A Teaching Guide on Sustainable Living Practices

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Western Washington University
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This teaching guide is for individuals who are interested in teaching a course on sustainable living practices. The suggestions and material provided in this guide are open for anyone to access and use. I created this guide for my Master’s project at Western Washington University (WWU). I taught the course described in this guide to 23 undergraduate students during Fall 2016. The course had the following three goals for students:

- Become familiar with a variety of sustainable living practices and local sustainable resources
- Have the opportunity to engage in more sustainable living practices
- Use critical thinking skills to explain the barriers that prevent individuals from living sustainably

I evaluated how effectively the curriculum achieved these goals over the course of the quarter in three ways. The first method of evaluation was to analyze students’ assignments throughout the quarter, particularly their final papers where they were asked to reflect on their experiences in the course and how these experiences shaped their knowledge of, perspectives of, and engagement in sustainable living practices. The second method was to review anonymous course evaluations that each student was given at the end of the quarter as part of a mandatory requirement that all WWU courses must fulfill. The third method was to analyze responses that students provided on surveys they were asked to complete at both the beginning and end of the quarter. These surveys were designed with the purpose of
measuring the course’s effectiveness at achieving the desired outcomes. The survey did this by asking questions about students’ engagement in and knowledge of sustainable living practices, as well as their awareness of local sustainability resources.

Improvements were made to the course curriculum based on the findings from the review of assignments, student evaluations, and surveys. These improvements are reflected in this teaching guide. It may be necessary to make adaptations to the material in this teaching guide, depending on the institution and the location where this guide is being used. This particular course had access to many sustainability resources through WWU and the city of Bellingham, which may not be available in other areas. These resources are described in the following sections.

Western Washington University

The Sustainable Living Practices course described in this guide was designed and taught at Western Washington University (WWU). There are many features of WWU that made it a suitable institution for implementing a pilot version of this course. WWU is a medium-sized, liberal arts university that takes great pride in being a “green” campus. It purchases 100 percent renewable energy and even generates some of its own energy from on-campus solar panels.¹ Tuition for WWU students includes a bus pass that gives students easy access to public transportation that will get them to and from campus and other areas of interest in town.²

WWU also offers many academic programs related to the environment and sustainability. One of WWU’s six colleges is Huxley College of the Environment (Huxley),

which offers both undergraduate and graduate programs on topics such as environmental studies, environmental economics, business and sustainability, geography, environmental sciences, and environmental education. Huxley also works with multiple on-campus research institutes, such as the Institute for Energy Studies and Resilience Institute, which provide further learning opportunities for students. Many of the courses offered through these programs and research institutes teach students about possible solutions for minimizing the environmental impact of human activities. Therefore, the curriculum for this course on sustainable living, which teaches individuals how to reduce their own environmental impact, was easily integrated with other courses offered through Huxley.

In addition to the many academic programs that provide opportunities for students to pursue environmental degrees, there are numerous on-campus programs, clubs, and events that students of any academic program can participate in. WWU has two permanent environmental offices - the Environmental Center and the Office of Sustainability. These two offices provide a multitude of environmental resources to students, including a 5-acre farm that students can reserve garden plots in; a recycling center that provides recycling and composting services; a $300,000 annual fund that students can receive grants from for sustainability projects; and a program that teaches students living in residence halls how to reduce their environmental impact.3

These offices hold many on-campus events that students can attend, such as an annual sustainability fair and various environmental workshops. There are also 14 student-led environmental clubs that allow students to get involved in projects related to sustainable food, gardening, renewable energy, and more.4 The many sustainability resources that WWU’s campus provide were very useful for promoting the sustainable living class and for helping interested students find ways to get involved in sustainability outside of class. The Office of Sustainability and Huxley also contributed three of the four guest speakers that spoke in the class. The resources that WWU was able to provide for this class and the students in it may or may not exist at other institutions.5

5 Link to image used in this section: Western Washington University
Bellingham, Washington

WWU is located in the city of Bellingham, Washington in the Northwestern corner of the U.S. Bellingham is approximately 90 miles north of Seattle, Washington and 50 miles south of Vancouver, British Columbia. The city has many sustainability resources and programs that students in the WWU sustainable living course had the opportunity to take advantage of. For example, students interested in reducing their waste by grocery shopping in bulk could choose to shop at one of two locations for the local co-op store, which offers nut butters, pasta, soy sauce, oils, vinegars, snacks, soaps, shampoos, cleaners, and more in bulk. During the lectures on water efficiency, the instructor was able to give each student a free water-saving kit, courtesy of the City of Bellingham’s water efficiency program. Each kit included low-flow showerheads, low-flow kitchen and bathroom sink aerators, and toilet leak detector tablets.

During the home energy efficiency lectures, the instructor could recommend that interested students living off campus sign up for a free home energy audit program offered by the local utility company, Puget Sound Energy. This program provides participants with free installation of up to 20 LED light bulbs. Students that were interested in reducing their environmental impact from driving had a number of alternative transportation options in Bellingham, including an accessible bus system and bike-friendly roads and trails. These are just a few of the resources offered that support a sustainable lifestyle in Bellingham. These resources may not be available in other cities.

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7 Link to image used in this section: Bellingham, WA
### Course Timeline

This teaching guide is modeled after a 2-credit course that meets twice per week for 50-minute lectures. The timeline for this course covers 10 weeks of material. It is assumed that the course meets for 20 lectures during these 10 weeks and that the institution has a specified week for finals exam that takes place after these 10 weeks. These details may change depending on the academic calendar of each institution. The material in this guide can be adapted for different timelines if necessary. The following table shows the suggested timeline that this guide follows.

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<th>Meeting #</th>
<th>In Class</th>
<th>Assignments Due</th>
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<td>1</td>
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<td>N/A</td>
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<td>1</td>
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<td><strong>Topic</strong>: Climate Change and Sustainable Living Overview</td>
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<td><strong>Topic</strong>: The U.S. Waste Problem</td>
<td><strong>Video assignment</strong>: “The Story of Stuff”</td>
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<td>2</td>
<td>4</td>
<td><strong>Topic</strong>: Zero Waste Lifestyle <strong>Other</strong>: Assign Sustainable Living Paper 1; Possible guest speaker</td>
<td><strong>Reading assignment</strong>: Zero Waste blog</td>
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<td>5</td>
<td><strong>Topic</strong>: Zero Waste Activity</td>
<td><strong>Reading assignment</strong>: Zero Waste blog</td>
</tr>
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<td>6</td>
<td><strong>Topic</strong>: Food Waste</td>
<td><strong>Video assignment</strong>: “Last Week Tonight with John Oliver”</td>
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<td>7</td>
<td><strong>Topic</strong>: Sustainable Living Paper Discussion</td>
<td><strong>Paper</strong>: Sustainable Living Paper 1</td>
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<td>4</td>
<td>8</td>
<td><strong>Topic</strong>: The Environmental Impacts of Food Production</td>
<td><strong>Research assignment</strong>: Environmental impacts of food production</td>
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<td>5</td>
<td>9</td>
<td><strong>Topic</strong>: Environmentally Friendly Food Choices Part 1</td>
<td><strong>Reading assignment</strong>: Environmentally friendly food <strong>Reading assignment</strong>: “Flexitarian” diet</td>
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<td>Week</td>
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<tr>
<td>5</td>
<td><strong>Topic:</strong> Environmentally Friendly Food Choices Part 2&lt;br&gt;<strong>Other:</strong> Midterm exam</td>
<td>No assignments (study for midterm)</td>
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<td><strong>Reading assignment:</strong> “The Trouble with Tourism”</td>
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<td><strong>Paper:</strong> Sustainable Living Paper 3</td>
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Course Syllabus

The syllabus that was used for the WWU course is provided below. The syllabus will need to be adapted to the policies of whichever institution the course is taught at.

Huxley College of the Environment, Western Washington University

ENVS 297I (CRN 44252): Sustainable Living Practices

Fall 2016 - 2 credits

Location: Communications Facility (CF) 226

Time: Tuesdays, Thursdays 10-10:50am

Prerequisites: None

Course Overview

Research shows that although many individuals consider various sustainable practices to be important—such as composting, using public transportation, buying local goods, and reducing energy use—the majority of these individuals do not actually engage in these practices. In this course we will explore some of the reasons behind why a gap exists between the attitudes about sustainability and the adoption of sustainable behaviors. We will seek to answer the question: Why might it be difficult for an individual to incorporate sustainable practices into their lifestyle even if they believe these practices to be important? We will look for this answer in readings and discussions, as well as through assignments that require engaging in selected practices and documenting the experience.

This course will also provide students with examples of sustainable living practices that an average individual can adopt (i.e. we won’t focus on large investments like a solar panel array), including practices that are relevant to the Bellingham area. Students will learn about these practices through readings, lecture, guest speakers, and assignments. The course will be divided into various topics of sustainability, such as waste, food, water, energy, and transportation. Much of the learning that takes place in this course will be through discussion with peers. Students will connect with one another in groups and then together will reflect on the readings, guest speakers, and their own experiences.
Learning Objectives
At the end of this course you should be able to:

- Understand various practices that an individual can adopt to enjoy a more sustainable lifestyle.
- Explain why a gap may exist between an individual’s attitude about sustainability and their engagement in sustainable practices.
- Understand which local resources are available to help an individual minimize their environmental impact in their daily life.

Text
You are not required to purchase a textbook for this course. Selected readings will be posted on Canvas each week.

Expectations

a) Attendance, readings, and participation
It is very important that you complete all of the required readings before each class so that you are able to contribute to class and group discussions. This course relies heavily on discussion as a way to connect, learn from, and reflect on ideas and assignments with your peers. Your participation in discussions is a significant part of your grade. It would be unfair to your peers if you did not complete the readings before class and were unable to contribute to group discussions. To ensure that all students are completing the readings, you will be required to complete at least one assignment each week that shows you have read the required readings. There will also be various, short assignments to submit on Canvas periodically.

b) Sustainable living papers (3 total)
Three times throughout the quarter, you will be asked to choose a new sustainable living practice that you learned about in class - and do not already engage in - to temporarily adopt for approximately 10 days. You will submit a 2-3 page paper (double-spaced) that documents and reflects on your experience with each new practice. You will also be expected to talk about your experiences and papers in class. These are not meant to be difficult papers, but rather a chance for you to reflect on how your own experiences relate to the readings, guest
lectures, or class discussions (when applicable). You will not be graded on your ability to successfully adopt the practice. Your paper should address the following questions:

- Which practice did you choose to adopt?
- Why did you choose this practice? What are the benefits of adopting it?
- What challenges did you encounter during this experience?
- What might make this practice easier to adopt?
- How did your experience relate to ideas mentioned in class discussions, readings, and/or guest lectures?

c) Exams

There will be short midterm and final exams given near the middle and end of the quarter. The purpose of these exams is to test how well you have paid attention to and understood the concepts shared in class.

d) Final paper

You will submit a final paper (approximately 1,000 words, double-spaced, 12 pt Times New Roman) that discusses your experience in this class, what you learned, and how you will (or will not) apply it to your own life. You should draw upon the readings, class discussions, and lectures in your paper.

e) Surveys

There will be a survey given at the beginning of the quarter that will ask questions to help the instructor better understand students’ living practices, knowledge of sustainability, and awareness of local resources. You will receive a grade for completing the survey, but your individual responses will not be graded.

Grading

The grade for this course will be comprised of the following components:

a) Sustainable living papers (30% - 10% per paper)
b) Final paper (10%)
c) Attendance, readings, and participation in weekly discussions and assignments (35%)
d) Midterm exam (10%)
e) Final exam (15%)

Grade Cutoffs

A 92.5, A- 90.0, B+ 87.5, B 82.5, B- 80.0, C+ 77.5, C 72.5, C- 70.0, D+ 67.5, D 62.5, D- 60.0, F

This is a pass/fail class. Any grade at least 70% or above is considered a passing grade. One thing I would change is to make this a graded course.

Sickness and other Emergencies

If you miss an assignment due to sickness or a family emergency, you may complete the assignment at a later time. Please inform me as soon as possible if you need an extension due to an emergency or sickness. Since our class only meets 10 times during the quarter, it is important that you make it to class every week. If you miss class due to sickness or an emergency, and you contact me, I will give you the option to make up the class with an assignment. Classes missed for other reasons will result in a deduction from your attendance and participation grades.

Western encourages students to seek assistance and support at the onset of an illness, difficulty, or crisis.

- For a medical concern or question, contact Student Health 650-3400.
- For an emotional or psychological concern or question, contact the Counseling Center 650-3400.
- For a health and safety concern, contact University Police 650-3555.
- For a family or personal crisis or emergency, contact Dean of Students 650-3450.

Cell phones and Laptops

Cells phones must be put on silent and stowed away during class. Laptops may be used when appropriate (i.e. to look something up related to a discussion you are having about a class topic or to take notes). If the use of your laptop is clearly unrelated to class and is distracting other students, participation points may be taken away.

Academic Honesty

You are expected to be familiar with, and to follow, the University’s policies on academic integrity as set forth in the WWU Academic Dishonesty Policy and Procedures. All policies
related to academic integrity apply to in-class and take home projects, assignments, exams, and quizzes. Students may only collaborate on assignments with permission from the instructor. Allegations of alleged academic dishonesty will be investigated. Sanctions for academic dishonesty can include failing grades and/or suspension from the university.

Reasonable Accommodation Policy

WWU provides reasonable accommodation to the known physical, sensory, or mental limitations of qualified students. To request accommodation students should contact the WWU DRS office. It is open Monday through Friday, from 8 am to 5 pm. and located in Old Main 120. They may be reached at drs@wwu.edu or 360.650.3083.

Canvas

To access Canvas you will need your Universal ID and Password. You can access the site after you have logged into your MyWestern account. Any login or Canvas inquiries should be directed toward the ATUS help desk at 650-3333. E-mail sent through Canvas will go to your WWU email account. If you don’t use your WWU account, please have your messages forwarded to the account that you do use. Please check your WWU email account daily for course materials, assignments, and announcements.
Guest Lectures

There were four guest speakers that presented lectures to this class during the quarter. The guest speakers shared valuable insight on their real-world experiences with the various topics covered in the course. Overall, student feedback on the guest speakers was very positive. The students appreciated having the opportunity to ask these speakers specific questions about their area of expertise. Many students commented that these guest lectures were motivating and inspiring. The four guest speakers that spoke in the class were:

- The WWU Zero Waste Coordinator – an expert on waste who personally practices a Zero Waste lifestyle;
- The owner of a local ice cream shop, who purchases most of his ingredients from local farms;
- The WWU Sustainable Transportation Manager – an expert on alternative transportation options in Bellingham who does not personally own a car;
- The Dean of WWU’s Huxley College of the Environment, who has published research on the negative environmental, social, and economic impacts of the tourism industry.

There are a couple of instances throughout this teaching guide that it is recommended a guest speaker present in the class. Depending on the guest speakers that are available in the area, the instructor may choose to invite a guest speaker to the class at a different time than is suggested in this guide. The instructor should use their discretion in deciding when a guest speaker will best fit into the schedule of their course.

Modules

This teaching guide is divided into eight modules: course introduction, climate change and sustainable living overview, waste, food, water, energy, transportation, and final assignments. The following sections of this teaching guide provide suggested topics, goals, lectures, lecture slides, activities and assignments for each of the lectures within each module. Some modules include textboxes titled “Student Experiences”. These textboxes include direct quotes from the final papers written by students in the WWU Sustainable Living class. These quotes provide examples of students’ experiences in the class and their perceptions of the course content.
Module 1: Course Introduction

Brief Description: This module provides students with an opportunity to review the class syllabus with the instructor, and to get to know their peers.

Estimated Length: One 50-minute lecture

Lecture Topics:
- Course Introduction

Student Goals:
Become familiar with the syllabus, course expectations, and peers

Lecture Summary:
Students will learn about the course’s expectations, goals, assignments, and topics, followed by an opportunity to ask questions. This is also an opportunity for the instructor to answer any student questions regarding the online software that will be used for the course, if any (i.e. Canvas, Blackboard, etc.). The instructor will lead the students in an icebreaker activity that will help them become familiar with their peers. The meeting will end with students completing an in-class survey. Responses to the surveys will provide the instructor with information on students’ demographics, knowledge of sustainability concepts and practices, engagement in sustainable living practices, and awareness of sustainability resources.

Sample Lecture Slides:
There are no lecture slides necessary for this introductory meeting. The instructor may want to show a slide with photos of themselves as a way to introduce themselves to the students. It will be helpful to use a projector when reviewing the syllabus and the online software used for the course.

Suggested Activities:
Icebreaker Activity
This can be any activity of the instructor’s choosing that gives each student the opportunity to share some information about themselves, such as their name, academic
interests, year in school, and reason for taking the class. There are a number of suggestions online for how to make an icebreaker activity interesting and enjoyable.

Pre-Class Survey

Students will take this survey near the end of the first class meeting. Students will be given a grade for participating in the survey, but their responses are not graded. The purpose of the survey questions is to provide the instructor with information on students’ current understanding of sustainability concepts; their engagement in sustainable behaviors; and their awareness of local sustainability resources. The survey will also ask questions about students’ demographic information. It is important for the instructor to have an idea of how many students live either on or off campus, what type of housing they live in, what year they are in school, and whether they have roommates.

Students’ answers to these questions will determine the sustainable resources and practices that are available to them. For example, a student living on campus might have fewer opportunities to engage in sustainable living practices related to food if their institution requires them to have a campus meal plan, like WWU does. One student who participated in this course commented in their final paper that they attempted to be a vegetarian for two weeks, but had difficulty finding a variety of vegetarian options at the dining hall. There were also multiple students who participated in the course that were in their first quarter as freshmen at WWU. They brought attention to the fact that they were unaware of most local sustainability resources because of the short amount of time that they had lived in Bellingham prior to participating in the course.

The instructor can use the information gathered from student responses to determine if there is any specific content that they want to focus on or skip throughout the quarter. For example, if every student appears to understand the causes of climate change, then the instructor should spend very little time talking about climate change in future lectures. And if the majority of students are unaware of local recycling or composting services, then the instructor should spend extra time providing information on these services during the Waste lectures. A copy of the pre-class survey that was used in this course is included in the Appendix. It is recommended that the instructor make changes to the survey so that the questions better reflect the location of their specific course as well as the interests of the instructor.
Module 2: Climate Change and Sustainable Living Overview

Description: This module provides students with an overview of climate change and sustainable living.

Estimated Length: One 50-minute lecture

Lecture Topics:
- Climate Change and Sustainable Living

Lecture 1: Climate Change and Sustainable Living Overview

Student Goals:
- Understand the causes of climate change
- Be able to define sustainability
- Identify the barriers to a sustainable lifestyle

Equipment/Supplies:
- Computer and projector to display PowerPoint slides

Suggested Assignments Due Before Lecture:
“Why Bother?” Reading Assignment
Student will read the article “Why Bother?” by Michael Pollan. This article can be accessed at the following link:
http://michaelpollan.com/articles-archive/why-bother/. Many individuals who learn about climate change can become overwhelmed by the severity and magnitude of its predicted impacts. Individual solutions to climate change, such as changing light bulbs and eating less meat, can feel insignificant in the face of such a daunting global problem. In this article, Michael

Student Experience
“I have mentioned the ‘Why Bother?’ article by Michael Pollan time and time again in my writing but it made such an impact on me that I feel it is justified. That first reading of the quarter was the initial spark for this class. ‘Why Bother?’ has related to almost all my other courses this quarter and I’ve found that it creates a more meaningful way to go about my day.”
Pollan both asks and answers the question: “Why bother trying to make a difference?” It is an excellent article to have students read at the beginning of the course, as it will provide reasons for why the upcoming lectures in the course on sustainable living practices matter. Many students that participated in this course mentioned that this article resonated with them.

After students read this article, they will answer the following questions:

- What is your answer to Michael Pollan’s question? Why should we bother with sustainable living practices?
- Were there any parts of this article that you felt you could relate to?
- In what ways can we use our everyday decisions to send messages to politicians and businesses?

**Lecture Summary:**

The greenhouse effect explains the process by which solar radiation is reflected and absorbed by Earth’s atmosphere, clouds, and surface. Some of the solar radiation that is absorbed by the Earth’s system is emitted back into the atmosphere in the form of infrared radiation. Greenhouse gases in the atmosphere, such as carbon dioxide (CO₂), absorb the majority of the infrared radiation. The gases then re-emit this radiation in many directions, which warms the Earth’s surface and lower atmosphere. Climate change is the result of the enhancement of this greenhouse effect. The effect is primarily enhanced by human activities that emit greenhouse gases into the atmosphere. The increased concentration of greenhouse gases in the atmosphere has caused more infrared radiation to be trapped within the Earth’s atmosphere, which has led to rising global temperatures. Global impacts of these rising temperatures have already been observed or are predicted to occur. Impacts include more extreme weather events, sea level rise, ocean acidification, and more pests and diseases. 

**Student Experience**

“Sustainability and the changes you must make in order to live this new lifestyle can be a bit much to wrap your head around— which is why there may be such a gap between people’s attitudes towards sustainability and their engagement in these practices. I am guilty of being one of those people for a very long time… After I was given the tools and information as to how to live sustainably, I was presented the issue of making some pretty big lifestyle changes that involves my eating habits [and] shopping habits among a cluster of other habits that I did not even realize I had.”
diseases.\textsuperscript{8} There are many human activities that contribute to climate change by emitting greenhouse gases, such as deforestation, transportation, agricultural practices, and electricity and heat generation. Although these activities are practiced on a global scale, there are choices that individuals can make in their own lives to reduce the environmental impact of these activities. Individuals can choose to practice sustainable living, which is defined as living a lifestyle that uses as few resources as possible and causes the least amount of damage for future generations to deal with. A study of 1,000 participants found that many individuals who value sustainable living practices do not personally engage in them. This is called the Conservation Attitude-Behavior Gap.\textsuperscript{9} To overcome this gap, the Northwest Earth Institute recommends that individuals connect with their peers to reflect on their experiences with and thoughts on sustainable living, which will lead to more engagement in sustainable living practices.\textsuperscript{10} The purpose of this class is to provide students with the opportunity to connect and reflect with their peers on sustainable living.

**Sample Lecture Slides** (full lecture can be found at this link)\textsuperscript{11}:

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\textsuperscript{10} Lyles, K. (2016). *The Importance of Connection, Reflection and Action*. Northwest Earth Institute.

\textsuperscript{11} The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
Which activities emit greenhouse gases?

- Electricity and heat generation
  - Burning fossil fuels produces more GHG emissions than any other activity
  - What percentage of global GHG emissions do you think burning fossil fuels produces?
    - 25-30% of global GHG emissions

Sustainable Living

- Definition: Living a lifestyle that uses as few resources as possible and causes the least amount of damage for future generations to deal with (Regenerative Leadership Institute)
- What are the benefits of sustainable living?
Suggested Activities:

Discussion on Ecological Footprints and Handprints

Students will compare and contrast the Ecological Footprint and Ecological Handprint measurements. The Ecological Footprint quiz measures the negative impact that humans have and determines the number of Earths necessary to sustain an individual’s lifestyle. This quiz can be accessed with the following link: 
http://www.footprintnetwork.org/resources/footprint-calculator/. There is research that shows that the results of this type of quiz may discourage individuals and make them feel helpless against climate change. The concept of an Ecological Handprint was designed to instead reward people for the positive impacts that they have on the environment, rather than making them feel guilty about the negative impacts. More information about the Ecological Handprint can be accessed with the following link: 

The instructor will show students the Ecological Footprint website and the Ecological Handprint website. Then students will meet in small groups to discuss their opinions on these two measurement tools. The groups will address the following questions:

- What are the pros and cons of each measurement tool?
- Did your group prefer one measurement tool to another? Why?
Do you think that these types of tools can encourage behavior change?

Discussion on Conservation Attitude-Behavior Gap

After being introduced to the concept of the Conservation Attitude-Behavior Gap\(^2\) (or the “Say-Do” gap), students will meet in small groups for five minutes to discuss the barriers to sustainability that might cause this gap to exist. A representative from each group will share three of the barriers that their group came up with. Examples of barriers might include:

- Time
- Money
- Misinformation
- Information Overload

The instructor will write the barriers on a chalkboard or whiteboard, if available. The instructor will then circle the most common answers and discuss why these things might make sustainable living difficult to pursue.

Module 3: Waste

Description: This module will teach students about the problems associated with waste production and how an individual can mitigate these problems by adopting low- or zero-waste practices.

Estimated Length: Five 50-minute lectures

Lecture Topics:
- The U.S. Waste Problem
- Zero Waste Lifestyle
- Zero Waste Activity
- Food Waste
- Sustainable Living Paper Discussion

Lecture 1: The U.S. Waste Problem

Brief Description: This lecture introduces the waste problem in the U.S. and the consequences associated with waste production.

Student Goals:
- Understand why waste is a problem globally and in the U.S.
- Be able to identify the link between overconsumption and waste

Equipment/Supplies:
- Computer and projector to display PowerPoint slides and videos
- Various waste products for the How Long to Decompose Discussion (optional)

Suggested Assignments Due Before Lecture:
“The Story of Stuff” Video Assignment

Students will watch the 20-minute video called “The Story of Stuff” for the next lecture’s discussion on waste. It can be accessed with the following link:
http://storyofstuff.org/movies/story-of-stuff/. This video provides the audience with a detailed description of the five stages of a product’s life cycle - extraction, production,
distribution, consumption, and disposal - as well as the environmental and social impacts of each of these stages. The video is both informative and interesting to watch. After students watch the video, they will answer the following questions:

- What is your reaction to this video? Did anything in it surprise you? Was there anything that you already knew?
- How can consumers let corporations know that they want products that are produced in an environmentally friendly way?
- Think of a product that is commonly used in society. What do you think the life cycle of this product looks like? Be sure to consider each stage of its life cycle when answering this question.

**Lecture Summary:**

The U.S. produces nearly one-third of the world’s waste even though the country only makes up 5% of the global population. Each American generates approximately 4.5 pounds of waste per day. About 45% of this waste that ends up in landfills could be recycled.\(^\text{13}\) One possible explanation for the waste problem in the U.S. is society’s over-consumption of material goods. It is estimated that 70% of the country’s $18 trillion economy is spent on consumer goods, and that 99% of these goods are disposed of within six months. Studies show that over-consumption of goods causes individuals to feel burdened by their own lifestyle.\(^\text{14}\)


Graphics provided by the U.S. Environmental Protection Agency (EPA) show which products are recycled, composted, and thrown away in the U.S. Food waste, plastics, and paper products are the most common materials found in U.S. landfills, even though all of these can be either composted or recycled.\footnote{U.S. EPA (2014). Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012. U.S. Environmental Protection Agency.}

Plastic is a particularly important waste product because it is one of the most popular materials used to produce consumer goods, is difficult to recycle, and does not biodegrade. The production of plastic products requires approximately 8\% of annual global oil production.\footnote{Ibeh, C. (2011). Thermoplastic Materials. Boca Raton, FL: Taylor & Francis Group.} Plastic often ends up in the ocean, where it breaks down into micro-plastics, harms marine species, and contributes to garbage patches in the ocean.\footnote{Link to image used in this section: Plastic in ocean}

Plastics, along with other products, also end up in landfills. Landfills release CO$_2$ and methane, leak toxic chemicals into waterways, and take up large areas of land. Although recycling is often a more environmentally friendly disposal option than sending items to landfills, recycling facilities still require energy inputs and can produce toxic chemicals when burning materials. There are also many items that individuals put into their recycling bins that do not actually end up being recycled.\footnote{Cermansky, R. (2009). When Recycling is Bad for the Environment. Discover Magazine.} Recycling can also remove the guilt of throwing things away, which disincentives individuals from producing less waste. The best options for reducing an individual’s waste production is to avoid buying disposable products and products with disposable packaging, buy used items when possible, and to repurpose items that were going to be thrown away.

\begin{quote}
“The fact that the average American produces four and a half pounds of waste per day is alarming and made me change the way I purchase products. It was also interesting to learn about the consequences of overconsumption, not just from a physical point of view but also from a mental standpoint of how it can cause increased daily stress. Upon learning and analyzing waste more, I now look to items that have minimal packaging and I try to eliminate the use of virgin materials like plastic bags and utensils. This was the easiest practice to adopt because it makes me feel like I am making a significant effort to cut down my waste and therefore ecological footprint.”
\end{quote}
The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.

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19 The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
Suggested Activities:

**In-Class Video: “High Price of Materialism”**

This five-minute video provides an excellent description of overconsumption in U.S. society, including reasons why it exists and how individuals can overcome its grip on their lives. Environmental damage is just one of many consequences of a materialistic lifestyle described in the video. This video will be shown in class during the discussion on
overconsumption in society. It can be accessed on YouTube with the following link: 
https://www.youtube.com/watch?v=oGab38pKscw&feature=youtu.be. Students will be asked the following questions after watching the video:

- What are possible consequences of a materialistic lifestyle?
- Can you think of some examples of materialism that you have personally seen in the media, at a store, or anywhere else?
- What are some examples of intrinsic values?

In-Class Video: “What Really Happens to the Plastic You Throw Away”

This four-minute video follows the journeys of three plastic water bottles, from their production to their disposal. Each water bottle is disposed in a different way. The first ends up in a landfill, where it releases toxic chemicals into nearby waterways. The second bottle travels through waterways until it ends up in the ocean as part of the Great Pacific Garbage Patch. The third bottle is sent to a recycling facility to be transformed into a new product. This short and interesting video fits perfectly into the discussion on plastic products. After watching the video, students will be asked about their reaction to the video, including which aspects of the video they found surprising and which aspects they were already aware of. The video can be accessed on YouTube with the following link: 

Discussion: How Long to Decompose?

Students will meet in small groups for five minutes. They will either be shown a PowerPoint slide like the one below - without the captions below the photos -, or physical representations of the photos on the slide. Each group will estimate how long they think it takes for each of these items to decompose. The instructor will reveal the correct answers after groups share their guesses for each item with the rest of the class. ²⁰

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Student Goals:

- Define a Zero Waste lifestyle
- Become familiar with a number of Zero Waste practices

Equipment/Supplies:

- Computer and projector to display PowerPoint slides (if using)

Suggested Assignments Due Before Lecture:

Zero Waste Blog Reading

There are a number of online blogs written by individuals pursuing a Zero Waste lifestyle. This assignment gives students an opportunity to read first-hand experiences with...
this lifestyle. Here are a few examples of websites that have posts about Zero Waste living:

<table>
<thead>
<tr>
<th>Website</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero Waste Home</td>
<td>• Bea Johnson considers herself a Zero Waste expert. She has started this lifestyle in 2008, wrote a book on Zero Waste living, and now travels the world to give talks about it.</td>
</tr>
<tr>
<td>Trash is for Tossers</td>
<td>• Lauren Singer is living a Zero Waste life in New York City. She does not produce any garbage that will be sent to the landfill.</td>
</tr>
<tr>
<td>Going Zero Waste</td>
<td>• Kathryn provides guidance to individuals who are interested in a Zero Waste lifestyle. Her blog includes a suggested 30-day Zero Waste challenge.</td>
</tr>
</tbody>
</table>

The instructor may find another website not listed above that they would prefer to use. After students read whichever blog post was assigned to them, they should answer some or all of the following questions:

- How challenging do you feel a Zero Waste lifestyle would be for you?
- What do you think would be the hardest thing to “give up” in this lifestyle? Are there certain items that could be impossible to give up? (Example: disposable packaging from medications)
- Are there any practices that you currently engage in that are part of a Zero Waste lifestyle? Examples might include recycling, composting, avoiding purchasing items you don’t need, etc.
- What questions do you have about a Zero Waste lifestyle?

**Lecture Summary:**

The best way to teach students about a Zero Waste lifestyle is through a guest speaker who is currently practicing this lifestyle. This gives students the opportunity to ask specific questions that the speaker can answer with first-hand experiences. In the Sustainable Living class discussed in this manual, WWU’s Zero Waste Coordinator led this particular lecture. The Coordinator was a WWU student working for the Office of Sustainability and using Zero
Waste practices in her own life. She used PowerPoint slides with photos to support her presentation to the class on her experiences with Zero Waste living. She explained that one of the reasons that she decided to practice this lifestyle is because of the negative impacts that waste has on individuals living in foreign countries. Some individuals actually have homes in landfills that are full of waste shipped from the U.S. These individuals spend their lives searching through the waste for items to sell, which exposes them to toxic chemicals that negatively impact their health. The guest speaker explained that learning about this problem was one of the main reasons that she decided she to produce less waste.

She then described her personal journey to a Zero Waste lifestyle, including when she started and the challenges she faced along the way. She explained that she follows five steps in her lifestyle:

**Student Experience**

“Something that was very interesting was the guest speaker living a zero waste lifestyle. The amount of commitment she has towards living zero waste and showing that a sustainable lifestyle is possible, even when in college, is very inspiring. Many people may not be ready to commit to a complete zero waste lifestyle in today’s society, but she showed that each choice taken will help our environment.”

- Recycle and compost everything you can
- Give up items that do not fit into a Zero Waste lifestyle
- Reuse items
- Make your own products from scratch, such as deodorant and almond milk
- Make switches in your lifestyle that produce less waste, such as buying in bulk and avoiding disposable packaging
Throughout and after her presentation, students were able to ask her specific questions about her lifestyle. The speaker could provide answers to these questions with specific examples from her own life. If possible, the instructor for this course should find an individual in their community pursuing a Zero Waste lifestyle that would be willing to speak to the students. If the instructor is unable to find a guest speaker, then they can prepare a presentation that shares the experiences of individuals practicing a Zero Waste lifestyle based on the stories that they post online. The website “Going Zero Waste” may be particularly helpful for this presentation. This website explains how to get started with a Zero Waste lifestyle, provides answers to commonly asked questions about Zero Waste living, and shares the experiences of the website’s author through her blog posts. The website can be accessed with the following link: [https://www.goingzerowaste.com/](https://www.goingzerowaste.com/).

### Lecture 3: Zero Waste Activity

**Student Goals:**

Become familiar with a number of Zero Waste practices

**Equipment/Supplies:**

Various waste and recycling products (i.e. compost, metal, glass, plastic, paper, landfill, and other) and containers for the Recycling Workshop

DIY toothpaste ingredients (i.e. coconut oil, peppermint oil, baking soda)

**Suggested Assignments Due Before Lecture:**

Zero Waste Blog Reading

Students will choose a post to read from a Zero Waste blog that they have not yet been assigned. Examples of Zero Waste blogs are provided in the Suggested Assignments for the previous lecture. Students will find and read at least one post that provides specific information.
examples of how an individual can practice a Zero Waste lifestyle. Then students will submit a written summary of the post that they read, which they will briefly share with their group members during the next lecture.

Lecture Summary:

This is an activity-based meeting that will give students hands-on experience with Zero Waste practices. This meeting was not included in the WWU Sustainable Living class, but it was added to this manual based on suggestions from participating students. Many students suggested that adding more hands-on, interactive activities would improve the overall effectiveness of this course. There are a number of activities related to Zero Waste practices that could provide interactive experiences for students. A couple of simple activities for this meeting are suggested below. The instructor may choose to incorporate one or more of these activities into this meeting, or they may choose another activity related to Zero Waste living that is not suggested here.

Suggested Activities:

Discussion on Zero Waste Blog Reading

At the beginning of class, students will meet in small groups for 10 minutes to discuss their Zero Waste blog reading assignment. Each student will provide a summary of the blog post that they read to their peers. Groups may choose to share a summary of the most interesting blog post with the rest of the class.

Recycling Workshop

Many individuals find aspects of recycling confusing, such as what the numbers in the recycling symbols mean and what to do with items that do not fit into one recycling category. This activity will help students learn how to properly recycle various items. For this activity, the instructor will need seven containers (i.e. buckets, cardboard boxes, baskets) that students can put recyclables and non-recyclables into. The following labels should be written on each container:
The instructor will then need to bring in a collection of items that students can place in each container. There will need to be a few items that fit into each category. It is important to include items that are commonly disposed of improperly. A few examples of these items include:

1. Compost
2. Metal
3. Glass
4. Plastic
5. Paper
6. Landfill
7. Other

Tetra Pak, or aseptic, containers belong in the “landfill” category unless Tetra Pak recycling facilities exist nearby.

Greasy paper products belong in the “compost” category.

Plastic bags belong in the “other” category because they can be taken to a grocery store that recycles them.

For the activity, students will be divided into small groups and given a variety of recyclable and non-recyclable items. They will have approximately 10 minutes to decide as a group which of the seven containers they think each item belongs in. They will then place

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21 Links to images used in this activity: Tetra Pak container, Pizza box, Plastic bag
these items in the appropriate containers. After all items are placed in the containers, the instructor will take each item out of the containers one-by-one and ask the students to explain why they think each item belongs there. The instructor will then show students which container each item belongs in and explain why.  

**DIY Toothpaste Workshop**

There are many DIY articles online with recipes for making products from scratch that you can use in your home, such as laundry detergent, make-up, and soap. One of the simpler DIY zero-waste recipes is homemade toothpaste. There are a number of toothpaste recipes online, but the toothpaste recipe on the website Zero Waste Wisdom appears to be one of the cheaper and simpler recipes. The recipe is available at the following link: [https://www.zerowastewisdom.com/single-post/2016/05/22/Recipe-Toothpaste](https://www.zerowastewisdom.com/single-post/2016/05/22/Recipe-Toothpaste). The recipe suggests using 3 tablespoons of coconut oil, 3 tablespoons of baking soda, and 25 drops of peppermint essential oil. Xylitol is optional. Since this project will be for a larger group, it may make sense to have each student make a significantly smaller batch of toothpaste than what this recipe makes in order to keep overall costs low.

The instructor will bring in the ingredients. Students will bring in a clean, small jar or container of their own (perhaps something from their recycling bin) that they can store their toothpaste in. It will also be helpful to have access to a microwave and refrigerator for this workshop. Students will follow the recipe instructions. When they are done, they will each have a small portion of homemade toothpaste that they can try using at home. At the next class meeting, the instructor can ask students what they thought of the toothpaste.

24 Link to image used in this activity: [Homemade toothpaste](https://www.zerowastewisdom.com/single-post/2016/05/22/Recipe-Toothpaste)
Student Goals:

Understand the scale of the global and national food waste problem

Equipment/Supplies:

Computer and projector to display PowerPoint slides
Poster paper for Meal Planning Activity (optional)

Suggested Assignments Due Before Class:

“Last Week Tonight with John Oliver”: Food Waste

Students will watch the episode of “Last Week Tonight with John Oliver” that covers food waste. It is approximately 18 minutes long. It can be accessed on YouTube with the following link: https://www.youtube.com/watch?v=i8xwLWb0ILY. This video provides an entertaining and informative look at the food waste problem in the U.S. John Oliver covers topics such as food advertisements, poverty, sell-by dates, individual’s contribution to food waste, and food waste in grocery stores. This video is intended for mature audiences, so the instructor should use discretion when sharing it with their students. After they watch the video, students will write a paragraph on their reaction to what they saw in the video. What surprised them?

Lecture Summary:

Each year 1.3 billion tons of food - about one-third of the world’s total food production - is wasted. If even one-quarter of this food waste was saved, it could feed an additional 870 million people suffering from malnutrition.\textsuperscript{25} Approximately 30% of the world’s agricultural land\textsuperscript{26} and 45 trillion gallons of water\textsuperscript{27} are used to produce food that ends up being wasted. The production, transportation, and disposal of wasted food emit

\textsuperscript{25} FAO (2017). Key Facts on Food Loss and Waste You Should Know! Food and Agriculture Organization of the United Nations.
\textsuperscript{26} FAO (2013). Food Wastage Footprint: Impact on Natural Resources. Food and Agriculture Organization of the United Nations.
greenhouse gasses that contribute to climate change. Household food waste in the U.S. costs consumers a total of $165 billion annually.\textsuperscript{28}

The simplest way to avoid the issues associated with food waste is to not produce it. This can be achieved on an individual level by reducing food purchases to only items that will be eaten before spoiling. Planning meals in advance will give individuals a better idea of what quantity of each food item they will need. Individuals can also reduce their food waste by following “use by” dates on products less strictly. The “use by” date is when the manufacturer guarantees the “peak quality” of their product. Many food items can be eaten past this date. The website “Eat By Date” provides suggestions for how long after the “use by” date that food items can be safely eaten. This website can be accessed with the following link: \url{https://www.eatbydate.com/}.

Individuals can compost items that have spoiled or that are not typically eaten, such as banana peels and apple cores. Composting will turn food scraps into new, useful products that will not release greenhouse gas emissions into the atmosphere like they would if they were sent to a landfill. Many cities offer composting services that citizens can sign up for. If composting services are not available, individuals may choose to create their own compost.\textsuperscript{29}


\textsuperscript{29} Link to image used in this summary: Apples on ground
Sample Lecture Slides (full lecture can be found at this link)³⁰:

Food Waste

- How much food is wasted in the world?
  - 1.3 billion tons of food wasted annually
  - 1/3 of the world’s food
- How much of the waste produced in the U.S. is or once was edible?
  - 12%

³⁰ The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
“Use By” Dates

- “Use By” date: the last day that the manufacturer vouches for the product’s quality.
  - Many foods can be eaten after this date.
  - The website *Eat by Date* provides suggestions for how long various food items can be eaten after the “use by” date.

Compost
Suggested Activities:
Discussion on Food Waste

After they are told how much food is wasted in the world - but before they learn about the problems associated with this wasted food - students will have five minutes to meet in their small groups. Each group will come up with three problems associated with food waste and three suggestions they have for reducing or avoiding these problems. Each group will then share their thoughts with the rest of the class.

Meal Planning Activity

Students will have 10-15 minutes in small groups to come up with a three-day meal plan that does not produce any food waste (other than vegetable and fruit scraps). They will need to plan for three meals per day all three days. Each dinner can be used as leftovers for one other meal (i.e. lunch the following day). Each group will display their meal plan and its required ingredients to the rest of the class. Depending on the resources available in the classroom, meal plans can be displayed using a projector, whiteboard, or with poster paper.

Before assigning this activity, the instructor should show students an example of a zero-waste meal plan, including its ingredient list. The one-week meal plan at this link uses only 20 total ingredients: [http://www.coupons.com/thegoodstuff/no-waste-meal-plan/](http://www.coupons.com/thegoodstuff/no-waste-meal-plan/).

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**Lecture 5: Sustainable Living Paper Discussion**

**Brief Description:** This is a discussion day for students to share their experiences with the low-waste practices they adopted for their first sustainable living practices paper.

**Student Goals:**

Learn about the the sustainable living experiences of peers

**Suggested Assignments Due Before Lecture:**

First Sustainable Living Paper

This is the first of three sustainable living papers that students will be expected to complete during the quarter. For the assignment, students will be asked to attempt to adopt a new sustainable living practice for approximately 10 days. The practice must be related to waste. Students will submit a 2-3 page, double-spaced paper that documents and reflects on
their experience with this practice. This paper should be assigned approximately two weeks prior to this lecture. Students will be expected to talk about their experience and paper in class with their peers.

Students will not be graded on their ability to successfully adopt the new practice. The purpose of this assignment is for students to reflect on how their personal experiences relate to the readings, guest lectures, or class discussions. If a student was unable to successfully adopt their practice, then they should explain in their paper what made this practice challenging to adopt. It is recommended that students include photos of them completing their practice in their papers, although it is not a requirement. The paper should address the following questions:

- Which practice did you choose to adopt?
- Why did you choose this practice? What are the benefits of adopting it?
- What challenges did you encounter during this experience?
- What might make this practice easier for an individual to adopt?
- How did your experience relate to ideas mentioned in class discussions, readings, and/or guest lectures?

Below is a list of ideas of sustainable practices related to waste that students can choose to adopt. They are also encouraged to come up with their own ideas.

- Avoid purchasing items with non-recyclable packaging;
- Use reusable mugs and bottles for your drinks, instead of purchasing disposable coffee cups and water bottles;
- Bring a reusable container with you to restaurants or delis to package your leftovers and deli food;
- Bring your produce and bulk bags back to the grocery store to reuse them when you shop;
• Buy your groceries in bulk when possible;\textsuperscript{31}
• Shop at thrift stores like Goodwill or Buffalo Exchange when purchasing clothes;
• Find ways to repurpose items that you were planning to throw away.

**Suggested Activities:**

**Sustainable Living Paper Discussion**

Students will meet in small groups for 30 minutes. Each student will take turns sharing their experience with their practice. Students should answer the following questions:

• What practice did you choose to adopt?
• What are the benefits of adopting this practice?
• Were you successful in adopting this practice? If not, what would have made it easier to adopt?
• What challenges did you face during this experience?

After all group members have answered these questions, each group will share an overview of their group members’ experiences with these practices. Make a list of similarities between students’ experiences in a location where students are able to see the list, such as on a whiteboard. For example, you may find that multiple students express that limited time or money made their practices challenging to adopt. Lead a group discussion on why these similarities exist. Ask students to consider what this experience might look like for individuals who are not participating in this course.

**Student Experience**

“The most influential portion of the class was hearing other students talk about the effort they put into reducing waste. It was really inspiring and pushes me to care more, spend more energy on being considerate [of] the impact of my actions, and be more personally conscious [of] the environment.”

\textsuperscript{31} Link to image used in this section: [Bulk food](#)
Module 4: Food

Description: The following five lectures explore the environmental impacts of the agricultural sector, various ways to engage in a sustainable diet, and the benefits of local food purchases.

Estimated Length: Five 50-minute lectures

Lecture Topics:
- The Environmental Impacts of Food Production
- Environmentally Friendly Food Choices Parts 1 & 2
- Benefits of Local Food
- Sustainable Living Paper Discussion

Lecture 1: The Environmental Impacts of Food Production

Brief Description: This lecture provides an overview of the environmental impacts caused by the agricultural sector.

Student Goals:
Understand the environmental impacts of the agricultural sector

Equipment/Supplies:
Computer and projector to display PowerPoint slides and videos

Suggested Assignments Due Before Lecture:
Research Assignment: Environmental Impacts of Food Production

There are many articles online that describe the environmental impacts of food production. For this assignment, students will use at least three of these online articles to help them write a 1-2 page, double-spaced paper that describes these impacts. Since there are a significant number of environmental impacts associated with food production, students should choose three to focus on in their papers. Their papers should cite at least three
sources. Students will provide a summary of their papers to their peers in small group discussions during the following meeting.

**Lecture Summary:**

The agricultural sector is responsible for using 70% of all freshwater\(^{32}\) and 51% of U.S. land\(^{33}\). It produces air and water pollution, degrades soil quality, and creates antibiotic-resistant bacteria. It is also responsible for 10% of U.S. greenhouse gas emissions.\(^{34}\) The amount of greenhouse gas emissions generated is dependent on the type of food being produced. For example, the production of lamb and beef is responsible for the most greenhouse gas emissions because both of these animals have unique stomachs that cause them to release significant methane emissions. The production of food items like vegetables and fruits produce a much smaller quantity of greenhouse gas emissions in comparison to products that come from livestock.\(^{35}\) Manure from livestock can also release pollutants like nitrogen, phosphorous, and antibiotics into groundwater sources.

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Sample Lecture Slides (full lecture can be found at this link)\textsuperscript{36}:

\begin{itemize}
  \item \textbf{Environmental Concerns of Growing Food}
    \begin{itemize}
      \item \textit{Water conservation} – agriculture uses 70\% of all freshwater
      \item \textit{Water and air pollution}
      \item \textit{Soil quality} – agriculture degrades soil, making it susceptible to erosion
      \item \textit{Antibiotic resistance} – overuse of antibiotics creates antibiotic-resistant bacteria
      \item \textit{Land use} – accounts for 51\% of U.S. land
      \item \textit{Climate change} – agriculture is responsible for 10\% of U.S. emissions
    \end{itemize}
  
  \begin{itemize}
    \item \textbf{Impact of Various Foods}
      \begin{itemize}
        \item Post Farmgate Emissions (includes processing, transport, retail, cooking, waste disposal)
        \item Production Emissions (includes all emissions before product leaves the farm)
      \end{itemize}
  \end{itemize}
\end{itemize}

\textsuperscript{36} The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
Suggested Activities:

In-Class Video: Methane-Collecting Bags Hooked up to Cows

This two-minute video provides the viewer with a great visualization of how much methane gas cows emit. Scientists attached methane-collecting bags to cows and found that one cow could fill up a 55-gallon garbage bag with methane in one day. After students watch this video, the instructor will ask for volunteers to share their reactions. The video is available at: http://www.motherjones.com/environment/2015/12/discovery-racing-extinction-methane-bags-timelapse

Discussion on Research Assignment

At the beginning of class, students will meet in their small groups for 15 minutes to discuss their research assignment on the environmental impacts of food production. Each student will share a summary of their paper with their group members. Each group will then

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37 Please email stefania.cilinceon@gmail.com if you would like a copy of the full PowerPoint presentation used for any lecture in this guide.
38 Link to image used in this activity: Cow with methane bag
share the collective impacts that their group discussed with the rest of the class. The instructor will write a list of these impacts somewhere that all of the students can see the list. Then the instructor will begin lecture with an overview of the environmental impacts of food production.

**Lecture 2: Environmentally Friendly Food Choices Part 1**

**Brief Description:** This lecture provides students with many examples of how an individual can minimize their environmental impact through their diet.

**Student Goals:**

- Be able to identify environmentally friendly food choices

**Equipment/Supplies:**

- Computer and projector to display PowerPoint slides and videos

**Suggested Assignments Due Before Lecture:**

**Environmentally Friendly Food Reading Assignment**

Students will read the article in TIME magazine titled “33 Ways to Eat Environmentally Friendly”, which can be accessed with the following link: [http://healthland.time.com/2012/08/24/33-ways-to-eat-environmentally-friendly/](http://healthland.time.com/2012/08/24/33-ways-to-eat-environmentally-friendly/). This article provides suggestions for individuals to minimize their environmental impact through their food choices, including tips for eating at home, eating at a restaurant, and grocery shopping. Students will answer the following questions after completing the reading:

- Are there any practices listed in the article that you already do?
- Are there any that you do not do but would consider trying?
- Which of these practices do you think have the most environmental benefit?

**“Flexitarian” Diet Reading Assignment**

Students will read the article “Flexitarianism: The Environmentally Friendly Diet”, which can be accessed with the following link: [https://www.foe.co.uk/sites/default/files/downloads/flexitarianism-environmentally-friendly-diet-47222.pdf](https://www.foe.co.uk/sites/default/files/downloads/flexitarianism-environmentally-friendly-diet-47222.pdf). This article introduces readers to a diet that is primarily plant-based (i.e. vegetarian), but includes limited amounts of meat, seafood, and dairy. An individual with a
flexitarian diet may be called a “flexible vegetarian” because of their limited meat consumption. Shifting to a diet with less meat and dairy can significantly reduce an individual’s natural resource consumption, contribution to climate change, and contribution to environmental pollution. It can also produce similar health benefits to a vegetarian diet.

After students read the article, they will answer the following questions:

- What are your initial thoughts about this diet?
- What are the benefits of this diet over a strict vegetarian or vegan diet? What are the benefits of a strict vegetarian or vegan diet over this one?
- Imagine that there is an individual who is very opposed to a vegetarian or vegan diet, but you want them to try a flexitarian diet. What would you say to them to convince them to try it?

**Lecture Summary:**

One of the most effective ways that an individual can reduce their environmental impact is by cutting back on their consumption of meat and dairy products. If every U.S. citizen avoided eating meat for just one day per week, the U.S. would save 100 billion gallons of water, 70 million gallons of gas, 3 million acres of land, and 1.2 million tons of CO₂ equivalent. In fact, if an individual who frequently eats burgers reduced their burger consumption by one burger per week, the environmental benefit would be the equivalent of that individual taking their car off the road for 320 miles. Individuals who switch to a vegetarian, vegan, or “flexitarian” (flexible vegetarian) diet significantly reduce their daily environmental impact.

Considered to be an “exemplary sustainable diet” by the Food and Agriculture Organization of the United Nations (FAO), the Mediterranean diet emphasizes foods with a low environmental impact. The Double Pyramid Model is a diagram that shows the food pyramid for a diet similar to the Mediterranean diet next to an environmental food pyramid, which ranks foods by their environmental impacts. Foods such as beef and cheese, which are consumed in small amounts in a Mediterranean diet, both have high environmental impacts.

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Following the Double Pyramid Model can significantly reduce the environmental impact of an individual’s diet. An example of this model is in the sample lecture slides below.

Individuals may also choose to purchase and eat more organic foods. Foods that are certified organic by the U.S. Department of Agriculture (USDA) are grown without the use of pesticides, synthetic fertilizers, sewage sludge, genetically modified organisms (GMOs), or ionizing radiation. Animal products that are certified organic do not contain any antibiotics or growth hormones. Organic foods are also grown using methods that conserve soil and water resources. The Environmental Working Group (EWG), a U.S. organization that does research and advocacy for various environmental topics, has identified the 12 crops that are most heavily sprayed with pesticides and the 15 least sprayed crops. The EWG calls these lists the Dirty Dozen and the Clean Fifteen. Individuals who want to avoid buying produce that was grown with pesticides but may not be able to afford buying only organic food products can choose to avoid the produce on the Dirty Dozen list or buy organic versions of these particular items.
The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
Double Pyramid Model

Organic

Dirty Dozen
(most heavily sprayed crops)
- Apples
- Peaches
- Nectarines
- Strawberries
- Grapes
- Celery
- Spinach
- Sweet bell peppers
- Cucumbers
- Cherry tomatoes
- Sugar snap peas (imported)
- Potatoes

Clean Fifteen
(least sprayed)
- Avocados
- Sweet corn
- Pineapples
- Cabbage
- Sweet peas (frozen)
- Onions
- Asparagus
- Mangos
- Papayas
- Kiwi
- Eggplant
- Grapefruit
- Cantaloupe
- Cauliflower
- Sweet potatoes
**Suggested Activities:**

**Most Recent Meal Activity**

The instructor will tell students to think back to their most recent meal and ask themselves the following questions:

- Which ingredients were in your meal?
- Were there any ingredients in your food that have names you are not familiar with (i.e. additives with complex names)?
- How many miles do you think those ingredients had to travel to get to your plate?
- How much water do you think was used to produce these ingredients?
- If there was meat in the meal, where do you think this meat was raised? Do you know if the animals were raised humanely?

After students have a few minutes to think about these questions, they will be asked to raise their hand if they feel very familiar with the ingredients in their most recent meal. The instructor will follow this question by starting lecture with a discussion on information overload, which in this case refers to the idea that there are so many ingredients in many of our food products that we might not even know what most of them are.

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**Lecture 3: Environmentally Friendly Food Choices Part 2**

**Brief Description:** The first part of this meeting will be spent finishing up the lecture from the last meeting on environmentally friendly food choices. Students will spend the last ~35 minutes of the meeting taking a brief midterm exam.

**Student Goals:**

Understand the environmental impacts of the agricultural sector

**Equipment/Supplies:**

Computer and projector to display PowerPoint slides

**Suggested Assignments Due Before Lecture:**

**Study for Midterm Exam**

The only suggested assignment is to study for the midterm exam.
Lecture Summary:

This section of the lecture will cover the argument over genetically modified organisms, or GMOs. There are both advantages and disadvantages to GMO products. GMOs are a complicated topic because humans do not yet understand the long-term health and environmental effects of GMOs because they have not been in existence long enough. The purpose of this discussion on GMOs is not to convince students that GMOs are good or bad, but to provide them with information from both sides of the argument and let them decide for themselves. This lecture will also inform students about the Non GMO Project Verified label to help them identify non-GMO products in the grocery stores. If not discussed in the previous lecture, this lecture will also cover the benefits of buying local, eating in season, and eating non-processed foods. There are environmental, economic, and health benefits of these practices.

Sample Lecture Slides (full lecture can be found at this link):

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The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
Suggested Activities:

Midterm Exam

This exam will be given to students after the food lecture is completed. This exam is meant to test how well students have been paying attention during the course. Giving a midterm exam also provides students with an incentive to be more attentive during lecture and to take notes. The questions on the exam will be related to waste, food, climate change, and sustainable living in general. Any student who has attended each lecture and paid attention should easily answer the questions that are asked. Below is a list of sample questions:

- Briefly describe the greenhouse gas effect and its role in climate change. List three activities that produce greenhouse gas emissions.
- Explain what the conservation attitude-behavior gap is. What are some possible reasons for why it exists?
- Provide two examples of problems associated with landfills.
● The video shown in class called “What Really Happens to the Plastic You Throw Away” described the journeys of three plastic water bottles. Describe the journey of one of these three bottles.

● How would you describe a Zero Waste lifestyle to someone who has not heard of it?

● True or False: After a food product’s expiration date has passed, there are no circumstances in which it is still safe to eat that food.\(^{49}\)

● Explain why the environmental impact of beef production is greater than the environmental impact of broccoli production.

● True or False: Driving your car 50 fewer miles per week is more beneficial to the environment than eating one less hamburger per week.\(^{50}\)

● What do the “Dirty Dozen” and “Clean Fifteen” lists refer to? Note: You do not need to include examples of any products that are in these lists.

● List one advantage and one disadvantage of GMOs.

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**Lecture 4: Benefits of Local Food**

**Brief Description:** Students will have the opportunity to learn about the benefits of purchasing local products from the perspective of a local business owner.

**Student Goals:**

- Explain the environmental, social, and economic benefits of supporting local businesses
- Learn about the first-hand experiences of local business owners

**Suggested Assignments Due Before Lecture:**

**Food-Miles Reading**

Students will read the 6-page study titled “Food-Miles and the Relative Climate Impacts of Food Choices in the United States”, which can be accessed with the following link: [http://pubs.acs.org/doi/abs/10.1021/es702969f](http://pubs.acs.org/doi/abs/10.1021/es702969f). They can skim over the Methods section. This study compares the greenhouse gas reductions achieved by buying local foods.

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to those achieved by a dietary shift away from red meat and dairy products. The authors find that a dietary shift is more impactful in terms of reducing an individual’s contribution to climate change because the production phase of food releases significantly more greenhouse gas emissions than the transportation phase. After students read this study, they will answer the following questions:

- How do the authors define “food-miles”?
- What were the results of this study? Were you surprised by these results?

**Summary:**

This meeting will teach students of the benefits of supporting local businesses by providing them with an opportunity to speak to a local business owner. This can be done by either taking a group field trip to a local business or by inviting a local business owner to be a guest speaker in the class. This will help students understand the benefits of buying local beyond just the reduction in greenhouse gas emissions that results from products travelling shorter distances. There are a number of economic, social, and environmental benefits that the business owner may share with the students.

**Suggested Activities:**

**Field Trip to Local Business**

A field trip to a local business that offers tours could be very interesting for students. The availability of local businesses will vary depending on the location where the class takes place, but a few examples include:

- Visit a local farm and learn about the work that goes into maintaining it;
- Visit a microbrewery or local distiller that could show students how their operations work;
- Visit a local restaurant or bakery where the business owner or workers could show students a demonstration of them preparing local foods.

**Guest Speaker: Local Business Owner**

If a field trip is not an option, then another option is to invite a local business owner to the class. The guest speaker could give a presentation on their business operations and the benefits of purchasing products locally, rather than from a large corporation. The guest speaker could also lead a question and answer session where students have the chance to ask them specific questions.
Student Goals:

Learn about the sustainable living experiences of peers

Suggested Assignments Due Before Lecture:

Second Sustainable Living Paper

This is the second of three sustainable living papers that students will be expected to complete during the quarter. For the assignment, students will be asked to attempt to adopt a new sustainable living practice for approximately 10 days. The practice must be related to food. Students will submit a 2-3 page, double-spaced paper that documents and reflects on their experience with this practice. This paper should be assigned approximately two weeks prior to this lecture. Students will be expected to talk about their experience and paper in class with their peers.

Students will not be graded on their ability to successfully adopt the new practice. The purpose of this assignment is for students to reflect on how their personal experiences relate to the readings, guest lectures, or class discussions. If a student was unable to successfully adopt their practice, then they should explain in their paper what made this practice challenging to adopt. It is recommended that students include photos of them completing their practice in their papers, although it is not a requirement.

The paper should address the following questions:

- Which practice did you choose to adopt?
- Why did you choose this practice? What are the benefits of adopting it?
- What challenges did you encounter during this experience?
- What might make this practice easier for an individual to adopt?
- How did your experience relate to ideas mentioned in class discussions, readings, and/or guest lectures?
Below is a list of ideas of sustainable practices related to food that students can choose to adopt. They are also encouraged to come up with their own ideas.

- Compost all food waste.
- Purchase more local products.
- Reduce consumption of meat and/or dairy products. This can be extreme as eliminating these products completely for your diet for 10 days or choosing to have one vegetarian or vegan meal per day.
- Start growing your own food. If you live in a small space, you can start by growing some spices in your windowsill or on your balcony.\(^1\)

**Bring in Food to Share**

One fun assignment is to suggest that students bring in a food dish that meets some criteria of environmentally friendly food. This could be a food dish that uses local, in-season, non-GMO, vegetarian, vegan, or organic ingredients. These dishes will be shared during the sustainable living paper discussion.

**Suggested Activities:**

**Sustainable Living Paper Discussion**

Students will meet in small groups for 30 minutes. Each student will take turns sharing their experience with their practice. Students should answer the following questions:

- What practice did you choose to adopt?
- What are the benefits of adopting this practice?
- Were you successful in adopting this practice? If not, what would have made it easier to adopt?
- What challenges did you face during this experience?

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\(^1\) Link to image used in this assignment: [Windowsill herb garden](#)
After all group members have answered these questions, each group will share an overview of their group members’ experiences with these practices. Make a list of similarities between students’ experiences in a location where students are able to see the list, such as on a whiteboard. For example, you may find that multiple students express that limited time or money made their practices challenging to adopt. Lead a group discussion on why these similarities exist. Ask students to consider what this experience might look like for individuals who are not participating in this course.

Potluck

Students will bring a food item to class that meets some criteria of environmentally friendly food, such as an item that uses local, in-season, non-GMO vegetarian, vegan, or organic ingredients. Each food item will be shared with the entire class. Each student will explain to the class what their item is and how it fits the criteria.
Module 5: Water Conservation

**Brief Description:** This module covers topics in water conservation, including the importance of and threats to conserving water.

**Estimated Length:** One 50-minute lecture

**Lecture Topics:**
- Water Conservation

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Lecture 1: Water Conservation

**Brief Description:** This lecture covers the issues associated with water quantity and water quality, including ways that an individual can practice water conservation.

**Student Goals:**
- Understand the importance of and threats to water conservation
- Become familiar with ways to reduce an individual’s water footprint

**Equipment/Supplies:**
- Computer and projector to display PowerPoint slides and videos
- Printed versions of the Water Footprint Calculator worksheets for each student (available by searching “Water Footprint Calculator Worksheet Berkeley” on Google)

**Suggested Assignments Due Before Lecture:**

**Water Sustainability Reading Assignment**

Students will read the 15-page report titled “Water Sustainability in a Changing World”, which can be accessed with the following link: [http://www.nwri-usa.org/pdfs/2010ClarkePrizeLecture.pdf](http://www.nwri-usa.org/pdfs/2010ClarkePrizeLecture.pdf). This report explains the drivers of change in the quantity and quality of available global water sources, the consequences of having too much or too little water in an area, and possible solutions for protecting global water sources for future generations. You may choose to ask students the following questions after they complete the reading:
For each of the four "drivers" that impact water quantity and quality, answer these questions:

○ How does this driver impact water quantity and quality? Or, if it's more applicable: How is this driver impacted by water quality and quantity?

○ What is at least one solution to the water problems associated with this particular driver?

● Which activities cause there to be too little water?

● What problems are caused by having too much water?

● What are the two suggestions that the author provides for meeting the challenges associated with water?

● Extra credit (optional): Look up an article that shows a real-life example of one of the water problems discussed in this article. Summarize this example in 2 sentences and then provide the link to the article that you found. Be prepared to share a summary of this article with your peers.

**Lecture Summary:**

Although 71% of the Earth’s surface is covered in water, humans can readily access less than 1% of that water.\(^{52}\) Humans use 321 billion gallons of surface water and 77 billion gallons of groundwater per day.\(^{53}\) Fortunately for humans, the Earth is a closed system, so water is continuously recycled through the environment in what is called the Water Cycle. This means that Earth will never run out of water. So if the planet is not running out of water, then why care about water conservation? Water shortages are really a problem of distribution. Just because there is enough freshwater to meet the global population’s current needs, the water may not always be available where it is needed, when it is needed, and in the quality that it is needed. This is why approximately 783 people worldwide do not have access to clean water.\(^{54}\)

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\(^{52}\) USGS (2016). *How Much Water is There on, in, and Above the Earth?* U.S. Department of the Interior.


An example of a water shortage situation in the U.S. is the Ogallala Aquifer. This underground aquifer spans across eight states in the Midwest and provides water to the production of about 20% of the wheat, corn, cattle, and cotton produced in the U.S. It is also the main water supply for the people throughout the High Plains. More than $20 billion worth of food and fiber depend on this aquifer. Industrial-scale extraction of the aquifer began after WWII. New technology allowed output to increase from a few gallons per minute to hundreds of gallons per minute. By 1974, five times more water was being withdrawn from the aquifer annually than in 1949. The rate at which water has been removed from the aquifer is too high for nature to replenish it. Scientists estimate that if the entire aquifer were drained, it would take 6,000 years for it to be naturally replenished. This has caused the aquifer to deplete by about 30%, and it is expected that it will continue to deplete. Some areas near the aquifer have already experienced water shortages. For example, many families in Clovis, New Mexico have had their wells dry. The two-year-old in the photo on the second sample lecture slide is bathed nightly by her mother using water in buckets that were hauled from town.

Large-scale solutions for water conservation issues include flood mitigation, desalination plants, wastewater recycling, and investments in initiatives that promote conservation, such as a USDA investment of $74 million to conserve billions of gallons of water in the Ogallala Aquifer. There are also opportunities for individuals to make a positive impact for water conservation. The average American directly uses 80-100 gallons of water per day. The most water-intensive activities inside the average home are flushing toilets and washing clothes. Lawn irrigation accounts for one-third of nationwide residential water use. Some practices that individuals can engage in to reduce their direct water

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consumption include using an efficient dishwasher instead of washing dishes by hand; turning off the faucet of the sink while tooth-brushing and washing one’s hands; taking shorter showers; following the “if it’s yellow, let it mellow” rule; and installing water-saving fixtures in one’s home. Depending on the location of the course, there may be free or low-cost water conservation resources available for students to take advantage of. For example, the City of Bellingham’s Water Efficiency Program offers all Bellingham citizens free water-saving kits.

In addition to reducing their direct water use, individuals can engage in practices that will reduce their indirect water use. Indirect water use accounts for a much larger percentage of an individual’s water footprint. Water is used to produce a number of products and services that individuals use every day, such as gasoline, cotton, meat and dairy, electricity, and packaging. Reducing meat, dairy, gasoline, and electricity consumption, as well as avoiding products with packaging and buying secondhand clothing, will also reduce an individual’s indirect water consumption.60

60 Links to images used in this lecture summary: Ogallala Aquifer; City of Bellingham logo
Sample Lecture Slides (full lecture can be found at this link):}

Parts of the aquifer have been depleted. If the entire aquifer was
drained, it would take 6,000 years for it to be naturally replenished.

New Mexico has 24 less inches of annual rainfall
compared to the national average.

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61 The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
**Direct Water Use**

- How much water does a typical American use per day?
  - 80-100 gallons
- Which household activity uses the most water?
- Is it more efficient to wash dishes by hand or use a dishwasher?
- How much water is devoted to outdoor water uses?
  - Landscape irrigation accounts for 1/3rd of nationwide residential water use (9 billion gallons per day)

![Average Indoor Household Water Use](chart.png)

**Indirect Water Use**

The majority of our water use can be attributed to indirect water use.

- **Gasoline:** 7 gallons of water are needed to produce enough gasoline to drive one mile in a car
- **Cotton:** 100 gallons of water are used to grow and process 1 pound of cotton
  - The average American goes through about 35 pounds of new cotton per year
- **Meat/Dairy Production:**
  - 1 lb of beef = 1,799 gallons
  - 1 gallon of milk = 880 gallons
- **Electricity:** Thermoelectric power plants make up 41% of U.S. freshwater withdrawals
Suggested Activities:
Water Footprint Calculator Worksheet

The University of Berkeley, California has developed a printable Water Footprint Calculator Worksheet that can be found on Google by searching “Water Footprint Calculator Worksheet Berkeley”. This 2-page worksheet gives students the tools to figure out the household and individual water footprint of an example family in Oakland, California. After calculating the water footprints for this family, there are four questions that students can answer that will help them better understand which activities and products require the greatest water use. To do this in-class activity, the instructor should bring enough printed copies of this worksheet for each student in the class to complete. Each student will have 10 minutes to complete the worksheet. The class will then discuss the questions on the worksheet together.  

The Hidden Water We Use Website

The National Geographic website has a tool called “The Hidden Water We Use” that shows how much water is needed to produce a large variety of popular products, such as beef, wine, potatoes, oil, solar power, cotton, and paper. This website can be shown to the class during the section of lecture that discusses indirect water use. Website link: http://environment.nationalgeographic.com/environment/freshwater/embedded-water/

62 Links to image used in this activity description: Water footprint
Module 6: Energy Efficiency

Description: This module provides students with an overview of electricity, including how it is generated, how it is consumed, and how its production contributes to climate change. It also discusses home energy efficiency tips and information on local energy programs (if applicable).

Estimated Length: Three 50-minute lectures

Lecture Topics:
- Electricity Overview
- Home Energy Efficiency

Lecture 1: Electricity Overview

Brief Description: This lecture teaches students about electricity generation and consumption, and how these two things contribute to climate change.

Student Goals:
- Understand how electricity is produced
- Identify the ways in which electricity production contributes to climate change

Equipment/Supplies:
- Computer and projector to display PowerPoint slides and videos
- Various waste products for the How Long to Decompose

Suggested Assignments Due Before Lecture:
Energy Technology Research Assignment

The lectures in the following energy efficiency module primarily focus on electricity production and home energy tips for individuals. This assignment will give students an opportunity to learn about innovative energy technologies that can also help households save energy. Students will research two innovative energy technologies online. They will then submit a one-paragraph summary for each of the two technologies. For example, a student may choose to write a paragraph on a technology like Tesla’s solar roof tiles.
Lecture Summary:

Electricity is a secondary energy source made from primary energy sources, such as coal, natural gas, nuclear power, and renewable energy. Electricity is generated with mechanical energy. More specifically, a primary energy source is used as fuel to spin a turbine. The turbine is connected to a rod within a generator. At the end of the rod are large magnets. A coil of insulated copper wire is wrapped around these magnets. When the turbine spins the generator rod, it causes the magnets within the wire coils to move. The moving magnets then cause electrons in the wire to move, which creates electricity. So electricity is basically a product of magnets, copper wire, and a spinning movement.\(^{63}\) After electricity is generated at a power plant, it travels long distances through transmission lines to distribution lines, which deliver electricity to homes.

In the U.S., coal and natural gas are the most common energy sources used for electricity generation. Between 2005 and 2015, coal consumption decreased while natural gas consumption increased. This is likely because natural gas is much cheaper to use than coal. During this time there was also an increase in renewable energy sources, although overall they make up only 13% of U.S. electric generation. Nuclear power generation has remained the same, which is likely because of how expensive, time-consuming, and controversial it can be to build a new nuclear power plant.\(^{64}\) Electricity generation accounts for approximately 37% of U.S. CO\(_2\) emissions.\(^{65}\) The most carbon intensive energy sources are fossil fuels such as coal, oil, and natural gas. Interestingly enough, the carbon intensity of solar panels is higher than that of nuclear power. This can be explained by the carbon intensity of the processes used to extract and refine the materials that solar panels are made of.

Sample Lecture Slides (full lecture can be found at this link) 66:

**Electricity Generation: Electromagnetic Induction**

- Mechanical energy → electricity
- A primary energy source is used as fuel to spin a turbine.
- The turbine is connected to a rod within a generator. At the end of the rod are large magnets. A coil of insulated copper wire is wrapped around these magnets.
- When the turbine spins the generator rod, it causes the magnets within the wire coils to move. The moving magnets then cause electrons (charged particles) in the wire to move – creating electricity!

**The Journey of Electricity**

66 The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
Suggested Activities:

Guest Speaker from Local Utility Company or Energy Program

If possible, a guest speaker from a local utility company or energy program will come in speak to the class about energy. They can explain how energy is produced, which energy sources are used to produce the electricity used in the area, and/or what local energy programs are offered to households that are interested in lowering their energy consumption.
Discussion on Energy Technology Research Assignment

At the start of class, students will meet in small groups for 10 minutes. Each student in the group will share brief summaries of the two innovative energy technologies that they researched. Each group will then choose the most interesting technology to share with the rest of the class.

Lecture 2: Home Energy Efficiency

**Brief Description:** This lecture provides an overview of the ways in which an individual can reduce their home energy use.

**Student Goals:**
- Understand a variety of energy conservation practices
- Become familiar with local energy programs (if applicable)

**Equipment/Supplies:**
- Computer and projector to display PowerPoint slides and videos

**Suggested Assignments Due Before Lecture:**

Energy Behavior Reading Assignment

Many individuals studying sustainability ask questions like: “How do we get people to care?” “What motivates people to change their behavior?” There are studies that attempt to answer questions like these by using energy conservation as an example. For this reading assignment, students will review two of these studies to get a better idea of the ways to motivate individuals to change their behavior. The first of these readings is the 2-page study “Altruism, Self-Interest, and Energy Consumption” by Thomas Dietz, which can be accessed with the following link: [http://www.pnas.org/content/112/6/1654](http://www.pnas.org/content/112/6/1654). The second of these is the 7-page research article “The Constructive, Destructive, and Reconstructive Power of Social Norms” by Schultz et al, which can be accessed with the following link: [https://jsmf.org/meetings/2008/july/social%20norms%20Cialdini.pdf](https://jsmf.org/meetings/2008/july/social%20norms%20Cialdini.pdf). The Methods and Results section of this article can be optional for students to read. After students read these articles, they will answer the following questions:
• Does money appear to motivate people to save energy? Provide an example from each of the two articles to support your answer.

• Why did people with children change their behaviors more dramatically in the Dietz article?

• Explain what the boomerang effect is. How can this effect be buffered?

Lecture Summary:

When on the topic of electricity, it is likely that the words “power” or “energy” might be used. These words are sometimes used interchangeably but their definitions are very different. Power is measured in kilowatts (kW). It is instantaneous. Energy is measured in kilowatt-hours (kWh). It is measured over time. The average electric bill will show values for a household’s electricity use in kWh. Many electric utilities use a tiered rate schedule when charging customers for the kWh that they use. This means that households may be charged a higher price per kWh when their electricity use exceeds an amount specified by the utility company. The most energy-intensive household activity is heating and cooling, which accounts for approximately one-half of energy use in the average household. This is followed by water heating, appliance use, lighting, and refrigerator use.

There are a number of ways that an individual can reduce the amount of energy used by each of these household activities in order to save money and reduce their environmental impact. The most significant energy savings will be realized by focusing on reducing the energy used by heating and cooling systems. The most important thing that an individual can do to lower their energy usage is to weatherize their home, since leaky doors and windows waste are the number one cause of energy waste in most homes. Individuals can weatherize their homes cost-effectively by using caulking to seal holes around windows and doors, covering windows with a layer of plastic film or bubble wrap, or using a homemade draft snake on windowsills or against doors. Individuals can also use their heating system more efficiently by maintaining an even temperature in their home instead of repeatedly turning the heating system on and off; keeping the temperature between 58-60°F when asleep or away from home; keeping the
temperature at 68°F or lower when at home and awake; closing the doors of rooms not in use to avoid heating unnecessary rooms; and keeping the space in front of heaters clear of any furniture. 67 During the warmer months, individuals can reduce their cooling demand by leaving their windows open overnight to let cool air in; closing windows and shades during the day to keep warm air and sunlight out; and using light-colored shades on windows.

In order to reduce the energy use required by water heating, an individual can lower the temperature on their water heater to 120°F. 68 There are a number of YouTube videos that provide detailed instructions for how to do this. Another way to cut back on hot water usage is by using cold or warm water for most laundry loads, since the clothes washer uses more hot water than any other household appliance. In fact, 90% of the energy for a laundry load using hot water goes towards heating the water. 69 Cold water is always sufficient for the rinse cycle of clothes washers.

Tips for saving energy used by appliances and electronics include buying products with the Energy Star logo; using power strips that can be easily turned off; line-drying clothes when possible; and using sensor drying on the clothes dryer when available. Energy used by light bulbs can be easily reduced by replacing all light bulbs with energy-efficient LED bulbs, which use approximately 75-80% less energy than a standard incandescent bulb. 70 The Department of Energy recommends keeping the refrigerator temperature at 35-38°F and the freezer temperature at 0°F. 71 Individuals can reduce the cooling load of their refrigerators by letting hot food cool down before putting it inside.

All of the home energy efficiency tips provided are low- or no-cost measures that most individuals can practice in their homes. Practicing a combination of these tips is likely to result in some energy savings. To achieve even deeper energy savings with a limited budget, an individual can research local energy companies that offer energy efficiency

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69 Opower (2013), Ways to Save. Puget Sound Energy.
programs. In Bellingham, a local utility company - Puget Sound Energy - offers a number of free programs to its customers to help them save energy, such as a free home energy audit and an appliance rebate program. Another local utility, Cascade Natural Gas, offers free energy-saving kits to its customers. Individuals should check to see if any programs such as these are available in their area.\textsuperscript{72}

Sample Lecture Slides (full lecture can be found at this link)\textsuperscript{73}:

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Understanding_an_Electricity_Bill.png}
\caption{Understanding an Electricity Bill}
\end{figure}

\textbf{Power} is measured in kilowatts (kW). Power is instantaneous.
- Ex: A light bulb is using 100 watts of power at this moment

\textbf{Energy} is measured in kilowatt-hours (kWh). It is measured over time.
- Ex: If you run a 100-watt light bulb for 8 hours, it will have consumed 0.8 kWh

\textsuperscript{72} Links to image used in this lecture summary: Thermostat; Energy Star logo
\textsuperscript{73} The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
Lighting: Swap out Incandescent Bulbs

- **Incandescent**
  - Energy saved: N/A
  - Annual energy cost: $4.80
  - Bulb life: 1000 hours

- **CFL**
  - Energy saved: ~75%
  - Annual energy cost: $1.20
  - Bulb life: 10,000 hours

- **LED**
  - Energy saved: ~75-80%
  - Annual energy cost: $1.00
  - Bulb life: 25,000 hours

Heating: Weatherization Tips

- Leaky doors & windows are the #1 waste of energy in most rentals
  - For example, if you can see the outdoors around the edges of your door, you’re losing heat!
  - To fix:
    - Use caulk around doors and windows
    - Make a draft snake or use rolled up towels on windowsills and against doors
    - Cover windows with blankets or bubble wrap/plastic film
  - Report significant leaks to your landlord
Suggested Activities:

Discussion on Energy Behavior Readings

Students will have five minutes at the beginning of class to meet in small groups to discuss the two articles that they read for class. In their groups, they will answer the following questions:

- What motivates people to change their behaviors, according to these studies?
- Do you agree with this?

Groups will then share their answers with the rest of the class.

How Much Energy is used by Household Activities?

Students will be shown a pie chart similar to Figure 1 below. This chart was made using data from the local energy utility, Puget Sound Energy. The chart should be updated to reflect the most recent available data. There should be no labels on the chart describing what each section is. Students will try to guess which household activity corresponds to which section of the pie chart.
Students will then be shown the same pie chart but with labels, like the one in Figure 2 below. Are they surprised by anything on the chart?
**Lecture 3: Group Activity**

**Brief Description:** This meeting is dedicated to a group energy-related activity of the instructor’s choosing. A group activity will give students an opportunity to be creative with their peers. Some ideas are provided in the Suggested Activities.

**Student Goals:**
Apply knowledge of energy to new situations

**Equipment/Supplies:**
Poster paper and markers, crayons, or colored pencils (if doing the Energy Conservation Posters activity)

**Suggested Assignments Due Before Lecture:**

**Energy Efficiency Research Assignment**
Students will choose three of the home energy efficiency practices discussed in lecture to do their own research on. They will write a few sentences on each of these practices with more details than what was provided in lecture. Students may choose to answer the following questions:

- What are the benefits of this practice? Try to think of benefits beyond just the economic and environmental benefits. For example, switching to a LED light bulb can reduce waste heat given off by lighting, which might improve the overall comfort level of a home.
- What barriers might prevent an individual from trying this practice in his or her own home? Can you think of any ways to make this practice easier or more enjoyable?

**Suggested Activities:**

**Energy Conservation Posters**
Students will spend 10 minutes in small groups discussing areas within their institution where they feel energy is wasted. An example could be a computer lab where the screens are not turned off, or a classroom where lights are often left on overnight. The students will make small posters together that can be hung in these areas to try to increase energy efficient behaviors. For example, the posters might have reminders to turn off
computer screens or lights. The instructor will provide paper and colorful markers, crayons, or colored pencils for the students to use. This activity will give students an opportunity to be creative together and to extend the impact of the class to individuals outside of the class.

**Energy Production Facility Field Trip**

Students will take a tour of an energy production facility near the institution where the class is being held, if possible. Examples of facilities near Bellingham, WA that students have toured through WWU classes include WWU’s steam plant, a natural gas cogeneration facility in downtown Bellingham, nearby hydropower dams, and a solar panel producer. If available in your area, other possible field trip ideas include visiting a Zero Net Energy House or a LEED-certified building to give students a chance to learn about energy-efficient building design.
Module 7: Transportation

Brief Description: The first lecture of this module will provide an overview of the U.S. transportation sector, including how this sector contributes to climate change and how individuals can reduce the impact of their personal use of transportation. Students will spend the second lecture of this module presenting their microadventure assignments.

Estimated Length: Two 50-minute lectures

Lecture Topics:
- Transportation Overview
- Microadventure Presentations

Lecture 1: Transportation Overview

Brief Description: This lecture provides facts about the U.S. transportation sector, its environmental impact, and about alternative modes of transportation.

Student Goals:
- Understand how the transportation sector contributes to climate change
- Identify ways an individual can be more environmentally friendly with their use of transportation

Equipment/Supplies:
- Computer and projector to display PowerPoint slides

Suggested Assignments Due Before Lecture:
Social Justice and Transportation Reading Assignment
Students will read the article in the Huffington Post titled “Think Public Transportation Isn’t a Social Justice Issue? Think Again”, which can be accessed with the article: http://www.huffingtonpost.com/molly-secours/cant-get-there-think-publ_b_782280.html. This article shares the first-hand experiences of a low-income, African American woman who grew up relying on public transportation. Her experiences
demonstrate that public transportation systems can be severely inadequate for the individuals that rely on them. This reading will hopefully give students a new perspective on issues related to transportation. After finishing the reading, students will do the following:

- In at least one paragraph, explain the similarities and differences between your experiences with transportation and the experiences of the individuals described in this article.

**Personal Transportation Assignment**

Students will choose one location that they travel to often. They will then write one paragraph explaining the impact of the mode of transportation they most frequently use to get to this location. Their paragraph should address the following questions:

- How many miles away is this location?
- How long does it take to get there?
- How much CO₂ does this trip produce, if any?  

Next students will write at least one paragraph explaining two different modes of transportation. Their paragraph should answer the following questions:

- How long does it take to get the location using each of these modes of transportation?
- How much CO₂ is produced by these trips?
- What are the advantages and disadvantages of each mode of transportation?

**Lecture Summary:**

The transportation sector is responsible for approximately 26% of U.S. greenhouse gas emissions. There were 16.4 metric tons of CO₂ emitted per person in the U.S. in 2013. A typical passenger vehicle emits about 4.7 metric tons of CO₂ per year, assuming a fuel economy of 21.6 miles per gallon. This means that transportation is responsible for 28.7% of total emissions per person in the U.S. Reducing an individual’s environmental impact

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74 Students can use the online Travel Calculator by Native Energy to find the answer to this question.
from driving a car is as simple as driving fewer miles per year. One way to do this is to be more efficient when driving around. For example, if an individual has multiple errands to run in one day, then they can plan their route so that they are driving the fewest number of miles possible. When available, individuals can also choose to use alternative modes of transportation that produce less, or zero, CO₂ emissions. For example, the use of public transportation in the U.S. reduces CO₂ emissions by 37 million metric tons annually.⁷⁸ There are a number of public transportation options that an individual can choose to use, such as busses, trains, and subways. In 2014, Americans took 10.8 billion trips on public transportation.⁷⁹ Individuals may also choose to bike or walk instead of driving. Both of these activities do not produce any CO₂ emissions and they have a number of health benefits.

**Sample Lecture Slides** (full lecture can be found at [this link])⁸⁰:

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⁸⁰ The lectures used for the WWU course may not perfectly match the content of the teaching guide, since changes were made to the course after its completion. These changes are incorporated into the teaching guide.
Suggested Activities:

Social Justice and Transportation Discussion

Students will meet in small groups for 15 minutes to discuss their thoughts on the reading assignment on social justice and transportation. Each group should come up with a list of possible issues that a public transportation system in a city could have. The group
should then make a list of possible solutions to these issues. Each group will share a summary of these solutions with the rest of the class.

**Lecture 2: Microadventure Presentations**

**Brief Description:** This meeting will provide time for each student to share a brief presentation on the microadventure they chose for their reading assignment.

**Student Goals:**

- Identify the environmental, economic, and social impacts of the tourism industry
- Define the terms “locavism” and “microadventures”

**Suggested Assignments Due Before Lecture:**

“*The Trouble with Tourism*” Reading Assignment

Students will read the 2014 article titled “The Trouble with Tourism” that was co-authored by the Dean of WWU’s College of the Environment. It can be accessed with the following link: [http://digitalcommons.calpoly.edu/rpta_fac/57/](http://digitalcommons.calpoly.edu/rpta_fac/57/). This article explains some of the environmental, economic, and social consequences associated with the tourism industry. It then introduces the idea of “locavism”, or local tourism, as a possible solution to the issues that the tourism industry causes. After students read the article, they will complete the following:

- Although tourism can come across as a renewable, low-impact activity (i.e. making memories instead of buying "things"), the authors argue that tourism "is a product of carbon-dependent civilizations and thus cannot serve as an antidote to the very stuff of which it is made" (306). In 2-3 sentences, try to explain what this statement means. Why is tourism not as

**Student Experience**

“Among our guest speakers, [WWU] Huxley Dean’s… discussion of tourism was the most influential. He raised the point, one I had either tried to ignore or suppress, that tourism is an oil-based industry directly related to climate change. I had always associated success with one’s ability to see the world, but in reality people that fly are significantly increasing their carbon footprints.”
carbon-neutral as many people think? (Hint: The authors provide a great explanation on page 309).

- The authors argue that tourism "gives the illusion of participating in sustainable activities wherein pleasure can be gained without impact" (311). Do you agree with this statement? Can you think of a specific tourism activity - either that you've experienced in your own life or heard of other people experiencing - that might give an individual the illusion that they are enjoying themselves without having a negative impact on the world around them?

- Carefully read the section describing how tourism can create a leakage of social capital (starting with the last paragraph on page 311 and ending before "Reimagining Tourism: Locavism" on page 312). Describe two issues that the authors say can occur when an individual places significant value on "other" places. How do individuals who long for “other” places affect their hometowns?

- In 1 sentence, explain what "locavism" is, as described by the authors. Then visit the website called PNW Microadventures, which was created by Recreation students at WWU, for a real-life example of this concept. This website can be accessed with the following link: http://www.pnwmicroadventures.com/

- Now that you are familiar with microadventures, make a two-slide PowerPoint presentation of a microadventure that you have been on that you enjoyed. Try to keep the microadventure within 150 miles of where you live. Your presentation should include a description of the place that you visited and the mode of transportation that you used to get there, an explanation of what made this trip enjoyable, and some photos of the location (either your own or ones that you found online). You will present this short presentation during the next class meeting. Please send the presentation slides to the instructor before the start of the next meeting.
**Suggested Activities:**

**Microadventure Presentations**

Each student will share the two-slide PowerPoint presentations on their chosen microadventure with the entire class. Assuming that the class size is 25 students, then each student will have two minutes to share their presentation. If there are more than 25 students, this activity might work best if students are divided into smaller groups. If there are less than 25 students, then each student will have more time for their presentation.

**Lecture 3: Sustainable Living Paper Discussion**

**Brief Description:** This meeting is a discussion day for students to share their experiences with the energy- and/or water-related practices that they adopted for their third sustainable living practice paper. Their paper is due before the beginning of class.

**Student Goals:**

Learn about the sustainable living experiences of peers

**Suggested Assignments Due Before Lecture:**

**Third Sustainable Living Paper**

This is the third of three sustainable living papers that students will be expected to complete during the quarter. For the assignment, students will be asked to attempt to adopt a new sustainable living practice for approximately 10 days. The practice must be related to energy and/or water use. Students will submit a 2-3 page, double-spaced paper that documents and reflects on their experience with this practice. This paper should be assigned approximately two weeks prior to this lecture. Students will be expected to talk about their experience and paper in class with their peers.

**Student Experience**

“I may have only participated in four different practices [throughout the quarter] but I got to learn about what others were doing and their own experiences which made it feel like I was part of something much bigger.”

Students will not be graded on their ability to successfully adopt the new practice. The purpose of this assignment is for students to reflect on how their personal experiences...
relate to the readings, guest lectures, or class discussions. If a student was unable to successfully adopt their practice, then they should explain in their paper what made this practice challenging to adopt. It is recommended that students include photos of them completing their practice in their papers, although it is not a requirement. The paper should address the following questions:

- Which practice did you choose to adopt?
- Why did you choose this practice? What are the benefits of adopting it?
- What challenges did you encounter during this experience?
- What might make this practice easier for an individual to adopt?
- How did your experience relate to ideas mentioned in class discussions, readings, and/or guest lectures?

Below is a list of ideas of sustainable practices related to energy and/or water use that students can choose to adopt. They are also encouraged to come up with their own ideas.

- Reduce the time you spend in the shower.
- Hang your clothes to dry instead of using your clothes dryer.
- Unplug all appliances when not in use.
- Turn off the faucet while you are brushing your teeth or in between doing dishes.
- Turn your thermostat down to the lowest level that you find comfortable (and wear warmer clothes in the house so you don’t have to turn your thermostat up!)
- Turn off lights that are not in use.

**Suggested Activities:**

**Sustainable Living Paper Discussion**

Students will meet in small groups for 30 minutes. Each student will take turns sharing their experience with their practice. Students should answer the following questions:

- What practice did you choose to adopt?
- What are the benefits of adopting this practice?

**Student Experience**

“The easiest sustainable living practice that I adopted during this quarter must have been conserving energy. I read a lot of blogs and such on little adjustments I could make to my apartment to make it more energy efficient, and tried them out. I also monitored my daily energy use on the [Puget Sound Energy] website.”
● Were you successful in adopting this practice? If not, what would have made it easier to adopt?
● What challenges did you face during this experience?

After all group members have answered these questions, each group will share an overview of their group members’ experiences with these practices. Make a list of similarities between students’ experiences in a location where students are able to see the list, such as on a whiteboard. For example, you may find that multiple students express that limited time or money made their practices challenging to adopt. Lead a group discussion on why these similarities exist. Ask students to consider what this experience might look like for individuals who are not participating in this course.

Student Experience

“Hearing everyone share their personal insight on what they are trying to do to ensure our world sticks around for a few more decades has been an incredible experience. Being in a class full of young students all wanting the same thing was very motivating. I honestly can say that a lot of my drive came from the fact that I knew multiple others were participating in the same act I was.”
Module 8: Final Assignments

**Brief Description:** Students will spend the last in-class meeting taking a cumulative final exam that will test their knowledge of various sustainability concepts discussed in class. Students will also complete a final paper in which they reflect on their experience in the class. This paper will be submitted online during finals week. There will be no in-class meeting during finals week.

**Estimated Length:** One 50-minute meeting

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Meeting 1: In-Class Final Exam

**Suggested Activities:**

**Final Exam**

As with the midterm exam, the final exam is not meant to be difficult. The purpose of the final exam is to test how well students have been paying attention during the course. Giving a final exam also provides students with an incentive to be more attentive during lecture and take notes. The questions on the exam will be related to transportation, energy, water, food, waste, climate change, and sustainable living in general. Any student who has attended each meeting and paid attention should be able to easily answer the questions asked. The suggested questions for the midterm exam related to food, waste, climate change, and sustainable living can also be used for this exam. Suggested questions related to water, energy, and transportation include:

- Less than ___% (1%) of the world’s water can be readily accessed for humans to use.  

- Thanks to the water cycle, the Earth will never run out of water. Why, then, is it important to conserve water?

- Which activity is responsible for using the most water in a typical home?

- Explain what indirect water use is. What are two examples of indirect water use?

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• Briefly describe the process of electricity generation. What are three primary energy sources that can be used to produce electricity?

• Which of the following is responsible for the greatest consumption of energy in a typical household? Options: Water heating, lighting, heating and cooling, appliances and electronics, refrigerators. 82

• Describe two local energy resources that an individual could use to save energy.

• Approximately what percentage of U.S. greenhouse gas emissions can be attributed to the transportation sector? Options: 5%, 10%, 25%, 33% 83

• Describe two issues associated with the public transportation system. Think back to the transportation and social justice article that we read to help you.

• What are two negative impacts of the tourism industry?

• What is a microadventure?

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**Finals Week: Final Paper**

**Suggested Activities:**

**Final Paper**

Students will submit a paper (approximately 1,000 words, double-spaced, 12 pt Times New Roman) that discusses their experience in this class, what they learned, and how they will (or will not) apply it to their own lives. Students should draw upon the readings, class discussions, and lectures in their papers. Each paper should address the questions in the outline below. Students may choose to use this outline for writing their paper.

1. **Introduction** - Give a brief summary of the problems that sustainability addresses. Why is sustainability important? [1 point]

2. **Challenges to Sustainability** - Explain why there is a gap between individuals' attitudes about sustainability and their engagement in sustainable practices. What makes sustainable living practices challenging to adopt? Use at least one example from your own experiences with the bi-weekly papers. [2 points]

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3. Sustainable Living Practices - Summarize the practices that you learned about in this class that you found most useful. Of the various practices that you adopted for the sustainable living papers, which was the easiest to adopt and which was the most difficult? Why? [2 points]

4. Class Influence - Has this class changed your perspective on sustainable living? If applicable: In what ways do you plan to incorporate sustainability into your own life? [2 points]

5. Conclusion (Class Experience) - What are your overall thoughts about this class? Did you find the information in it useful or interesting? Please explain at least two ways that you think this class could be improved. [2 points]

The remaining one point will be given to students that meet the length and formatting requirements. Late papers will not be accepted.
Sustainable Living Class Pre-Class Survey Questions

Demographic Information

Please write the last five digits of your W#: ___________

1. Select the type of housing that you currently live in:
   - On-campus dormitory or apartment
   - Off-campus apartment
   - Off-campus house or duplex
   - With parent(s) or guardian(s)
   - Other (please specify): ____________________

2. What year are you in college?
   - Freshman (first year)
   - Sophomore
   - Junior
   - Senior
   - Other (please specify): ____________________

3. Please write your age: ___________

4. Why did you choose to take this class? (Select all that apply)
   - I want to reduce my environmental impact
   - I needed some more credits in my schedule
   - I want to learn more about sustainability
   - Other (please specify): ____________________
Factual Questions

Note: Please be honest when answering the questions on this survey. If you are not sure about the answer to a question, then take your best guess. There is no penalty for answering a question incorrectly. You are not expected to know the answers to all of these questions. Ideally you will be more familiar with the concepts mentioned in these questions by the end of the quarter.

5. Which of the following sectors do you believe produces the most greenhouse gas emissions in the U.S.?
   - Agriculture
   - Transportation
   - Industry
   - Electricity
   - Commercial/Residential

6. Roughly what percentage of the world's carbon dioxide emissions does the U.S. produce?
   - 5%
   - 15%84
   - 25%
   - 50%

7. About how much of the U.S. economy (~$18 trillion) is spent on consumer goods?
   - 10%
   - 33%
   - 50%
   - 70%85

8. How many pounds of trash does the average American produce daily?
   - 1
   - 3
   - 587
   - 7

9. What percentage of that trash is or once was edible?
   - 1%
   - 6%

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10. Roughly how much of the food produced in the world is wasted or lost annually?
   1/5
   1/4
   1/3
   1/2

11. Three-quarters of the Earth's surface is covered with water. How much of that water is drinkable?
   Less than 1%
   Between 1-5%
   More than 5%

12. Which primary energy source is consumed the most in the U.S.?
   Coal
   Natural gas
   Petroleum
   Renewable energy
   Nuclear power

13. What is the biggest energy user in the average home?
   Lighting
   Space heating/cooling
   Heating water
   Refrigeration
   Electronics

14. In relation to food, what does GMO stand for?

   Answer: Genetically Modified Organism

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**Sustainable Living Questions**

15. How familiar do you feel you are with sustainable living?
   - Extremely familiar
   - Very familiar
   - Moderately familiar
   - Slightly familiar
   - Not familiar at all

16. How much of a priority is living sustainably to you?
   - A great deal
   - A lot
   - A moderate amount
   - A little
   - None at all

17. What do you believe are the greatest barriers to living sustainably?
   - Money
   - Time
   - Misinformation
   - Information overload
   - Other (please specify): ____________________

18. How often would you say you engage in the following practices?

<table>
<thead>
<tr>
<th>Practice</th>
<th>Never</th>
<th>Sometimes</th>
<th>About half the time</th>
<th>Most of the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use a reusable water bottle</td>
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<tr>
<td>Shop at the farmer’s market or co-op</td>
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<tr>
<td>Eat local food</td>
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<tr>
<td>Eat organic food</td>
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<tr>
<td>Recycle plastic, glass, and/or paper goods</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Compost</td>
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</tbody>
</table>
Purchase products with disposable packaging

Buy food in bulk

Turn off lights when I leave the room

Turn the faucet off while brushing my teeth

Buy things I don't need

Use a reusable mug

Bring a Tupperware to restaurants to package leftovers

19. How often would you say you do the following?

<table>
<thead>
<tr>
<th>Activity</th>
<th>A few times a year or less</th>
<th>Once every month or so</th>
<th>A few times a month</th>
<th>A few times a week</th>
<th>Everyday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use public transportation (i.e. bus or train)</td>
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<tr>
<td>Buy new clothes</td>
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<tr>
<td>Buy used clothes</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Eat meat products</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Ride my bike or walk</td>
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</tr>
</tbody>
</table>

20. Which of the following programs, organizations, or events are you aware of?
   - Bellingham Energy Prize*
   - Community Food Co-Op*
   - PSE's HomePrint Energy Assessment*
   - Community Supported Agriculture (CSA) food boxes*
   - Sustainable Connections*
City of Bellingham's free water-saving kits*
WWU Zero Waste program**
WWU Resident Resource Awareness Program (ResRAP)**
Microadventures/Staycations
PSE's Green Power*
FoodPlus! Compost*

21. Check any of the following actions that you have completed:
   - Opted out of junk mail
   - Signed up for a compost bin through SSC (if living off campus) *
   - Replaced your lightbulbs with LEDs
   - Signed up for PSE's Green Power program*
   - Installed a low-flow shower-head
   - Other (please specify): ____________________

*These resources may not be available outside of Bellingham, Washington
** These resources may not be available outside of Western Washington University