

## River Quest 2019 **WATER POWER**

### A Minnesota Power/Boulder Lake ELC Demonstration of Water Generated Electricity

MN Science Standard 6.2.3.2.1 Energy Next Generation (WI) MS-ETS1-4 Engineering Design

A baseball sitting on a shelf doesn't burn your catcher's mitt, does it? How would that catcher's mitt feel if it had to stop a ball from the Minnesota Twins' pitcher. A bicycle slowly peddled is easy to stop, right? How much brake would it take to stop a racing bike?

It's all about the energy of speed. The faster something is going, the more energy it has and the harder it is to stop.

Weight is also a factor in stopping an object's motion. Water is a real heavy-weight, coming in at 8.3 pounds per gallon! Little energy is required to stop the flow of pond water. If a pond's flood gates were opened and the water began to flow, that same water would be harder to stop.

People have long captured the energy of moving water with spinning wheels for grinding grain or wood. In 1880, people in the United States began to spin turbines with moving water to create electricity for lighting.

How does *water power* work? Water is directed downhill in large flow lines where it speeds toward the power house. Inside the *power house*, the water is directed through pipes called *penstocks* which deliver water to water wheels called *turbines*. The water forces the *turbines* to spin, and, because the turbines are connected to electrical *generators*, electricity is created.

The Thomson Dam on the St. Louis River was built in 1907 to create a large pond of water for use in generating electricity. Today, Thomson Hydro is Minnesota's largest producer of hydro energy. When running at full power, the station has the ability to light up 700,000 100-watt light bulbs!

That's **Water Power** and that's Minnesota's home-grown **Hydro-Electric Generation!**

#### On-Line Resources

<http://mphydro.com> <http://www.mnpower.com/Environment/EnergyForward>  
<http://www.mnpower.com/Environment/RenewableEnergy>  
<http://www.mnpower.com/Environment/ReducingEmissions>  
<http://www.mnpower.com/Environment/Stewardship>

#### Vocabulary

**Turbine:** a mechanical device that spins as the flowing water hits its blades.

**Generator:** a mechanical device that, when spun by the turbine, creates electricity.

**Flow-Lines and Penstocks:** large diameter pipes that deliver the flowing water to the turbines. **Hydro-Electric Generation:** generating electrical energy from water power. (hydro = water)

**Minnesota Power:** a Utility providing energy services in the Upper Midwest and owned by ALLETE, Inc.

