

## **Grist Mills** **A home-based lesson plan**

### Historical Background

When English settlers moved into central Virginia in the second half of the 18th century (1750-1800), they brought the tradition of tobacco farming with them. Around the same time, German and Scots-Irish settlers arrived in central Virginia from northern areas. They farmed mostly corn and wheat as well as fruit and raised livestock for meat and dairy products. These settlers established many of the merchant mills that replaced the plantation and custom mills of earlier times. Gristmills ground grain into **grist** or **meal**, which could be **sifted** to get flour. They were powered by wind, water, or livestock.

### Types of Gristmills

- Plantation gristmills were built by a plantation owner to grind their grain and perhaps some of their neighbor's grain.
- Custom gristmills were operated by the mill owner who ground grain for those nearby and usually kept some of the end product as payment.
- Merchant mills were commercial operations that bought grain and ground it into products for sale and export.

Early grist mills were built along creeks to have easy access to water power. A **sluice gate** makes the **water wheel** turn. An **axel** is attached to the water wheel; as the wheel turns, the axel also turns. The axel is connected to a **gear** which rotates the **millstones**. Through this setup, the power from the water wheel rotates large millstones that grind the grain gradually into smaller and smaller pieces. Energy is defined as "the ability to do work", and it exists in many forms! It is how things change and move. When gristmills get power from water this process is called **hydropower**.



Photo Credit: <https://kids.kiddle.co/Gristmill>

### Key Words

**Grist** - grain that has been ground by a gristmill. Grain can be ground into *meal* or flour, depending on how coarsely it is ground. Coarsely-ground corn is called grits and finely-ground corn is called corn meal. Wheat, oats, barley, and buckwheat are also ground into flour.

**Sift** - the process that removes lumps and large pieces from meal and flour.



Photo Credit: epicurious.com

*Sluice* - is a water channel controlled at its head by a *gate*, which is a piece of wood or metal that slides up and down in groves in the sidewalls of the channel. In a mill, they are used to channel the water toward the *water wheel*. The gate controls the flow of water.



Photo Credit: [www.angelfire.com/journal/millrestoration/site.html](http://www.angelfire.com/journal/millrestoration/site.html)

*Axle* - a rod, either fixed or rotating, that passes through the center of a wheel/

*Gear* - is a rotating machine part with cut teeth that mesh with another toothed part to transmit power. Geared devices can change the speed, torque, and direction of a power source.



Photo Credit: Wikipedia

*Millstones* - are stones used in gristmills, for grinding grains. Millstones come in pairs. The base or bedstone doesn't move. Above the bedstone is the turning runner stone which actually does the grinding.

*Hydropower* - is power derived from the energy of falling or fast-running water, which may be harnessed for useful purposes.

Pre-Activity

Watch George Washington's Mount Vernon's YouTube video "George Washington's Gristmill" to see all these parts in action before building your own water wheel!

Activity - Build a Water Wheel

Supplies

- Various supplies from around your house such as disposable plates, straws, pencils, disposable cups, spoons, etc.\*
- Bucket or sink
- Plastic cup, water bottle, or pitcher

\* This is a great activity for using recycled items. NOTE - A guardian's help is needed for this activity.

Directions

1. Gather a variety of materials so you can experiment and come up with your own version of a water wheel!



2. You will need a circular center for your water wheel, you can use disposable plates, foam, a cork, etc. Make a hole and run your axle through the center of the water wheel. For the axle, you can use a pencil, wood dowel, straw, etc.



3. Attach pedals to your water wheel. These will catch the water and cause the wheel to spin on the axle. You can use small cups, plastic spoons, etc. To hold the pedals in place you might need hot glue, utility tape, etc.



4. Either position your water wheel over the sink or over a bucket. Using the plastic cup, water bottle, or pitcher, pour water over the wheel to make it turn.



5. You may need to continue to experiment and make changes to your water wheel.

For more specific examples and instructions, check out these online activities:

- <https://www.greenkidcrafts.com/water-wheel/>
- <https://www.kiwico.com/diy/Arts-and-Crafts-Ideas/1/project/Water-Wheel/2807>
- <http://www.craftsforlearning.com/Waterwheel%20Program.htm>
- <https://www.education.com/activity/article/simple-water-wheel/>