

Destination 2017: Education for Sustainability Lesson Plan

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Campus: West

Discipline: EET

Week 1

1. Course Prefix and Name (select a course you wish to incorporate sustainability, ex: *ENC 1101*):
ETS 1210C Introduction to Photonics
2. Needs Assessment
 - a. What is the CIM [course outcome](#) that you plan on teaching during your sustainability-focused lesson?
This module enables students to understand and distinguish between different types of lasers and non-laser light sources and identify their characteristics. Become familiar with human eye and vision. Recognize and avoid various laser beam hazards.
 - b. What is a particular lesson, activity, or unit you already use that you wish to incorporate sustainability? Or, if you will be creating a new lesson, which concepts might align with sustainability?
Green Photonics - Enabled Eco-friendly Design & Production: Laser Applications
 - c. What [sustainability topic](#) might it cover?
9. Innovation & Infrastructure

For more resources see,

- Sample Valencia lesson plans ([English](#), [New Student Experience](#), [Mathematics](#)),
- [Tips on integrating sustainability into existing courses](#)
- [Arizona State University's archive of sustainability lesson plans](#)

Week 2

3. Student Learning Outcomes

What is your end learning goal with the lesson? What should the [students be able to do/understand/care about](#)?

- a. The students will identify the characteristics of 5 non-laser light sources (man-made).
- b. The students will examine the main properties of a laser source and its application in green photonics.

Week 3

4. Lesson Title: Green Photonics

5. Lesson Summary: Currently, the green photonics (combination of optics and electronics) will have a greater role in decreasing our environmental impact. The biggest impact will occur in the product design and the manufacturing process.

Eco-efficient design - photonics technologies, using the light in a laser form, are used to increase the speed, accuracy, and quality of the manufacturing process.

6. Lesson Overview/Background:

- a. How will your lesson connect to the [3 pillars of sustainability](#): environmental, social, and economic issues?

Environmental - utilization of lasers in the manufacturing process (welding/machining plastic components without the need of glues and solvents)

Social - information awareness about the availability of new technologies

Economical - lasers requires less energy consumption; increased accuracy will help save valuable materials

- b. How will your lesson address at least one of the [5 key concepts](#)?

Long term development - these technologies currently are in the incipient phase and in the future, multiple applications will evolve

7. Assessment

- a. Identify the [type\(s\) of assessment](#) (*experiential, inquiry-based, project-based, place-based*) strategies you will use to assess content mastery ([summative](#)) and write out the instructions that will be given to students.

Project-based - the students will research and discuss possible future applications of lasers in green photonics technologies

- Investigate current applications
- Research future applications
- Discuss the results in groups (4 students) and be prepared to share with the class the results
- Participate in the class discussion and complement other group's presentations

- b. Identify the strategy or strategies you will use to assess student learning and provide ongoing feedback ([formative](#)) and write out the instructions that will be given to students.

Each student will create a research paper about which type of laser and current/future technological applications in green photonics.

Must include: laser type / history of the laser / advantages & disadvantages / current & future applications

8. Lesson Activities

- a. What will students need to know or do prior to the lesson activity or activities (readings, items to be prepared, prior knowledge)?

The students will read the module referring to non-lasers and lasers source.

The instructor will provide an interactive lesson (theory / video / hands-on demonstration)

- b. Describe the activity or activities students will be doing.

- i. Write out the instructions that will be given to students.

The first part will occur outside the class environment. In the second part, the students will get together during the class time and discuss their results. In the last part, the students will turn in a research paper.

- ii. How will you keep students engaged throughout this activity.

The students will participate in an interaction lesson and the group discussions.

9. Materials and Resources

For the questions below, include links to resources you plan to use with a summary of how you plan to use the resource.

- a. What content do you already have?

The lesson about non-lasers/lasers sources I use currently in class.

Additional sources: Intro to Photonics - textbook and the laboratory manual

- b. What new materials will you need to create?

Few cutting edge laser applications involving the direct environmental benefits and manufacturing techniques will be added to the interactive lesson.

Week 4

10. Reflection

- a. Explain how your outcome(s), learning activities, and assessments are aligned and connected.

One of the outcomes of the lesson is the laser light sources. The students will study and learn about laser applications in the field of "green photonics." From the interactive lesson, the online research, and the class discussions, the students will create a research paper that will contain: laser type, history, current applications, and possible future applications. Overall, the students will make the correlation between the theory, laser functionality, and real life applications in the industry, which, as future technicians, they will benefit from it.

- b. How will you [evaluate the effectiveness of your lesson](#)?

The students will discuss in groups about the entire lesson process and will provide individual, anonymous feedback at the end of the class. I will also ask them to think about future activities that can be implemented in the same lesson.