



# **Wolcott Public Schools**

**154 Center Street  
Wolcott, Connecticut 06716  
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## **High School Curriculum Grades 11 - 12 Ecology**



*Children are our Future...*

## ECOLOGY – GRADES 11 - 12

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### **Mission Statement:**

*The mission of the Wolcott Public Schools is to develop in each student the knowledge, skills, and attitudes necessary to become a productive member of the community and a contributing member to society.*

### **Departmental Philosophy:**

The philosophy of the Science Department is to support the development of scientific literacy in all students, as well as motivate more students to pursue careers in science, technology and engineering. Science literacy, in the view of Wolcott science educators, is a combination of understanding major science concepts and theories, using scientific reasoning, and recognizing the complex interactions between science, technology and society. To that end the Wolcott Science Department will:

- 1.) Articulate the core science ideas, knowledge and skills that all Connecticut students should learn.
- 2.) Define the knowledge, abilities and understandings that students are expected to demonstrate on the statewide science assessments.
- 3.) Influence the way science is taught and assessed.

### **Course Description:**

Ecology is the science that studies the interrelationships between living species and their physical environment. This course examines how ecosystems function including cycling of nutrients, energy transfer, competition and symbiotic relationships. Man, one small member of the environment, must understand and accept his responsibility to improve and preserve his planet. The second semester focus of this course is to raise students' environmental awareness by studying, analyzing and discussing a variety of ecological topics such as global warming, air and water pollution, depletion of natural resources, vanishing wildlife, discarding waste products, etc. Students will also participate in several projects and field trips about specific environmental problems. *(College credit is offered through Naugatuck Valley Community College upon completion of the course with a grade "C" or better).*

## ECOLOGY – GRADES 11 - 12

| <i>Performance Standards</i>   | <i>Sample Activities</i>  | <i>Assessment Strategies</i>  | <i>Resources</i>   |
|--|---|---|--|
| <p><b>The use of resources by human populations may affect the quality of the environment.</b><br/>(<i>CT Framework Content Standard 9.8</i>)</p>                                      | <p>1.) SEARCH Lab</p>   | <p><b>Any combination of the following based on school wide and course specific rubrics:</b></p> <p><b>Pre-Assessment</b><br/>                     -KWL charts<br/>                     -pretests<br/>                     -checklists<br/>                     -observations<br/>                     -self evaluation &amp; questions</p>   | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>SEARCH Lab</i>”</li> <li>• Waders</li> <li>• Water Testing Kit</li> <li>• Macroinvertebrate Nets</li> <li>• Forceps</li> <li>• Isopropyl Alcohol</li> <li>• Large Trays</li> <li>• Waste Water Jugs</li> <li>• Thermometer</li> <li>• Meter Sticks</li> <li>• Measuring Tape</li> <li>• Float Object</li> </ul>                 |
| <p><b>Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.</b><br/>(<i>CT Framework Content Standard 9.9</i>)</p> | <p>1.) Global Warming and Biodiversity</p> <p>2.) Diatoms as water quality indicators</p> | <p><b>Formative Assessments</b><br/>                     -questioning student<br/>                     -conferencing<br/>                     -peer evaluation<br/>                     -observation<br/>                     -performance tasks<br/>                     -exit cards<br/>                     -portfolio check<br/>                     -quizzes<br/>                     -journal entries<br/>                     -self evaluation</p> <p><b>Summative Assessments</b><br/>                     -lab/science journal entries<br/>                     -performance tasks<br/>                     -portfolio review<br/>                     -unit tests<br/>                     -semester exams<br/>                     -product/exhibits/displays<br/>                     -demonstrations</p> | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>Global Warming</i>”</li> <li>• Colored Pencils</li> <li>• Copy of activity, “<i>Diatoms as Water-Quality Indicators</i>”</li> <li>• Wooden Popsicle Stick</li> <li>• Water Sample with Diatoms</li> <li>• Collection Bottle</li> <li>• Dropper</li> <li>• Coverslip</li> <li>• Slides</li> <li>• Compound Microscope</li> </ul> |



## ECOLOGY – GRADES 11 - 12

| <i>Performance Standards</i>  | <i>Sample Activities</i>   | <i>Assessment Strategies</i>  | <i>Resources</i>   |
|---|--|---|--|
| <p><b>Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.</b><br/>(<i>CT Framework Content Standard 9.9</i>)<br/>(Continued)</p> <p><b>Various sources of energy are used by humans and all have advantages and disadvantages.</b><br/>(<i>CT Framework Content Standard 9.3</i>)</p> | <p>5.) Forestry and Conservation Study</p> <p>1.) Cleaning Up Oil Spills</p> | <p><b>Any combination of the following based on school wide and course specific rubrics:</b></p> <p><b>Pre-Assessment</b><br/>-KWL charts<br/>-pretests<br/>-checklists<br/>-observations<br/>-self evaluation &amp; questions</p> <p><b>Formative Assessments</b><br/>-questioning student<br/>-conferencing<br/>-peer evaluation<br/>-observation<br/>-performance tasks<br/>-exit cards<br/>-portfolio check<br/>-quizzes<br/>-journal entries<br/>-self evaluation</p> <p><b>Summative Assessments</b><br/>-lab/science journal entries<br/>-performance tasks<br/>-portfolio review<br/>-unit tests<br/>-semester exams<br/>-product/exhibits/displays<br/>-demonstrations</p> | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>Forestry and Conservation Study</i>”</li> <li>• Flexible Tape Measure</li> <li>• Paper Clip</li> <li>• String</li> <li>• Protractor</li> <li>• Steel Washer</li> <li>• Yard Stick</li> <li>• 4 Wooden Stakes</li> <li>• Marker</li> <br/> <li>• Copy of activity, “<i>Cleaning Up Oil Spills</i>”</li> <li>• Motor oil</li> <li>• Clear plastic container</li> <li>• Cotton balls</li> <li>• Detergent</li> <li>• Sand</li> <li>• Salt water</li> </ul> |





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| <i>Performance Standards</i>   | <i>Sample Activities</i>  | <i>Assessment Strategies</i>  | <i>Resources</i>  |
|--|---|---|---|
| <p><b>Evolution and biodiversity are the result of genetic changes that occur over time in constantly changing environments.</b><br/>(<i>CT Framework Content Standard 10.5</i>)</p> | <p>1.) Modeling Evolution</p> <p>2.) Heredity and The Environment</p> <p>3.) Predator Prey Interactions</p> | <p><b>Any combination of the following based on school wide and course specific rubrics:</b></p> <p><b>Pre-Assessment</b><br/>                     -KWL charts<br/>                     -pretests<br/>                     -checklists<br/>                     -observations<br/>                     -self evaluation &amp; questions</p> <p><b>Formative Assessments</b><br/>                     -questioning student<br/>                     -conferencing<br/>                     -peer evaluation<br/>                     -observation<br/>                     -performance tasks<br/>                     -exit cards<br/>                     -portfolio check<br/>                     -quizzes<br/>                     -journal entries<br/>                     -self evaluation</p> <p><b>Summative Assessments</b><br/>                     -lab/science journal entries<br/>                     -performance tasks<br/>                     -portfolio review<br/>                     -unit tests<br/>                     -semester exams<br/>                     -product/exhibits/displays<br/>                     -demonstrations</p> | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>Modeling Evolution</i>”</li> <li>• Paper</li> <li>• Scissors</li> <li>• Paper Bags</li> <li>• Graph Paper</li> <li>• Pencil</li> <br/> <li>• Copy of activity, “<i>Heredity and Environment</i>”</li> <li>• 2 Petri Dishes</li> <li>• Filter Paper</li> <li>• Light Proof Storage</li> <li>• Tobacco Seeds (heterozygous for albinism)</li> <li>• Pipette</li> <li>• Water</li> <br/> <li>• Copy of activity, “<i>Predator Prey Interactions</i>”</li> <li>• Metric Ruler</li> <li>• Paper</li> <li>• Scissors</li> <li>• Cardboard</li> <li>• Masking Tape</li> </ul> |





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| <i>Performance Standards</i>   | <i>Sample Activities</i>     | <i>Assessment Strategies</i>  | <i>Resources</i>  |
|--|------------------------------|---|---|
| <p><b>Atoms react with one another to form new molecules.</b><br/>(<i>CT Framework Content Standard 9.4</i>)</p>   | <p>1.) Carbonic Acid Lab</p> | <p><b>Any combination of the following based on school wide and course specific rubrics:</b></p> <p><b>Pre-Assessment</b><br/>                     -KWL charts<br/>                     -pretests<br/>                     -checklists<br/>                     -observations<br/>                     -self evaluation &amp; questions</p>   | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>Carbonic Acid Lab</i>”</li> <li>• Graph paper</li> <li>• 2 - 250ml flasks</li> <li>• Straws</li> <li>• White Paper</li> <li>• .04M Hydrogen Peroxide</li> <li>• Phenolphthalein</li> </ul>   |
| <p><b>Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles</b><br/>(<i>CT Framework Content Standard 9.7</i>)</p> | <p>1.) The Oxygen Cycle</p>  | <p><b>Formative Assessments</b><br/>                     -questioning student<br/>                     -conferencing<br/>                     -peer evaluation<br/>                     -observation<br/>                     -performance tasks<br/>                     -exit cards<br/>                     -portfolio check<br/>                     -quizzes<br/>                     -journal entries<br/>                     -self evaluation</p> <p><b>Summative Assessments</b><br/>                     -lab/science journal entries<br/>                     -performance tasks<br/>                     -portfolio review<br/>                     -unit tests<br/>                     -semester exams<br/>                     -product/exhibits/displays<br/>                     -demonstrations</p> | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>The Oxygen Cycle</i>”</li> <li>• 8 Culture Tubes with Caps</li> <li>• Markers</li> <li>• Masking Tape</li> <li>• pH paper</li> <li>• Pond Water</li> <li>• Droppers</li> <li>• Bromothymol Blue</li> <li>• Neutral Red Solution</li> <li>• <i>Elodea</i> sprigs</li> <li>• Snails</li> <li>• Test-tube rack</li> <li>• Light source</li> </ul> |

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| <i>Performance Standards</i>   | <i>Sample Activities</i>               | <i>Assessment Strategies</i>  | <i>Resources</i>   |
|--|--|---|--|
| <p><b>Microorganisms have an essential role in life processes and cycles on Earth.</b><br/>(<i>CT Framework Content Standard 10.2</i>)</p>   | <p>1.) Composting in a Bottle</p>      | <p><b>Any combination of the following based on school wide and course specific rubrics:</b></p> <p><b>Pre-Assessment</b><br/>                     -KWL charts<br/>                     -pretests<br/>                     -checklists<br/>                     -observations<br/>                     -self evaluation &amp; questions</p>   | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>Composting In a Bottle</i>”</li> <li>• 2 Liter Soda Bottle</li> <li>• Topsoil</li> <li>• Organic Material</li> <li>• Scissors</li> <li>• Markers</li> </ul>   |
| <p><b>Living organisms have the capability of producing populations of unlimited size, but the environment can support only a limited number of individuals from each species.</b><br/>(<i>CT Framework Content Standard 10.6</i>)</p> | <p>1.) Sampling a Biotic Community</p> | <p><b>Formative Assessments</b><br/>                     -questioning student<br/>                     -conferencing<br/>                     -peer evaluation<br/>                     -observation<br/>                     -performance tasks<br/>                     -exit cards<br/>                     -portfolio check<br/>                     -quizzes<br/>                     -journal entries<br/>                     -self evaluation</p> <p><b>Summative Assessments</b><br/>                     -lab/science journal entries<br/>                     -performance tasks<br/>                     -portfolio review<br/>                     -unit tests<br/>                     -semester exams<br/>                     -product/exhibits/displays<br/>                     -demonstrations</p> | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>Sampling a Biotic Community</i>”</li> <li>• Protective Work Gloves</li> <li>• Tape Measure</li> <li>• 16 Stakes</li> <li>• Hammer</li> <li>• String</li> <li>• Field Guide</li> <li>• Notebook</li> </ul> |

## ***ECOLOGY – GRADES 11 - 12***

| <b><i>Performance Standards</i></b>   | <b><i>Sample Activities</i></b>                                | <b><i>Assessment Strategies</i></b>   | <b><i>Resources</i></b>   |
|---|--|---|---|
| <p><b>Living organisms have the capability of producing populations of unlimited size, but the environment can support only a limited number of individuals from each species.</b><br/> <b><i>(CT Framework Content Standard 10.6)</i></b><br/>           (Continued)</p> | <p>2.) Modeling Disease Transmission</p> <p>3.) SEARCH Lab</p> | <p><b>Any combination of the following based on school wide and course specific rubrics:</b></p> <p><b>Pre-Assessment</b><br/>           -KWL charts<br/>           -pretests<br/>           -checklists<br/>           -observations<br/>           -self evaluation &amp; questions</p> <p><b>Formative Assessments</b><br/>           -questioning student<br/>           -conferencing<br/>           -peer evaluation<br/>           -observation<br/>           -performance tasks<br/>           -exit cards<br/>           -portfolio check<br/>           -quizzes<br/>           -journal entries<br/>           -self evaluation</p> <p><b>Summative Assessments</b><br/>           -lab/science journal entries<br/>           -performance tasks<br/>           -portfolio review<br/>           -unit tests<br/>           -semester exams<br/>           -product/exhibits/displays<br/>           -demonstrations</p> | <ul style="list-style-type: none"> <li>• Copy of activity, “<i>Modeling Disease Transmission</i>”</li> <li>• Test-tube</li> <li>• Water</li> <li>• Hydrogen Peroxide</li> <li>• Phenolphthalein</li> <li>• Dropper</li> <li>• Rubber stopper</li> <br/> <li>• Copy of activity, “<i>SEARCH Lab</i>”</li> <li>• Waders</li> <li>• Water Testing Kit</li> <li>• Macroinvertebrate Nets</li> <li>• Forceps</li> <li>• Isopropyl Alcohol</li> <li>• Large Trays</li> <li>• Waste Water Jugs</li> <li>• Thermometer</li> <li>• Meter Sticks</li> <li>• Measuring Tape</li> <li>• Float Object</li> </ul> |

# ***ECOLOGY – GRADES 11 - 12***

## **Pacing Guide**

### **September: Introduction: Toward a Sustainable Future:**

Chapter 1, Unit 1: *Ecosystems: Basic Units of the Natural World.*

Chapter 2: *Ecosystems: What They Are*

### **October: Unit 1: Ecosystems: Basic Units of the Natural World:**

Chapter 3: *Ecosystems How They Work*

Chapter 4: *Ecosystems How They Change*

### **November: Unit 2: The Human Population:**

Chapter 5: *The Human Population*

Chapter 6: *Population and Development*

### **December: Unit 6: Toward a Sustainable Future:**

Chapter 22: *Economics, Public Policy, and The Environment*

Chapter 23: *Sustainable Communities and Lifestyles*

### **January: Unit 6: Toward a Sustainable Future:**

Chapter 23: *Sustainable Communities and Lifestyles*

### **February: Unit 5: Pollution and Prevention:**

Chapter 20: *The Atmosphere: Climate, Climate Change and Ozone Depletion*

Chapter 21: *Atmosphere Pollution*

### **March: Unit 5: Pollution and Prevention:**

Chapter 16: *Pests and Pest Control*

Chapter 17: *Water Pollution and Its Prevention*

### **April: Unit 4: Energy:**

Chapter 12: *Energy from Fossil Fuels*

Chapter 13: *Energy from Nuclear Power*

Chapter 14: *Renewable Energy*

### **May: Unit 3: Renewable Resources:**

Chapter 7: *Water: Hydrologic Cycle and Human Use*

Chapter 8: *Soil: Foundation for Land Ecosystem*

### **June: Unit 3: Renewable Resources Unit:**

Chapter 10: *Wild Species and Biodiversity*

# ***ECOLOGY – GRADES 11 - 12***

## **Essential Questions**

- 1.) What impacts will the next 50 years of population growth have on ecosystem goods and services?
- 2.) How are materials such as water, carbon and nitrogen cycled through an ecosystem?
- 3.) What human activities need to be limited to ensure sustainability with the ecosystem?
- 4.) What factors of human population growth concern the environment?
- 5.) How can alternative forms of energy change the way society views fossil fuels?
- 6.) What steps can be taken to solve the ongoing issue of pollution in water, air and soil?
- 7.) How have human activities changed the climate?
- 8.) What are the conditions that define a sustainable society?
- 9.) What influence does global warming have on biodiversity?

# ***ECOLOGY – GRADES 11 - 12***

## **Skills Objectives**

- 1.) Students will understand the impact humans have had on the environment over time.
- 2.) Be able to recognize renewable and non-renewable resources.
- 3.) Students will be able to identify the factors that affect the size of a population.
- 4.) Students will understand how human demand for energy has changed.
- 5.) Students will be able to discuss the problems associated with fossil fuels.
- 6.) Students will be able to explain the basic structure and function of a nuclear power plant.
- 7.) Students will be able to describe how different forms of energy such as: hydroelectric power, wind energy and geothermal energy can be utilized.
- 8.) Students will be able to explain past and present methods for disposing of solid waste.
- 9.) Students will understand how ozone depletion and global warming have an effect on the climate.
- 10.) Students will be able to describe how climate change can be a detriment to biodiversity.
- 11.) Students will be able to express the conditions needed for a sustainable society.

# ***ECOLOGY – GRADES 11 - 12***

## **Assessments**

[That are aligned to the curriculum – this will be done through the data teams throughout the year – no need to do them now, I just wanted to let you know where they will go in the curriculum, as we complete them.  
Thank.]