

## Comparing Biofuels and Bioproducts

### Objectives

- To create and present an exhibit about a form of bioenergy or other renewable energy source

**Skill Level:** Middle School and High School

**Prep time:** 10 minutes

**Class time:** 2 class periods: 1 for preparation and another for presenting

### Materials (per group)

- 18" x 36" sheets of poster paper
- Markers, crayons, pencils, other coloring supplies
- Construction paper
- Scissors
- Glue/tape
- Packet with information and photos

### Standards

**Disciplinary Core Idea:**

Dependent on final content choices

**Performance Expectations:**

Dependent on final content choices

**Practices**

- Asking questions / defining problems
- Developing / using models
- Planning / carrying out investigations
- Analyzing / interpreting data
- Math / computational thinking
- Constructing explanations / design solutions
- Engaging in argument from evidence
- Obtaining / evaluate / communicate

**Crosscutting Concepts**

- Patterns
- Cause and effect: Mechanism / explanation
- Scale, proportion, and quantity
- Systems and system models
- Energy / matter: Flows, cycles, conservation
- Structure and function
- Stability and change

## Background Information

In this activity, students will research, plan, create, and present a poster about a renewable energy source, preferably a form of bioresource or bioproduct. Students will not only gain new knowledge about renewable energy and energy conservation, but they will have an opportunity to be creative and inventive as they learn.

### PLUG INTO THE POWER OF PLANTS AND WASTE ... TO HELP MEET THE NEEDS OF A GROWING POPULATION

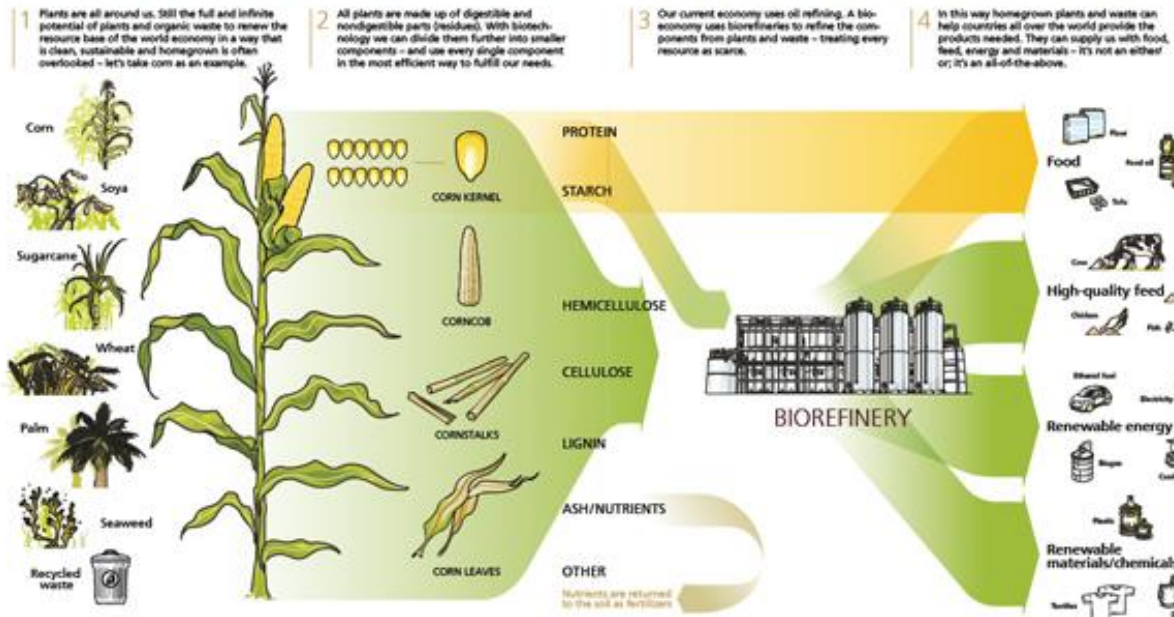


Figure 1. The various bioresources that are used to make bioproducts. [Reference](#)

To begin, students should understand the idea of bioresources and bioproducts. Bioproducts, like biofuels, are made by products that can be recycled or regrown. Bioproducts are often made from plants such as bioplastics, which are often able to decompose more quickly than regular plastics. Bioresources are the materials that make up bioproducts, like the plants in the bioplastics example. Students should pick either a bioresource or a bioproduct to research and create a poster on. Some additional examples of bioproducts are: biogasifiers, methane digesters, ethanol, biodiesel, and biobased jet fuel. Additional bioresources are: seaweed, vegetables, and recycled waste. These examples can be used as a source of inspiration for students as they research their own bioproduct of biofuel.

### Engage

- Define bioenergy
- Who uses this source?

- How would you inform people about this source who do not use it already?

**Explore**

**Experiment Questions:**

- Define your bioproduct/bioresource.
- How is the product/resource produced and distributed?
- What are some uses of the product/resource?
- What is the environmental impact of the product/resource?
- What are the advantages and disadvantages to widespread use of bioproduct/bioresources?

Each student/group will use written information, pictures, charts, diagrams, etc. on the poster to convey this information.

**Procedure:**

Using research information and the supplies provided, create a simple, yet comprehensive poster that addresses the following prompts:

1. Research a bioresource or bioproduct on the Internet, in magazines, in books, etc.
2. Pick out the main ideas from the information and answer the experiment questions.
3. Plan your poster.
4. Create your poster using the materials provided. Get creative!
5. Compare bioproducts/bioresources by doing a class presentation.
6. Have a class discussion of the benefits and complications with each bioproduct/bioresource.

**Explain**

- Who uses your source?
- Are there any limits/ disadvantages to your source?
- How fast does your bioenergy source regenerate?

## Resources

**Resources Used:**

- [NEED curriculum](#)
- [Transportation Fuels](#)
- [Hatfield Biodiesel](#)
- [Oregon Executive Council](#)
- [Disadvantages of Biodiesel](#)
- [Biodiesel Basics](#)

- [International Energy Statistics](#)