



## Mechanical Timekeeping: The Pendulum Clock

**Background:** In 1581, an Italian scientist named Galileo sat in a church watching a chandelier swing back and forth on a chain. He measured the time it took for the chandelier to make a full swing (back and forth) and found that the time was the same whether the chandelier moved in a long or short swing. A Dutch astronomer, Christiaan Huygens, furthered Galileo's work and in 1656 patented the first pendulum clock. In this activity, participants recreate Galileo's experiment.

### Materials:

Long piece of thread  
Metal washer  
Popsicle stick  
Tape  
Table  
Yardstick or meter stick  
Ruler  
Stopwatch

### Instructions for Activity:

1. Tie a long piece of thread to a metal washer. The metal washer will be the pendulum bob.
2. Tape the popsicle stick to the top of a table or other high surface.
3. Tape the end of the thread to the top of the popsicle stick. The end of the thread with the washer should hang about a meter or yard below the popsicle stick.
4. Pull the bob back about 2 cm or 1" and release it. Use a stopwatch to measure the time it takes for the pendulum to make ten complete swings back and forth.
5. Now pull the bob back 10 cm or 4" and repeat the experiment.

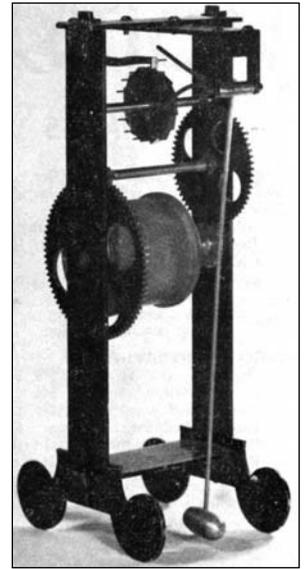
### Questions:

1. Was Galileo correct?
2. Does the distance a pendulum bob swing affect the time it takes to make one complete swing?

### Additional Activity Ideas:

Conduct the same experiment, but vary the lengths of the thread holding the metal washer. What happens to the swing time now?

\*\*If you can locate a pendulum clock to show to participants, use it as a demonstration piece so that their pendulum experiment is placed in context.



Reproduction of Galileo's clock, 1833.