

**Syracuse City School District**  
**Career and Technical Education Program**  
**Course Syllabus**  
**NAR100: Natural Resources 100**



### **Course Description**

This course introduces students to the study of natural resources in an outdoor and classroom setting through hands-on activities and learning. Students will work in groups to investigate and help solve environmental problems and will explore careers available in the natural resources pathways. Major areas of study include environmental health, science measurement and skills, ecology, biomes and ecosystems, population studies, tradeoff investigations, and mineral use and identification. Students will develop an integrated view of the biological, ecological and social dimensions of the environment and can earn credits from SUNY-ESF, Syracuse University Project Advance and Onondaga Community College.

Career opportunities include Environmental Engineer/Scientist/Specialist, Natural Science Manager

### **Course Objectives**

1. Students will be able to identify different types of natural resources and describe their uses and any issues surrounding them.
2. Students will learn how to work in a group and be a good group member to help solve problems collectively.
3. Students will participate in several field trips to explore career opportunities in the natural resource field.

### **Integrated Academics**

This course will help prepare students to be successful on the Living Environment and/or Earth Science Regents exam if needed.

### **Equipment and Supplies**

- **School will provide:** Field trip opportunities, lab supplies and materials and any safety equipment when necessary.
- **Student will provide:** Composition notebook to be used as a field journal, 2-3 inch 3 ring binder to be used as students working portfolio, plastic sheet protectors.

### **Textbook**

Environmental Science; Houghton, Mifflin, Harcourt 2013

### **Grading**

Students will be provided with several opportunities to show their learning throughout the course. These opportunities will include homework and classwork assignments, vocabulary quizzes, laboratory reports, projects, unit exams, and hands-on lab practical exams.

### **Additional Course Policies**

As with any science course safety is the number one priority for students at all times. Students must follow all safety rules and procedures and any additional safety precautions provided by the instructor. Any failure to comply with safety rules and procedures will result in removal from the classroom for that day and possible removal from the program if the unsafe behavior persists.

## Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none"><li>• Introduction to Science and the Environment</li><li>• Ecology</li></ul>
2	<ul style="list-style-type: none"><li>• Populations</li><li>• Water, Air and Land</li></ul>
3	<ul style="list-style-type: none"><li>• Minerals</li><li>• Energy Resources</li></ul>
4	<ul style="list-style-type: none"><li>• Environmental Health</li><li>• The Future</li><li>• Review/Culminating Activities or Projects</li></ul>

**Syracuse City School District  
Career and Technical Education Program  
Scope and Sequence  
NAR100: Natural Resources 100**



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
<b>Weeks 1-6</b>  <b>Introduction to Science and the Environment</b>	<ul style="list-style-type: none"> <li>• What is Environmental Science?</li> <li>• What 5 major fields of study contribute to Environmental Science?</li> <li>• How did each stage in human development affect the planet/environment?</li> <li>• What are the main environmental problems throughout history and today?</li> <li>• How do scientists solve problems and communicate their knowledge?</li> </ul>	<ul style="list-style-type: none"> <li>• Define and explain proper science lab and field safety procedures</li> <li>• Distinguish between types of resources (renewable, nonrenewable)</li> <li>• Scientific inquiry progresses through a continuous cycle of questioning, data collection, interpretation, analysis, and critical review by other scientists (the scientific method)</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Lab Safety/Introduction to field study</li> <li>• Let's Graph</li> <li>• Making Metric Measurements and Conversions</li> <li>• Microscope Measurement</li> <li>• Ecological Footprints</li> </ul> Project: <ul style="list-style-type: none"> <li>• Scientific Method Project</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter Questions</li> <li>• Vocabulary</li> <li>• Skill Builders</li> </ul> Class Work: <ul style="list-style-type: none"> <li>• Journal Writing</li> <li>• Case Studies</li> <li>• Current Events</li> <li>• Readings and Text-based Questions</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> <li>• Metric Measurement and conversions</li> <li>• Lab Safety</li> <li>• Graphing</li> </ul>	<b>Career Ready Practices</b> CRP2,4,5	<b>Literacy</b> RI.9-10.1,4 RST.9-10.1,3,4,7 WHST.9-10.2,6
				<b>Cluster Standards</b> AG2,3	<b>ELA</b> RSI.9-10.1-8 W.9-10.3,4,6,10 SL.9-10.1,4 L.9-10.1,2,3,4,6
				<b>Pathway Standards</b> AG-ENV1,5	<b>Math</b> HSS.IC.A.1 HSS.IC.B.3
					<b>Science</b> HS.ES2 HS.ES3 HS.ETS1

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
			Field Trip/Field work: <ul style="list-style-type: none"> <li>School Grounds</li> <li>ESF forest in Tully</li> </ul>		
<b>Weeks 7-12</b>  <b>Ecology</b>	<ul style="list-style-type: none"> <li>What are the components of an ecosystem?</li> <li>How do organisms interact in an ecosystem?</li> <li>What is a biome?</li> <li>What are the different biomes and what determines them?</li> <li>How are biomes related to ecosystems?</li> <li>How do ecosystems change over time?</li> <li>How do humans affect different ecosystems?</li> </ul>	<ul style="list-style-type: none"> <li>Describe the biotic and abiotic factors that make up an ecosystem and how they interact</li> <li>Describe how energy is transferred through an ecosystem from producers to consumers</li> <li>Explain the relationship between producers and consumers</li> <li>Describe the cycling of carbon, nitrogen, and phosphorous through an ecosystem</li> <li>Identify ways human activities affect the cycling of materials</li> <li>Describe the 2 types of ecological succession</li> <li>Name and describe the biomes and explain why vegetation is used to classify them</li> <li>Describe the diversity of species types on Earth</li> <li>Explain why biodiversity is important to ecosystems and humans</li> </ul>	Labs: <ul style="list-style-type: none"> <li>Ecosystem in a Jar</li> <li>Pond Water Safari</li> <li>Food Webs</li> <li>Cycling Nutrients through an Ecosystem</li> <li>Owl Pellet Dissection</li> </ul> Dichotomous Keys Project: <ul style="list-style-type: none"> <li>Biomes of the World (presentation with PowerPoint or Prezi)</li> </ul> HW: <ul style="list-style-type: none"> <li>Chapter Questions</li> <li>Vocabulary</li> <li>Skill builders</li> </ul> Class work: <ul style="list-style-type: none"> <li>Journal Writing</li> <li>Case Studies</li> <li>Current Events</li> <li>Reading passages with text dependent questions</li> <li>Tests: <ul style="list-style-type: none"> <li>Chapter</li> <li>Unit</li> </ul> </li> <li>Quizzes: <ul style="list-style-type: none"> <li>Vocabulary</li> <li>Parts of an Ecosystem</li> </ul> </li> </ul>	<b>Career Ready Practices</b> CRP1,2,4,5,8  <b>Cluster Standards</b> AG1,2,6  <b>Pathway Standards</b> AG-ANI5 AG-ENV2,3	<b>Literacy</b> RI.9-10.1,4 RST.9-10.1,3,4,7 WHST.9-10.2,6  <b>ELA</b> RSI.9-10.1-8 W.9-10.3,4,6,10 SL.9-10.1,4,5 L.9-10.1,2,3,4,6  <b>Math</b> HSS.ID.C.7 HSS.ID.C.9 HSS.IC.A.1 HSS.IC.B.3 HSS.IC.B.6  <b>Science</b> HS.LS2 HS.LS4 HS.ES3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
			<ul style="list-style-type: none"> <li>• Food Webs</li> <li>• Biomes</li> <li>• Field Trip/Field work:</li> <li>• Using Field Guides to Identify Local Organisms</li> </ul>		
<b>Weeks 13-17</b>  <b>Populations</b>	<ul style="list-style-type: none"> <li>• What are populations?</li> <li>• What limits population growth?</li> <li>• How has the human population changed over time?</li> <li>• How does an increased human population affect finite resources?</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the 3 main properties of a population</li> <li>• Describe logistic vs. exponential population growth</li> <li>• Explain how population sizes are regulated in nature</li> <li>• Explain carrying capacity and limiting factors</li> <li>• Explain predator and prey relationships and adaptations for survival</li> <li>• Explain density dependent and density independent limiting factors</li> <li>• Describe how the human population has changed over the last 200 years</li> <li>• Describe 3 problems caused by rapid human population growth</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Kaibab Deer</li> <li>• Predator-Prey Relationships</li> <li>• Population Growth</li> <li>• Sampling Methods</li> <li>• Human Population Growth</li> <li>• Calculating Generation Rate</li> </ul> Projects: <ul style="list-style-type: none"> <li>• Endangered Species Project (just written)</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter Questions</li> <li>• Vocabulary</li> <li>• Skill Builders</li> <li>• Class Work:</li> <li>• Case Studies</li> <li>• Current Events</li> <li>• Reading passages with text dependent questions</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes:	<b>Career Ready Practices</b> CRP1,2,4,5,7,8,11  <b>Cluster Standards</b> AG1,2,6  <b>Pathway Standards</b> AG-NR1,2,3	<b>Literacy</b> RST.9-10.1,3,4,7 WHST.9-10.2,6  <b>ELA</b> RSI.9-10.1-8 W.9-10.1,3,4,5,6,9,10 SL.9-10.1,4,5 L.9-10.1,2,3,4,6  <b>Math</b> HSS.ID.C.7 HSS.ID.C.9 HSS.IC.A.1 HSS.IC.B.3 HSS.IC.B.6  <b>Science</b> HS.LS2 HS.ES3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
			<ul style="list-style-type: none"> <li>• Vocabulary</li> <li>Graphing population data</li> <li>• Map Skills</li> <li>Fieldtrip/Fieldwork:               <ul style="list-style-type: none"> <li>• Rosamond Gifford Zoo</li> <li>• Fish Hatchery</li> <li>• Sampling Practice (local)</li> </ul> </li> </ul>		
<b>Weeks 18-22</b>  <b>Water, Air and Land</b>	<ul style="list-style-type: none"> <li>• What are the parts of the water cycle and how do humans affect each part?</li> <li>• How is our water supply protected?</li> <li>• What is the ozone field?</li> <li>• What are the causes and effects of pollution?</li> <li>• What causes acid precipitation and what are the effects?</li> <li>• What is climate change and what are the causes and effects?</li> <li>• How do we use land?</li> <li>• What is land management and why is it important?</li> <li>• How are policies made surrounding the use of air, water, and land?</li> <li>• What is a tradeoff and what role do they play in making environmental policies?</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the water cycle.</li> <li>• Discuss the distribution of water on Earth</li> <li>• Explain why freshwater is a limited resource.</li> <li>• Identify patterns of global water use</li> <li>• Identify ways water can be conserved</li> <li>• Describe types of water pollution and their sources</li> <li>• Describe the laws designed to improve water quality</li> <li>• Name air pollutants and provide sources</li> <li>• Describe how air pollution affects human health</li> <li>• Explain the cause of acid rain and the effect it has on the environment</li> <li>• Explain how the ozone shield protects the Earth</li> <li>• Explain the greenhouse effect</li> <li>• Explain why the carbon dioxide level of the atmosphere is increasing and name the sources</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Water Cycle</li> <li>• Water Quality</li> <li>• Ground Water Filtration</li> <li>• Oil Spill</li> <li>• pH Lab</li> <li>• Acid Rain</li> <li>• Land Use</li> <li>• Topographic Maps</li> <li>• Climatographs</li> </ul> Projects: <ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Persuasive Writing (with debate)</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter Questions</li> <li>• Vocabulary</li> <li>• Skill Builders</li> <li>• Reading passages and text dependent questions</li> </ul> Class Work: <ul style="list-style-type: none"> <li>• Case Studies</li> <li>• Daily Journal Writing</li> <li>• Current Events</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul>	<b>Career Ready Practices</b> CRP2,4,5,6,7,8,11  <b>Cluster Standards</b> AG1,6  <b>Pathway Standards</b> AG-NR1,2	<b>Literacy</b> RST.9-10.1,3,4,7 WHST.9-10.2,6  <b>ELA</b> RSI.9-10.1-9 W.9-10.3,4,6,10 SL.9-10.1,4,5 L.9-10.1,2,3,4,6  <b>Math</b> HSS.ID.C.9 HSS.IC.B.6 HSS.IC.B.5  <b>Science</b> HS.ES2 HS.ES3 HS.LS2

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
		<ul style="list-style-type: none"> <li>Describe the effects of a warmer Earth</li> <li>Determine the pro's and con's of environmental situations and use them to make a decision</li> </ul>	Quizzes: <ul style="list-style-type: none"> <li>Vocabulary</li> <li>Graphing</li> <li>Map Skills</li> </ul> Fieldtrip/Fieldwork <ul style="list-style-type: none"> <li>Waste Water Facility (Minoa)</li> <li>Chittenango Falls</li> </ul>		
<b>Weeks 23-26</b>  <b>Minerals</b>	<ul style="list-style-type: none"> <li>What is a mineral?</li> <li>What are the properties of minerals?</li> <li>How do minerals form?</li> <li>What uses do we have for minerals?</li> <li>What are the environmental impacts of mining minerals?</li> </ul>	<ul style="list-style-type: none"> <li>Define the term mineral</li> <li>Describe the properties of minerals and how to identify minerals based on their properties</li> <li>Describe the process by which a mineral forms</li> <li>Describe mineral extraction</li> <li>Describe the methods used for mining minerals</li> <li>Describe the possible environmental impacts of mineral mining and extraction</li> <li>Describe the economic impacts of mining for countries</li> <li>Describe how the government regulates mining</li> </ul>	Labs: <ul style="list-style-type: none"> <li>Properties of Minerals</li> <li>Identifying Minerals</li> <li>Mining Minerals</li> <li>Extraction of Copper from its Ore</li> </ul> Projects: <ul style="list-style-type: none"> <li>Mining Information Brochure</li> </ul> HW: <ul style="list-style-type: none"> <li>Chapter Questions</li> <li>Vocabulary</li> <li>Skill Builders</li> </ul> Class Work: <ul style="list-style-type: none"> <li>Case Studies</li> <li>Daily Journal Writing</li> <li>Current Events</li> <li>Reading passages with text dependent questions</li> </ul> Tests: <ul style="list-style-type: none"> <li>Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>Vocabulary</li> <li>Identifying Minerals</li> </ul> Fieldtrip/Fieldwork: <ul style="list-style-type: none"> <li>Herkimer Diamond Mines</li> </ul>	<b>Career Ready Practices</b> CRP1,2,4,5,8,9,12	<b>Literacy</b> RI.9-10.1,4 RST.9-10.1,3,4,7 WHST.9-10.2,6
				<b>Cluster Standards</b> AG1,2,6	<b>ELA</b> RSI.9-10.1-9 W.9-10.3,4,6,10 SL.9-10.1,4 L.9-10.1,2,3,4,6
				<b>Pathway Standards</b> AG-ENV2 AG-NR1,2	<b>Math</b> HSG.MG.A.2 HSS.IC.B.6 HSS.IC.B.5
					<b>Science</b> HS.ES2 HS.ES3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
			<ul style="list-style-type: none"> <li>Museum Of Science and Technology</li> </ul>		
<b>Weeks 27-31</b>  <b>Energy Resources</b>	<ul style="list-style-type: none"> <li>What are renewable and nonrenewable energy resources?</li> <li>How are fossil fuels formed?</li> <li>How are fossil fuels used?</li> <li>What are the consequences of using fossil fuels?</li> <li>What is nuclear energy?</li> <li>What is the energy use per country?</li> <li>How can energy be conserved?</li> <li>How is energy regulated?</li> </ul>	<ul style="list-style-type: none"> <li>Name and list renewable energy resources and nonrenewable energy resources</li> <li>List types of renewable energy and discuss the advantages and disadvantages of each</li> <li>Explain how fossil fuels are formed and why they are considered nonrenewable</li> <li>List the advantages and disadvantages of using nuclear power</li> <li>Identify ways in which energy can be conserved in daily life</li> <li>Explain energy efficient appliances and compare them</li> </ul>	Labs: <ul style="list-style-type: none"> <li>Classifying Resources</li> <li>Household Energy Consumption</li> <li>Energy Efficient Appliance Comparison</li> <li>Blowing in the Wind</li> <li>Wind Power</li> </ul> Projects: <ul style="list-style-type: none"> <li>Design an Energy Policy</li> <li>Energy Use Debate</li> </ul> HW: <ul style="list-style-type: none"> <li>Chapter Questions</li> <li>Vocabulary</li> <li>Skill Builders</li> <li>Monitor Home Energy Use</li> </ul> Class Work: <ul style="list-style-type: none"> <li>Case Studies</li> <li>Daily Journal Writing</li> <li>Current Events</li> <li>Reading Passages with text dependent questions</li> </ul> Tests: <ul style="list-style-type: none"> <li>Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>Vocabulary</li> <li>Energy Efficiency</li> <li>Map Skills</li> </ul>	<b>Career Ready Practices</b> CRP1,2,4,5,6,7,8,11  <b>Cluster Standards</b> AG1,2,6  <b>Pathway Standards</b> AG-NR2	<b>Literacy</b> RI.9-10.1,4,7 RST.9-10.1,3,4,7 WHST.9-10.2,6  <b>ELA</b> RSI.9-10.1-9 W.9-10.2,3,4,6,10 SL.9-10.1-4,6 L.9-10.1,2,3,4,6  <b>Math</b> HSS.ID.C.9 HSS.IC.B.3 HSS.IC.B.5 HSS.IC.B.6  <b>Science</b> HS.ES2 HS.ES3



Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
			Fieldtrip/Fieldwork: • Fenner Wind Farm • Morrisville College?		
<b>Weeks 32-35</b>  <b>Environmental Health</b>	<ul style="list-style-type: none"> <li>• How is solid waste disposed of?</li> <li>• What are the environmental and health related problems caused by landfills and burning trash?</li> <li>• What are biodegradable materials and can they be cost effective?</li> <li>• What are the benefits of recycling?</li> <li>• How can waste be hazardous to human health?</li> <li>• What are biological hazards?</li> <li>• How do environmental changes contribute to an increase in infectious diseases?</li> </ul>	<ul style="list-style-type: none"> <li>• Describe how landfills work</li> <li>• Name environmental problems caused by landfills</li> <li>• Identify types of solid waste</li> <li>• Name the characteristics that make a material biodegradable</li> <li>• Identify ways by which the amount of solid waste can be reduced</li> <li>• Describe how consumer buying power can influence solid waste reduction</li> <li>• Discuss the law of supply and demand</li> <li>• List the benefits of composting</li> <li>• Name characteristics of hazardous waste</li> <li>• Describe how hazardous waste can be disposed of safely</li> <li>• Explain how scientists use toxicology and epidemiology</li> <li>• Describe the relationship between waste, pollution, and human health</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Garbage Lab</li> <li>• Composting</li> <li>• Lead Poisoning and Mental Ability</li> <li>• Lyme Disease Risk</li> </ul> Projects: <ul style="list-style-type: none"> <li>• Recycling Education Campaign</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter Questions</li> <li>• Vocabulary</li> <li>• Skill Builders</li> </ul> Class Work: <ul style="list-style-type: none"> <li>• Case Studies</li> <li>• Daily Journal Writing</li> <li>• Current Events</li> <li>• Reading passages with text dependent questions</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> <li>• Graphing</li> <li>• Map Skills</li> </ul> Fieldtrip/Fieldwork: <ul style="list-style-type: none"> <li>• OCCRA</li> <li>• Landfill</li> <li>• Waste to Energy Plant</li> </ul>	<b>Career Ready Practices</b> CRP1,2,4,5,6,7,8,9  <b>Cluster Standards</b> AG1,2,6  <b>Pathway Standards</b> AG-ENV2,3	<b>Literacy</b> RI.9-10.1,4,5 RST.9-10.1,3,4,7 WHST.9-10.2,6  <b>ELA</b> RSI.9-10.1-8 W.9-10.3,4,6,10 SL.9-10.1,4 L.9-10.1,2,3,4,6  <b>Math</b> HSS.IC.B.5 HSS.IC.B.6  <b>Science</b> HS.LS2 HS.ES2 HS.ES3

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
		<ul style="list-style-type: none"> <li>Describe how changes in the environment can lead to changes in infectious diseases</li> </ul>	<ul style="list-style-type: none"> <li>Composting (local)</li> </ul>		
<b>Weeks 36-38</b>  <b>The Future</b>	<ul style="list-style-type: none"> <li>What does sustainability mean?</li> <li>What does it mean to live sustainably?</li> <li>How do people determine the value of a product?</li> <li>What are Environmental Impact Statements and what is their purpose?</li> <li>How can individuals impact environmental policy?</li> </ul>	<ul style="list-style-type: none"> <li>Describe some of the challenges of living sustainably</li> <li>Explain how economics and environmental science are related</li> <li>Explain how economics can limit environmental changes or choices</li> <li>Give examples of how private efforts address environmental problems</li> <li>Give examples of federal agencies that have environmental responsibilities</li> <li>Identify ways in which the choices you make as an individual may affect the environment</li> </ul>	Labs: <ul style="list-style-type: none"> <li>Internet Lab – Making Conservation Profitable</li> <li>Price Comparison of going green</li> </ul> Projects: <ul style="list-style-type: none"> <li>Be an Environmental Scientist</li> </ul> HW: <ul style="list-style-type: none"> <li>Chapter Questions</li> <li>Vocabulary</li> <li>Skill Builders</li> </ul> Class Work: <ul style="list-style-type: none"> <li>Case Studies</li> <li>Daily Journal Writing</li> <li>Current Events</li> <li>Reading passages with text dependent questions</li> </ul> Tests: <ul style="list-style-type: none"> <li>Unit</li> <li>Quizzes:</li> <li>Vocabulary</li> </ul> Fieldtrip/Fieldwork: <ul style="list-style-type: none"> <li>Farmers Market</li> </ul>	<b>Career Ready Practices</b> CRP1,2,4,5,6,7,8  <b>Cluster Standards</b> AG1,2,6  <b>Pathway Standards</b> AG-ENV2,3 AG-NR1,2,3	<b>Literacy</b> RI.9-10.1,4 RST.9-10.1,3,4,7 WHST.9-10.2,6  <b>ELA</b> RSI.9-10.1-8 W.9-10.3,4,6,10 SL.9-10.1,4 L.9-10.1,2,3,4,6  <b>Math</b> HSS.IC.B.5 HSS.IC.B.6  <b>Science</b> HS.LS2 HS.ES2 HS.ES3
<b>Weeks 39-40</b>  <b>Review and Culminating</b>	<ul style="list-style-type: none"> <li>How do we apply this information to real world problems?</li> </ul>	<ul style="list-style-type: none"> <li>Apply information learned to research an environmental issue or</li> </ul>	<ul style="list-style-type: none"> <li>Final Exam</li> <li>Research Project and Presentations</li> </ul>	<b>Career Ready Practices</b> CRP2,4,5,6,7,8,11	<b>Literacy</b> RI.9-10.1,4,7 RST.9-10.1,3,4,7

Time Frame Unit of Study	Key Questions	Key Learning Targets (Students should know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science Standards
<b>Activities</b>		problem and present the findings			WHST.9-10.2,6
				<b>Cluster Standards</b> AG1,2,6	<b>ELA</b> RSI.9-10.1,3-8,10 W.9-10.1,3,4,5,6,7,8,9,10 SL.9-10.1,4,6 L.9-10.1,2,3,4,6
				<b>Pathway Standards</b> AG-ENV2,3 AG-NR2,3	<b>Math</b> HSS.IC.B.5 HSS.IC.B.6
					<b>Science</b> HS.LS2 HS.ES2 HS.ES3

**Syracuse City School District**  
**Career and Technical Education Program**  
**Course Syllabus**  
**NAR200: Natural Resources 200**



### **Course Description**

Natural Resources 200 is the second course in the CTE pathway and includes additional hands-on learning opportunities both outdoors and inside the classroom. Students will work in groups to gain knowledge about natural resources, the ways they are used and how they are analyzed. Through these activities, they will gain an understanding of various careers options. Students will develop an integrated view of the biological, ecological and social dimensions of the environment and can earn credits from SUNY-ESF, Syracuse University Project Advance and Onondaga Community College.

Career opportunities include Environmental Engineer/Scientist/Specialist, Natural Science Manager

### **Course Objectives**

1. Assess and monitor stream, soil, and forest health.
2. Collect and interpret from field testing.
3. Identify native plant species and the importance of plants in the ecosystem.
4. Understand minerals and mining types and processes and describe the positive and negative aspects of each.
5. Students will learn about different types of maps and create various types of maps to depict different types of information.
6. Discuss current environmental health issues and strategize ways to limit or control and environmental health issue.
7. Successfully complete the Red Cross CPR and First Aid Certification Exam.

### **Integrated Academics**

This course will help prepare students to be successful on the Living Environment and/or Earth Science Regents exam if needed.

### **Equipment and Supplies**

- **School will provide:** Field trip opportunities, lab supplies and materials and any safety equipment when necessary.
- **Student will provide:** Composition notebook to be used as a field journal, 2-3 inch 3 ring binders to be used as students working portfolio, plastic sheet protectors.

### **Textbook**

Environmental Science; Houghton, Mifflin, Harcourt 2013

### **Grading**

Students will be provided with several opportunities to show their learning throughout the course. These opportunities will include homework and classwork assignments, vocabulary quizzes, laboratory reports, projects, unit exams, and hands-on lab practical exams.

## Additional Course Policies

As with any science course safety is the number one priority for students at all times. Students must follow all safety rules and procedures and any additional safety precautions provided by the instructor. Any failure to comply with safety rules and procedures will result in removal from the classroom for that day and possible removal from the program if the unsafe behavior persists.

## Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none"><li>• Streams, testing, data collection and interpretation.</li><li>• Safety rules and regulations for field work.</li><li>• CPR and First Aid Certification.</li></ul>
2	<ul style="list-style-type: none"><li>• Plant identification, classifications and propagation.</li><li>• Plant Diseases.</li><li>• Threats to local plant life and plant conservation.</li></ul>
3	<ul style="list-style-type: none"><li>• Maps used in environmental field work.</li><li>• Map skills and map creation for field work.</li><li>• Soil components, classifications and steps in soil formation.</li></ul>
4	<ul style="list-style-type: none"><li>• Nutrients cycled through the soil and identification of living organisms that help the cycling process.</li><li>• Mineral extraction, mining and its impact on the environment.</li><li>• Current environmental health issues, their effects on humans and other organisms.</li><li>• Predicting future environmental health concerns, based on present day patterns and choices.</li></ul>

**Syracuse City School District  
Career and Technical Education  
Scope and Sequence  
NAR200: Natural Resources 200**



Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
<b>Weeks 1-8:</b>  <b>Streams</b>	<ul style="list-style-type: none"> <li>• What aspects of water quality can be measured?</li> <li>• What determines the quality of the water in a stream?</li> <li>• How can we determine the health of a stream?</li> <li>• What affects the health of a stream?</li> <li>• What role do humans play in the health of streams and their ecosystems?</li> <li>• How can we interpret macroinvertebrate data to get an idea of stream health?</li> <li>• What conservation methods can we utilize to protect streams?</li> </ul>	<ul style="list-style-type: none"> <li>• Describe what tests should be done to examine the water quality of a stream</li> <li>• Interpret the meaning of test outcomes</li> <li>• How things like pollution, run off, erosion, buffer zones, watersheds affect the overall health of streams</li> <li>• Use dichotomous keys to identify macroinvertebrates in local streams and create a food web from the data</li> <li>• Interpret the data from macroinvertebrate analysis to assess overall stream health</li> <li>• Identify ways to conserve water and help keep streams healthy</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Water pollution</li> <li>• Water analysis</li> <li>• Stream formation</li> <li>• Dichotomous keys</li> <li>• Macroinvertebrate Lab</li> </ul> Project: <ul style="list-style-type: none"> <li>• Macroinvertebrate Collection and ID for DEC, write a report to send to DEC</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> Classwork: <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> Fieldtrip/Fieldwork: Nottingham Campus	<b>Career Ready Practice</b> CRP1,2,4,5,7,8,11,12	<b>Literacy</b> 1,2,3,4, 7,9 WHST.9-10.1,2,10
				<b>Cluster Standards</b> AG2,6	<b>ELA</b> RSI.9-10.1-9 W.9-10.2,3,4,6,10 SL.9-10.1,3,4 L.9-10.1,2,3,4,6
				<b>Pathway Standards</b> AG-NR2,3	<b>Math</b> N-Q1,2,3 S-IC6 F-IF6 F-LE3 G-GMD3 G-MG1,2
<b>Weeks 9-12:</b>  <b>Safety and First</b>	<ul style="list-style-type: none"> <li>• What are common first aid emergencies?</li> </ul>	<ul style="list-style-type: none"> <li>• Identify when common first aid should be used</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Basic First Aid</li> </ul>	<b>Career Ready Practice</b> CRP1,2,3,4	<b>Literacy</b> RST.9-10.1,2,3,4,7 WHST.9-10.1,2,10

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
<b>Aid</b>	<ul style="list-style-type: none"> <li>How should you respond to common first aid emergencies?</li> <li>How should you respond to cardiac or breathing emergencies?</li> <li>How are pediatric responses different than adult responses?</li> <li>What should you do to stay safe in the field and prevent emergencies from occurring?</li> <li>How can you survive in the field during an emergency?</li> </ul>	<ul style="list-style-type: none"> <li>Decide what action should be taken when first aid is required</li> <li>Demonstrate the correct action to take when first aid is required</li> <li>Perform proper CPR techniques on both adults and infants</li> <li>Explain how pediatric responses should be different than adult responses and demonstrate the differences</li> <li>Describe proper safety rules and regulations when working in the field</li> <li>Describe survival strategies for emergency situations</li> </ul>	<ul style="list-style-type: none"> <li>CPR for all</li> <li>Survival 101 Project: <ul style="list-style-type: none"> <li>Become First Aid Certified</li> </ul> </li> <li>HW: <ul style="list-style-type: none"> <li>Chapter questions</li> <li>Vocabulary</li> <li>Skill builders</li> </ul> </li> <li>Classwork: <ul style="list-style-type: none"> <li>Case studies</li> <li>Current events</li> <li>First aid demos</li> </ul> </li> <li>Tests: <ul style="list-style-type: none"> <li>Chapter</li> <li>Unit</li> <li>Lab practical</li> </ul> </li> <li>Quizzes: <ul style="list-style-type: none"> <li>Vocabulary</li> </ul> </li> <li>Fieldtrip/Fieldwork: Nottingham Campus</li> </ul>	<ul style="list-style-type: none"> <li><b>Cluster Standards</b> AG3</li> <li><b>Pathway Standards</b> AG-NR1</li> </ul>	<ul style="list-style-type: none"> <li><b>ELA</b> RSI.9-10.1-8 W.9-10.3,4,6,10 SL.9-10.1,3,4 L.9-10.1,2,3,4,6</li> <li><b>Math</b> N-Q1,2,3</li> <li><b>Science</b> HS-ESS3</li> </ul>
<b>Weeks 13-20:</b>  <b>Plants (ID, Classification, Propagation and Diseases)</b>	<ul style="list-style-type: none"> <li>What are the main parts of plants, flowers, and trees?</li> <li>What are the different classifications of plants?</li> <li>What characteristics of plants can be used to identify them?</li> <li>How are dichotomous keys used in the field to identify unknown plants?</li> <li>How do plants reproduce?</li> <li>What are the current</li> </ul>	<ul style="list-style-type: none"> <li>Name and identify the parts of a leaf, flower, and tree</li> <li>Determine the different groups of plants and how they are classified</li> <li>Use both physical and molecular characteristics of plants to help identify the plant type and name</li> <li>Use a dichotomous key to identify leaves and twigs</li> <li>Describe different types of reproductive methods used by plants and their</li> </ul>	<ul style="list-style-type: none"> <li>Labs: <ul style="list-style-type: none"> <li>Dissecting a flower</li> <li>Plant types</li> <li>Plant ID</li> <li>Dichotomous keys</li> <li>Disease ID</li> <li>Plant Conservation Project: <ul style="list-style-type: none"> <li>Leaf collection</li> <li>Research project on plant disease</li> </ul> </li> </ul> </li> <li>HW: <ul style="list-style-type: none"> <li>Chapter questions</li> <li>Vocabulary</li> <li>Skill builders</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>Career Ready Practice</b> CRP2,4,5,7,8,9,12</li> <li><b>Cluster Standards</b> AG6</li> <li><b>Pathway Standards</b> AG-NR2 AG-PL2,3</li> </ul>	<ul style="list-style-type: none"> <li><b>Literacy</b> RST.9-10.1,2,3,4,5,6,7,8 WHST.9-10.1,2,7,10</li> <li><b>ELA</b> RSI.9-10.1-8 W.9-10.2,3,4,5,6,7,8,9,10 SL.9-10.1,2,4,5 L.9-10.1,2,3,4,6</li> <li><b>Math</b> N-G1 F-IF6 S-IC6 S-ID1-4,9</li> </ul>

Time Frame Unit of study	Key Questions	• Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
	<p>threats to local plant life in CNY?</p> <ul style="list-style-type: none"> <li>• What diseases affect plants and how can they be identified?</li> <li>• What are current methods being used to help conserve plants?</li> </ul>	<ul style="list-style-type: none"> <li>• success rate</li> <li>• Identify and determine the consequences of the threats to local plant life.</li> <li>• Develop an action plan to help slow or eliminate the threats to local plant life</li> <li>• Identify plants with diseases and which disease they have contracted</li> <li>• Discuss the tradeoffs of current conservation methods for plants</li> </ul>	<p>Classwork:</p> <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> <li>• Lab practical</li> </ul> <p>Quizzes:</p> <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> <p>Fieldtrip/Fieldwork: Nottingham Campus Local nursery/tree farm</p>		<p>F-LE3 G-GMD3 G-MG1,2,3</p> <p><b>Science</b> HS-LS1 HS-LS2 HS-LS4 HS-ES3 HS-ETS1</p>
<p><b>Weeks 21-26:</b></p> <p><b>Map Skills</b></p>	<ul style="list-style-type: none"> <li>• What role do maps play in field work?</li> <li>• What symbols are used on maps?</li> <li>• How are different types of maps used and for what purpose?</li> <li>• Which type of map would you use for different purposes?</li> <li>• How are maps created?</li> <li>• What must be included in a good map when making one?</li> </ul>	<ul style="list-style-type: none"> <li>• Describe situations when you would use a map when doing field work</li> <li>• Determine how symbols and scales are used on maps and demonstrate how to use them</li> <li>• Name the different types of maps and the function of each type</li> <li>• Read different types of maps, including road maps, topographic maps, political maps, climate map, resource map, and thematic maps</li> <li>• Create your own map using proper scale, direction, and symbols</li> </ul>	<p>Labs:</p> <ul style="list-style-type: none"> <li>• Map types</li> <li>• Reading maps</li> <li>• Creating maps</li> <li>• Topographic maps</li> <li>• Scales and Symbols</li> </ul> <p>Project:</p> <ul style="list-style-type: none"> <li>• Map Project</li> </ul> <p>HW:</p> <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> <p>Classwork:</p> <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> <p>Quizzes:</p> <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> <p>Fieldtrip/Fieldwork: Nottingham Campus</p>	<p><b>Career Ready Practice</b> CRP1,2,4,5,6,8,11,12</p> <p><b>Cluster Standards</b> AG2</p> <p><b>Pathway Standards</b> AG-NR1</p>	<p><b>Literacy</b> RST.9-10.1-5,7 WHST.9-10.1,2,10</p> <p><b>ELA</b> RSI.9-10.1-8 W.9-10.2,3,4,6,10 SL.9-10.1,4 L.9-10.1,2,3,4,6</p> <p><b>Math</b> N-Q1,2,3 F-IF4,5,6</p> <p><b>Science</b> HS-ESS2 HS-ESS3 HS-ETS1</p>



Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
<b>Weeks 27-32:</b>  <b>Soil</b>	<ul style="list-style-type: none"> <li>• What are the basic components, uses, and properties for soil?</li> <li>• How does soil form and what can affect the formation?</li> <li>• What interactions among living organisms occur within soil?</li> <li>• How does soil affect nutrient cycling?</li> <li>• How do nutrient deficiencies affect output from land and what can be done to manage nutrients within soil?</li> <li>• What can we learn from soil analysis and the processes that occur within and around the soil?</li> </ul>	<ul style="list-style-type: none"> <li>• Name the basic components of soil and describe different types of soils that exist</li> <li>• Describe how soils are classified and what characteristics determine that classification</li> <li>• Name and describe the uses for soil around the world and in previous cultures.</li> <li>• Describe the soil formation process using the steps outlined in CLORPT</li> <li>• Utilize data analysis to create a soil map.</li> <li>• Describe which nutrients are cycled through the soil and what living organisms help the cycling process</li> <li>• Interpret the interactions among the living organisms found within the soil</li> <li>• Analyze soil for content and be able to list any nutrient deficiencies and their possible cause</li> <li>• Develop a plan to manage soil and land use to prevent nutrient deficiencies</li> <li>• Investigate soil characteristics and processes such as pH,</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• ID soil types</li> <li>• Porosity and Permeability</li> <li>• Soil Maps</li> <li>• Soil Analysis</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> Classwork: <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> Fieldtrip/Fieldwork: <ul style="list-style-type: none"> <li>• Nottingham Campus</li> <li>• Hebeirg Forest (Mr. Ray on advisory board)</li> </ul>	<b>Career Ready Practice</b> CRP1-5,7,8,11,12	<b>Literacy</b> RST.9-10.1-10 WHST.9-10.1,2,10
				<b>Cluster Standards</b> AG1,6	<b>ELA</b> RSI.9-10.1-8 W.9-10.3,4,6,10 SL.9-10.1,3,4 L.9-10.1,2,3,4,6
				<b>Pathway Standards</b> AG-NR1 AG-PL1	<b>Math</b> N-Q1,2,3
				<b>Science</b> HS-ESS2 HS-LS4 HS-ES3	

Time Frame Unit of study	Key Questions	• Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
		<ul style="list-style-type: none"> <li>sorption, precipitation, oxidation and reduction reactions, and organic matter within the soil</li> </ul>			
<b>Weeks 33-36:</b>  <b>Mineral Extraction (Ores)</b>	<ul style="list-style-type: none"> <li>What use do we have for minerals and ores that need to be mined from the Earth?</li> <li>How are mining sites located?</li> <li>What types of mining exist and what are the positive and negative effects of each type?</li> <li>What is the environmental impact of mining in the Earth?</li> <li>How can we limit the effects mining practices have on the Earth?</li> <li>What role does the NMA (National Mining Association) play in mining?</li> <li>What technology is used to present day mining?</li> </ul>	<ul style="list-style-type: none"> <li>Name the types of minerals and ores we mine for and that each mineral and ore is used for</li> <li>Describe the process of identifying sites for mining of different minerals and ores</li> <li>Describe the main types of mining, including surface, strip, subsurface, and solution mining</li> <li>Determine positive and negative aspects of each type of mining</li> <li>Name the cause and effects of acid mine drainage and how it can be limited or prevented</li> <li>Explain how reclaiming and restoring land after mines have been abandoned would limit the effects on the environment</li> </ul>	Labs: <ul style="list-style-type: none"> <li>Mineral ID</li> <li>Mineral Extraction</li> <li>Mineral Uses</li> <li>Environmental Impact of Mining Project:</li> <li>Mining “How To” Guide (with safety info, environmental impact info)</li> </ul> HW: <ul style="list-style-type: none"> <li>Chapter questions</li> <li>Vocabulary</li> <li>Skill builders</li> </ul> Classwork: <ul style="list-style-type: none"> <li>Case studies</li> <li>Current events</li> </ul> Tests: <ul style="list-style-type: none"> <li>Chapter</li> <li>Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>Vocabulary</li> </ul> Fieldtrip/Fieldwork: Nottingham Campus <ul style="list-style-type: none"> <li>Herkimer Diamond Mine</li> </ul>	<b>Career Ready Practice</b> CRP1,2,4,5,8,12  <b>Cluster Standards</b> AG1,2  <b>Pathway Standards</b> AG-NR2,3	<b>Literacy</b> RST.9-10.1,2,3,7,8 WHST.9-10.1,2,9,10  <b>ELA</b> RSI.9-10.1-8,10 W.9-10.2,3,4,5,6,7,8,10 SL.9-10.1,4 L.9-10.1,2,3,4,6  <b>Math</b> N-Q1,2,3 G-GMD3 S-IC6  <b>Science</b> HS-ES2 HS-ES3 HS-LS2
<b>Weeks 37-40:</b>  <b>Environmental Health (current)</b>	<ul style="list-style-type: none"> <li>What are the current environmental health issues we face today?</li> </ul>	<ul style="list-style-type: none"> <li>Identify current health issues (including lead, zika virus, Ebola, flu)</li> </ul>	Labs: <ul style="list-style-type: none"> <li>Mapping diseases</li> <li>Spreading</li> </ul>	<b>Career Ready Practice</b> CRP1,2,4,5,8,12	<b>Literacy</b> RST.9-10.1,2,4,5,10 WHST.9-10.1,2,7,8,9,10

Time Frame Unit of study	Key Questions	• Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
	<ul style="list-style-type: none"> <li>• What are the effects of these environmental health issues on humans and other organisms?</li> <li>• What can we do to help limit or eliminate the risks associated with these environmental health issues?</li> </ul>	<ul style="list-style-type: none"> <li>• strains, diabetes, cancer, and other diseases or issues)</li> <li>• Describe how humans are affected by each health issue</li> <li>• Describe how each health issue affects other organisms</li> <li>• Develop an action plan to help limit or eliminate one cause of an environmental health issue</li> <li>• Predict future health issues based on present day environmental patterns or choices</li> </ul>	infectious diseases <ul style="list-style-type: none"> <li>• Predict Life Span Project:</li> <li>• Informational Brochure on health issue</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> Classwork: <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> Fieldtrip/Fieldwork: <ul style="list-style-type: none"> <li>• Nottingham Campus</li> <li>• Health clinic</li> </ul>	<b>Cluster Standards</b> AG1,2                       <b>Pathway Standards</b> AG1,4,5 AG-NR2	<b>ELA</b> RSI.9-10.1-8 W.9-10.3,4,6,10 SL.9-10.1,4 L.9-10.1,2,3,4,6  <b>Math</b> N-Q1,2,3 F-IF4,6 F-LE3 S-ID1,2,3,4,9 S-IC1,2,3,6  <b>Science</b> HS-ES2,3 HS-L4

**Syracuse City School District  
Career and Technical Education Program  
Course Syllabus  
NAR300: Natural Resources 300**



**Program Overview**

This course introduces students to the study of natural resources in an outdoor and classroom setting through hands-on activities and learning. Students will work in groups to investigate and help solve environmental problems and will explore career options in the natural resources pathways. Major areas of study include environmental health, science measurement and skills, ecology, biomes and ecosystems, population studies, tradeoff investigations, and mineral use and identification. Students will develop an integrated view of the biological, ecological and social dimensions of the environment and can earn credits from SUNY-ESF, Syracuse University Project Advance and Onondaga Community College.

Career opportunities include Environmental Engineer/Scientist/Specialist, Natural Science Manager

**Course Description**

During this course students will identify the risks of natural disasters, prepare for hazardous conditions, learn map making and surveying skills, identify and classify animals, learn about plant and animal diseases, invasive species and research current environmental health concerns.

**Pre-Requisites**

Natural Resources 100 and 200

**Course Objectives**

- Create an emergency preparedness kit for any natural disaster or environmental emergency.
- Create a map using surveying techniques and skills.
- Identify animals using classification techniques, tracks, or other pieces of information.
- Identify plant and animal diseases and develop an action plan to prevent the spread.
- Design a plan to identify local invasive species and stop their spread.
- Research current issues that affect the health of the environment and human populations.

**Integrated Academics**

1 ELA Credit will be earned at the completion of this course.

**Equipment and Supplies**

- **School will provide:** Field trip opportunities, lab supplies and materials and any safety equipment when necessary.
- **Student will provide:** Composition notebook, writing utensils.

**Textbook**

Environmental Science; Houghton, Mifflin, Harcourt 2013

## Grading

Students will be provided with several opportunities to show their learning throughout the course. These opportunities will include homework and classwork assignments, vocabulary quizzes, laboratory reports, projects, unit exams, and hands-on lab practical exams.

## Additional Course Policies

As with any science course safety is the number one priority for students at all times. Students must follow all safety rules and procedures and any additional safety precautions provided by the instructor. Any failure to comply with safety rules and procedures will result in removal from the classroom for that day and possible removal from the program if the unsafe behavior persists.

## Course Calendar

Quarter	Units of Study
1	<ul style="list-style-type: none"><li>• Hazards and Natural Disasters</li></ul>
2	<ul style="list-style-type: none"><li>• Animal Classification, ID and Natural Tracking Skills</li><li>• Plant and Animal Diseases</li></ul>
3	<ul style="list-style-type: none"><li>• Pests and Invasive Species</li><li>• Map Making and Surveying Skills</li></ul>
4	<ul style="list-style-type: none"><li>• Environmental Health</li></ul>

**Syracuse City School District  
Career and Technical Education  
Scope and Sequence  
NAR300: Natural Resources 300**



Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
<b>Weeks 1-8:</b>  <b>Animal Classification and ID</b>	<ul style="list-style-type: none"> <li>• How can animals be identified and what characteristics determine how they are classified?</li> <li>• What types of animal reproduction exist and how does the type of reproduction effect the continuation of the species?</li> <li>• What is tracking and why would we want to know how to track animals?</li> <li>• What role do animals play in ecosystems and natural environments and how do they change those areas?</li> <li>• How can animals be identified and what characteristics determine how they are classified?</li> <li>• What types of animal reproduction exist and how does the type of reproduction effect the continuation of the species?</li> <li>• What is tracking and why would we want to</li> </ul>	<ul style="list-style-type: none"> <li>• Determine major animal classification within the Animal Kingdom and the characteristics that define each</li> <li>• Use dichotomous keys to identify animals</li> <li>• Describe and analyze the system of animal classifications</li> <li>• Identify the names of animals using the KPCOFGS classification system, know 15 local animals by their scientific name</li> <li>• Examine animal reproduction and explain how each type is effective for the animal's lifestyle or habitat</li> <li>• Differentiate between internal and external reproduction and when/why each is used</li> <li>• Define the term "tracking," explain each type of "track," and ID animals using their tracks</li> <li>• Determine animal roles in the environment and identify how they contribute to changes in their natural environments</li> <li>• Determine major animal classification within the</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Classify Animals</li> <li>• Dichotomous Keys to ID Animals</li> <li>• Identify animal tracks</li> </ul> Animal Reproduction Project: <ul style="list-style-type: none"> <li>• Animal Tracking Journal</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> <li>• Classwork:</li> <li>• Case studies</li> <li>• Current events</li> <li>• Journal Writing</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> <li>• Lab practical</li> <li>• Quizzes:</li> <li>• Vocabulary</li> </ul> Fieldtrip/Fieldwork: <ul style="list-style-type: none"> <li>• Nottingham Campus</li> <li>• Beaver Lake, ESF Heiberg Forest, Clarks Reservation (OR other outdoor space for tracking)</li> </ul>	<b>Career Ready Practice</b> CRP1,2,4,5,7,8,12	<b>Literacy</b> RST.11-12.1,2,3,5,8,9 WHST.11-2.1,2,4,6,9,10
				<b>Cluster Standards</b> AG1,2,4,6	<b>ELA</b> RSI.11-12.1-8 W.11-12.2,3,4,6,10 SL.9-11-12.1,4 L.11-12.1,2,3,4,6
				<b>Pathway Standards</b> AG-ANI1,3,4,6 AG-NR3	<b>Math</b> G-MG1,2,3 N-Q-A1,2,3 S.ICB4 S.ICB6 S.MDB7 HSS-IDC9
					<b>Science</b> HS-LS1,2,4 HS-ESS3 HS-ETS1

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
	<p>know how to track animals?</p> <ul style="list-style-type: none"> <li>• What role do animals play in ecosystems and natural environments and how do they change those areas?</li> </ul>	<p>Animal Kingdom and the characteristics that define each</p> <ul style="list-style-type: none"> <li>• Use dichotomous keys to identify animals</li> <li>• Describe and analyze the system of animal classifications</li> <li>• Identify the names of animals using the KPCOFGS classification system, know 15 local animals by their scientific name</li> <li>• Examine animal reproduction and explain how each type is effective for the animal's lifestyle or habitat</li> <li>• Differentiate between internal and external reproduction and when/why each is used</li> <li>• Define the term "tracking," explain each type of "track," and ID animals using their tracks</li> <li>• Determine animal roles in the environment and identify how they contribute to changes in their natural environments</li> </ul>	<p>animals)</p> <p>Labs:</p> <ul style="list-style-type: none"> <li>• Classify Animals</li> <li>• Dichotomous Keys to ID Animals</li> <li>• Identify animal tracks</li> <li>• Animal Reproduction</li> </ul> <p>Project:</p> <ul style="list-style-type: none"> <li>• Animal Tracking Journal</li> </ul> <p>HW:</p> <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> <li>• Classwork:</li> <li>• Case studies</li> <li>• Current events</li> <li>• Journal Writing</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> <li>• Lab practical</li> <li>• Quizzes:</li> <li>• Vocabulary</li> </ul> <p>Fieldtrip/Fieldwork:</p> <ul style="list-style-type: none"> <li>• Nottingham Campus</li> <li>• Beaver Lake, ESF Heiberg Forest, Clarks Reservation (OR other outdoor space for tracking animals)</li> </ul>		
<b>Weeks 9-16:</b>	<ul style="list-style-type: none"> <li>• What types of fish are in NY and what</li> </ul>	<ul style="list-style-type: none"> <li>• Identify all major groups of fish found in NYS and</li> </ul>	<p>Labs:</p> <ul style="list-style-type: none"> <li>• FISH ID</li> </ul>	<b>Career Ready Practice</b>	<b>Literacy</b> RST.11-12.1,2,

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
<b>Unit Topic:</b> <b>NYS Fisheries and Fisheries Management</b>	adaptations do they have for survival? <ul style="list-style-type: none"> <li>• What techniques exist for estimating fish population size?</li> <li>• What role has fishing played in civilization throughout history and what role does it currently play in today's society?</li> <li>• What occurrences are effecting fish populations today?</li> <li>• How can fisheries be managed effectively?</li> <li>• What role do fish play in NYS tourism?</li> <li>• What government agencies and programs exist to help monitor fish populations?</li> <li>• What does a fish hatchery do?</li> </ul>	describe the characteristics of each group <ul style="list-style-type: none"> <li>• ID fish caught and found in NYS by sight using identifying characteristics and reference guides</li> <li>• Name and describe adaptations fish have for survival in different habitats and explain why fish may be found in only selective habitats</li> <li>• Analyze different habitats to determine which types of fish would live there and why</li> <li>• Collect fish using various techniques such as trap nets, electrofishing, seining, and traditional rod and reel fishing and use that data to predict current fish populations and water quality conditions</li> <li>• Research and determine the role of fishing throughout history for different civilizations</li> <li>• Identify current uses for fish in today's culture</li> <li>• Research and determine the role fishing and fish play in NYS tourism and the economic value of fisheries in NYS</li> <li>• Determine the government agencies involved in managing NYS fisheries</li> <li>• Describe the role fish hatcheries play in</li> </ul>	<ul style="list-style-type: none"> <li>• Fish Population Study</li> <li>• Fish Adaptations</li> <li>• Fishing in the field (various techniques used)</li> </ul> Project: <ul style="list-style-type: none"> <li>• Trout In the Classroom</li> <li>• Fishing Techniques</li> <li>• Fish Tourism Project (Economic impact of fishing industry in NYS)</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> Classwork: <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> <li>• Journal Writing</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> Fieldtrip/Fieldwork: Nottingham Campus Barry Park, Onondaga Lake, Oneida Lake, Fish Hatchery	CRP1,2,4,5,6,7,8,9,10,11,12	3,8,9,10 WHST.11-12.1,2,4,6,9,10
				<b>Cluster Standards</b> AG-1,2,3,5,6	<b>ELA</b> RSI.11-12.1,-9 W.11-12.3,4,6,10 SL.11-12.1,3,4 L.11-12.1,2,3,4,6
				<b>Pathway Standards</b> AG-ANI1,2,3,4,5,6 AG-ENV2 AG-NR1,2,3	<b>Math</b> N-Q.A1 HSS-MD.B5,6,7 HSS-IC.B3,5,6 HSS-ID.A2,3,4 HSS-ID.C9
					<b>Science</b> HS-LS1,2,3,4 HS-ES2,3 HS-ETS1



Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
		maintaining healthy NYS fisheries and researching fish populations and diseases <ul style="list-style-type: none"> <li>Identify and describe any causes of fish decline and explain the impact fish decline has on the ecosystem humans</li> </ul>			
<b>Weeks 17-24:</b>  <b>Wildlife Management</b>	<ul style="list-style-type: none"> <li>What are the needs of wildlife for cover, food, water, and living spaces?</li> <li>What factors, both natural and human created, that effect wildlife populations?</li> <li>What are the 4 major goals of wildlife management systems?</li> <li>What federal, state, and local municipalities work to manage wildlife populations?</li> <li>What is the importance of habitat management and monitoring land use patterns in maintaining wildlife populations?</li> <li>What management options exist for different wildlife habitats?</li> <li>What role to humans play in everyday wildlife population control?</li> </ul>	<ul style="list-style-type: none"> <li>Determine the basic needs of animals given their native habitat</li> <li>Determine any/all threats to animals within their native habitats using a cause and effect framework</li> <li>Name and describe the 4 major goals of wildlife management systems and how these goals manage wildlife populations</li> <li>Name and describe federal, state, and local municipalities and their management efforts to control wildlife populations</li> <li>Assess the importance of managing land properly and its role in wildlife management and habitat conservation/protection</li> <li>Analyze a habitat to determine which option for habitat conservation is best used for wildlife management</li> <li>Identify and research</li> </ul>	Labs: <ul style="list-style-type: none"> <li>ID wildlife habitats and animal needs</li> <li>Managing wildlife population</li> <li>Create Ideal wildlife habitat (backyard pollinator garden, insect hotels, other ideas)</li> </ul> Project: <ul style="list-style-type: none"> <li>Research project – wildlife management system (oral presentation)</li> </ul> HW: <ul style="list-style-type: none"> <li>Chapter questions</li> <li>Vocabulary</li> <li>Skill builders</li> <li>Classwork:</li> <li>Case studies</li> <li>Current events</li> <li>Journal Writing</li> </ul> Tests: <ul style="list-style-type: none"> <li>Chapter</li> </ul>	<b>Career Ready Practice</b> CRP1,2,4,5,6,7,8,9,10,11,12  <b>Cluster Standards</b> AG1,3,4,5,6  <b>Pathway Standards</b> AG-NR1,2,3,4 AG-ANI 5,6	<b>Literacy</b> RST.11-2.1,2,3,7,8,9,10 WHST.11-2.1,2,4,5,6,7,8,9,10,  <b>ELA</b> RSI.11-12.1-9 W.11-12.2,3,4,6,5,7,8,9,10 SL.11-12.1-6 L.11-12.1,2,3,4,6  <b>Math</b> N-Q.A1,2,3 F-LEA.IB,IC HSS-ID.A2,3,4,9 HSS-IC.A1 HSS-IC.B 5, 6 HSS-MD.B5, 6, 7

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
	<ul style="list-style-type: none"> <li>• What career opportunities exist in the field of wildlife management?</li> </ul>	<p>potential careers in wildlife management systems</p>	<ul style="list-style-type: none"> <li>• Unit</li> <li>• Quizzes:</li> <li>• Vocabulary</li> </ul> <p>Fieldtrip/Fieldwork: Nottingham campus Certified local habitats</p>		<p><b>Science</b> HS-LS1,2,3,4 HS-ES 2,3 HS-ETS1</p>
<p><b>Weeks 25-32:</b></p> <p><b>Plant and Animal Diseases</b></p>	<ul style="list-style-type: none"> <li>• What diseases affect plants, and how are the diseases spread/acquired?</li> <li>• What negative consequences occur for the plants and for humans when plants acquire diseases?</li> <li>• What diseases affect animals, and how are the diseases acquired/spread?</li> <li>• What negative consequences occur for the animals and for humans when animals acquire diseases?</li> <li>• How can the spread of plant and animal diseases be prevented?</li> <li>• How can diseases be managed within current populations of organisms?</li> <li>• What federal, state, and local municipalities exist that play a role in managing plant and animal diseases?</li> </ul>	<ul style="list-style-type: none"> <li>• Identify common diseases that affect local plants</li> <li>• Explain how diseases are spread among plants</li> <li>• Examine how disease can affect a plant's anatomy, physiology, propagation, and survival</li> <li>• Discuss the negative consequences of plant diseases</li> <li>• Identify and describe diseases affecting local animals</li> <li>• Explain how diseases can be transmitted from animal to animal (or species to species)</li> <li>• Explore how disease affects animal anatomy, physiology, reproduction, and survival</li> <li>• Detail the negative consequences for animals with diseases</li> <li>• Identify the role humans have in the spread of diseases in plants and animals</li> <li>• Create an action plan to slow or stop the spread of diseases and prevent the</li> </ul>	<p>Labs:</p> <ul style="list-style-type: none"> <li>• Identify plant disease</li> <li>• Identify animal disease</li> <li>• Determine evidence of plant and/or animal diseases</li> </ul> <p>Project:</p> <ul style="list-style-type: none"> <li>• Research project (plant or animal disease)</li> <li>• Action plan on disease prevention</li> </ul> <p>HW:</p> <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> <p>Classwork:</p> <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> <li>• Journal writing</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> <li>• Lab practical</li> </ul> <p>Quizzes:</p> <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> <p>Fieldtrip/Fieldwork:</p> <ul style="list-style-type: none"> <li>• Nottingham Campus</li> </ul>	<p><b>Career Ready Practice</b> CRP 1,2,4,5,6,7,8,11,12</p> <p><b>Cluster Standards</b> AG1,2,3,6</p> <p><b>Pathway Standards</b> AG-ANI 6,7 AG-NR4</p>	<p><b>Literacy</b> RST.11-12.1,2,3,7,8,9 WHST.11-12.2,4,5,6,7,8,9,10</p> <p><b>ELA</b> RSI.11-12.1-8 W.11-12.3,4,6,10 SL.11-12.1,4 L.11-12.1,2,3,4,6</p> <p><b>Math</b> HSS.IDC9 S.ICB5 S.ICB6 S.MDB7</p> <p><b>Science</b> HS-LS1,2,3,4 HS-ETS1</p>

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
		future spread of diseases in plants and animals	<ul style="list-style-type: none"> <li>Local nursery/tree farm</li> <li>Cornell or ESF campus (or guest speaker to discuss diseases)</li> </ul>		
<b>Weeks 33-38:</b>  <b>Pests and Invasive Species</b>	<ul style="list-style-type: none"> <li>What makes an organism a “pest”, and what characteristics help identify an organism as a “pest”?</li> <li>What negative affects do pests have on plants and animals and how can we intervene in a sustainable, environmentally friendly manner?</li> <li>What do you know about local invasive species, their negative effects and how they are spread?</li> <li>How might the spread of invasive species be predicted, controlled or prevented in our local environment and what limitations might affect management efforts?</li> <li>What federal, state, and local municipalities exist in controlling and managing invasive species?</li> </ul>	<ul style="list-style-type: none"> <li>Describe a “pest’s” distinguishing characteristics</li> <li>Identify plant and animal pests in our local ecosystems and environment</li> <li>Predict the effects of invasive species on ecosystems</li> <li>Research and develop a plan to control or prevent a pest or invasive species, while protecting the environment</li> <li>Discuss conditions favorable for invasive species and describe actions to control or prevent their transmission in our local environment</li> </ul>	Labs: <ul style="list-style-type: none"> <li>ID invasive species</li> <li>ID pests</li> <li>Pest Population Study</li> </ul> Project: <ul style="list-style-type: none"> <li>Research project on local pest/invasive species (both written and oral)</li> </ul> HW: <ul style="list-style-type: none"> <li>Chapter questions</li> <li>Vocabulary</li> <li>Skill builders</li> </ul> Classwork: <ul style="list-style-type: none"> <li>Case studies</li> <li>Current events</li> </ul> Tests: <ul style="list-style-type: none"> <li>Chapter</li> <li>Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>Vocabulary</li> </ul> Fieldtrip/Fieldwork: <ul style="list-style-type: none"> <li>Nottingham Campus</li> </ul>	<b>Career Ready Practice</b> CRP 1,2,4,5,6,7,8,9,11,12 <b>Cluster Standards</b> AG1,2,3,6  <b>Pathway Standards</b> AG-ANI 5 AG-NR4	<b>Literacy</b> RST. 11-2.1,2,3, 8 WHST.11-2.1,2, 4,5,6,7,8, 9,10  <b>ELA</b> RSI.11-12.1-8 W.11-12.3,4,6, 10 SL.11-12.1,4 L.11-12.1,2,3,4,6  <b>Math</b> HSS.IDC9 S.ICB5 S.ICB6 S.MDB7  <b>Science</b> HS-LS1,2,4 HS-ESS3 HS-ETS1
<b>Weeks 39-40:</b>  <b>Environmental Health</b>	<ul style="list-style-type: none"> <li>What are the current environmental health issues we face today?</li> </ul>	<ul style="list-style-type: none"> <li>Identify current health issues (including lead contamination, zika virus,</li> </ul>	Labs: <ul style="list-style-type: none"> <li>Mapping diseases</li> <li>Spreading</li> </ul>	<b>Career Ready Practice</b> CRP1,2,4,5,8,12	<b>Literacy</b> RST.11-2.1,2,3, 5,6,7,8,9 WHST.11-1,2,

Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
<b>(current)</b>	<ul style="list-style-type: none"> <li>• What are the effects of these environmental health issues on humans and other organisms?</li> <li>• What can we do to help limit or eliminate the risks associated with these environmental health issues?</li> </ul>	<p>Ebola, flu strains, diabetes, cancer, and other diseases or issues)</p> <ul style="list-style-type: none"> <li>• Examine how humans are affected by each health issue</li> <li>• Describe how each health issue affects other organisms</li> <li>• Develop an action plan to help limit or eliminate one cause of an environmental health issue</li> <li>• Predict future health issues based on present day environmental patterns or choices</li> </ul>	<p>infectious diseases</p> <ul style="list-style-type: none"> <li>• Predict Life Span Project:</li> <li>• Informational Brochure on health issue</li> </ul> <p>HW:</p> <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> <p>Classwork:</p> <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> <li>• Journal writing</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> <p>Quizzes:</p> <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> <p>Fieldtrip/Fieldwork:</p> <ul style="list-style-type: none"> <li>• Nottingham Campus</li> <li>• Health clinic</li> </ul>		4,6,7,8,9,10
				<p><b>Cluster Standards</b> AG-1,2</p>	<p><b>ELA</b> RSI.11-12.1-8 W.11-12.3,4,6,10 SL.11-12.1,4 L.11-12.1,2,3,4,6</p>
				<p><b>Pathway Standards</b> AG1,4,5 AG-NR2</p>	<p><b>Math</b> N-Q1,2,3 F-IF4,6 F-LE3 S-ID1,2,3,4,9 S-IC1,2,3,6</p>
					<p><b>Science</b> HS-ES2,3 HS-LS2,4</p>

**Syracuse City School District**  
**Career and Technical Education Program**  
**Course Syllabus**  
**NAR400: Natural Resources 400**



**Program Overview**

*This course introduces students to the study of natural resources in an outdoor and classroom setting through hands-on activities and learning. Students will work in groups to investigate and help solve environmental problems and will explore careers options in natural resources pathways. Major areas of study include environmental health, science measurement and skills, ecology, biomes and ecosystems, population studies, tradeoff investigations, and mineral use and identification. Students will develop an integrated view of the biological, ecological and social dimensions of the environment and can earn credits from SUNY-ESF, Syracuse University Project Advance and Onondaga Community College.*

*Career opportunities include Environmental Engineer/Scientist/Specialist, Natural Science Manager*

**Course Description**

*During this course students will identify NYS fish, learn about fish biology, fisheries management, NYS agriculture and food science, forestry, landscaping, sustainability systems, current environmental health issues, as well as the economics and ethics of governmental policies and ways of doing business within the realm of natural resources.*

**Pre-Requisites**

*Successful completion of Natural Resources 100, 200 and 300 courses*

**Course Objectives**

- Identify NYS fish and describe the purpose and function of NYS fishery management programs.
- Create a tourism program that highlights NYS agriculture and products.
- Use proper landscaping techniques and terminology to design a landscape to meet a customer's request.
- Design a plan that meets all ethical, economic, and sustainability guidelines for a topic of interest in the field of natural resources.

**Integrated Academics**

Upon completion of the entire Natural Resources CTE pathway students will have earned 4 CTE credits, 1 ELA credit and 1 Science credit.

**Equipment and Supplies**

- School will provide: Field trip opportunities, lab supplies and materials and any safety equipment when necessary.
- Student will provide: Composition notebook, writing utensils

**Textbook**

*Environmental Science; Houghton, Mifflin, Harcourt 2013*

## **Grading**

*Students will be provided with several opportunities to show their learning throughout the course. These opportunities will include homework and classwork assignments, vocabulary quizzes, laboratory reports, projects, unit exams, and hands-on lab practical exams.*

## **Additional Course Policies**

*As with any science course safety is the number one priority for students at all times. Students must follow all safety rules and procedures and any additional safety precautions provided by the instructor. Any failure to comply with safety rules and procedures will result in removal from the classroom for that day and possible removal from the program if the unsafe behavior persists.*

## **Course Calendar**

<b>Quarter</b>	<b>Units of Study</b>
1	<ul style="list-style-type: none"><li>• NYS fish and fisheries</li><li>• Fishery Management</li></ul>
2	<ul style="list-style-type: none"><li>• NYS Agriculture and Food Science</li><li>• Forests and Landscaping Management</li></ul>
3	<ul style="list-style-type: none"><li>• Economics and Ethics of Natural Resource Systems</li><li>• Sustainability Systems in Natural Resources</li></ul>
4	<ul style="list-style-type: none"><li>• Environmental Health</li></ul>

**Syracuse City School District  
Career and Technical Education  
Scope and Sequence  
NAR 400: Natural Resources 400**



Time Frame Unit of study	Key Questions	Key Learning Targets (Students will know and be able to)	Assessment Evidence of Learning	Related Standards	CCLS Literacy, ELA, Math, Science
<b>Weeks 1-8:</b>  <b>Unit Topic:</b> <b>NYS</b> <b>Agriculture</b> <b>and Food</b> <b>Science</b>	<ul style="list-style-type: none"> <li>• What essential nutrients are necessary for the growth of crops?</li> <li>• What nutrients are limiting factors?</li> <li>• What is crop rotation and what use does it have in growing crops?</li> <li>• What are fertilizers and how do they work?</li> <li>• How do fertilizers lead to nutrient pollution?</li> <li>• How is irrigation used for crops?</li> <li>• Who regulates the use of land in the USA and NY?</li> <li>• Why are pollinators important and why should we save the bees?</li> <li>• Can you explain what “Certified Organic” means and identify the requirements for “organic”?</li> <li>• What other resources do farms consume?</li> <li>• What environmental issues are created by modern agricultural</li> </ul>	<ul style="list-style-type: none"> <li>• Determine the necessary nutrients for successful crop growth</li> <li>• Describe the use of crop rotation and explain the reasons crops are rotated</li> <li>• Name and describe different types of fertilizers and explain how fertilizers work</li> <li>• Determine the best type of fertilizer based on research and needs of a particular field or crop</li> <li>• Explain what nutrient pollution is and determine the cause and effects</li> <li>• Describe the different types of irrigation systems and their effectiveness</li> <li>• Calculate water use efficiency and determine ways to increase this figure</li> <li>• Compare and contrast commercial farming and local farming and determine the effect on the local, country, and global economy of each type of farm</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Agriculture Land Use</li> <li>• Concentrate the Solution</li> <li>• Fertilizer and the Environment</li> <li>• Plant Nutrient Deficiencies</li> <li>• Plant-Soil Interactions</li> <li>• Know Your Nitrogen</li> <li>• Souring Milk</li> <li>• Coliform Counts</li> <li>• Chain of Food, Energy and the Commodity Trace-Back</li> <li>• Conserving Bumble bees</li> <li>• Food Science-Bread Dough Challenge</li> <li>• Project: Farm to Table Economic Impact</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> <li>• Classwork:</li> </ul>	<b>Career Ready Practice</b> CRP1,2,4,5,6,7,8,9,10,11,12	<b>Literacy</b> RST.11-12.1,2,3,8,9,10 WHST.11-12.1,2,4,6,9,10
				<b>Cluster Standards</b> AG-1,2,3,5,6	<b>ELA</b>
				<b>Pathway Standards</b> AG-ANI1,2,3,4,5,6 AG-ENV2 AG-NR1,2,3	<b>Math</b> NQ-A1 HSSMD-B5,6,7 HSSIC-B3,5,6 HSSID-A2,3,4 HSSID-C9
					<b>Science</b> HS-LS2,3,4 HS-ES3

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	<p>practices?</p> <ul style="list-style-type: none"> <li>• What risks are associated with food production and consumption?</li> <li>• What agricultural practices are currently used to raise livestock?</li> <li>• What agricultural products are most important for the NYS economy and how are those products developed?</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the purpose of government organizations and policies in the agriculture business including the FDA and USDA</li> <li>• Explain the importance of bees and other pollinators and the effect on food production as a result of their decline</li> <li>• Determine the causes of the decline of bees</li> <li>• Determine the resources farms use and calculate the amount, including energy, water, land, etc.</li> <li>• Determine the risks associated with producing food, transporting food, and consuming food for both the farmer and the consumer</li> <li>• Track a NYS agriculture product from farm to table and determine economics of that product</li> </ul>	<ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> <li>• Journal Writing</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> <li>• Lab practical</li> </ul> <p>Quizzes:</p> <ul style="list-style-type: none"> <li>• Vocabulary</li> <li>• Fieldtrip/Fieldwork:</li> <li>• Nottingham Campus</li> <li>• Brady Faith Farm or Jubilee Farms (urban farm sites in Syracuse)</li> <li>• Restaurant that uses “farm to table” practices</li> </ul>		
<p><b>Weeks 9-16:</b></p> <p><b>Agricultural Biotechnology (Agritech)</b></p>	<ul style="list-style-type: none"> <li>• Why does agritech exist and what role does it serve in modern agriculture?</li> <li>• What is the goal of agritech?</li> <li>• What is the history of agritech?</li> <li>• What techniques does agritech include and what</li> </ul>	<ul style="list-style-type: none"> <li>• Determine the overall use and goal of biotechnology in agriculture by tracing its history through time</li> <li>• Determine how each technique is used and what the goal/outcome of each will be, including crossbreeding, mutagenesis, polyploidy,</li> </ul>	<p>Labs:</p> <ul style="list-style-type: none"> <li>• DNA extraction</li> <li>• Food Label Analysis</li> <li>• Crossbreeding Analysis</li> </ul> <p>Project:</p> <ul style="list-style-type: none"> <li>• Debate-research both sides of the issue and present evidence for both</li> </ul>	<p><b>Career Ready Practice</b></p> <p>CRP1,2,4,5,6,7,8,9,10,11,12</p> <p><b>Cluster Standards</b></p> <p>AG-1,2,3,6</p>	<p><b>Literacy</b></p> <p>RST.11-12.1,2,3,4,5,6,7,8,9,10</p> <p>WHST.11-2.1,2,4,5,6,8,9,10</p> <p><b>ELA</b></p> <p><b>Math</b></p> <p>HSSIC-B5,6</p> <p>HSSMD-B5,6,7</p>



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	<p>is the purpose/outcome of each technique?</p> <ul style="list-style-type: none"> <li>• What effect does agritech have on the nutritional content of the crop?</li> <li>• What concerns or issues do GMO and agritech raise for human consumption?</li> <li>• What are the safety testing and regulations used to assure GMO's and agritech crops are safe for human consumption?</li> <li>• What federal, state, and local municipalities work to control agritech and the use of GMO's?</li> <li>• What jobs exist in the agritech field?</li> </ul>	<p>protoplast fusion, RNA interference, transgenics, genome editing</p> <ul style="list-style-type: none"> <li>• Analyze the nutritional content of GMO's and compare that content to organic (non GMO food products)</li> <li>• Analyze the public health concerns of consuming GMO's and address each concern using data collection and analysis</li> <li>• Identify all government agencies involved in agritech regulations and determine the role each plays</li> <li>• Research job opportunities in agritech field</li> </ul>	<p>HW:</p> <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> <p>Classwork:</p> <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> <li>• Journal writing</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> <p>Quizzes:</p> <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> <p>Fieldtrip/Fieldwork:</p> <ul style="list-style-type: none"> <li>• College Campus to visit DNA lab</li> <li>• Local Farm using agritech techniques</li> </ul>	<p><b>Pathway Standards</b> AG-NR1,2,3 AG-FD2,4 AG-PL1,2</p>	<p><b>Science</b> HS-LS1,2,3,4</p>
<p><b>Weeks 17-24:</b>  <b>Forest and Landscape Management</b></p>	<ul style="list-style-type: none"> <li>• What is the ecology of a forest ecosystem?</li> <li>• How can you determine which trees are best suited for the ecosystem and environment at present?</li> <li>• How can forests be managed in terms of establishment, composition, growth and density to ensure the healthiest forest ecosystem?</li> </ul>	<ul style="list-style-type: none"> <li>• Describe a forest ecosystem in ecological terms including the role of each type of tree present</li> <li>• Identify and explain the limiting factors for tree growth and establishment</li> <li>• Determine which trees are biologically and economically suited for a forest site</li> <li>• Explain how forests can be regenerated both naturally and artificially</li> </ul>	<p>Labs:</p> <ul style="list-style-type: none"> <li>• Forest Ecology study</li> <li>• Assessing soil composition</li> <li>• Tree ID by leaf, twig, bark, and visual of entire tree</li> <li>• Collecting "tree data" and "mapping tree data" using GIS</li> <li>• Determining the Height of a Tree</li> <li>• Estimating the amount of standing timber in a</li> </ul>	<p><b>Career Ready Practice</b> CRP1,2,4,5,6,7,8,9,10,11,12</p> <p><b>Cluster Standards</b> AG2,6</p> <p><b>Pathway Standards</b> AG-ENV3 AG-NR1,2,3,4 AG-PL1,2,3,4</p>	<p><b>Literacy</b> RST.11-12.1,2,3,8,9,10 WHST.11-2.1,2,4,5,6,9,10</p> <p><b>ELA</b></p> <p><b>Math</b> HSSIC-B3,5,6 GMG-A1 HSSMD-B5,6,7 NQ-A1</p>

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	<ul style="list-style-type: none"> <li>• What reproduction methods exist for stand reproduction?</li> <li>• How can you determine which forest product the market needs and you can produce?</li> <li>• How can you ID trees?</li> <li>• How can timber cruising be used to estimate the amount of standing timber in a forest?</li> <li>• What tools are used in forest management?</li> <li>• How is firewood produced from start to finished product?</li> <li>• How can you assess a site for landscape needs?</li> <li>• How can you create a landscaping plan?</li> <li>• How can you determine which types of plants should be planted based on needs?</li> <li>• What should be done to assure that newly planted plants and trees become established?</li> <li>• What kinds of care do trees require?</li> </ul>	<ul style="list-style-type: none"> <li>• Describe reproduction methods for stand regeneration and discuss positive and negative aspects of each</li> <li>• Create a research plan to determine which tree products are marketable and can be grown in your ecosystem and environment</li> <li>• Identify trees using leaves, twigs, bark, and visual of the whole tree</li> <li>• Estimate the height of a tree using a clinometer</li> <li>• Estimate the amount of standing timber in a stand using timber cruising and accurate measurements</li> <li>• Use GIS to create a map of a stand of trees after collecting data and measurements</li> <li>• Discuss tool use and maintenance when logging (chain saw)</li> <li>• Describe methods to fell trees safely</li> <li>• Describe the process of creating firewood from start to finish</li> <li>• Assess a site for landscaping needs including soil composition, sunlight, water availability, and animal interactions</li> </ul>	<p>forest using timber cruising</p> <p>Project:</p> <ul style="list-style-type: none"> <li>• Landscape Plan (determine need, soil and climate characteristics, hydrozones, desired outcome, adhere to budget restrictions, implement planting schedule and design)</li> <li>• Leaf Litter Data Collection with Dr. Ruth Yanai from ESF</li> </ul> <p>HW:</p> <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> <li>• Classwork:</li> <li>• Case studies</li> <li>• Current events</li> <li>• Journal Writing</li> </ul> <p>Tests:</p> <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> <p>Quizzes:</p> <ul style="list-style-type: none"> <li>• Vocabulary</li> <li>• Fieldtrip/Fieldwork:</li> <li>• Nottingham Campus</li> <li>• Local nursery/tree farm</li> <li>• Heiberg Forest</li> <li>• ESF-Dr. Yanai as guest speaker</li> </ul>		<p><b>Science</b> HS-LS1,2,4</p>

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		<ul style="list-style-type: none"> <li>• Determine hydrozones within the landscape area and determine which plants should be planted in each hydrozone based on needs</li> <li>• Assess the needs of the plants before deciding when and where to plant them in a landscape plan</li> <li>• Follow your research and gathered information to plant and create the landscape plan</li> </ul>			
<b>Weeks 25-32:</b>  <b>Economics and Ethics in Natural Resources</b>	<ul style="list-style-type: none"> <li>• What are the laws of supply and demand and how are they related to our natural resources?</li> <li>• How are our natural resources currently allocated and who has control over this allocation process?</li> <li>• What is the overall goal of allocating resources?</li> <li>• How are the economy and natural resources interconnected?</li> <li>• How can we run an economy while taking into consideration the limitations of our natural resources?</li> <li>• What are the 3 pillars of sustainability and how are they interconnected?</li> <li>• How are recreational,</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the laws of supply and demand in relation to specific natural resources (water, land, minerals, etc.)</li> <li>• Determine who has the authority to allocate resources and analyze how they make decisions</li> <li>• Examine how the allocation of resources effects an economy (both local and national level)</li> <li>• Determine the effects of limited resources on an economy</li> <li>• Explain the 3 pillars of sustainability and how they are interconnected</li> <li>• Determine the role recreation and commercial factors play when developing policies regarding the allocation</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Supply and Demand</li> <li>• Ethics 101</li> <li>• Project:</li> <li>• Research project on an “hot topic” in ethics and natural resources</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> Classwork: <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> <li>• Journal</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> <li>• Fieldtrip/Fieldwork:</li> </ul>	<b>Career Ready Practice</b> CRP-1,2,4,5,6,7,8,9,10,11,12  <b>Cluster Standards</b> AG-1,2,3,4,6  <b>Pathway Standards</b> AG-ENV2 AG-NR1,2	<b>Literacy</b> RST.11-12.1,2,3,4,6,7,8,9,10 WHST.11-2.1,2,4,5,6,7,8,9,10  <b>ELA</b>  <b>Math</b> HSSID-C9 HSSIC-B3,5,6 HSSMD-B5,6,7  <b>Science</b> HS-LS2,4 HS-ES2,3 HS-ET1

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	<p>commercial, and social policies considered when developing policies on natural resource allocation and use?</p> <ul style="list-style-type: none"> <li>• What do the terms perpetual and exhaustible mean in terms of natural resource use and allocation?</li> <li>• What ethical considerations should be made when developing policies about natural resources and their use and allocation?</li> <li>• What governmental agencies currently work in developing these policies?</li> </ul>	<p>and use of natural resources</p> <ul style="list-style-type: none"> <li>• Define the terms perpetual and exhaustible in the realm of natural resources and explain how these terms effect policy making decisions</li> <li>• Define the term “ethical” and relate the term to policies designed to manage natural resources</li> <li>• Determine and examine the governmental agencies involved in making policies surrounding the use and management of our natural resources</li> </ul>			
<p><b>Weeks 33-37:</b> <b>Sustainability Systems</b></p>	<ul style="list-style-type: none"> <li>• What does sustainability mean and what does it apply to?</li> <li>• What is your definition of sustainability?</li> <li>• Why is sustainability important and what role does it currently play in environmental issues?</li> <li>• What government policies, programs and organizations exist that help promote, regulate and control sustainability?</li> </ul>	<ul style="list-style-type: none"> <li>• Define sustainability in several different ways</li> <li>• Create your own working definition of sustainability</li> <li>• Identify places where sustainability is applied, encouraged, or necessary</li> <li>• Determine the importance of sustainability practices in multiple environmental science and natural resource fields</li> <li>• Identify and discuss the government agencies that promote and encourage sustainability, and</li> </ul>	<p>Labs:</p> <ul style="list-style-type: none"> <li>• Sustainable versus Not sustainable</li> </ul> <p>Project:</p> <ul style="list-style-type: none"> <li>• Design an environmental outreach program to promote sustainability</li> </ul> <p>HW:</p> <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> <li>• Classwork:</li> <li>• Case studies</li> <li>• Current events</li> </ul>	<p><b>Career Ready Practice</b> CRP-1,2,4,5,6,7,8,9,10,11,12</p> <p><b>Cluster Standards</b> AG-1,2,3,4,6</p> <p><b>Pathway Standards</b> AG-NR1,2,3 AG-ENV2</p>	<p><b>Literacy</b> RST.11-12.1,2,3,4,5,6,7,8,9,10 WHST.11-2.1,2,4,5,6,9,10</p> <p><b>Math</b> HSSMD-B5,6,7 NQ-A1 HSSIC-B3,5,6</p> <p><b>Science</b> HS-LS2,4 HS-ES2,3 HS-ET1</p>

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		describe programs that support sustainability efforts	Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> <li>• Fieldtrip/Fieldwork:</li> <li>• Nottingham Campus</li> </ul>		
<b>Weeks 37-40:</b>  <b>Environmental Health (current)</b>	<ul style="list-style-type: none"> <li>• What are the current environmental health issues we face today?</li> <li>• What are the effects of these environmental health issues on humans and other organisms?</li> <li>• What can we do to help limit or eliminate the risks associated with these environmental health issues?</li> </ul>	<ul style="list-style-type: none"> <li>• Identify current health issues (including lead contamination, zika virus, Ebola, flu strains, diabetes, cancer, and other diseases or issues)</li> <li>• Examine how humans are affected by each health issue</li> <li>• Describe how each health issue affects other organisms</li> <li>• Develop an action plan to help limit or eliminate one cause of an environmental health issue</li> <li>• Predict future health issues based on present day environmental patterns or choices</li> </ul>	Labs: <ul style="list-style-type: none"> <li>• Mapping diseases</li> <li>• Spreading infectious diseases</li> <li>• Predict Life Span</li> </ul> Project: <ul style="list-style-type: none"> <li>• Informational Brochure on health issue</li> </ul> HW: <ul style="list-style-type: none"> <li>• Chapter questions</li> <li>• Vocabulary</li> <li>• Skill builders</li> </ul> Classwork: <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Current events</li> <li>• Journal writing</li> </ul> Tests: <ul style="list-style-type: none"> <li>• Chapter</li> <li>• Unit</li> </ul> Quizzes: <ul style="list-style-type: none"> <li>• Vocabulary</li> </ul> Fieldtrip/Fieldwork: <ul style="list-style-type: none"> <li>• Nottingham Campus</li> <li>• Health clinic</li> </ul>	<b>Career Ready Practice</b> CRP1,2,4,5,8,12	<b>Literacy</b> RST.11-12.1,2,3,5,6,7,8,9 WHST.11-12.4,6,7,8,9,10
				<b>Cluster Standards</b> AG-1,2	<b>ELA</b>
				<b>Pathway Standards</b> AG1,4,5 AG-NR2	<b>Math</b> N-Q1,2,3 F-IF4,6 F-LE3 S-ID1,2,3,4,9 S-IC1,2,3,6  <b>Science</b> HS-ES2,3 HS-L4