



Renewable Resources Lesson 3: *The Engineer*

Student Handout

Your Challenge

The town of Resourceville is unique. The town's residents have access to every resource you studied in *The Make*. It seems their options for energy are endless! This has been a huge draw for the town, and as a result, its population has tripled in the past five years! Town council is thrilled with the boom in population, but behind closed doors, they're facing a problem.

The town's resources are in trouble. There are two problems: conserving natural resources and mitigating the uneven distribution of resources. They heard about the great work you did in *The Make* and have hired you as an engineer to solve one of their resource problems.



Your Task

1. Choose **one** of the two resources you chose to study in *The Make*. This can either be the renewable or nonrenewable resource.
2. Recall how that resource is distributed throughout the world and how it has an impact on the environment and society.
3. Go through the engineering design process to determine how you plan to:
 - a. conserve the natural resource

OR

 - b. mitigate* the uneven distribution of a natural resource.



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4. Present your final solution to the town through a model or technical drawing.

*The word “mitigate” means to make a problem less serious or less severe. For example, if your sibling is **blasting** music, putting in earplugs would *mitigate* the problem. It doesn’t fix the problem completely; it just makes it easier to deal with.

Planning Organizer

Choose **one** of the resources, either renewable or nonrenewable, that you studied in *The Make*. This natural resource will be your focus.



Include your findings from <i>The Make</i>	
How is this resource distributed throughout the world?	What are its impacts on the environment and society?



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Design your solution	
Will your design CONSERVE the natural resource or MITIGATE* its uneven distribution? *Remember, “mitigate” means to make the problem less serious or less severe.	
What will your design do?	
What are your solution requirements? What are some possible constraints (limitations) to consider? <i>For example, a requirement may be size or usability; a limitation may be cost or space.</i>	
Requirements	Limitations
What MATERIALS will you need to build your design solution? Where would you SOURCE these materials from?	
How does your design work?	



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Create

With the above plan in mind, now it is time to create your solution. Choose the format in which you'll present your solution. This will be either:

Option A: Build a 3D model or

Option B: Create a technical drawing.

Your teacher will specify the amount of time you have.

If you choose option A, you will build a model, and write the information text on a separate piece of paper. If you choose option B, you will draw a technical sketch and write supporting information on the same paper.

For each presentation format, complete the following requirements.

- Title: Name of design as heading
- An explanation of how your solution works
- Explanations of all parts and how they contribute to the product
- A description of the function of each facet/component of your design
- Create a caption that explains how your device will ultimately provide electrical energy
- Description of how your device solves the challenge
- Final presentation of design solutions in written and verbal format as if you are presenting/pitching your device to the town



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Assessment: Final Presentation

You designed a solution to the problem of either conserving natural resources or solving the unequal distribution of natural resources. Your audience may be a group of your peers, or a group of other members of your community.

Use the Checklist and Science & Engineering Practices Rubric to ensure you have addressed all aspects of *The Engineer* with quality work.

Renewable Resource *The Engineer* Checklist: Content Concepts and Practices

Your Challenge: Design a plan to conserve a natural resource or to mitigate the uneven distribution of a natural resource.

Project Completeness:

- Technical drawing or model is detailed
- Functioning parts are labeled for clarity
- Technical drawing has the name of the design as the heading
- Equipment design drawing is well-organized, neat, and in color

DCI Standards Checklist:

- Includes annotations describing how the design solution works
- Includes annotations about the location of the design solution
- Includes a caption explaining how the solution conserves or mitigates natural resources
- Includes a caption explaining impacts of the natural resource
 - Uses research from *The Make* to create a caption that explains how your natural resource is distributed throughout the world and
 - How this impacts environment and society, specifically describing uses of the resource

Science & Engineering Practices Assessed

	Emerging (1)	Developing (2)	Proficient (3)	Advanced (4)
Constructing Explanations and Designing Solutions	Constructs an explanation with no clear sources of evidence.	Uses scientific principles and/or data from at least one source to construct or evaluate an explanation, but explanation contains minor misconceptions.	Uses accurate but incomplete scientific principles and/or data from multiple sources to construct or evaluate an explanation.	Uses accurate and complete scientific principles and/or data from multiple sources to construct or evaluate an explanation.