



The RiverRidge Foundation for
Environmental Research and Education

The Academy of Environmental Sciences

Conservation Biology Syllabus: Virginia

The Course Timeline: June 28th – August 13th, 2010 (Seven Weeks)

Instructors:

Florian Schmitt (Instructor on Record)

Office: <http://www.tappedin.org>

Create a username and password, search my name, and you will find my office.

Office Hours: Wednesdays 7:00 pm - 8:00 pm Central Time; Sundays 7:00 pm – 8:00 pm Central Time

Email: fschmitt@riverridgefoundation.org

Chris Packert

Office: <http://www.tappedin.org>

Create a username and password, search my name, and you will find my office.

Office Hours: Wednesdays 8:00 pm - 9:00 pm Eastern Standard Time; Sundays 8:00 pm – 9:00 pm Eastern Standard Time

Email: cpackert@riverridgefoundation.org

Grades: Grades will be determined from a summation of student performances on Background Building Activities, Research Investigations, and the Final Project.

A breakdown of component percentages includes:

Online Activities: 50%

The Research Investigation: 30%

The Final Project: 20%

Differentiated Instruction:

High School Science Teachers:

Participants will:

1. increase knowledge of conservation biology by successfully completing all course units.
2. mentor high school students in online activities and field experiences
3. complete units one through four before leaving for the research expedition
4. produce a digital portfolio and complete the final project, assess the degree to which online activities and field research experiences addressed course objectives, make recommendations for revisions through a course evaluation, and develop a lesson plan for classroom use.

University Undergraduates

Participants will:

1. increase knowledge of conservation biology by successfully completing all course units.
2. complete units one through four before leaving for the research expedition
3. contribute to a positive learning environment by collaborating with course mentors, students, and instructors.
4. complete the final project and produce a digital portfolio

High School Students (Participating for College Credit)

Participants will:

1. increase knowledge of conservation biology by successfully completing all course units.
2. complete units one through four before leaving for the research expedition
3. contribute to a positive learning environment by collaborating with course mentors, students, and instructors.
4. complete the final project and produce a digital portfolio

Course Resources:

1. **Primary Online Resource:** *Environment: The Science Behind The Stories*, by Withgott and Brennen, 3rd Edition. \$30.00

http://wps.aw.com/bc_withgott_enviro_3/

Class ID: cm228704

2. Lippson, A.J. and Lippson, R.L. (2006). *Life in the Chesapeake Bay*. Baltimore: The Johns Hopkins University Press: \$25.00

3. *The State of the Chesapeake Bay*: Free
<http://www.chesapeakebay.net/pubs/sob/index.html>

The Final Project (Constructing an Online Wikispace: Digital Portfolio): The course will begin by introducing students to course objectives and to the preparation of the final project. Student research projects will be selected from the following choices:

- Measurement of environmental contamination with heavy metals including lead and mercury, and the effect this has on the region's ecosystems
- The effects of a local dairy farm on the surrounding ecosystem
- The effects of invasive species (flora and fauna) on biodiversity
- Research into biologically active chemical concentrations, especially hormonally active compounds, within the aquatic habitats of the Shenandoah River watershed
- Analysis of the survival rate of injured and orphaned wildlife rehabilitated and released from the Blue Ridge Wildlife Center
- Research into the fish kills of the South Fork of the Shenandoah River
- This list will grow as new ideas are identified

Week 1: Chapter 6: Species Interactions and Community Ecology

June 28th – July 2nd

Objectives:

1. Compare and contrast the major types of species interactions
2. Characterize feeding relationships and energy flow, using them to construct trophic levels and food webs
3. Distinguish characteristics of a keystone species
4. Characterize the process of succession and the debate over the nature of communities
5. Perceive and predict the potential impacts of invasive species in communities
6. Explain the goals and methods of ecological restoration
7. Describe and illustrate the terrestrial biomes of the world

Background Building Activities:

Required Reading: Chapter 6: Species interactions; Ecological communities; Earth's Biomes; and Conclusion

Activities: All student submissions are due by 11:59 pm Saturday night. Make sure to join the group activities throughout the week. Check Moodle for specific dates and times.

1. Engage in an introductory web chat: Go to Moodle for time of web chat.
2. Read Chapter 6
3. Answer the questions in “Testing your Comprehension” (From E-Book; Page 171), question 1 to 10.
4. Go to “Seeking solutions” and answer all questions and explain problems from 1 to 6 (From E-Book: Page 171).
5. Interpreting Graphs and Data (From E-Book: Page 171 and 172) Answer Questions 1-3.
6. Calculating Ecological Footprints (From E-Book: Page 172) Answer Questions 1-3.
7. Animations (From the web resources of Science Behind the Stories: Make sure Chapter 6 is selected to access correct animation): Aquatic Biomes, explore aquatic biomes. Send a document containing questions and answers to questions 1-4 to your mentor.
8. Investigate It!: Select Chapter 6; Unites States-Georgia-Biodiversity; Bees Vanish; Answer Questions 1-5.
9. Complete Chapter Quiz: Questions: 6, 1-20
10. Read the Executive Summary, The State of the Chesapeake Bay, and A Watershed Partnership sections from *The State of the Chesapeake Bay* and engage in a online discussion.

The Final Project: Students select their project, form collaborative research groups, create their Wikispace, conduct background research on their topics, and consider their topic in terms of the objectives of this unit. Check Moodle for more information on this activity.

Week 2: Chapter 11: Biodiversity and Conservation Biology

July 5th – July 9th

Objectives:

1. Characterize the scope of biodiversity on Earth
2. Contrast background extinction rates with periods of mass extinction
3. Evaluate the primary causes of biodiversity loss
4. Specify the benefits of biodiversity
5. Assess the science and practice of conservation biology
6. Compare and contrast traditional and innovative biodiversity conservation efforts

Background Building Activities

Read: Chapter 11: Biodiversity and Conservation Biology

Activities:

1. Page 342: Testing Your Comprehension: Answer questions: 1, 2, 5-10.
2. Message board questions from seeking solutions section (Page 325) at the end of the chapter: 1, 2, and 6.
3. Page 325: Interpreting Graphs and Data: Questions 1-3.
4. Page 326: Calculating Ecological Footprints: Questions 1-3.
5. Animations: How are impacts on community diversity measured?
6. Animations: You Decide: Can We Prevent Species Extinction?
7. Current Events: The Preservation Predicament and answer questions 1-5.
8. Current Events: Don't Let The Green Grass Fool You and engage in a web discussion.
9. Investigate It! Case Study: Costa Rica: Extinction Nightline Video. Answer Questions 1-5.
10. Chapter 11 Quiz.
11. Read Chapter 1: Life in the Bay from *The State of the Chesapeake Bay* and engage in an online discussion

The Final Project:

Students will apply the objectives of this unit to the research of their final project.

Week 3: Chapter 12: Resource Management, Forestry, Land Use, and Protected Areas

July 12th – July 16th

Objectives:

1. Identify the principles, goals, and approaches of resource management
2. Summarize the ecological roles and economic contributions of forests, and outline the history and scale of forest loss
3. Explain the fundamentals of forest management and describe the major methods of harvesting timber
4. Analyze the scale and impacts of agricultural land use
5. Identify major federal land management agencies and the lands they manage
6. Recognize types of parks and reserves, and evaluate issues involved in their design
Read: Resource Management, Forest Management, Agricultural Land Use, Parks and Preserves, and Conclusion.

Background Building Activities:

1. Testing Your Comprehension: Questions 2-5, 7-10.
2. Web Discussion: Seeking Solutions: Questions 3-6.
3. Interpreting Graphs and Data: Questions 1-3.
4. Calculating Ecological Footprints: Questions 1-3.
5. Animations: Madagascar and the Biodiversity Crisis.
6. Current Events: Saving Trees is Music to Guitar Makers Ears and answer questions 1-5.
7. Current Events: Before It Disappears and answer questions 1-5.
8. Case Study: Report tallies hidden costs of human assault on nature and answer questions 1-5.
9. Graph It!: Forestational Changes: Answer Questions 1-6.
10. Chapter 12 Quiz.

11. Read Chapter 2: Vital Habitat Protection and Restoration from *The State of the Chesapeake Bay* and engage in an online discussion

The Final Project: Students will apply the objectives of this unit to the research of their final project.

Week 4: Sustainable Solutions

July 19th – July 23rd

Objectives:

1. Explain the concept of sustainable development
2. Discuss how protecting the environment can be compatible with promoting economic welfare
3. Describe and assess key approaches to designing sustainable solutions
4. Explain how time is limited but how human potential to solve problems is tremendous

Read: Sustainability and Sustainable Development; Strategies for Sustainability; Precious Time; Conclusion

Background Building Activities:

1. Testing Your Comprehension: Questions 4-10.
2. Web Discussion: Seeking Solutions: Questions 2-6.
3. Interpreting Graphs and Data: Questions 1-3.
4. Calculating Ecological Footprints: Questions 1-4.
5. Current Events: Read *In Many Communities, It's Not Easy Going Green* and engage in a web discussion.
6. Investigate It!: Watch the video: The List: The End of Poverty and answer questions 1-5.
7. Read Chapter 3: Water Quality from *The State of the Chesapeake Bay* and engage in an online discussion

The Final Project: Students will apply the objectives of this unit to the research of their final project.

Week 5: The Field Research Component

July 24th – August 1st

DAY ONE: July 24th

Travel to Point Lookout State Park and spend two-days studying environmental aspects of the bay/river confluence.

1. Explore Point Lookout State Park
2. Gather water chemistry data
3. Evening Seminar: Features of the Chesapeake Bay Watershed
4. Read Chapter 4: Sound Land Use and engage in a discussion

DAY TWO: July 25th

1. Morning Field Investigations
 - Submerged Aquatic Vegetation Investigation
 - Marsh/Tidal Wetland Study
2. Lunch
3. Travel to a hotel near Great Falls Park
4. Evening Seminar: The Piedmont Province
5. Read Chapter 4: Sound Land Use from *The State of the Chesapeake Bay* and engage in a discussion

DAY THREE: July 26th

1. Explore Great Falls Park and study the Piedmont portion of the watershed. Conduct environmental investigations on changes in water chemistry, soil composition, rock type, and survey plant and animal species. Sources of pollution will be identified and discussed.
2. Travel to Harpers Ferry and stay at a hotel
3. Read Chapter 5: Stewardship and Community Engagement and Chapter 6: Looking Ahead from *The State of the Chesapeake Bay* and engage in a discussion
4. Evening Seminar: Building the Wikispace

DAY FOUR: July 27th

1. Investigate the Peregrine Falcon Restoration Project
2. Conduct watershed studies at the Shenandoah/ Potomac Confluence. Topics will include changes in water chemistry, soil composition, rock type, survey plant and animal species. Sources of pollution will be identified and discussed.
3. Travel to Lions Youth Camp in Boyce, Virginia
4. Evening Seminar: Specifics of The Scientific Method

DAY FIVE: July 28th

1. Canoe the Shenandoah River with Downriver Canoe Company and collect environmental data on the Shenandoah River.
2. Explore the grounds of the Burwell-van Lennep Foundation and Lions Youth Camp
3. Students begin environmental research projects. The Burwell-van Lennep Foundation and the Lions youth camp will be used for research project locations.
4. Evening Seminar: Students analyze their data and listen to a presentation by Jeff Kelble, The Shenandoah Riverkeeper: State of the Shenandoah River
5. Sleep at Lions Youth Camp

DAY SIX: July 29th

1. Conduct environmental research projects.
2. Evening Activities: Students analyze their data
3. Sleep at Lions Youth Camp

DAY SEVEN: July 30th

1. Conduct environmental research projects
2. Evening Seminar: Students analyze their data and listen to a presentation by the Blue Ridge Wildlife Center
3. Sleep at Lions Youth Camp

DAY EIGHT: July 31st

Analyze data, draw conclusions, and prepare a presentation during the day

1. Present the environmental research investigation to the group during the evening session
2. Sleep at Lions Youth Camp

DAY NINE: August 1st

1. Clean Youth Camp and return home

Week 6: August 5th – August 9th

The Final Project: Students will use this week to add data from their field research to their Wikispace and complete their digital portfolio.

Week 7: August 12th – August 16th

Drawing Conclusions: Students will spend this week evaluating student portfolios and their own course experience.