Leave It to Beavers?

Emily Johnson

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233 N. Michigan Avenue, Suite 420 Chicago, IL 60601 800.222.5870 greatbooks.org

Prereading

What do you know?

What do you already know about dams?

What do you think?

Why do you think humans build things without thinking about the consequences to the environment?

Each time you read the text, return to what you wrote here to see if new information changes or adds to your answers.

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The highlighted words will be important to know as you work on this unit.

Ever since humans saw what the first dam-builders—beavers—were up to, we have been **determined** to build one of our own. After all, if a beaver can stop a river with some sticks and mud, how hard can it be? The ancient Egyptians were among the first to try. One of their dams was 37 feet tall, 348 feet wide, and filled with 100,000 tons of rocks. It fell apart a few years after they built it.

Since then, humans have gotten a lot better at building dams. Now we build them for all sorts of reasons. We use them to store water, to prevent flooding, to make it easier for boats to travel, and to power homes and businesses with electricity.

Today dams bring water to people near and far. When a dam is built across a river, a large area of water fills up behind the dam. This new body of water is called a reservoir. The water in a reservoir supplies nearby towns and cities with drinking water and is used to **irrigate** farmland during **droughts**.

The most common reason for building dams these days is for electricity. More than 90 percent of the world's **renewable** energy comes from dams. By using the strength of the rushing water to spin **turbines**, we generate electricity to run our factories and light up cities and towns. Dams are an important part of powering modern life.

determined: firmly set on doing something and not letting anything stop you
irrigate: supply with water
droughts: long periods with no rain
renewable: able to be replaced by natural processes
turbines: engines with blades that turn quickly from water, steam, or air pressure

Mastering the Mighty River

Since the days of the ancient Egyptians, dams have gotten a lot bigger. The Hoover Dam is one of two dams that controls the Colorado River. It is also one of the largest dams in the United States. It is made of enough concrete to build a two-lane highway from New York to San Francisco, California. The Hoover Dam weighs more than 6.6 million tons and stands as tall as a 72-story skyscraper. It is an amazing example of **engineering**!

The Hoover Dam has a huge reservoir called Lake Mead. It covers 233 square miles and can store up to 9.2 trillion gallons of water. This amount could cover the entire state of New York in a foot of water. Thanks to the Hoover Dam, the Colorado River's water is put to good use in the thirsty states it runs through. It supplies water to desert areas in Colorado, Wyoming, New Mexico, Utah, Arizona, Nevada, California, and parts of Mexico. If you take a drink of tap water at Disneyland in California, the water is actually coming from Lake Mead, 300 miles away.

The water is not only used for drinking. It also waters over one million acres of farmland in the United States and almost half a million acres in Mexico. Without it, we would not be able to produce nearly as much food for our growing nation.

Another function of the Hoover Dam is to power electric plants. In fact, one of the dam's most important jobs is to supply electricity to California. The water that rushes through the dam generates enough electricity to serve 1.3 million people a year. People who get their power from the Hoover Dam live in many different states, including Arizona, California, and Nevada.

Nature Fights Back

When the Hoover Dam was finished in 1935, it was the tallest dam in the world. Since then over 40,000 other large dams have been built to meet the world's water and energy needs.

engineering: designing and building structures, machines, or systems using science

These dams have improved the quality of life for millions of people all over the world. But as useful and mighty as these dams are, they can also cause problems for the environment.

Think about it. What might happen when we block the flow of the world's largest rivers? For starters, earthquakes. All the water that isn't flowing down the Colorado River is just sitting in the reservoir. And 9.2 trillion gallons of water is *heavy*. The weight of all that water can cause tiny cracks in the earth's crust, which eventually breaks under the weight. The result is an earthquake. Over 100 earthquakes have been triggered by filling reservoirs.

Dams stop more than just water from flowing. They stop whatever is *in* the water too, such as fish and **sediment**. Many types of fish move upstream to lay their eggs. Once they hatch, growing fish move downstream to complete their life cycles. Getting past the dams is tricky, though. As a result, dams have led to the extinction of many species.

Sediment also gets stuck behind dams. It carries important **nutrients** and minerals that keep the river **ecosystem** healthy and balanced. Sediment also keeps the water level right. Without this soil to fill up the bottom of the rivers, riverbanks begin to crumble away. Strong floods happen more often then.

Another surprising discovery about dams is that they are changing the local **climate**. In fact, dams are actually making rain. To understand how this is possible, let's review where rain comes from. The same rain that falls from the sky today has been around since the earth began. All the water that will ever exist is the same water that comes out of your faucet right now. For all you know, the last glass of water that touched your lips once touched dinosaur lips.

sediment: pieces of material that sink to the bottom of a liquid
nutrients: substances that people, animals, and plants need in order to grow
ecosystem: communities of living and nonliving things that interact with each other in an area
climate: the usual weather conditions in a place or area (such as temperature, wind speed, and rainfall)

We have the water cycle to thank for this. Water on the ground **evaporates** into the air and forms clouds. The clouds release the water back to the earth as rain. Then the whole cycle starts over again. This might help explain why most rain forms over the ocean. After all, what holds more water than an ocean?

Scientists now have evidence that suggests manmade reservoirs are making their own rain. Even though a reservoir is a huge body of water, its water is spread out over large but shallower areas for things like irrigation and recreation. This shallow water evaporates even faster. This makes for a **humid** climate with more rainfall. In other words, dams are changing the local climate and making it rain. And it doesn't just rain more often. It also rains harder.

This may not seem like a big deal. But the problem is that dams were built to hold a certain amount of water. This amount is based on how much it usually rains. More rain means dams must hold back more water. And remember all the sediment that isn't flowing downstream? It's piling up behind the dams, leaving even less space in reservoirs for water. What do you think might happen to older dams when there is more water and less room to hold it?

Today people are divided on whether or not having so many dams is a good idea. On the one hand, dams bring us drinking water, power our homes, and protect us from floods. They are incredible examples of human engineering. Yet as we begin to see dams' negative effects on the environment, some people wonder if we would be better off leaving dam building to the beavers.

evaporates: changes from liquid to gas
humid: having lots of moisture in the air

Second Reading Questions

Do you think people should continue to build dams? Why or why not?

Give two pieces of evidence to support your answer above.

One piece of evidence that supports your answer:

Your evidence can be:

- A detail from the text, like a fact or a quote
- A detail from a photo, chart, or other text feature

Another piece of evidence that supports your answer:

Shared Inquiry Discussion

Name: _____

Text: _____

1. Use the answer and evidence you wrote on the previous page to participate in the Shared Inquiry discussion.

2. After discussion, think about whether your answer changed or stayed the same. Write it below. Then write a piece of evidence that changed or strengthened your answer.

Your answer to the focus question after discussion:

_____

_____

_____

_____

Evidence you found or that someone else used that helped you (circle one)

change your answer / make your first answer stronger:

_____

_____

_____

_____

_____