There are about 90,000 dams in the world. Dams are structures that hold back large amounts of water. Dams are not a new concept. There were dams in Mesopotamia, ancient Egypt, and early Rome. Some dams are built by animals, such as beavers, some are constructed by humans, and some are formed by natural causes. Dams are classified several ways: size, purpose, structure, and/or material. The readings in this unit examine one important dam: the Hoover Dam in the United States.
Part 1: Public Projects

Getting Started

One famous dam in the United States, the Hoover Dam, is located on the border between the states of Arizona and Nevada. The dam of the Colorado River took five years to build, from 1931 to 1936, but was dedicated in 1935 by President Franklin Roosevelt. It was first known as the Boulder Dam but was renamed the Hoover Dam, in honor of President Herbert Hoover. Answer these questions with a partner.

1. Have you ever seen a dam? What dams are you familiar with? Where are they?
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________

2. Dams hold a lot of water. Some dams are used to generate electricity. What other purposes might dams serve?
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________

Reading 1 is from a reference book titled How Stuff Works. The passage discusses the Hoover Dam and some consequences if the dam broke. It explores what would happen to the surrounding areas as well as what would happen to the dam itself.

Before reading an academic passage, it is useful to know the purpose for a reading to make sure to get what is needed from the passage. Is the purpose to complete an assignment, write a paper, prepare for a test, or develop a better understanding? Is there some other reason? Knowing the purpose before you start reading may also save you time.
Before Reading Strategy: Knowing the Purpose for a Reading

Academic readings can be long and challenging. Sometimes it is hard to motivate yourself to read, especially in a field that is different than your own or does not seem relevant to your life. To prevent this, it sometimes helps to develop a purpose for reading. In other words, set a goal. By working toward the goal, you will focus on the reading so that you can achieve the goal. Always make sure that you know why you are reading the text and what information you need (or want) to learn.

Purposes can vary:

- It may be a purpose from the teacher, such as learning something that may appear later on a test or gathering information to complete a writing assignment.
- It may be a purpose from the textbook, such as achieving a list of objectives at the beginning of a chapter.
- It may be a purpose from your advisor, such as background reading.

You may have to motivate yourself by asking questions about the topic that you hope to answer or questions that you want to ask during a class discussion. You can also make predictions about the topic and then see how many you get right.

Setting goals helps you pay more attention to certain information. Focusing in this way helps you put more value on different parts of the reading rather than trying to remember every single detail.

Practice Activity: Knowing the Purpose for a Reading

Reading 1 discusses what would happen if one of the United States’ most important water delivery systems failed. Focus on the topic by answering these questions.

1. What objectives does your instructor have for asking you to read this?
   ____________________________________________________________

2. What do you need to learn from this reading? __________________________
   ____________________________________________________________
3. Why do you think the author chose to write about this topic? Give at least two reasons. _______________________________________________________.
_________________________________________________________________

Vocabulary Strategy: Learning Synonyms

When you learn a new word, you should also learn a synonym or two for it. One of your first questions might be, “I already know a similar word for that idea. How is this new word different from the word I already know?” Or, you may not know another word that is similar. Learning synonyms is extremely useful in increasing your vocabulary and overall fluency. It will greatly help your reading, speaking, listening, and writing.

Knowing a lot of synonyms is also very helpful when you are paraphrasing. Review the box on pages 14–15. You should begin to notice that some words are related but not exact synonyms. For example, the word commerce means “business.” A thesaurus might use a word like trade because that also means “business.” A good thesaurus would also list dealings and retailing as related words because they don’t have the exact meaning. Some thesauruses (and dictionaries) make this distinction. When you choose to paraphrase, you should make sure the word or words you are using mean the same thing as the original does.

Practice Activity: Identifying Synonyms

Do you know any synonyms for these words? If not, use a dictionary to identify one or two synonyms for each of these words from Reading 1.

modern _____________________ _____________________
amazing _____________________ _____________________
effect _____________________ _____________________
quickly _____________________ _____________________
represent _____________________ _____________________
sizable _____________________ _____________________
**Vocabulary Power**

There are a number of terms and phrases in this reading that you may encounter in other academic settings. Add at least five vocabulary items to your vocabulary notebook or log.

Match the words in bold from the reading on the left with a definition on the right.

_____ 1. The Hoover Dam is one of those miracles of the modern world that almost **defies** explanation.  
   a. usual  
   b. ability  
   c. complete stop  
   d. fail; come to nothing  
   e. resist  
   f. get rid of  
   g. cause to relocate  
   h. empty

_____ 2. No **conventional** bomb would have an effect on a dam like this.  

_____ 3. But let’s say that some sort of tremendous earthquake or an asteroid strike or some other natural disaster were to somehow **eliminate** the Hoover Dam in one fell swoop.  

_____ 4. If you eliminated a sizable amount of generating **capacity** like that . . . .

_____ 5. Farmers in the Imperial Valley get most of their water from the Colorado River, and these irrigation systems would **collapse**.

_____ 6. Prior to irrigation, the Imperial Valley was a **barren** desert.

_____ 7. With the loss of water and the loss of power, Las Vegas would become uninhabitable, and that would **displace** 1.5 million residents and empty more than 120,000 hotels rooms and the casinos, bringing the multi-billion-dollar gambling industry in this city to a **halt**.

_____ 8. With the loss of water and the loss of power, Las Vegas would become uninhabitable, and that would displace 1.5 million residents and empty more than 120,000 hotels rooms and the casinos, bringing the multi-billion-dollar gambling industry in this city to a **halt**.
Reading

Now, read the passage.

What If the Hoover Dam Broke?

1  The Hoover Dam is one of those miracles of the modern world that almost defies explanation. When you stand next to it, the size is unbelievable. It is more than 700 feet high (imagine a 70-story building). The top of the dam is more than 1,200 feet long. At the base, it is an amazing 660 feet thick and at the top it is 45 feet thick. The water on the lake side is more than 500 feet deep, and the lake holds a total of 10 trillion or so gallons of water—enough water to cover a state like Connecticut 10 feet deep.

2  Let’s say the Hoover Dam broke. This is difficult to imagine, given its thickness. No conventional bomb would have an effect on a dam like this. It is difficult to imagine even a nuclear bomb having an effect, unless it were an extremely powerful one and it were inside the dam at the time of explosion. But let’s say that some sort of tremendous earthquake or an asteroid strike or some other natural disaster were to somehow eliminate the Hoover Dam in one fell swoop. What would happen?

3  The first thing that would happen is that 10 trillion gallons of water would move as quickly as they could out of the lake and down the river in a huge tsunami of water. The Hoover Dam is located in a desert area that is not hugely inhabited below the dam, but there are still some sizable populations. Lake Havasu City, population 40,000, is about the biggest town in the United States along the river. Bullhead City, population 30,000 is also close to the dam. Needles, California; Blythe, California; and Laughlin, Nevada, all have populations of around 10,000 people as well.
Where the water would do immense damage is in the lakes below the Hoover Dam. It turns out that below the Hoover Dam is another large lake called Lake Mohave, which is held in place by Davis Dam, and below that is Lake Havasu, held in place by Parker Dam. These are smaller lakes and smaller dams. For example, Lake Havasu only holds about 200 billion gallons of water.

As the water released by the Hoover Dam moved through these two lakes, it would likely destroy them and their dams as well. That’s where the real impact would be felt, because these lakes affect a huge number of people. The water in them produces hydroelectric power, irrigates farmland, and supplies drinking water to cities like Los Angeles, Las Vegas, Phoenix, and San Diego.

The Hoover Dam produces roughly 2,000 megawatts of power. Davis and Parker Dams produce less, but together they might all produce 3,000 megawatts. That represents about one half of one percent of the total electrical power produced in the United States. If you eliminated a sizable amount of generating capacity like that, especially in that area of the country (near Los Angeles and Las Vegas, for example), it would definitely cause problems.

The destruction of irrigation water supplies would also have a huge effect on farming in the region. Farmers in the Imperial Valley get most of their water from the Colorado River, and these irrigation systems would collapse. Prior to irrigation, the Imperial Valley was a barren desert. Today it is the home of more than half a million acres of farmland and produces more than a billion dollars in fruits and vegetables every year.

There would be large effects as well from the loss of drinking water. For example, Las Vegas gets 85 percent of its drinking water from Lake Mead—the lake behind Hoover Dam. With the loss of water and the loss of power, Las Vegas would become uninhabitable, and that would displace 1.5 million residents and empty more than 120,000 hotel rooms and the casinos, bringing the multi-billion-dollar gambling industry in this city to a halt.

Isn’t it amazing how much commerce and how many people depend on one dam?
After Reading Strategy: Understanding Details

Sometimes, the purpose of reading certain academic texts is to learn some specific facts or statistics about a topic to help develop your understanding of an event or a concept. When that is a purpose of your reading, you will probably want to go back through the text several times to make sure you have understood all of the important details.

Some textbooks give the impression that details aren’t important, but that is not true. Again, it depends on the purpose. For much of the academic reading you will do, it will be most important to understand the main ideas, but for others, the details will be important, especially if you need to write about it later or answer questions on a test. Details are more likely to be important when reading about historical events, scientific experiments, literature, mathematical equations, or processes.

If understanding the details is an important component of your reading task, you will want to review the text more than once. Details are often names, places, numbers, and/or dates. Read carefully for these types of details.

Practice Activity: Understanding Details

Assume that your purpose for reading about the Hoover Dam was to understand details. Answer the questions.

1. What are the three most important pieces of specific information given about the dam in Paragraph 1?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

2. What other dams would be affected if the Hoover Dam broke?

___________________________________________________________________

3. Which cities would lose power and drinking water if the Hoover Dam broke and severely damaged Davis and Parker dams?

___________________________________________________________________
4. In which area would farmland be most negatively impacted if the Hoover Dam broke?
___________________________________________________________________

5. Which city would suffer the most damage if the Hoover Dam broke?
___________________________________________________________________

**Practice Activity: Reading for the Big Picture**

Although the last activity focused on details, this one focuses on main ideas. Choose the best answer for each question.

1. What is the main idea of the passage?
   a. If the Hoover Dam broke, it would be the result of a natural disaster or a bomb.
   b. If the Hoover Dam broke, surrounding cities would suffer.
   c. If the Hoover Dam broke, cities and other dams would be damaged.
   d. If the Hoover Dam broke, people would not have enough drinking water.

2. Which events would happen if the Hoover Dam broke? Choose all that are correct.
   a. an earthquake would be triggered
   b. a tsunami would be triggered
   c. electricity could not be generated at the same capacity
   d. farmers would not need to irrigate for a long time
   e. the fruit and vegetable industry would suffer
   f. drinking water would be lost
   g. people would have to move to Las Vegas
Paraphrasing to Simplify

Write a paraphrase that expresses the main points of the original without re-using too many words or phrases from the original.

1. It is difficult to imagine even a nuclear bomb having an effect, unless it were an extremely powerful one and it were inside the dam at the time of explosion.

2. The first thing that would happen is that 10 trillion gallons of water would move as quickly as they could out of the lake and down the river in a huge tsunami of water.

3. If you eliminated a sizable amount of generating capacity like that, especially in that area of the country (near Los Angeles and Las Vegas, for example), it would definitely cause problems.
Writing Strategy: Paraphrasing, Part 2

Unit 1 explained that paraphrasing is rewriting ideas from a secondary source. The box on pages 14–15 offered five ways to change the wording to avoid plagiarism. Changing words helps to paraphrase, but it also helps to change the grammar and structure of the original. There are several strategies you can use to do this. As always, it is best to use more than one wording and/or structure technique when paraphrasing.

These techniques focus on changing grammar or structure.

- **Rearrange clauses or phrases**

  *Original:* As the water released by the Hoover Dam moved through these two lakes, it would likely destroy them and their dams as well.

  *One example with rearrangement:* It would likely destroy these two lakes and their dams as well, as the water released by the Hoover Dam moved through them.

- **Change the voice (active to passive or passive to active)**

  *Original:* That’s where the real impact would be felt, because these lakes affect a huge number of people.

  *One example with voice changed:* That’s where the real impact would be felt, because a huge number of people are affected by these lakes.

- **Change word groups**

  *Original:* The water in them produces hydroelectric power, irrigates farmland, and supplies drinking water to cities like Los Angeles, Las Vegas, Phoenix, and San Diego.

  *One example with a new word group:* The water in them produces hydroelectric power, irrigates farmland, and supplies drinking water to large cities [in California, Nevada, and Arizona].
• Change the punctuation

Original: The water in them produces hydroelectric power, irrigates farmland, and supplies drinking water to cities like Los Angeles, Las Vegas, Phoenix, and San Diego.

One example with new wording and punctuation: The water in them does three things: produces hydroelectric power, irrigates farmland, and supplies drinking water.

• Add or combine sentences

Original: The water in them produces hydroelectric power, irrigates farmland, and supplies drinking water to cities like Los Angeles, Las Vegas, Phoenix, and San Diego.

One example with new punctuation and two sentences: The water in them does three things: produces hydroelectric power, irrigates farmland, and supplies drinking water. These things are important to the cities of Los Angeles, Las Vegas, Phoenix, and San Diego.

Remember that using just one technique usually does not change the original enough to avoid plagiarism. Combine them with each other as well as with the wording strategies from Unit 1. You also still need to cite the source.

Original: The Hoover Dam produces roughly 2,000 megawatts of power. Davis and Parker Dams produce less, but together they might all produce 3,000 megawatts. That represents about one half of one percent of the total electrical power produced in the United States.

One example with more than one strategy: Approximately 2,000 megawatts of power is generated by the Hoover Dam. Davis and Parker Dams don’t generate as much power as the Hoover Dam. Together they generate 3,000 megawatts, which, in the United States, is only approximately a half of one percent of all the electricity in the country.
**Practice Activity: Paraphrasing**

Re-write the words or phrases using each of the paraphrasing strategies.

1. Rearrange clauses or phrases

   The destruction of irrigation water supplies would also have a huge effect on farming in the region.

   ____________________________________________________________
   ____________________________________________________________

2. Change the voice from active to passive

   The Hoover Dam produces roughly 2,000 megawatts of power.

   ____________________________________________________________
   ____________________________________________________________

3. Change word groups

   If you eliminated a sizable amount of generating capacity like that, especially in that area of the country (near Los Angeles and Las Vegas, for example), it would definitely cause problems.

   ____________________________________________________________
   ____________________________________________________________

4. Change punctuation

   Today it is the home of more than half a million acres of farmland and produces more than a billion dollars in fruits and vegetables every year.

   ____________________________________________________________
   ____________________________________________________________
5. Add or combine sentences

Today it is the home of more than half a million acres of farmland and produces more than a billion dollars in fruits and vegetables every year.

6. Go back to the Paraphrasing to Simplify exercise on page 48, and answer these questions.

a. Did you use any of the strategies? Which ones? __________________
   _______________________________________________________________

b. Where can you use the strategies or use more than one?
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________

   c. Can you edit the paraphrases you wrote? Mark places in your paraphrases where you think you can make changes.

   d. Can you write one completely new paraphrase?
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
   _______________________________________________________________
Short Writing Tasks

Write your response to each task following the directions given for length and source material.

Task 1 (Summary)

Look again at Reading 1. Write a one-paragraph summary of the reading. Review the boxes on pages 14–15 and 49–50 to review paraphrasing and page 33 to review summarizing. Be sure to mention or cite your source. (Length: 4–6 sentences)

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Task 2 (Research)

Reading 1 talks about what would happen if the Hoover Dam broke. Based on your instructor’s guidelines, do some light research online or in a library to learn about another dam. Light research is not as detailed and does not take as much time as preparation for a long essay or research paper. Light research includes finding a few sources that provide some supporting details. Write some details about the dam—its location, size, and materials. Take notes in the space provided. Then write your paragraph on a separate piece of paper. (Length: 6–8 sentences)

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
Part 2: Constructing the Hoover Dam

Getting Started

There are many types of dams and they are different sizes, serve different purposes, and are made from different materials. Building dams is considered challenging and requires great engineering and architectural skills. Answer these questions with a partner.

1. Can you think of materials that would be used to make a dam?
   _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________

2. What kinds of things do you think engineers and architects have to think about to build a dam?
   _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________

3. Do you think you would ever want to build structures? Why or why not?
   _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________
Reading 2 is from a book that explores the history of engineering in the United States by looking at some of the biggest engineering projects. This type of book includes a lot of detail about various engineering projects.

If you are an engineering student or curious about this topic, you might be interested to read the passage. If, however, you do not know much about engineering or have not read about history, you might be worried about understanding the passage. We all have to read things on topics that are new or unfamiliar to us. As a result, it’s important to know what to do when you have to read something on a topic that is new to you.

Before Reading Strategy: Preparing for a New Topic

Imagine that you have been assigned a reading that is on a topic that is new to you and outside your area of expertise. Read the title of the reading on page 59. Before you even start reading, you recognize that you are worried that you won’t understand enough of the vocabulary to be able to understand the reading. What can you do?

1. Go online or to a reference book and try to find a short explanation of the topic or event. In the case of Reading 2, it might be “structural engineering.” In this type of source, the explanation is designed to be simple and general. It will give you a basic idea of the concepts and vocabulary. It might also provide some ideas for similar topics you could look at. Make a list of words on the topic that might appear in the reading. Look up the meanings before you start reading. See the Vocabulary Strategy on page 57.

2. Go online to look for photos related to the topic of the reading. Sometimes you just need to be able to get a picture in your head of a particular concept. In the case of Reading 2, look again at the photos on pages 54 and 61, but also search for photos online related to the building of the Hoover Dam.

3. Skim the reading to look for vocabulary that you don’t know. Make a list of the words and add them to your vocabulary log. Look up the meanings before you start reading. See the Vocabulary Strategy on page 57.

4. Skim the reading to look for other clues to understanding what the reading is about. Talk to your classmates. Share what you think you know.
Practice: Preparing for a New Topic

Prepare for the reading on pages 59–62 by answering these questions.

1. Look up “structural engineering” in a reference book or online source. What is given as the basic meaning?
   ____________________________________________________________
   ____________________________________________________________

2. As you read more about the topic, what are some vocabulary words that you see used more than once?
   ____________________________________________________________
   ____________________________________________________________

3. Skim the reading to see if you find any of the same words in the reading. If so, which ones?
   ____________________________________________________________
   ____________________________________________________________

4. Write a sentence about what you think the reading will be about.
   ____________________________________________________________
   ____________________________________________________________
Vocabulary Strategy: Previewing Difficult Vocabulary

Another key to preparing for an academic reading is to make sure you know some of the vocabulary related to the topic. Even if you are an engineering student, for example, and the reading is on an engineering-related topic, there will be vocabulary you may not know or may not know in English.

To preview vocabulary, do some of the same things you would do to preview a reading on a new topic (listed on page 55). For example:

- Skim the reading to look for vocabulary you don’t know. Make a list of the words and add them to your vocabulary log. Look up the meanings before you start reading.

If you know the meaning of the new or difficult words before you start reading, it will help improve your understanding of the reading the first time you read it. However, re-reading (see the After Reading Strategy on page 11) can also help you solidify your understanding of new vocabulary.

Practice Activity: Previewing Difficult Vocabulary

Reading 2 includes a description of some of the challenges facing the engineers of the Hoover Dam. The descriptions include words and engineering concepts that you may not be familiar with. Follow these steps.

1. Circle or highlight the vocabulary items in Paragraphs 5–7 that are new to you.
2. Skim the reading, and underline the words or phrases that seem to describe the process of building the dam.
3. Look up the meanings of the vocabulary words that are unknown to you. Add them to your vocabulary log.
Vocabulary Power

There are a number of terms and phrases in this reading that you may encounter in other academic settings. Add at least five vocabulary items to your vocabulary notebook or log.

Match the words in bold from the reading on the left with a definition on the right.

_____ 1. Yet one measure of the immensity of the Hoover Dam is that the tunnels were merely a **preliminary** to the main task at hand.

a. disaster
b. perfect
c. list
d. early; first
e. thinking about
f. became one
g. huge
h. be better than

_____ 2. For years, Reclamation engineers had been **pondering** what sort of wall would halt the great river in its ancient bed and hold back its immense pressure—some 45,000 pounds per square foot at the dam’s base.

_____ 3. They also had to block this force of nature beyond any possibility of failure. Anything less would court **catastrophe**.

_____ 4. . . . then mixed with water and Portland cement to make a stream of **flawless** concrete that would flow without letup for four years.

_____ 5. Somehow, too, the engineers had to **outwit** the chemistry of concrete.

_____ 6. As the grout hardened, the pile of blocks **fused** into a single mass.

_____ 7. Compared to most other construction jobs, the structures still to be finished seemed **colossal**: the power plant; the soaring towers that would take in water from the reservoir; the pipes to carry water from the towers to the plant.

_____ 8. It is easy enough to **enumerate** the tangible benefits of the Hoover Dam.
The Building of the Hoover Dam

1. The diversion of the Colorado river through the canyon walls ranks as one of history’s great feats of engineering. Yet one measure of the immensity of the Hoover Dam is that the tunnels were merely a preliminary to the main task at hand.

2. For years, Bureau of Reclamation engineers had been pondering what sort of wall would not only halt the great river in its ancient bed and hold back its immense pressure—some 45,000 pounds per square foot at the dam’s base—they also had to block this force of nature beyond any possibility of failure. Anything less would court catastrophe. After considering various designs, they chose the form known as an arch-gravity dam. It would take the shape of an inverted wedge; that is, a wall thick at the bottom and thin at the top, curving into cliffs on either side. With this ingenious shape, the wall would play a kind of trick on the river, transferring the water’s enormous weight through the concrete to the canyon. In other words, the water would jam the dam into place, compressing the concrete, while the dam’s weight pressed down into the riverbed.

3. This was Frank Crowe’s main job—to pour 4.4 million cubic yards of concrete to make a curving wall 727 feet high and 660 feet thick at the base. It would contain enough concrete to pave a standard highway from San Francisco to New York. This was not just a huge job but a tricky one. Enormous fields of gravel had to be found nearby and excavated, then filtered to eliminate clay and organic material, and then mixed with water and Portland cement to make a stream of flawless concrete that would flow without letup for four years. Somehow the concrete had to be carried to the dam at great speed, because the mixture required at the Hoover Dam was unusually dry to ensure it would set properly. If the gray-white mud took too long to get from the mixing plant to the dam, it would harden into uselessness en route.

4. Somehow, too, the engineers had to outwit the chemistry of concrete. If Crowe built the Hoover Dam as a single monolithic mass, it would not fully cool for more than a century. In the meantime, the earth’s biggest structure, contracting as it cooled, would crack into the earth’s biggest pieces.
There was an even bigger problem. Standard practice for a major concrete job like this required the laborious construction of tall trestles and scaffolds by which workers and trucks could get at the structure to pour the concrete. But on a job so big, this never could be done fast enough to meet [the company’s] deadline. Woody Williams had faced the same sort of problem in the tunnels. To solve it, he had rigged a new machine. Crowe imagined a similar solution on a scale magnified many times. It was an open-air machine that filled the entire dam site. Inspired by devices he had made for earlier dams, Crowe wove a web of five cableways high above the canyon floor. Each cableway held six lines suspended between 90-foot towers. The towers could be pushed north or south along the canyon as needed via railroad tracks. Along the canyon-spanning cables, carriages moved back and forth, each equipped with dangling hooks for picking up and putting down great loads of anything that was needed anywhere on the site—loads of pipe, loads of men, or 8-cubic-yard buckets of concrete. In a booth on the canyon rim, an operator sat like a master of monstrous marionettes,* watching hand signals from men below [and], then sending buckets over the lines at the rate of 1,200 feet per minute, then dropping the buckets down to the precise point on the rising structure where they were needed.

When the men on the dam opened the bottom-side doors in a bucket, mushy concrete weighing sixteen tons fell into a wooden form as big as a house. Men called puddlers stomped on the mushy mass to press it into place. Then another load was dumped and another until the form was full. When the form was pulled away, it left a shape like a very large child’s block.

At first, the movements went slowly—getting the loaded buckets from the mixing plant via rail to the right spot on the canyon floor; hooking the bucket to the proper cable line; hoisting the bucket and moving it to the pour site many yards distant; lowering it; dumping it; raising the line and moving the carriage to haul the empty bucket away and retrieve a new one. In the first month of pouring, June 1932, the crews poured only 25,000 cubic yards—far too slow to meet their timetable.

But week by week they developed a routine and a rhythm. Soon, the journalist Duncan Aikman observed, there was “a stark and uncompromising efficiency . . . . Everywhere men move fast, throw all their power of muscle and machinery into what they are doing, waste no time in workmanly sociabilities on the job. There is no gaiety
about the scene, no sense of men colorfully enjoying their work. Instead, a kind of surly determination broods over their labor.” It took just 90 days for the men to raise their speed from 25,000 cubic yards per month to nearly 150,000 yards. By March 1934, it was 262,000 yards, one huge bucket every 78 seconds.

A time-lapse movie of the dam in progress would show shapes rising one block at a time to form 230 towering columns, with the columns standing up against each other to form a thick wall between the canyon’s cliffs. Each block was penetrated by cold-water pipes, five feet apart. Thus, one block at a time, the hot concrete cooled fast. Into the narrow cracks between the columns, Crowe’s crews pumped tons of muddy grout. As the grout hardened, the pile of blocks fused into a single mass.

The Reclamation Bureau’s original schedule set December 4, 1934, as the day when they should start pouring concrete. On December 5, 1934, the 3-millionth ton of concrete joined the dam. In a matter of weeks the wall was done. The boss had earned his nickname—“Hurry-Up” Crowe. Compared to most other construction jobs, the structures still to be finished seemed colossal: the power plant; the soaring towers that would take in water from the reservoir; the pipes to carry water from the towers to the plant. Yet compared to the dam itself, they seemed like afterthoughts.

Gradually, the men and the Reclamation Bureau introduced the Colorado River to its new regime. They divided the waters and put them to work—some to turn the
giant turbines in the powerhouse, some to irrigate the farms of the Imperial Valley. Much of the rest pooled behind the wall and backed up into the space that would be called Lake Mead, the largest reservoir in the United States, big enough to hold all the water that flows down the river in two years.

12 It is easy enough to enumerate the tangible benefits of the Hoover Dam. It became the keystone in a system of dams and canals that prevents floods; irrigates luxuriant, year-round farmland across Southern California and Arizona, including the magnificent Imperial Valley; gives clear water to metropolitan Los Angeles and San Diego; and generates electrical power for Las Vegas and most of southern California. The population and industry of the modern Southwest are its offspring. The Allied victory in World War II owed much to ships and aircraft built in factories powered by the Hoover Dam.

13 [The dam’s] career as a symbol began even before it was finished, when Americans looked to it for reassurance that their nation, staggered by the Great Depression, could still achieve great things.

After Reading Strategy: Deciding If the Author’s Goals Were Met

Earlier you read how determining the purpose of a reading is an important strategy before reading. Purpose also plays a role after reading a passage. Authors have goals when they write, but sometimes, it’s harder than it should be for readers to discover them. Other times it can be clear what the goals are when you start reading but less clear when you finish. As a result, it’s important to take a minute to think about a reading when you finish to discover if you think the author’s goals were met. In other words, did the author accomplish communicating everything he or she wanted the reader to know?

After you have finished a text, do a quick analysis of how well you think the author met the goals by asking yourself these questions:

1. Was the author’s goal(s) for writing the text as clear at the end of the text as at the beginning?
2. If it wasn’t, where do you think things got off track or where did things change? Where did you get lost?
3. What do you think the author could have done to meet the goal(s)?
Practice Activity: Deciding If the Author's Goals Were Met

Answer these questions about your experience with Reading 2.

1. What do you think the author's intent was? To inform? To persuade? To entertain? Was it accomplished?

___________________________________________________________________
___________________________________________________________________

2. Were there any other possible reasons that the author was writing? To stir emotion? To inspire? To teach? Do you think it was accomplished?

___________________________________________________________________
___________________________________________________________________

3. What does the reading include (or lack) in trying to achieve that purpose?

___________________________________________________________________
___________________________________________________________________

4. If you were writing about learning a second language, what would you include if you wanted to inform your readers? If you wanted to persuade them? If you wanted to entertain them?

___________________________________________________________________
___________________________________________________________________

Practice Activity: Reading for the Big Picture

Circle the correct information about the reading.

1. Diverting the Colorado River is / is not one of the greatest feats of engineering in history.

2. The pouring of concrete was huge, but not tricky / tricky, but not huge / both huge and tricky.

3. Pouring concrete was / was not the biggest problem the engineers faced.

4. The beginning of the process went slowly / quickly.

5. It is easy / not easy to count all the benefits of Hoover Dam.

6. Americans saw the Hoover Dam as a symbol of reassurance that the country could do great things before / during / after the Great Depression.
Paraphrasing to Simplify

Write a paraphrase that expresses the main points of the original without re-using too many words or phrases from the original.

1. Somehow the concrete had to be carried to the dam at great speed, because the mixture required at the Hoover Dam was unusually dry to ensure it would set properly.

2. Inspired by devices he had made for earlier dams, Crowe wove a web of five cableways high above the canyon floor.

3. A time-lapse movie of the dam in progress would show shapes rising one block at a time to form 230 towering columns, with the columns standing up against each other to form a thick wall between the canyon’s cliffs.
Writing Strategy: Narrowing the Topic

Academic writing is challenging. One way to make it easier is to make sure the topic is narrow enough to research effectively and finish in the time frame available. A bad topic is one that is too broad and could become a book instead of a research paper.

Some techniques for narrowing a topic and helping you focus include:

- Do preliminary secondary research to make sure there aren’t too many sources (or eliminate dated or unreliable sources).
- Brainstorm the general topic to think of words associated with it.
  
  Dams
  
  Materials
  Building Processes
  Types
  
  - Perform an internet search for keywords or subtopics (consider an internet search for subtopics of the subtopics).

    Dams → the Hoover Dam → Building the Hoover Dam

- Formulate a research question (what question do you really want to answer?).

  What process did engineers use to build the Hoover Dam?

- Consider classifications, such as times, locations, population, sizes, things, or points of view (for example, economical, legal, or political).

  Dams built after 1950
  Dams in the United States → Nevada/Arizona
  Dams built by animals → beavers
  Dams built with concrete
  Economic impact of dams
• Develop a thesis statement on which to focus.

Use more than one strategy if necessary. For example, it might be useful to brainstorm and then formulate a research question. At the end of the process, make sure to choose an aspect you find especially interesting. Writing is even harder when the topic isn’t interesting to the writer.

General Topic: Architecture

Broad: Dams

Narrower: Economic impact of dams built in the U.S. after 1950

Practice Activity: Narrowing the Topic

Look at the list of general topics. Think of ways to narrow the topic to make them more achievable. Then compare your answers and the strategies you used.

1. business

2. engineering

3. language

4. math

5. science

6. mission statements

7. public transportation
8. global warming

9. video games

10. college education

### Your Active Vocabulary in the Real World

Vocabulary is important. Some words are useful for your speaking or for your writing, but other words are useful for your reading or your listening. For each word, decide how you think you will probably need this word for your English. Put a check mark (✓) under the ways you think you are likely to need the word. It is possible to have a check mark in more than one column.

<table>
<thead>
<tr>
<th>YOUR VOCABULARY</th>
<th>I need to be able to use this word in WRITING.</th>
<th>I need to be able to use this word in SPEAKING.</th>
<th>I need to understand this word in READING.</th>
<th>I need to understand this word in LISTENING.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. enumerate</td>
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<tr>
<td>2. ponder</td>
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<tr>
<td>3. a concept</td>
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<tr>
<td>4. pave</td>
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<tr>
<td>5. or so</td>
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<tr>
<td>6. flow</td>
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<td>7. flooded</td>
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<tr>
<td>8. collapse</td>
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<td></td>
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<tr>
<td>9. an asteroid</td>
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<tr>
<td>10. ancient</td>
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</tbody>
</table>
## Rapid Vocabulary Review

From the three answers on the right, circle the one that best explains, is an example of, or combines with the vocabulary word on the left as it is used in this unit.

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms</td>
<td></td>
</tr>
<tr>
<td>1. dangle</td>
<td>bring, grab, hang</td>
</tr>
<tr>
<td>2. irrigate</td>
<td>add water, add air, add land</td>
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<tr>
<td>3. an impact</td>
<td>imagination, an effect, a tradition</td>
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<tr>
<td>4. haul</td>
<td>run, force, pull</td>
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<td>5. commerce</td>
<td>business, benefit, element</td>
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<tr>
<td>6. generate</td>
<td>prove, create, process</td>
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<tr>
<td>7. ingenious</td>
<td>brilliant, dangerous, unintelligent</td>
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<tr>
<td>8. ancient</td>
<td>primary, similar, old</td>
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<tr>
<td>9. stream</td>
<td>small job, small amount, small river</td>
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<tr>
<td>10. a spot</td>
<td>a job, a place, a wish</td>
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<tr>
<td>11. flow</td>
<td>finish, decide, move</td>
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<tr>
<td>12. a beaver</td>
<td>an animal, a plant, a person</td>
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<tr>
<td>Combinations and Associations</td>
<td></td>
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<tr>
<td>13. ___ a goal</td>
<td>put, run, set</td>
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<tr>
<td>14. in a ___ area</td>
<td>desert, tree, very</td>
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<tr>
<td>15. hold in ___</td>
<td>place, site, location</td>
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<tr>
<td>16. ___ a million</td>
<td>about, or so, as well</td>
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<td>17. pour a ___</td>
<td>person, liquid, result</td>
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<td>18. a loss ___ power</td>
<td>by, of, to</td>
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<td>19. bring ___ a halt</td>
<td>by, since, to</td>
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<tr>
<td>20. stomp ___</td>
<td>at, with, on</td>
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</tbody>
</table>
## Synthesizing: Writing Projects

<table>
<thead>
<tr>
<th>In-Class Assignments</th>
<th>Outside Assignments</th>
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</thead>
<tbody>
<tr>
<td><strong>Paraphrasing and Summarizing</strong></td>
<td><strong>If The Dam Broke</strong></td>
</tr>
<tr>
<td>Look at Reading 2 again. Choose one paragraph to paraphrase. Use the strategies in the boxes on pages 14–15 and 49–50. Then write a summary of the whole reading. When you are finished, compare your paraphrase with a partner who chose the same paragraph. Notice the things you both changed and talk about the words you changed differently. Then compare your summaries. Talk about the similarities and differences. <strong>Suggested Length:</strong> 300 words <strong>Preparation:</strong> none</td>
<td>Choose a building or structure from your own country or from a place you’d like to visit. Write an essay detailing what type of structure it is, its measurements, the materials it’s built from, the location, and other facts you think are interesting. Then write about what would happen if the structure were destroyed. Include who and what would be affected. <strong>Suggested Length:</strong> 500 words <strong>Preparation:</strong> Light research in a library or online</td>
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<thead>
<tr>
<th><strong>Do the Benefits Outweigh the Drawbacks?</strong></th>
<th><strong>A Research Proposal</strong></th>
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<tbody>
<tr>
<td>Integrate the material from the readings with your own ideas and thoughts. Write a paragraph detailing the benefits and potential drawbacks to the Hoover Dam. Decide if you think the benefits outweigh the drawbacks and include your final decision at the end of your paragraph. <strong>Suggested Length:</strong> 300 words <strong>Preparation:</strong> none</td>
<td>Imagine you have been tasked with writing a research paper about a dam other than the Hoover Dam. Write a research proposal for an instructor. Detail how you narrowed the topic. Include a thesis statement or research question you would focus on, why you chose the topic, two facts you would include to support your thesis or answer your question, and what sources you would use and why. <strong>Suggested Length:</strong> 800 words <strong>Preparation:</strong> Light research in a library or online</td>
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</table>
**Vocabulary Log**

To increase your vocabulary knowledge, write a definition or translation for each vocabulary item. Then write an original phrase, sentence, or note that will help you remember the vocabulary item.

<table>
<thead>
<tr>
<th>Vocabulary Item</th>
<th>Definition or Translation</th>
<th>Your Original Phrase, Sentence, or Note</th>
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</thead>
<tbody>
<tr>
<td>1. release</td>
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<td>2. eliminate</td>
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<td>3. irrigate</td>
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<td>4. turn out</td>
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<td>5. a feat</td>
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<td>6. invert</td>
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<td>7. concept</td>
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<td>8. or so</td>
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<td>9. gravel</td>
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<td>10. compress</td>
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<td>11. penetrate</td>
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<td>12. damage</td>
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<td>13. regime</td>
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<td>14. excavate</td>
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<tr>
<td>Vocabulary Item</td>
<td>Definition or Translation</td>
<td>Your Original Phrase, Sentence, or Note</td>
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<td>15. magnify</td>
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<td>16. harden</td>
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<td>17. a scaffold</td>
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<td>18. roughly</td>
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<td>19. supply</td>
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<td>20. play a trick</td>
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<td>21. at hand</td>
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<td>22. mud</td>
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<td>23. inhabit</td>
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<td>24. precise</td>
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<td>25. merely</td>
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