Name_____

# Garbage to Good

According to the Environmental Protection Agency, Americans create millions of tons of garbage per year. Of this amount, one-third is either recycled or composted, and just over 10 percent is burned. Over half of all garbage goes to landfills. Landfills are costly to build and can be a source of pollution.

Efforts have been made to reduce the impact of solid waste on landfills. Many innovative uses for waste have been developed. One use for waste is to create energy.

When waste is used to create energy, it results in heat or combustible gases. The most common way to achieve this result is through burning, or incineration. But burning waste can have hazardous emissions, so strict guidelines must be followed. Before such guidelines were developed, gas emissions were heavily acidic. This created acid rain that was harmful to both people and structures. Now filters are used, which make emissions cleaner than most home fireplaces.

Aside from the emissions that are produced, the residue that remains can be highly toxic and must be handled very carefully.

The most common method of creating energy from incineration is by using the heat created from burning the waste to boil water. The boiling water powers steam generators, which make electricity for homes and businesses.

Today, new ways of using waste to create electricity or fuels are being developed. They are very complicated. One example is the thermal method, which uses extremely high temperatures without burning.

The goal is to transform waste into a benefit for us. Sweden has run out of waste to transform into energy. Now they purchase waste from other countries. Perhaps someday we will also be able to make total use of our waste.

## Text Questions

1. According to the passage, how much of our garbage goes to landfills?
   a. one-third
   b. 10 percent
   c. 50 percent
   d. more than half
2. What is does the word *innovative* mean as it is used in the second paragraph?
   a. renewed
   b. new methods
   c. altered
   d. unimaginative
3. What is a positive result of burning waste?
   a. Burning waste results in heat or combustible gases.
   b. Without filters, burning creates acid rain that is harmful to both people and structures.
   c. The heat created from burning waste is used to boil water, which powers steam generators to make electricity.
   d. The residue that remains from burning waste can be highly toxic and must be handled very carefully.
4. Which title would be a good alternative for this text?
   a. "Waste Equals Energy"
   b. "A Model Country"
   c. "A New Way to Generate Heat"
   d. "Burning Our Garbage"
5. What do you think it will take for our country to implement effective uses of waste material? Give reasons to support your answer.

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# The Exciting Field of Engineering

The field of engineering is growing right along with technology. Careers in engineering include designing, planning, and building new things. For example, architectural engineers design, plan, and construct buildings and other structures. Engineering can also be applied to mechanics, medicine, chemistry, and transportation. Another way to think of engineering is that it has to do with products, machines, systems, or structures. In other words, almost everything in our world relies on engineering at some level.

Engineers are curious about how and why things work. An engineer will receive special training in a specific aspect of engineering. Often, things have more than one type of system, or aspect of design. For example, designing and building a computer requires electrical engineers for the wiring and circuitry. Someone has to design and create the hardware. This includes the keyboard, screen, and case that hold the electronic components. Software engineers contribute an operating system and programs that make the computer perform the desired functions.

Regardless of the end product, engineers follow a process that is sometimes called research and development. People want something that will perform a certain way or complete a specific task. Often, when something new is being created or built, a problem will be identified. Engineers need to assess the problem and find a way to solve it. Once the end result has been identified, engineers think about a design that might meet the requirements. Then they consider the available resources. Brainstorming possible solutions is part of the process, with ideas sketched and developed. The feasibility of each idea must be considered, as well as the advantages and disadvantages. Which idea seems most likely to accomplish the end result?

Engineers then build a model or prototype. This helps them envision how the final product will perform. At this stage, it's easier to test the outcome and make changes as needed.

Every time you modify a bicycle, change a character in an interactive game, or build a ramp for a skateboard, you're using engineering principles!

## Text Questions

1. Which of the following is <u>not</u> listed as an area of engineering?
   a. chemical
   b. electrical
   c. architectural
   d. resourceful
2. Which type of critical-thinking skills are mostly discussed in this passage?
   a. problem and solution
   b. cause and effect
   c. collaborating with others
   d. using reasons and evidence to convince others of a viewpoint
3. What does the word *feasibility* mean as it is used in the third paragraph?
   a. possibility
   b. ability to be carried out
   c. creativity
   d. practicality
4. What is the main idea of the third paragraph?
   a. It defines and introduces the field of engineering.
   b. It gives an example of a product that requires different types of engineering.
   c. It gives an overview of the process of product development.
   d. It suggests practical engineering applications.
5. Describe a time when you used principles of engineering and followed the process described in this passage, from identifying a problem to designing a proposed solution.

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# How We Use Corn

We might not think of corn as an ancient grain, but it is. For centuries, it has been known and grown as maize in the Americas. Scientists believe the original wild form of corn has long been extinct. Through the years, corn has been cultivated to the point where it is truly a domesticated crop. In its present state, it does not grow and propagate without man's intervention.

Corn is prepared and eaten in a variety of ways. Cornmeal is made by grinding whole corn. It is used for making cornflakes, cornbread, pancakes, and tortillas. Cornstarch is made from the endosperm. It is used in baby powder, as a thickening agent, and in some plastics. Corn syrup is made from cornstarch. As a sweetener, it is cheaper to produce than sugar cane.

We produce a biofuel, or gas, from corn called ethanol. Cars can run on a mixture of gasoline and up to 10 percent ethanol. Oil is also produced from corn and is used for many things, including cooking. After oil is pressed from corn, the germ remains. It can be used for livestock feed or added to industrial glue for strength.

Plastic made from corn uses over 50 percent less fossil fuels than other plastics. These products also decompose more easily in landfills. A common use of such plastic is food containers and disposable silverware.

Other uses for corn and its products include snack foods, medicinal teas, cosmetics, and soap. Corn is used in agriculture for animal bedding, feed, and fertilizers. We use corn products to make matches and carpet. It's even in batteries and crayons! It's hard to imagine a crop worldwide that has as many uses as corn.

## Text Questions

1. What does the word *domesticated* mean as it is used in the text?
   a. to adapt wild plants for human use
   b. a crop grown in home gardens
   c. tamed for human use
   d. to bring a crop from a foreign country and make it commonly grown in your own country
2. What might be a factor leading to the development of such a variety of uses for corn?
   a. It takes little effort to process.
   b. It has been a cultivated crop for hundreds of years.
   c. It grows in any climate.
   d. It only grows in certain areas.
3. According to the passage, which of the following is <u>not</u> a product made from corn?
   a. batteries
   b. crayons
   c. light bulbs
   d. matches
4. Which statement best illustrates how corn products are beneficial to the environment?
   a. In its present state, corn does not grow and propagate without man's intervention.
   b. As a sweetener, corn syrup is cheaper to produce than sugar cane.
   c. Corn can be used for livestock feed or added to industrial glue for strength.
   d. Plastic made from corn uses over fifty percent less fossil fuels than other plastics and decomposes more easily in landfills.
5. Based on what you read, how would you describe the economic impact of corn cultivation?

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