



STEM Virtual Learning- IMPACT

2nd & 3rd Grade

Structural Engineering

Lesson 5: Dams

May 4 , 2020



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Learning Targets:

Students will...

- Understand force & constraints on building structures.
- Understand challenges of engineers and the Engineering Design Process.

Background: This is a review lesson from 2nd Grade Civil Engineering

- Students learn the impact of force on designs
- Students learn about dams
- Students learn to overcome challenges

Let's Get Started:

Watch & Read-

1. [Getting More From Dams](#)
2. [Dam Basics](#)



Bonus- Can you name this dam?
Hint: It's in the Lake of the Ozarks, Mo.

Monday-

Practices:
Complete the 4 challenges.



Arch dam near a big city



Embankment dam at a gold mine



Gravity dam holding back a reservoir



Buttress dam on a scenic river

Remember, one purpose of a dam is to create electrical power for the surrounding area.

Monday-

DAMS

Think
About It!

**Along with electrical power, what are
some other things dams provide?**

Tuesday-

Practice on your own:
Let's meet civil engineer
[Andrew T. Straz](#)



Straz worked on the Edwards Dam removal in Augusta, Maine.
Click this [link](#) to answer questions about the dam. Record answers on a sheet of paper.

1. What year was the dam completed?
2. What was the dam's purpose?
3. What year was it removed?
4. What kinds of fish did the dam keep out of the river?
5. How much did it cost to have the dam removed?



Tuesday-

MORE Practice on your own:

Watch these two videos about a tunnel dam on the Niangua River in Camden County, Mo.

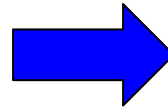
- [Tunnel Dam 2015 overview](#)
- [Tunnel Dam history](#)



Use the internet to search for more dams in Missouri. Find **3** dams and answer the following questions for each. Record information on the same sheet of paper as your Edwards Dam removal answers.

1. When was the dam built?
2. Where is the dam located?
3. What is the dam's purpose?

Use this
format for
your answers



NAME OF DAM

- 1.
- 2.
- 3.

Tuesday-

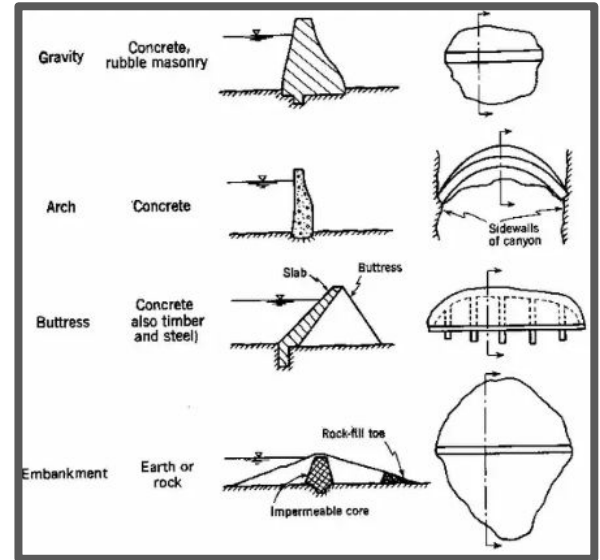
DAMS

Think
About It!

What different materials are dams made of?

Let's Review:

- There are 7 kinds of dams-
 1. Diversion Dam- diverts water.
 2. Buttress Dam- 3 types include the multiple arch, massive head, and deck.
 3. Embankment Dam- large and made of either natural or industrial waste material.
 4. Cofferdam- temporary and portable, used during a project then removed.
 5. Storage Dam- used to keep water in.
 6. Detention Dam- for flood control with a water reservoir.
 7. Gravity Dam- massive, made of concrete, blocks rivers.
- Dams can be made of compacted earth, rock and soil, timber, plastic, concrete, and steel.



Wednesday-

The 8th Wonder of the World? [The Hoover Dam](#)

Click the link above to learn about this famous dam.



What is the main purpose of the Hoover Dam?

Wednesday-

Project Introduction:



The previous video about the Hoover Dam ended with the question of how would the dam be built today. It explained that in the 1930's there were many things not taken into consideration when the dam was constructed. Watch this [video](#) to see exactly how it was built.

Wednesday-

DAMS

Think
About It!

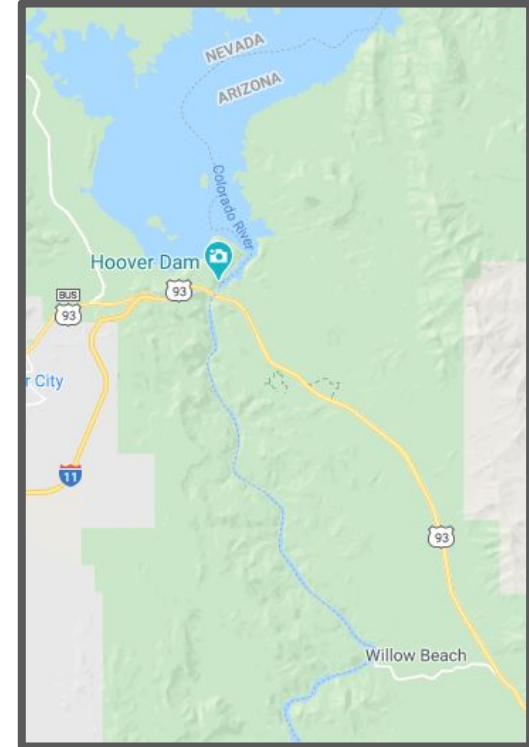
**What are some things to consider
when building a dam?**

Thursday-

Prompt:

You're really doing a great job with all these assignments! You've been given another challenging task. Just south of the Hoover Dam on the Colorado River is Willow Beach.

Currently Willow Beach isn't much of a beach. Parks and Recreation would like to see a water reservoir created that would allow more water to collect in the area. You have been hired to design a dam to be located just south of Willow Beach. This will back up water and turn it into an actual beach that tourists can visit and enjoy. Remember to consider important factors like the environment in your design since this is a national park.



Thursday-

Project:

Willow Beach Dam

Build a dam out of natural materials that can contain water.

Materials:

- Large container (the one from the tunnel project will work)
- Any natural building materials (example: sticks)
- Dirt (rocks, sand, gravel is optional if you can find any)
- Water
- Measuring cup
- Pencil
- Paper to record results



Thursday-

Procedure:

1. Put dirt (rocks, sand, gravel, etc.) in the container.
2. Use the building materials you collected to create a dam in the middle.
3. Measure a cup of water and pour it on **one** side.
 - Record how many cups of water you can add before it leaks or floods.
4. If it leaks or floods make revisions and try again.
 - Record information as *Attempt 1, Attempt 2*, and so on.
5. You will have succeeded when your dam holds water without leaking.

*This is a messy experiment that may need to be done outside or on a surface easily cleaned.



Thursday-

Self Check:



IMPACT students, make a report in Seesaw to share what you have learned.

In your report did you...

- Share the information about the three dams you found in Missouri.
- Explain the different purposes for dams.
- Share your experiment and the results.

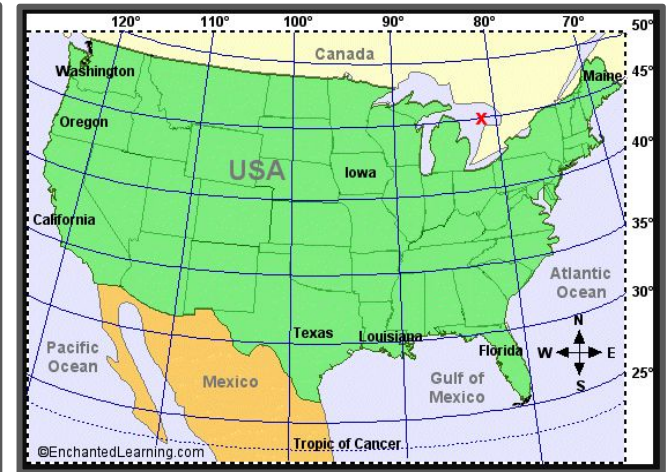


Coordinates Challenge:

Can you use the two maps provided to find the coordinates of the location of the Hoover Dam?

Procedure:

- Look at the first map to find the dam on the border between Nevada and Arizona (the star).
- Then use the second map to find the longitude (east & west).
- Then use the same map to find the latitude (north & south).
- Both coordinates meet at the starred location from the first map.
- There should be two numbers. You may have to make an educated guess on the exact numbers.
 - Example, if the location is between 100* and 110* , you can guess the number would be around 105* .



★ What are the coordinates of the Hoover Dam?

Friday Funday-

MATH GAME OF THE WEEK!

Twenty-four

- Can you make an equation that equals 24?
- You will need a deck of cards.
- Watch the [video](#) to see how to play.



★ The coordinates of the Hoover Dam are 36° North, 114° West. How close were you?