

**Warren County School District**

**PLANNED INSTRUCTION**

**COURSE DESCRIPTION**

**Course Title:** Land Ecology

**Course Number:** 00379

**Course Prerequisites:** None

**Course Description:**

This course introduces students to the complexities of land ecology and soil types including structure, land habitat use, and evaluation of land forms, soil characteristics, and conservation that impact habitat and society interactions. Students will develop skills in making informed decisions and taking constructive actions. Relevant lab activities will be incorporated throughout, utilizing scientific inquiry and appropriate technology.

Spring Semester Only

**Suggested Grade Level:** Grades 9-12

**Length of Course:**    ☒ One Semester                      ☐ Two Semesters                      ☐ Other (Describe)

**Units of Credit:** .5 (Insert *None* if appropriate)

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:**  
CSPG 32 - Biology

**Certification verified by WCSD Human Resources Department:** ☒ Yes    ☐ No

**TEXTBOOK AND SUPPLEMENTAL MATERIALS**

**Continue using Board approved textbook?** ☐ Yes    ☒ No (*If yes, then complete the information below.*)

**Board Approved Textbooks, Software, Supplemental Materials:**

**Title:**

**Publisher:**

**ISBN #:**

**Copyright Date:**

**Date of WCSD Board Approval:**

<http://www.envirothonpa.org/station/soils-and-land-use/>

The following references can be found on the Envirothon Soil / Land Use CD.

1. An Introduction to Soils of Pennsylvania
2. Websoilsurvey: <http://websoilsurvey.nrcs.usda.gov>
3. Web soil survey – Introduction to soils part 1
4. Web soil survey – Introduction to soils part 2
5. Soil Quality
  - Bulk Density Moisture/Aeration – pp. 1-4 (The measuring soil bulk density section is optional.)
  - Infiltration – pp. 1-3 (The measuring infiltration section is optional.)
  - Organic Matter – pp. 1-4 (The measuring soil organic matter section is optional.)
  - pH – pp. 1-6 (Use Cornell soil pH kit to measure pH, or whatever pH kit you have available.)
  - Soil Health Nuggets
  - Soil Health – What is soil health? Why should I care?
  - Soil Health Matters: Make Your Soil Healthy
6. Ray the Soil Guy – Soil Health Lessons in a Minute (USDA NRCS videos)
  - Is your soil healthy and functioning?
  - Have you discovered the cover?
  - How should healthy soils look?
  - How to boost your soil's energy.
7. Topographic Map Symbols
8. Soil Biology Primer – (pp. 4 – 17 only)
9. Soil References for Landforms and Geologic Terms “Soil Structure” “Soil Texture”
10. Soil's Not Trivial
11. Cornell Soil pH kits — pH kits may be purchased from the Cornell University
12. Do You Dig Wetland Soils?
13. The Color of Soil
14. Soil Carbon Sequestration Fundamentals Ohio State University Fact Sheet
15. How Does Your Garden Grow? Some information on soil fertility. NASA soil science website about soil and NPK

### **BOARD APPROVAL:**

**Date Written:** 2/28/18

**Date Approved:** \_\_\_\_\_

**Implementation Date:** 2018-2019

### **SPECIAL EDUCATION AND GIFTED REQUIREMENTS**

The teacher shall make appropriate modification to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

## **COURSE OVERVIEW**

*(List the content to be taught)*

1. **Basic Soil Ecology Knowledge**
  - Formation
  - Water in soils
  - Soil horizons
  - Hands-on investigation
  - Soil quality, fertility, and chemistry
  - Soil biology and diversity
2. **Understanding Maps, Surveys and Landforms**
  - Soil survey maps and data tables: Web soil survey
  - Topographic maps
  - Landforms and geologic terms
3. **Ecological Land Use**
  - Agriculture and conservation practices
  - Current environmental concerns and land use issues
  - Soils and history
  - Pollution remediation
  - Identification and benefits of wetlands
  - Carbon sequestration
4. **Decision-Making and Protection of Soils/Land Ecological Systems**
  - Scenarios
  - Actions at home and at school

## **ANCHORS AND STANDARDS**

\*Correlated with the Academic Standards for Environment and Ecology

After completing study on this issue, students will:

1. Describe the relationship between soil formation and the movement of water both within the soil and across the landscape.  
*\*4.4 Agriculture and Society – 4.4.10.C*
2. Describe how soil characteristics are affected by water, and how to control water movement to prevent erosion and pollution. Understand how topography, stream movement, and drainage are related.  
*\*4.4 Watersheds and Wetlands – 4.2.10.A*
3. Explain the importance of wetlands and how to recognize potential wetland areas and hydric soils.  
*\*4.2 Watersheds and Wetlands – 4.2.10.B, D, 4.2.12.D*
4. Explain the importance of soils as a natural resource which must be managed properly in order to sustain a healthy society. Understand that soils are in some ways nonrenewable, and what effect gross mismanagement of soils has had historically.  
*\*4.3 Natural Resources – 4.3.10.A, B, 4.3.12.B*
5. Describe the effects of human activity on soils and how soils can be used to clean up pollutants or can become a major pollutant.  
*\*4.5 Humans and the Environment – 4.5.10.A, C, 4.5.12.C*
6. Describe basic soil chemical and physical properties and how they interact with other variables to determine soil fertility or the ability of a soil to remediate pollution and improve environmental health.  
*\*4.5 Humans and the Environment – 4.5.10.E*
7. Explain how soil is alive, and how biological diversity is important for soil health and hence human, plant, and environmental health.  
*\*4.1 Ecology – 4.1.10.B, D, E*

8. Explain the soil food web and the different roles and survival strategies that various soil microbial organisms develop within the soil environment.  
\*4.1 Ecology – 4.1.10.C, D, 4.1.12.C
9. Understand and be able to describe the importance of soils to agriculture and soil quality properties. Describe current research findings on best management practices to maximize agriculture production, maintain and build soil health, and prevent soil loss and pollution.  
\*4.4 Agriculture and Society – 4.4.10.A, B, C, D
10. Use the soil survey to evaluate the best crops to grow in a given area and what limitations certain soils have to agricultural productivity. Also identify areas of prime farmland that should be preserved.  
\*4.4 Agriculture and Society – 4.4.10.C, D
11. Describe the hydrologic, carbon, and nutrient cycles and how soil management relates to those processes.  
\*4.1 Ecology – 4.1.10.B
12. Explain how societal needs, economic forces, and natural forces affect soil resources and how we can ensure long term sustainability of soil health.  
\*4.4 Agriculture and Society – 4.4.10.B, C, D  
\*4.5 Humans and the Environment – 4.5.10.A
13. Explain historical events that led to the creation of the soil conservation service.
14. Explain in detail the role that geology plays in soil formation, the kinds of soils that are formed, and their basic characteristics including texture, pH, color, and structure.  
\*4.1 Ecology – 4.1.10.F, 4.1.12.D
15. Describe the basic geologic features and rocks of the state of Pennsylvania and how they were formed.  
\*4.1 Ecology – 4.1.10.F
16. Understand and interpret geographical and geological information from topographic maps. Be able to make some basic assumptions about appropriate land use from topographic and geologic maps and information.  
\*4.1 Ecology – 4.1.10.F, 4.1.12.F
17. Use a soil survey or web-soil survey data to evaluate land use in Pennsylvania. Show how information in soil surveys can help the land user predict or avoid problems like sinkholes, or regions prone to landslides, flooding, drought, or soil instability.  
\*4.1 Ecology – 4.1.10.F, 4.1.12.F
18. Compare different kinds of land uses and conservation practices on erosion and sedimentation.  
\*4.4 Agriculture and Society – 4.4.10.E
19. Explain how climate is a major soil forming factor through it's affect on vegetation, organisms, water, and weathering.  
\*4.3 Natural Resources – 4.3.10.C, 4.3.12.C
20. Explain how soils and soil management are integral to maintaining clean water and a healthy aquatic environment.  
\*4.2 Watersheds and Wetlands – 4.2.12.A  
\*4.5 Humans and the Environment – 4.5.10.C

CC.3.5.9-12 Reading informational Text

CC.3.6.9-12 Writing

## ASSESSMENT

**Portfolio Assessment:** ☐ Yes ☒ No

**District-Wide Common Final Examination Required:** ☒ Yes ☐ No

**Course Challenge Assessment (Describe):** Must pass the final examination with a minimum of an 80%.

**WRITING TEAM:** Warren County School District Teachers

## WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? ☒ Yes ☐ No  
*\*Warren County School District Policy 9741 and 9744 state, "All classes in grades 9-12 shall have a final exam."*
2. Does this course issue a mark/grade for the report card? ☒ Yes ☐ No
3. Does this course issue a Pass/Fail mark? ☐ Yes ☒ No
4. Is the course mark/grade part of the GPA calculation? ☒ Yes ☐ No
5. Is the course eligible for Honor Roll calculation? ☒ Yes ☐ No
6. What is the academic weight of the course?  

☐ No weight/Non credit☒ Standard weight☐ Enhanced weight