

Guiding Question: How can we engineer Hydropower to maximize the amount of power generated?

Learning Goal: Engineer a watermill that generates the most power.

### Agenda

- 1) Finish Alternative energy sort
- 2) Introduction to hydropower
- 2) Hydropower Engineering
- 3) Exit Ticket

### Words of the day

Hydropower

Efficient



WOD

## Hydropower

Hydropower is electricity generated using the energy of moving water.



WOD

Efficient

How much Energy from the falling water is NOT transfer to work.

Energy from Falling water (Gravitational Potential Energy) > Work done by the system

## *Energy Source Pros and Cons*

<i>Cons -</i>	<i>Source</i>	<i>Pros +</i>

## H<sub>2</sub>O Solutions: Hydroelectric Power Project

You are working for H<sub>2</sub>O Solutions, an engineering design firm that works mostly with waterwheels and water energy! Your city wants to use hydropower instead of coal to make energy because they are worried about air pollution. The city hired *you* to design an efficient watermill. The firm (your class) split into several engineering teams (student groups) so each team can design and test a slightly different design. You will calculate power and work by measuring force, distance and time for your waterwheel. Then, H<sub>2</sub>O Solutions will present the most efficient design to the city.

**1. Materials:**

**2. Procedure:**

**3. Design Sketch:** (use the back of this paper if needed)

**4. Calculate the work and power of your waterwheel:**

$$\text{Work} = \text{force} \times \text{distance} \qquad \text{Power} = \text{Work} \div \text{time}$$

**5. Questions:**

What is hydropower?

How does hydropower work?

Why do you think your team's design will be efficient?

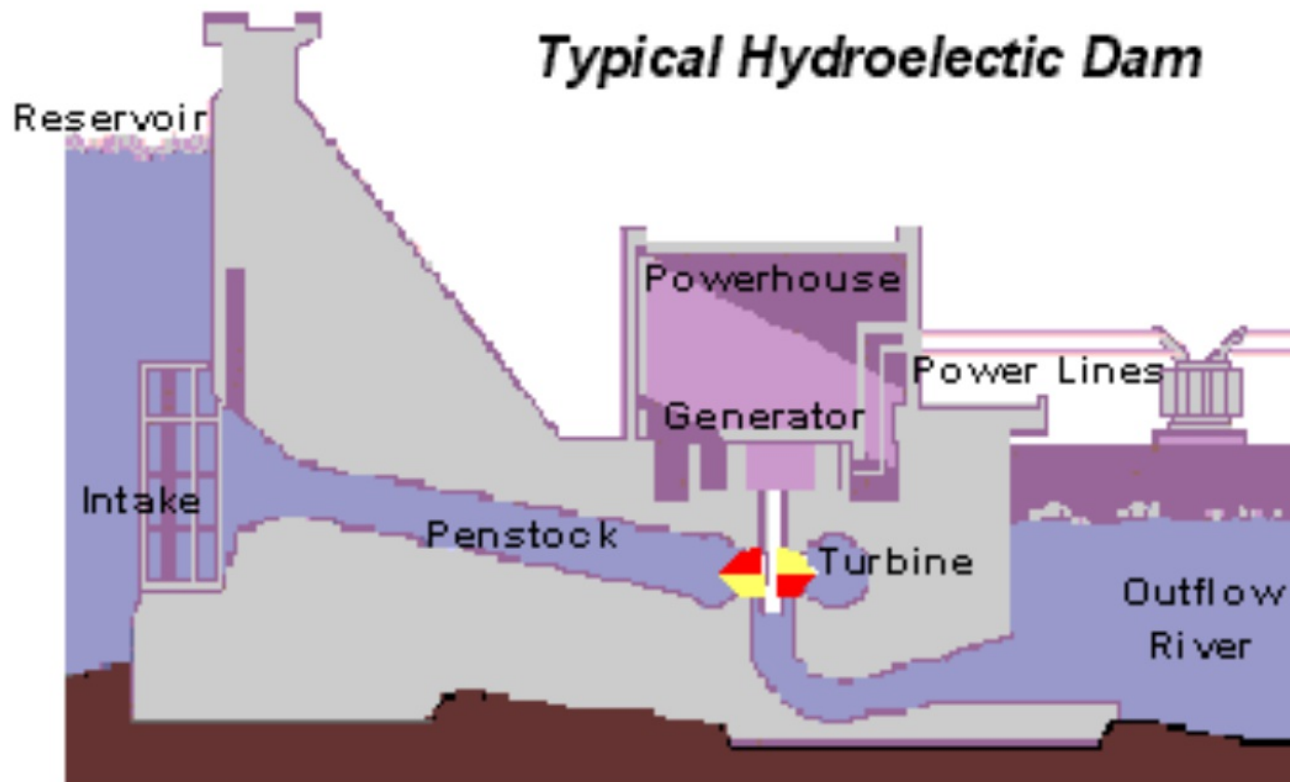




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Hydropower TF **SOC-20185817**



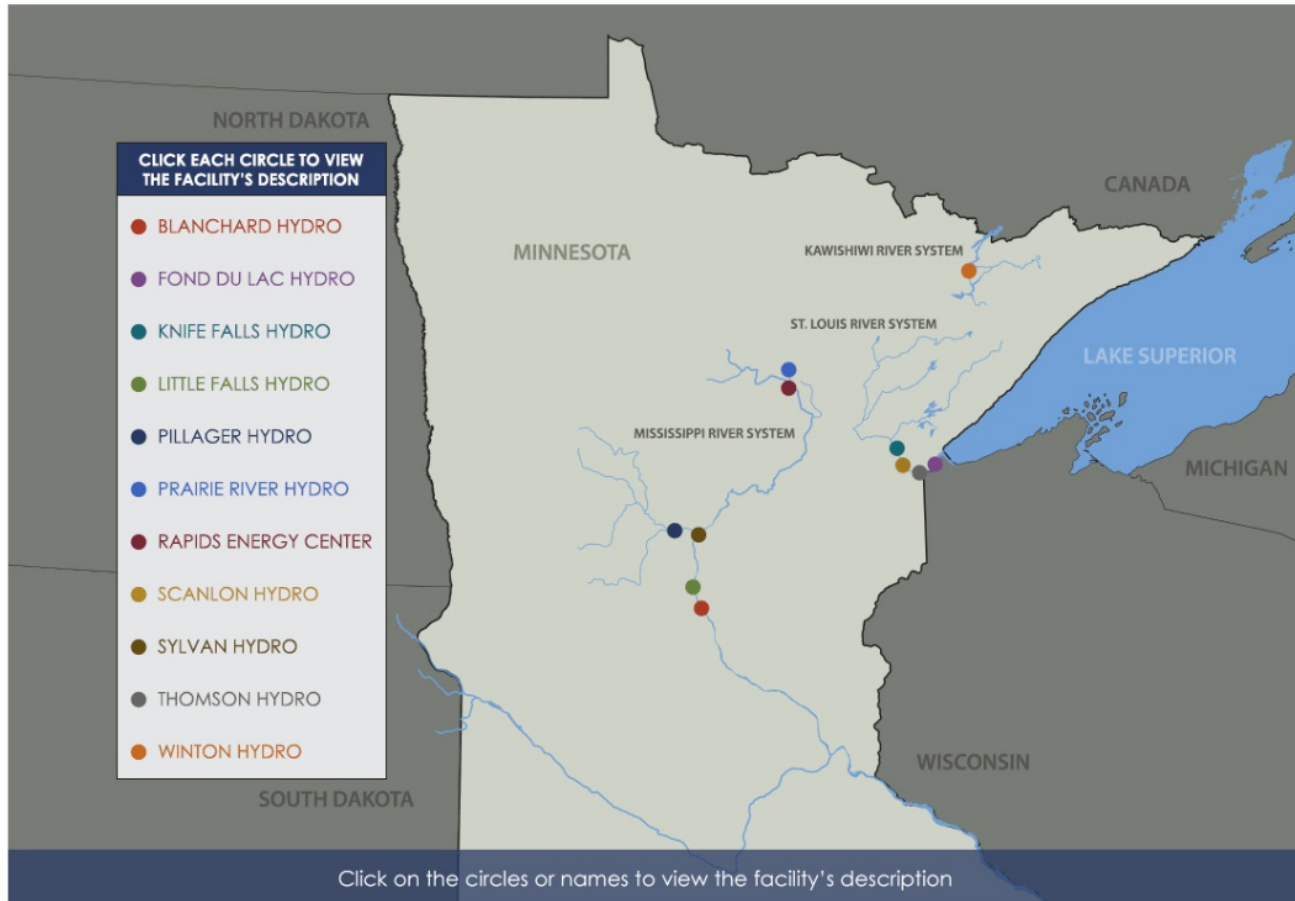
# How does a Dam work?







# Examples of hydropower in Minnesota



## A more simple hydropower design



# Materials Available

## Your Fin

- index cards
- straws
- toothpicks
- popsicle sticks

## Water-Proofing Materials

- aluminum foil
- plastic wrap
- Wax paper

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### 1. Materials:

List the materials YOU used

### 2. Procedure:

Describe in a list of steps  
You used to make the fins

### 3. Design Sketch: (use the back of this paper if needed)

### 4. Calculate the work and power of your waterwheel:

Work = force x distance

Power = Work ÷ time

## **5. Questions:**

What is hydropower?

How does hydropower work?

Why do you think your team's design will be efficient?