



The Windmill Project

{ How is the Sun's energy transferred
to create electrical energy?

* This project is a collection of material supporting windmill and energy exploration and it is meant to be a starting point for teachers. The lesson plan suits my individual needs. Take away or add anything you need to make it work for you.

A L.A.-S.T.E.A.M. Cross Curricular Lesson

Language Arts: CLOSE study of The Fabulous Perpetual Motion Machine

Science: Understanding the Sun's energy and it's effect on the Earth

Technology: Study of simple machines

Engineering: Building and Modifying a Windmill machine

Art: Creating a comic (create with templates from makebeliefs.com or pixtons.com or just by good old fashioned pencil and paper)

Math: Calculating and converting relevant units of measurement

Students will:

- Read and study The Fabulous Perpetual Motion Machine
- View videos and images of perpetual motion machines, windmills, windfarms, dams and hydro-electric turbines.
- Work in groups of 3 or 4
- Build a class standard Windmill
- Calculate the Power output of the Windmill
- Make modifications to the blades of the Windmill to create more power
- Create a summary of the process in the form of a comic using and understanding the literary elements of Character/Plot/Rising Action/Climax/Resolution
- Extensions: Create a water turbine and measure the power output. Write a short paragraph comparing and contrasting the machine created by the students in the play and the windmill machine created in the classroom experiment.
- Performance Based Writing Assessment

The following are some
photos of various types of
windmills and watermills.





Windmills of Holland



Windmill in Golden Gate Park

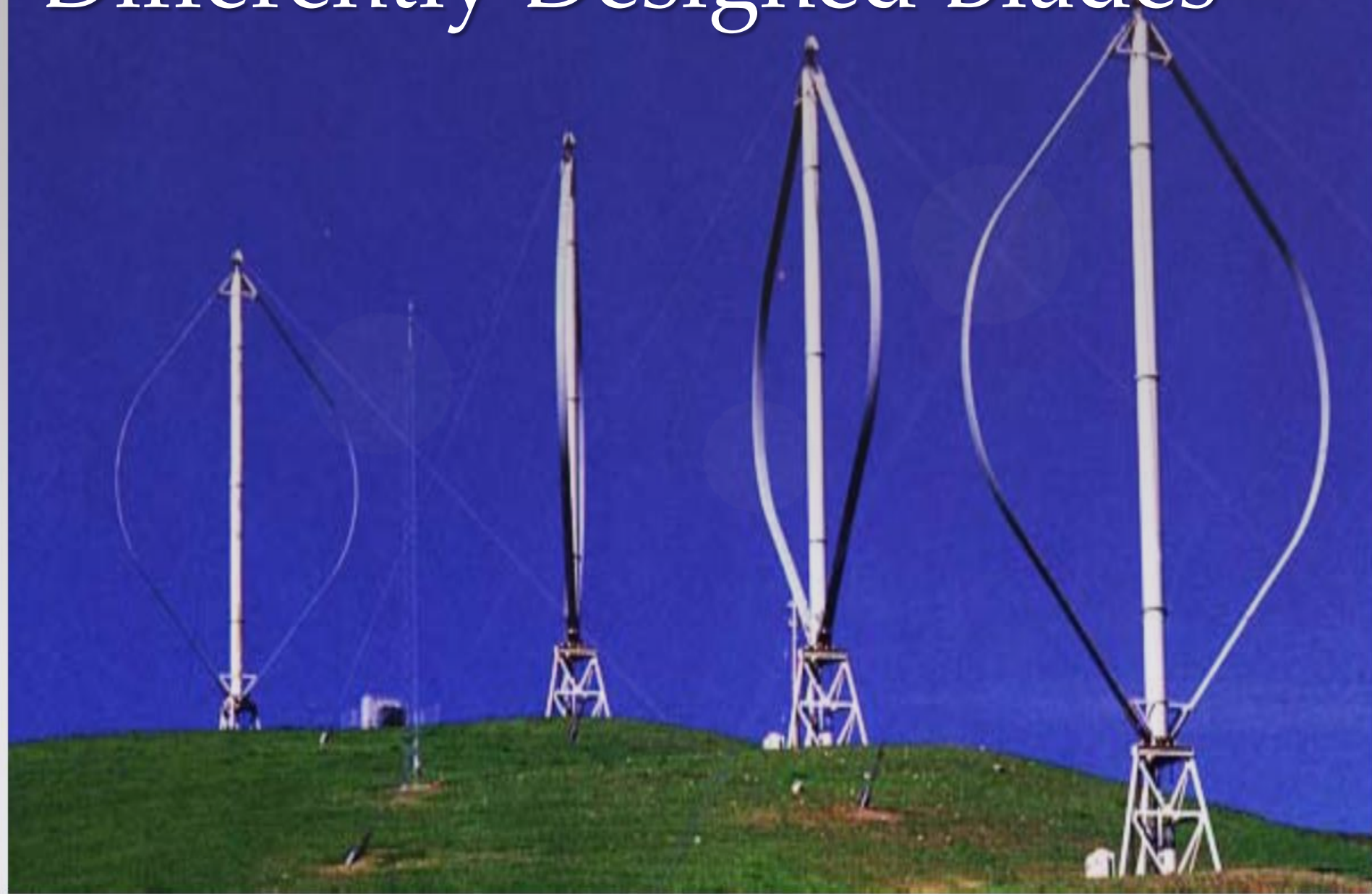


Another windmill in GGP.

A wide-angle photograph of a wind farm. Numerous white, three-bladed wind turbines are positioned along the crest of a long, rolling ridge. The landscape is arid, with dry, brownish-yellow grass and exposed dark, rocky soil. The sky is a deep blue, filled with soft, white clouds. The overall scene conveys a sense of clean, renewable energy in a natural setting.

A Wind Farm

Differently Designed Blades



Classic American Farm Windmill



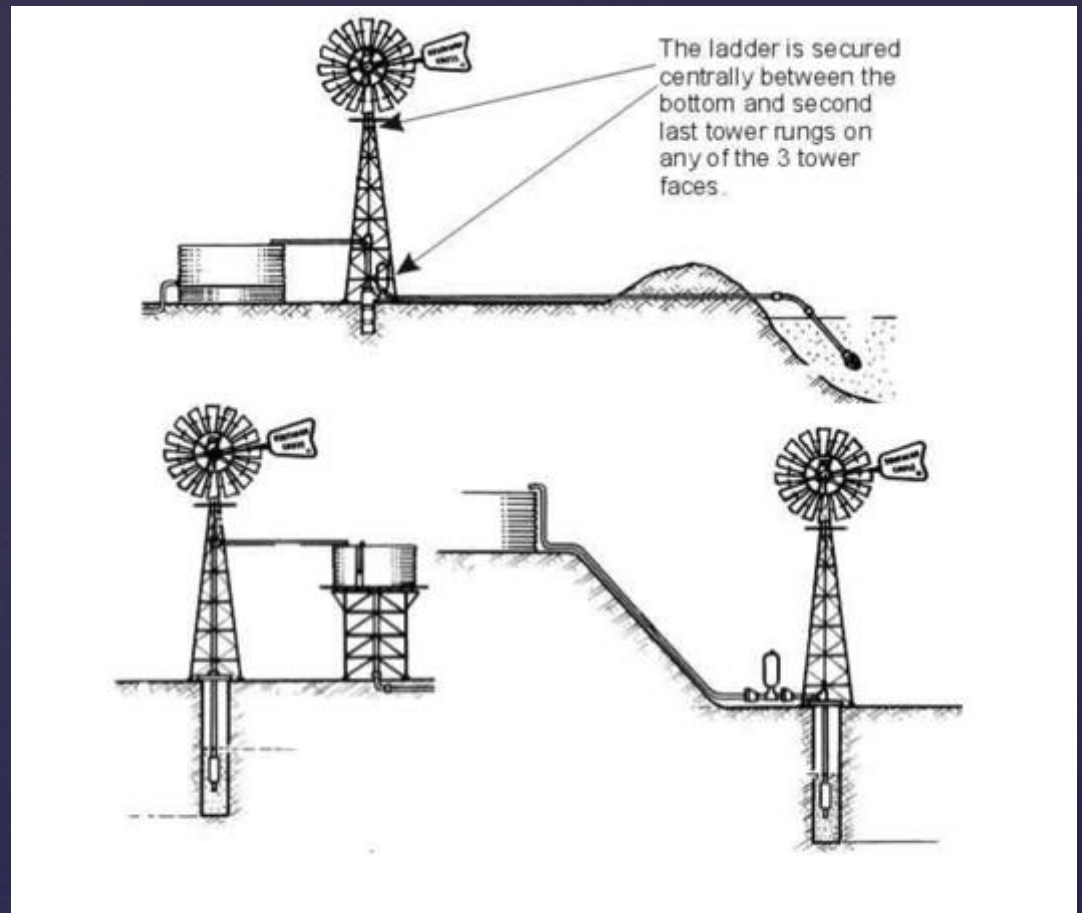
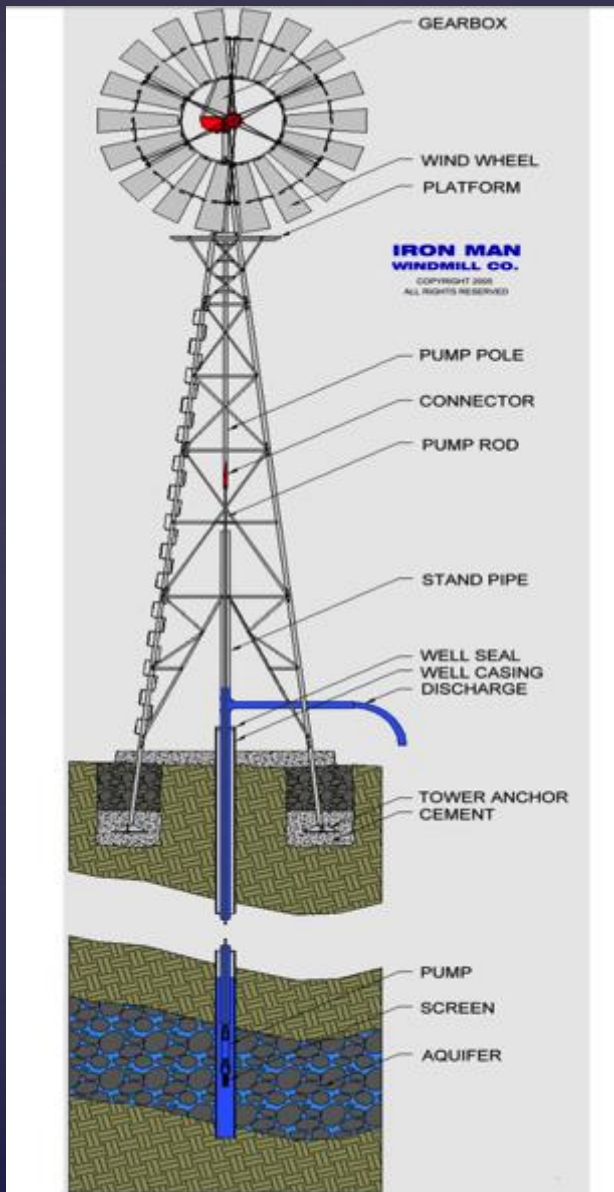


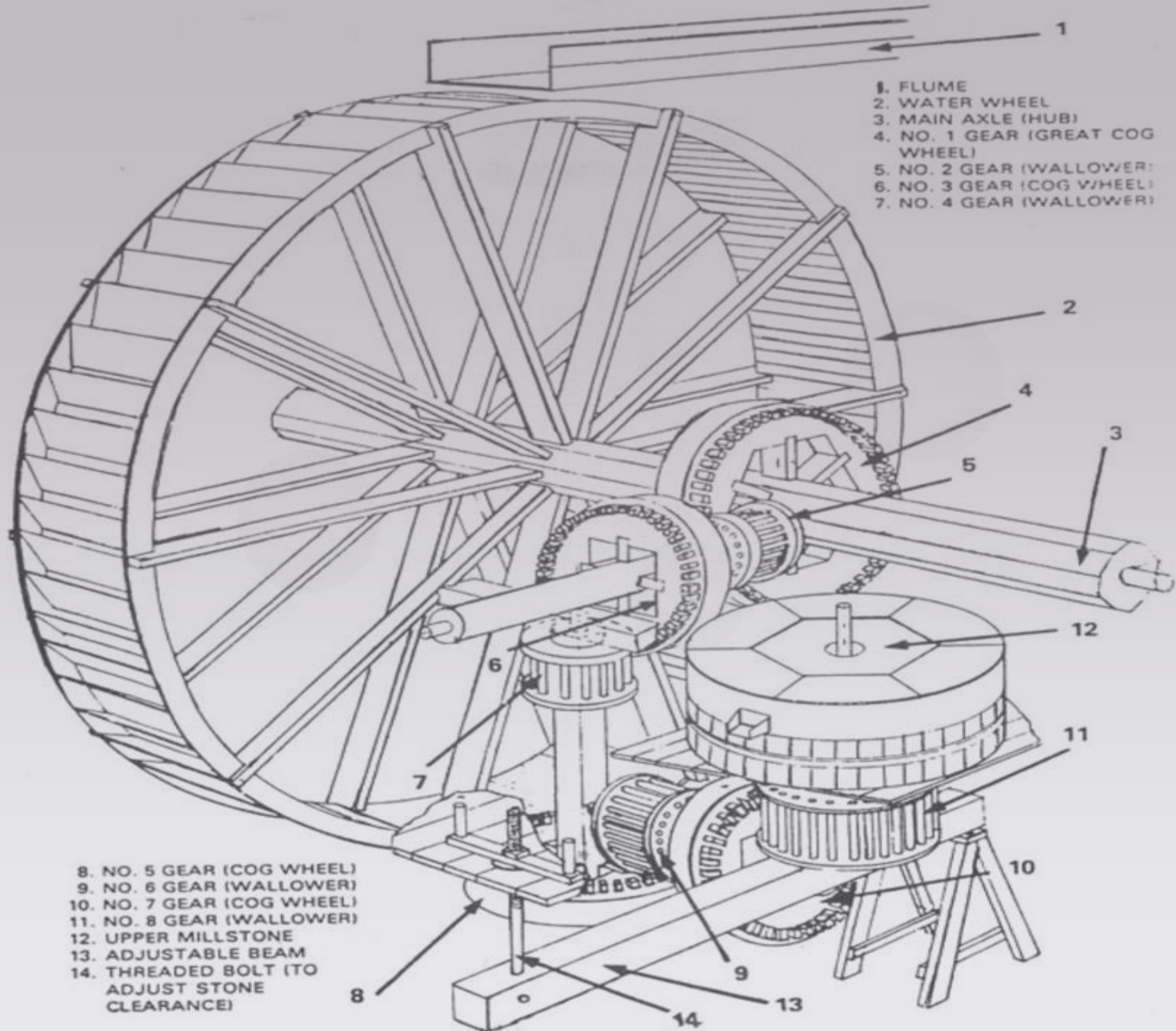
Diagram of a
Windmill Pump

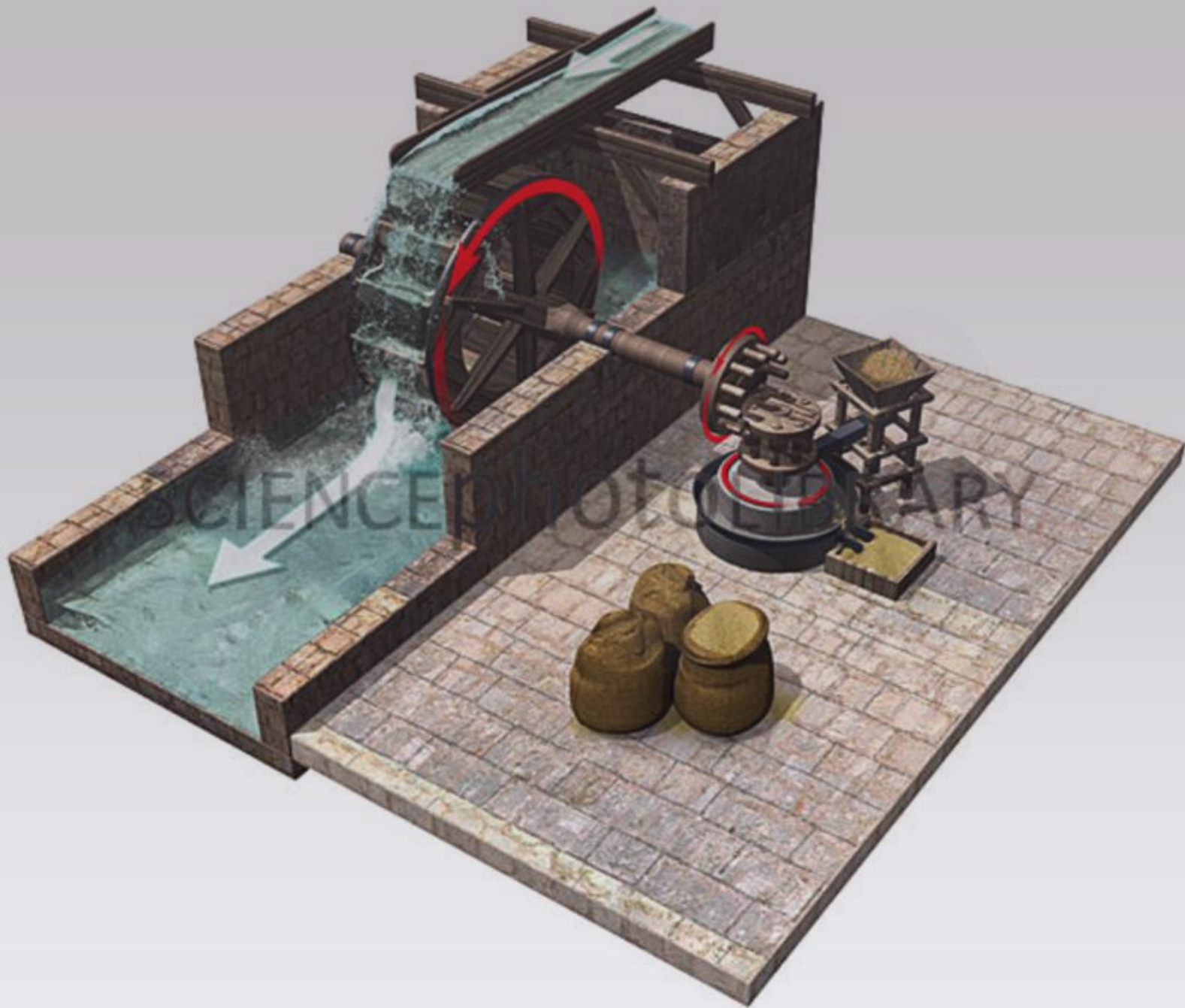
A photograph of a traditional watermill situated in a narrow stone mill race. The mill is a large, dark wooden structure with a prominent water wheel. It is flanked by two buildings: a red brick building with stone foundations on the left and a stone building with white window shutters on the right. Water flows rapidly over the mill's base, creating white foam. The scene is set in a lush, green environment with trees and foliage in the background.

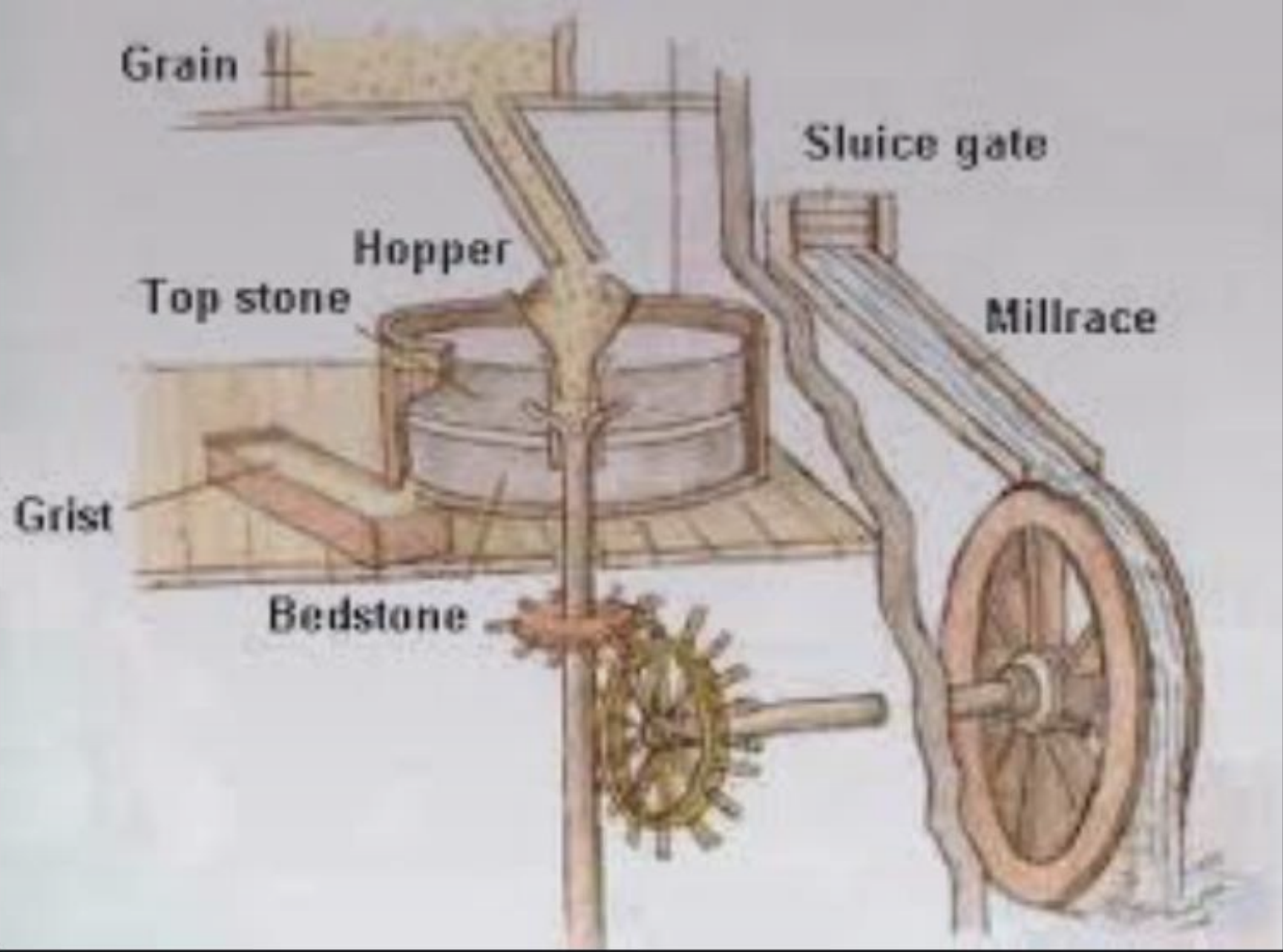
A watermill uses the same technology as a windmill but instead of being powered by wind it is powered by water!



A Watermill







*Lesson plan, links to
videos, diagrams,
documents, and student
work templates in the
Word Document