



PROJECT 2 : Creation of Public Campaign on Environmental Impacts of Smartphones

Lesson 2

Design a Future Without Pollution or Waste

Learning Objectives:

1. Understand that in nature waste is a resource.
2. Analyze the linear model of 'Take-Make-Dispose'.
3. Identify the challenges of current recycling programs.
4. Examine processes to minimize waste through improved design, recycling, reuse and recovery.



▶ What would the future look like if all waste was repurposed? How could this be accomplished? How does the increase of the earth's population impact pollution and waste? In the *Environmental Engineering for the 21st Century* study, Grand Challenge 3 explores ways to "Design a Future Without Pollution or Waste".

1

Start class by displaying a diagram or photograph of a pond or lake ecosystem.

Ask students to identify the interaction of organisms in the system with each other and with the system itself.

Students should have some basic knowledge of these interactions. Probing questions can be used to help students understand that in nature waste is a resource.



2

Then display the photograph in Box 3-2. Ask students how this differs from natural systems. Display the following statement:

An analysis of five high-income countries found that 1/2 to 3/4 of annual resource inputs are returned to the environment as waste within a year.

In a Think-Pair-Share have students discuss why this is happening and explore some of the consequences. As students share back to the class, help them develop the concept of our current linear model of 'Take-Make-Dispose'.



Box 3-2



Examine the 'Take-Make-Dispose' model with an example of a plastic bag.

TAKE: petroleum removal — MAKE: production process — DISPOSAL: landfill

Have students read Box 3-1 and create a list of issues concerning consumption and waste as they relate to the "Take-Make-Dispose" Linear model. Encourage students to consider who is affected by this model as it relates to the [Environmental Justice Educator Lesson](#).



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3

Students will be familiar with current recycling and reuse programs. Ask students if they believe these programs are effective. What percentage of plastics do they believe are recycled? Display the following statement:

The U.S. recycles or composts ()% of municipal waste and less than ()% of plastics.

Have students fill in the blank percentages. Most likely students will think the programs are more effective than they actually are.

Provide students with the actual percentages: 35% for municipal waste and 10% for plastics. Discuss why the percentages of recycling are low. What are the challenges faced by these programs? As students offer responses, classify them into the categories of **SOCIAL | POLITICAL | ECONOMIC**



The challenges posed by pollution and waste will continue to intensify. Reducing waste and pollution requires new approaches to design based on life-cycle thinking.

Display Figure 3-3: Explain to students that this diagram represents the prevention of pollution and waste through improved design. They will use this as a guideline for their project. Discuss some examples of environmental impacts could be prevented by different approaches in each of the elements in the diagram.



Utilize the Smartphone Campaign Project document included on the website to introduce the project and get student teams started. Students will use the content developed in lessons 1 and 2 as well as assigned readings from the report.

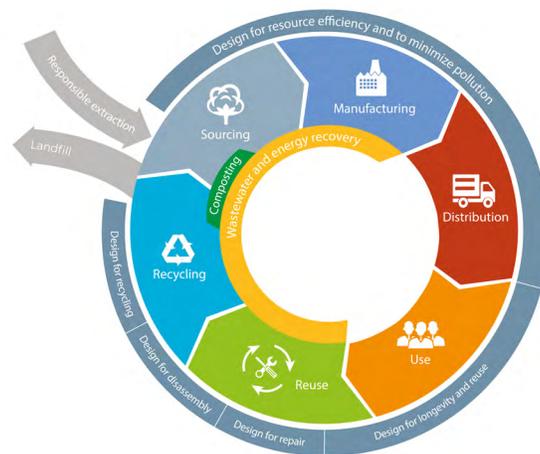


Figure 3-3 on p. 49. Sharply reducing waste and pollution requires new approaches to design based on life-cycle thinking.