phytoremediation				Library databases
	Sanitary landfill				Microscopes
	Secure landfill				Stereoscopes
	Leachate				Water quality tests
	Source reduction				Air quality tests
	Material substitution				Soil quality tests
	Manufacturing efficiency				
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	Extension – for high achieving students.	Content: Modified reading assignments Process: Extension activities, autonomous investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater depth of research into a given topic
Evaluation	Formative Assessments (ongoing & mid-lesson): Periodic checking for understanding; progress checks for projects; review of laboratory set-up, purpose, and hypothesis prior to beginning experiments; worksheets; submission of research summaries; student surveys; ePortfolio progress checks	
	Summative Assessments (unit final evaluation): Project evaluations by peers and teacher; formal laboratory reports; technology proficiency tests; formal presentations; ePortfolio final evaluation	

Unit 5	Length of Unit: 4 weeks to begin, then ongoing throughout second semester, final presentations during last 4-6 weeks of course			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Local Environmental Problems	Nitrates Phosphates Dissolved oxygen Ammonia Turbidity pH Salinity	CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l, 1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3.	Water Quality Analysis Lab Mapping SoCal Water Supplies Mapping SoCal Air Pollution Land Use Decisions Project	<u>Environmental Science</u> by Botkin & Keller <u>Mapping Our World</u> by ESRI Press <u>Analyzing Our World</u> by ESRI Press <u>Making Spatial Decisions</u> by ESRI Press
Air pollution	TDS Pesticides	(Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and 12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7,	SoCal Endangered Species Report SoCal Commutes – investigation Marine Protected Areas – debate project	<u>A Beginner's Guide to the Scientific Method</u> by S.S. Carey <u>Scientific Writing and Communication</u> by
Water quality and availability	Sulfur dioxide Particulate matter Ozone		Local Environmental Issues Action Research Project (extended)	
Urbanization	Nitrogen oxides Carbon monoxide			
Endangered species	Lead Volatile organic			

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Land degradation Transportation Coastal habitats	compounds PCBs DDT Heavy metals Urban sprawl Habitat corridors Ecological island Habitat degradation Invasive species Over-extraction Overgrazing Desertification Salinization Mass transit Public transportation CNG Hydrogen fuel cells Biofuels Coastal tourism Marine protected areas Rocky intertidal Kelp forest Urban runoff Wetlands Natural ecosystem services Coastal dunes Coastal sage scrub Biodiversity hotspot	1.8, 2.5, 2.6. ELA Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4. Foundation standards for Career Planning and Management, Technology, Problem Solving and Critical Thinking, Health and Safety, Responsibility and Flexibility, Ethics and Legal Responsibilities, Leadership and Teamwork, Technical Knowledge and Skills, and Demonstration and Application. CTE Standards for the Agriscience Pathway (C): 1.5, 2.0-2.5, 10.0-10.4, 12.0-12.3, 13.0-13.3. CTE Standards for the Forestry and Natural Resources Pathway (E): 1.0-1.5, 2.0-2.6, 5.1-5.3, 5.6, 6.0-6.6, 9.1-9.3, 11.2, 11.4, 13.4.	investigation)	A.H. Hofmann Focus in High School <u>Mathematics:</u> <u>Statistics and</u> <u>Probability</u> by NCTM <u>Green Jobs for a</u> <u>New Economy</u> by Peterson's USGBC website ArcGIS 10 PASCO probes Microsoft Office Library databases Microscopes Stereoscopes Water quality tests Air quality tests Soil quality tests
Differentiation	Support -- for students who are	Content: Modified reading assignments Process: Extended time, scaffold instructions, partner work, peer tutoring, modified assignments		

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	struggling with the content	Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, artistic design, lab design, and mode of presentation. Students can also study similar topics at varying degrees of depth and complexity.
	Extension – for high achieving students.	Content: Modified reading assignments Process: Extension activities, autonomous investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater depth of research into a given topic
Evaluation	Formative Assessments (ongoing & mid-lesson): Periodic checking for understanding; progress checks for projects; review of laboratory set-up, purpose, and hypothesis prior to beginning experiments; worksheets; submission of research summaries; student surveys; ePortfolio progress checks	
	Summative Assessments (unit final evaluation): Project evaluations by peers and teacher; formal laboratory reports; technology proficiency tests; formal presentations; ePortfolio final evaluation	

Unit 6	Length of Unit: 4 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Social Responsibility and Ethics Laws and regulations Ethics and standards	Environmental law Clean Air Act Clean Water Act Endangered Species Act Environmental Protection Agency RCRA CERCLA FDA	CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l, 1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3. (Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and	Environmental Legislation presentations Mock Congress debate Environmental Ad Campaign Consumerism and Production Project	<u>Environmental Science</u> by Botkin & Keller <u>Mapping Our World</u> by ESRI Press <u>Analyzing Our World</u> by ESRI Press <u>Making Spatial Decisions</u> by ESRI Press <u>A Beginner's Guide to the Scientific</u>

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Economics	Food Quality Protection Act Taylor Grazing Act National Wilderness System National Park System Federal lands Private lands Environmental justice Local undesirable land uses NIMBY Siting decisions External costs Subsidies Tax rebates Incentives Lobbyists Non-profits Special interest groups Fair wage Tariff Ecological economics	12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7, 1.8, 2.5, 2.6. ELA Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4. Foundation standards for Career Planning and Management, Technology, Problem Solving and Critical Thinking, Health and Safety, Responsibility and Flexibility, Ethics and Legal Responsibilities, Leadership and Teamwork, Technical Knowledge and Skills, and Demonstration and Application. CTE Standards for the Agriscience Pathway (C): 3.3-3.4, 4.3, 13.0-13.3. CTE Standards for the Forestry and Natural Resources Pathway (E): 1.3, 2.1, 2.6, 5.6-5.7, 10.1-10.2, 13.0-13.4.	<u>Method</u> by S.S. Carey <u>Scientific Writing and Communication</u> by A.H. Hofmann <u>Focus in High School Mathematics: Statistics and Probability</u> by NCTM <u>Green Jobs for a New Economy</u> by Peterson's USGBC website ArcGIS 10 PASCO probes Microsoft Office Library databases Microscopes Stereoscopes Water quality tests Air quality tests Soil quality tests
Differentiation	Support -- for students who are struggling with the content	Content: Modified reading assignments Process: Extended time, scaffold instructions, partner work, peer tutoring, modified assignments Product: See "Model Tasks" – many products include elements of student choice and personalization such as topic, artistic design, lab design, and mode of presentation. Students can also study similar topics at varying degrees of depth and complexity.	

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Evaluation	Formative Assessments (ongoing & mid-lesson): Periodic checking for understanding; progress checks for projects; review of laboratory set-up, purpose, and hypothesis prior to beginning experiments; worksheets; submission of research summaries; student surveys; ePortfolio progress checks	
	Summative Assessments (unit final evaluation): Project evaluations by peers and teacher; formal laboratory reports; technology proficiency tests; formal presentations; ePortfolio final evaluation	

Unit 7	Length of Unit: 4 to 5 weeks			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Future research and development Preservation Conservation Restoration Sustainability Product	Green technology Sustainable design Closed-loop production Sustainable development Preservation Conservation Mitigation Remediation Restoration Ecological footprint Reduce Reuse	CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l, 1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3. (Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and 12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7, 1.8, 2.5, 2.6. ELA	Making Spatial Decisions – Hurricane Damage Eco-Home project Future World Research & Design	<u>Environmental Science</u> by Botkin & Keller <u>Mapping Our World</u> by ESRI Press <u>Analyzing Our World</u> by ESRI Press <u>Making Spatial Decisions</u> by ESRI Press <u>A Beginner's Guide to the Scientific Method</u> by S.S. Carey <u>Scientific Writing and Communication</u> by A.H. Hofmann <u>Focus in High School</u>

Newport-Mesa Unified School District
Office of Secondary Curriculum and Instruction
High School Course of Study

Course Title	<i>Environmental Research and Technology</i>		Course Code	<i>[Office use only]</i>
development Urban and economic development Design with environmental awareness	Recycle Low-impact design Cal Green building code LEED certified USGBC Green construction	Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4. Foundation standards for Career Planning and Management, Technology, Problem Solving and Critical Thinking, Health and Safety, Responsibility and Flexibility, Ethics and Legal Responsibilities, Leadership and Teamwork, Technical Knowledge and Skills, and Demonstration and Application. CTE Standards for the Agriscience Pathway (C): 1.5, 2.1, 2.3-2.5, 3.2-3.4, 4.3, 13.0-13.3. CTE Standards for the Forestry and Natural Resources Pathway (E): 1.1-1.3, 1.5, 2.0-2.6, 3.2, 6.6, 10.111.2, 11.4.		<u>Mathematics: Statistics and Probability</u> by NCTM <u>Green Jobs for a New Economy</u> by Peterson's USGBC website ArcGIS 10 PASCO probes Microsoft Office Library databases Microscopes Stereoscopes Water quality tests Air quality tests Soil quality tests
Differentiation	Support -- for students who are struggling with the content	Content: Modified reading assignments Process: Extended time, scaffold instructions, partner work, peer tutoring, modified assignments Product: See "Model Tasks" – many products include elements of student choice and personalization such as topic, artistic design, lab design, and mode of presentation. Students can also study similar topics at varying degrees of depth and complexity.		
	Extension – for high achieving students.	Content: Modified reading assignments Process: Extension activities, autonomous investigation, independent research, modified assignments Product: See "Model Tasks" – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater depth of research		

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		into a given topic
Evaluation	Formative Assessments (ongoing & mid-lesson): Periodic checking for understanding; progress checks for projects; review of laboratory set-up, purpose, and hypothesis prior to beginning experiments; worksheets; submission of research summaries; student surveys; ePortfolio progress checks	
	Summative Assessments (unit final evaluation): Project evaluations by peers and teacher; formal laboratory reports; technology proficiency tests; formal presentations; ePortfolio final evaluation	

Unit 8	Length of Unit: ongoing throughout the course, with the final weeks of second semester being used for ePortfolio conferences and internship evaluations			
	Key Vocabulary	Standards (referenced)	Model Tasks	Tools / Texts
Career and College Preparation	Resume Curriculum vitae Letter of introduction Letter of recommendation 21 st century skills Professional Personal Business attire Earning potential Job outlook Government Industry Non-profit Retail Forestry careers Agricultural careers Green Industry Marine science careers Collaboration	CTE Agriculture and Natural Resources Industry Sector Standards: (Academics) Algebra I 10.0, 12.0, 13.0, 15.0. Geometry 8.0, 10.0, 11.0, 12.0. Probability and Statistics 8.0. Science Investigation and Experimentation 1a, 1c, 1d, 1f, 1j, 1l, 1m. Economics 12.2, 12.2.2, 12.2.3, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.4, 12.4.3. (Communications) ELA Reading 9th and 10th 2.1, 2.2, 2.3, 2.6, 2.7, 2.8. ELA Reading 11th and 12th 2.1, 2.3, 2.4. ELA Writing 9th and 10th 1.1, 1.2, 1.3, 1.5, 2.3, 2.5, 2.6. ELA Writing 11th and 12th 1.3, 1.6, 1.7, 1.8, 2.5, 2.6. ELA Conventions 9th and 10th 1.1, 1.2, 1.3. ELA Listening and Speaking 9th and 10th 1.1, 1.7, 2.2, 2.3. ELA Listening and Speaking 11th and 12th 1.8, 1.14, 2.4. Foundation standards for Career	ePortfolio KUDER assessment retake Mock job interview Green Jobs Presentation	<u>Environmental Science</u> by Botkin & Keller <u>Mapping Our World</u> by ESRI Press <u>Analyzing Our World</u> by ESRI Press <u>Making Spatial Decisions</u> by ESRI Press <u>A Beginner's Guide to the Scientific Method</u> by S.S. Carey <u>Scientific Writing and Communication</u> by A.H. Hofmann <u>Focus in High School Mathematics: Statistics and Probability</u> by NCTM <u>Green Jobs for a New Economy</u> by Peterson's USGBC website ArcGIS 10

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Course Title		Environmental Research and Technology		Course Code	[Office use only]
	Entry-level Certification Degree	Planning and Management, Technology, Problem Solving and Critical Thinking, Health and Safety, Responsibility and Flexibility, Ethics and Legal Responsibilities, Leadership and Teamwork, Technical Knowledge and Skills, and Demonstration and Application.			PASCO probes Microsoft Office Library databases Microscopes Stereoscopes Water quality tests Air quality tests Soil quality tests
Differentiation	Support -- for students who are struggling with the content	Content: Modified reading assignments Process: Extended time, scaffold instructions, partner work, peer tutoring, modified assignments Product: See “Model Tasks” – many products include elements of student choice and personalization such as topic, artistic design, lab design, and mode of presentation. Students can also study similar topics at varying degrees of depth and complexity.			
	Extension – for high achieving students.	Content: Modified reading assignments Process: Extension activities, autonomous investigation, independent research, modified assignments Product: See “Model Tasks” – many products inherently contain elements for building depth for high achieving students, including more rigorous experimental design elements and greater depth of research into a given topic			
Evaluation	Formative Assessments (ongoing & mid-lesson): Periodic checking for understanding; progress checks for projects; review of laboratory set-up, purpose, and hypothesis prior to beginning experiments; worksheets; submission of research summaries; student surveys; ePortfolio progress checks				
	Summative Assessments (unit final evaluation): Project evaluations by peers and teacher; formal laboratory reports; technology proficiency tests; formal presentations; ePortfolio final evaluation				