Textbook: Miller, Environmental Science 14e
Course Description: A contemporary study of the natural world through the human perspective. Emphasis will be placed on humans as a modifying force in the biophysical environment, including selected topics in ecological principles, pollution, population biology and environmental management.

Course Objectives
This is a broad-based course intended to provide a foundational knowledge of the environment. In the course you will:
1. Become versed in general vocabulary and concepts related to ecology and biodiversity.
2. Learn about sustainability and discuss solutions to preserving the natural world in an industrial age.
3. Become more aware of the impact of ecosystems on you personally and your impact on ecosystems.

Course Policies
Readings/Quizzes: Keep up with required reading. We will cover approximately one chapter a week. Chapters have between 3 and 7 sections. Therefore, plan on reading 1 or 2 sections each day. Content reading will be your responsibility on your own time. Weekly vocabulary quizzes will be provided. Success in the course will be dependent on your diligence in reading, note-taking and reviewing.

Attendance: Missing a graded activity due to absence without prior arrangements with me may result in a ZERO for the exercise. You must contact me by email or speak to me in person if you will be absent.

Ethical Conduct: You are expected to conduct yourselves as professionals. No cell phone use in class unless directed by the instructor. Chapter 14 of the University of Wisconsin Administrative Code (UWS 14) defines academic misconduct. Please refer to the brochure entitled “Academic Misconduct. Guidelines for Students. Cheating: Rules and Disciplinary Actions.” UWS 14 is available to all students in the Office of Student Services as well as online (www.uwc.edu/students/uwe-student-rights-regulations-booklet.pdf). The Menominee High School Student Handbook will also be enforced where it applies. Academic misconduct is taken very seriously and will be pursued vigorously in all cases.
Points Possible and Grading Scale

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This course runs as a semester course.
No quarter grades are issued.
All students take the FINAL EXAM.

Schedule of Possible Lesson Topics and Exam Dates (Approx.)

Week of 9/2

Chapter 1: Environmental Problems, Their Causes, & Sustainability
Case Study- A Vision of a More Sustainable World in 2060
1-1: Three Principles of Sustainability
1-2: How Our Ecological Footprint Affects the Earth
Case Study- China’s New Affluent Consumers
1-3: Why We Have Environmental Problems
1-4: What Is An Environmentally Sustainable Society?

Week of 9/9

Chapter 2: Science, Matter and Energy
Case Study- How Do Scientists Learn About Nature?
A Story about a Forest.
2-1: What Do Scientists Do?
2-2: What Is Matter and What Happens When It Undergoes Change?
2-3: What is Energy and What Happens When It Undergoes Change?

Week of 9/16

Chapter 3: Ecosystems: What Are They and How Do They Work?
EXAM 1, Friday
Case Study- Tropical Rain Forests Are Disappearing
9/21: (Chapters 1–3)
3-1: What Keeps Us and Other Organisms Alive?
3-2: What Are the Major Components of an Ecosystem?
Science Focus: Many of the World’s Most Important Organisms are Invisible to Us
3-3: What Happens to Energy in an Ecosystem?
3-4: What Happens to Matter in an Ecosystem?
Science Focus: Water’s Unique Properties
3-5: How Do Scientists Study Ecosystems?
Week of 9/23  

Chapter 4: Biodiversity and Evolution  
Case Study- Why Should We Protect Sharks?  
4-1: What is Biodiversity and Why Is It Important?  
Science Focus: Have You Thanked the Insects Today?  
4-2: How Does the Earth’s Life Change over Time?  
Science Focus: How Did Humans Become Such A Powerful Species?  
4-3: How Do Geological Processes and Climate Change Affect Evolution?  
4-4: How do Speciation, Extinction & Human Activities Affect Biodiversity?  
Science Focus: Changing the Genetic Traits of Populations.  
4-5: What Roles Do Species Play in Ecosystems?  
Case Study- Why Are Amphibians Vanishing?  
Case Study- The American Alligator- A Keystone Species That Almost Went Extinct

Week of 9/30  

Chapter 5: Biodiversity, Species Interactions & Population Control  
Case Study- The Southern Sea Otter: A Species in Recovery  
5-1: How Do Species Interact?  
Science Focus: Threats to Kelp Forests  
5-2: What Limits the Growth of Populations?  
Science Focus: Why Do California’s Southern Sea Otters Face an Uncertain Future?  
5-3: How Do Communities and Ecosystems Respond to Changing Environmental Conditions?

Week of 10/7 & 14  
Exam 2, Fri. 10/18 (Chaps 4-6)  

Chapter 6: The Human Population and Urbanization  
Case Study- Slowing Population Growth in China: A Success Story  
6-1: How Many People Can The Earth Support?  
Science Focus: How Long Can the Human Population Keep Growing?  
6-2: What Factors Influence the Size of the Human Population?  
Case Study- The U.S. Population is Growing  
Case Study- The United States: A Nation of Immigrants  
6-3: How Does a Population’s Age Structure Affect Its Growth or Decline?  
Case Study- The American Baby Boom  
6-4: How Can We Slow Human Population Growth?  
Case Study- Slowing Population Growth in India  
6-5: What Are the Major Urban Resource and Environmental Problems?  
Case Study- Urbanization in the United States  
Case Study- Mexico City  
6-6: How Does Transportation Affect Urban Environmental Impacts?  
6-7: How Can Cities Become More Sustainable and Livable?  
Case Study- The New Urban Village of Vauban  
Case Study- The Ecocity Concept in Curitiba, Brazil
Week of 10/21  

**Chapter 7: Climate and Biodiversity**

*Case Study- A Temperate Deciduous Forest*

7-1: What Factors Influence Climate?
7-2: How Does Climate Affect the Nature & Location of Biomes?

*Science Focus: Staying Alive in the Desert*

7-3: How Have Human Activities Affected the World’s Terrestrial Ecosystems?
7-4: What Are the Major Types of Aquatic Systems?
7-5: Why Are Marine Aquatic Systems Important and How Have Human Activities Affected Them?
7-6: What Are the Major Types of Freshwater Systems & How Have Human Activities Affected Them?

Week of 10/28  

**Chapter 8: Sustaining Biodiversity: The Species Approach**

*Case Study- Polar Bears and Climate Change*

8-1: What Role Do Humans Play in the Extinction of Species?

*Science Focus: Estimating Extinction Rates*

8-2: Why Should We Care about the Rising Rate of Species Extinction?
8-3: How Do Humans Accelerate Species Extinction?

*Case Study- The Kudzu Vine*  
*Case Study- Where Have all the Honeybees Gone?*  
*Case Study- A Disturbing Message from the Birds.*

*Science Focus: Vultures, Wild Dogs, and Rabies: Some Unexpected Scientific Connections*

8-4: How Can We Protect Wild Species from Extinction?

*Case Study- Protecting Endangered Sea Turtles*  
*Case Study- Protecting Whales: A Success Story...So Far.*

Week of 11/4  

**Chapter 9: Sustaining Biodiversity: The Ecosystem Approach**

*Case Study- Wangari Maathai and the Green Belt Movement*

9-1: What Are the Major Threats to Forest Ecosystems?

*Science Focus: Putting a Price Tag on Nature’s Ecological Services*

*Case Study- Many Cleared Forests in the U.S. have Grown Back*

9-2: How Should We Manage and Sustain Forests?

*Science Focus: Certifying Sustainably Grown Timber & Products Such as the Paper Used in This Book*

9-3: How Should We Manage and Sustain Grasslands?
9-4: How Should We Manage and Sustain Parks and Nature Reserves?

*Case Study- Stresses on U.S. Public Parks*

*Science Focus: Reintroducing the Gray Wolf to Yellowstone Nat’l Park*

*Case Study- Costa Rica—A Global Conservation Leader*

*Case Study- Controversy over Wilderness Protection in the U.S.*

9-5: What Is The Ecosystem Approach to Sustaining Biodiversity?

9-6: How Can We Help to Sustain Aquatic Biodiversity?

*Case Study- Industrial Fish-Harvesting Methods*
Week of 11/11  Chapter 10: **Food, Soil and Pest Management**

*Case Study- Organic Agriculture Is on the Rise*

10-1: What is Food Security and Why is it Difficult to Attain?

10-2: How is Food Produced?

*Science Focus: Soil is the Foundation of Life on Land*

10-3: What Environmental Problems Arise from Industrialized Food Production?

10-4: How Can We Protect Crops from Pests More Sustainably?

*Case Study- Ecological Surprises: The Law of Unintended Consequences*

10-5: How Can We Improve Food Security?

10-6: How Can We Produce Food More Sustainably?

*Case Study- Soil Erosion in the U.S.*

*Science Focus: The Land Institute and Perennial Polyculture*

Week of 11/25  Chapter 11: **Water Resources and Water Pollution**

*Case Study- The Colorado River Story*

11-1: Will We Have Enough Usable Water?

*Case Study- Freshwater Resources in the U.S.*

*Science Focus: Water Footprints and Virtual Water*

11-2: How Can We Increase Fresh Water Supplies?

*Case Study- Aquifer Depletion in the U.S.*

*Case Study- California Transfers Massive Amounts of Freshwater from Water-Rich Areas to Water-Poor Areas*

*Case Study- The Aral Sea Disaster: A Glaring Example of Unintended Consequences*

11-3: How Can We Use Freshwater More Sustainably?

11-4: How Can We Reduce the Threat of Flooding?

11-5: How Can We Deal with Water Pollution?

*Case Study-Is Bottled Water a Good Option?*

*Case Study- Ocean Garbage Patches: There is No Way*

*Science Focus: Oxygen Depletion in the Northern Gulf of Mexico*

*Science Focus: Treating Sewage by Working with Nature*

Week of 12/2  Chapter 12: **Geology and Nonrenewable Minerals**

12-1: What are the Earth’s Major Geological Processes and Hazards?

12-2: How are the Earth’s Rocks Recycled?

12-3: What are Mineral Resources and What are the Environmental Effects of Using Them?

12-4: How Long Will Supplies of Nonrenewable Mineral Resources Last?

*Science Focus: The Importance of Rare Earth Metals*

*Case Study- An Outdated Mining Subsidy: The U.S. General Mining Law of 1872.*

12-5: How Can We Use Mineral Resources More Sustainably?

*Science Focus: The Nanotechnology Revolution*

*Case Study- Pollution Prevention Pays*
Week of 12/9  
**Chapter 13: Energy**  
*Case Study- The Astounding Potential for Wind Power in the U.S.*  
13-1: What is Net Energy & Why Is it Important?  
13-2: What Are the Advantages & Disadvantages of Using Fossil Fuels?  
*Case Study- The U.S. uses Much More Oil than it Produces*  
*Case Study- Heavy Oil from Tar Sand*  
*Case Study- The Growing Problem of Coal Ash*  
13-3: What Are the Advantages & Disadvantages of Nuclear Power?  
*Case Study- High-Level Radioactive Wastes in the U.S.*  
*Case Study- The 3 Worst Nuclear Power Plant Accidents*  
13-4: Why is Energy Efficiency an Important Energy Resource?  
*Case Study- Saving Energy & Money with a Smarter Electrical Grid*  
*Case Study- The Rocky Mountain Institute*  
13-5: What Are the Advantages & Disadvantages of Using Renewable Energy Resources?  
*Case Study- Is Ethanol the Answer?*  
13-6: How Can We Transition to a More Sustainable Energy Future?

Week of 12/16  
**Chapter 14: Environmental Hazards and Human Health**  
*Case Study- Are Baby Bottles & Food Cans Safe to Use? The BPA Controversy*  
14-1: What Major Health Hazards Do We Face?  
14-2: What Types of Biological Hazards Do We Face?  
*Science Focus: Genetic Resistance to Antibiotics Is Increasing*  
*Case Study- The Global HIV/AIDS Epidemic*  
*Case Study- Malaria- The Spread of a Deadly Parasite*  
14-3: What Types of Chemical Hazards do We Face?  
14-4: How Can We Evaluate Chemical Hazards?  
*Case Study- Protecting Children from Toxic Chemicals*  
14-5: How Do We Perceive Risks & How Can We Avoid the Worst of Them.  
*Case Study- Death from Smoking*

Week of 12/30  
**Chapter 15: Air Pollution, Climate Disruption, and Ozone Depletion**  
*Case Study- Melting Ice in Greenland*  
15-1: What is the Nature of the Atmosphere?  
15-2: What are the Major Air Pollution Problems?  
15-3: How Should We Deal With Air Pollution?  
15-4: How Might the Earth’s Climate Change in the Future?  
*Science Focus: Using Models to Project Changes in Atmospheric Temperatures.*  
15-5: What are some Possible Effects of a Warmer Atmosphere?  
15-6: What can We do to Slow Projected Climate Disruption?  
15-7: How Have We Depleted Ozone in the Stratosphere & What Can We do About It?
Week of 1/6  Chapter 16: **Solid & Hazardous Waste**  
*Case Study- E-Waste—An Exploding Problem*  
16-1: What Are Solid Waste & Hazardous Waste, and Why Are They Problems?  
*Case Study- Solid Waste in the U.S.*  
16-2: How Should We Deal with Solid Waste?  
16-3: Why is Reusing and Recycling Materials So Important?  
Science Focus: Bioplastics  
16-4: What Are the Advantages & Disadvantages of Burning or Burying Solid Waste?  
16-5: How Should We Deal With Hazardous Waste?  
*Case Study- Recycling E-Waste*  
*Case Study- Hazardous Waste Regulation in the U.S.*  
*Case Study- Lead is a Highly Toxic Pollutant*  
16-6: How Can We Make the Transition to a More Sustainable Low-Waste Society?  
*Case Study- Industrial Ecosystems: Copying Nature*

Week of 1/13  Chapter 17: **Environmental Economics, Politics & Worldviews**  
Case Study- The Environmental Transformation of Chattanooga, TN  
17-1: How Are Economic Systems Related to the Biosphere?  
17-2: How Can We use Economic Tools to Deal With Environmental Problems?  
Individuals Matter: Muhammad Yunus and Ray Anderson  
17-3: How Can We Implement More Sustainable & Just Environmental Policies?  
Case Study- Managing Public Lands in the U.S. – Politics in Action  
Individuals Matter: Denis Hayes—A Practical Environmental Visionary  
Case Study- The Greening of American Campuses  
17-4: What Are Some Major Environmental Worldviews?  
Science Focus: Biosphere 2—A Lesson in Humility  
17-5: How Can We Live More Sustainably?