

Study Questions

The following study questions are designed for learning at the knowledge and comprehension levels of Bloom's Taxonomy. Answers are found within the Fact File. There is a separate section for each of the main topics: Construction of the Dam, Features of the Dam and Impact of the Dam. The following objectives are embedded within the study questions:

The learner will list reasons why the Black Canyon site was chosen for construction of Hoover Dam.

The learner will name three cities that benefit from the power produced at Hoover Dam.

The learner will identify the type of architecture used for the construction of Hoover Dam.

The learner will explain how the Colorado River Compact resolved conflicts over water rights.

The learner will describe how the cost of Hoover Dam was repaid.

The learner will describe the phases of Hoover Dam construction.

The learner will explain the operational features of Hoover Dam.

The learner will list the primary reasons for building Hoover Dam.

The learner will name the dams built downstream from Hoover Dam.

The learner will list two benefits of Davis Dam.

The learner will explain what happens to the money earned from the sale of hydroelectricity at Hoover Dam.

Construction of the Dam

Extensive planning went into the construction of the Hoover Dam. Selecting a site, resolving conflicts over water rights and raising money were some of issues that needed resolution before the dam could be built. The answers to the following questions can be found by exploring the Construction of the Dam section of the Fact File.

1. Which two states border the Hoover Dam?

Nevada and Arizona

2. How long did it take to build the Hoover Dam?

Three years

3. What was the Colorado River like before the building of Hoover Dam?

When it was quiet it carried silt which made it a poor source of drinking water and irrigation. After the snow melted, it would overwhelm dikes, destroy farmland and pollute canals.

4. List four reasons why the Black Canyon site was chosen to build the dam?

Accessibility

Geologic conditions

Depth to bedrock

Canyon width and depth

5. Explain how the Colorado River Compact resolved fights over water rights

The Colorado River Compact divided the river basin into two regions, the Upper and Lower Basin States.

6. How did the government both pay back the \$175 million price tag of the dam, and make a profit?

The government used hydroelectric generators in the design, and contracted to sell the power.

7. Why was Boulder City constructed?

The previous town used to house the workers had no toilets, clean drinking water or facilities. Boulder City was constructed to provide more suitable housing for the workers and their families.

8. Describe how the high-scalers prepared the canyon for construction.

They blasted, drilled and pried debris from the canyon walls using dynamite, jackhammers and crowbars.

9. How did the workers divert the water to begin construction of the dam?

Workers constructed four diversion tunnels to detour the water.

Cofferdams were constructed of earth and rock to force the water out of the riverbed.

10. How did the workers prevent uneven cooling in the concrete used to build the dam?

Workers built the dam in a series of 230 vertical, interlocking columns.

11. How were 4,360,000 cubic yards of concrete lowered during the construction of the dam?

The cableway crane system was used.

12. How did the majority of the fatalities during construction of the dam occur?

The majority of the fatalities occurred from being struck by falling objects.

Features of the Dam

The Hoover Dam is considered by many to be one of the greatest engineering feats of all time. The exceptional design of the operational features enabled the accomplishment of a task that many considered impossible. If functionality was not enough, it is also a massive work of art standing proud in the desert. The answers to the following questions can be found by exploring the Features of the Dam section of the Fact File.

1. How do the spillways prevent overflow of the dam onto the power plant below?

They are very similar to the overflow hole in a bathtub. When the water level rises too high, four 500,000 pound drum gates are raised which allow the water to flow into the concrete channels, then down tunnels to the river downstream.

2. Describe how the water channeled from the intake towers through the penstock pipes is used to create power.

The water spins the turbine, which is connected to a shaft that propels a large electromagnet (the rotor) that spins inside a tightly wound coil of wire (the stator). The exciter sends an electric current to the rotor, charging it with a magnet field, which in turn causes an electric current to build up in the stator. The current leaves the generator at 16,500 volts, and then goes to transformers where it is stepped up to 230,000 volts.

3. List three cities that benefit from the power produced at Hoover Dam.

Las Vegas, Nevada

Kingman, Arizona

Los Angeles, California

4. How does the height of the intake towers prevent silt from entering the power plant?

The intake towers, which are 250 feet above the riverbed, allow only clean water to enter the power plant because the silt from the water settles below the towers.

5. List three ways the penstock and outlet system are used.

Water from the penstocks are used to power the hydroelectric generator of the power plant.

The penstock pipes are used for irrigation.

The penstock pipes are used to release excess water due to overflow or for maintenance.

6. What do the bronze statues called Winged Figures of the Republic represent?

They represent the visionary spirit of mankind and the building genius of America.

7. The Hoover Dam is considered by many to be the largest example in the world of what type of architecture?

Art Deco

8. There were about 7 times as many visitors in the year 2000 compared to 1936.

Impact of the Dam

The inconsistency of the Colorado River developed a need for the Hoover Dam. The resulting influence on the Southwest has been varied. The answers to the following questions can be found by exploring the Features of the Dam section of the Fact File.

1. List the five primary reasons that Hoover Dam was built.

Flood control

Navigation

Irrigation

Water storage

Power

2. Name the two dams built downstream from the Hoover Dam.

Davis Dam

Parker Dam

3. List two benefits of Davis Dam.

It provides water storage to meet treaty obligations with Mexico.

It provides a billion kilowatts of power each year.

4. How much energy was produced at Hoover Dam in its first forty years of commercial power generation?

It produced about 150 billion kilowatts-enough for a million residents for 20 years.

5. How much oil would have been used in an oil-burning plant to produce this same amount of energy?

Approximately 258 million barrels of oil would have been used.

6. What happens to the money earned from the sale of hydroelectricity from Hoover Dam?

It is used to pay for all operation and maintenance costs at the dam. Arizona and Nevada each receive \$300,000 and \$500,000 is set aside each year for development of irrigation and power resources within the Colorado River Basin.