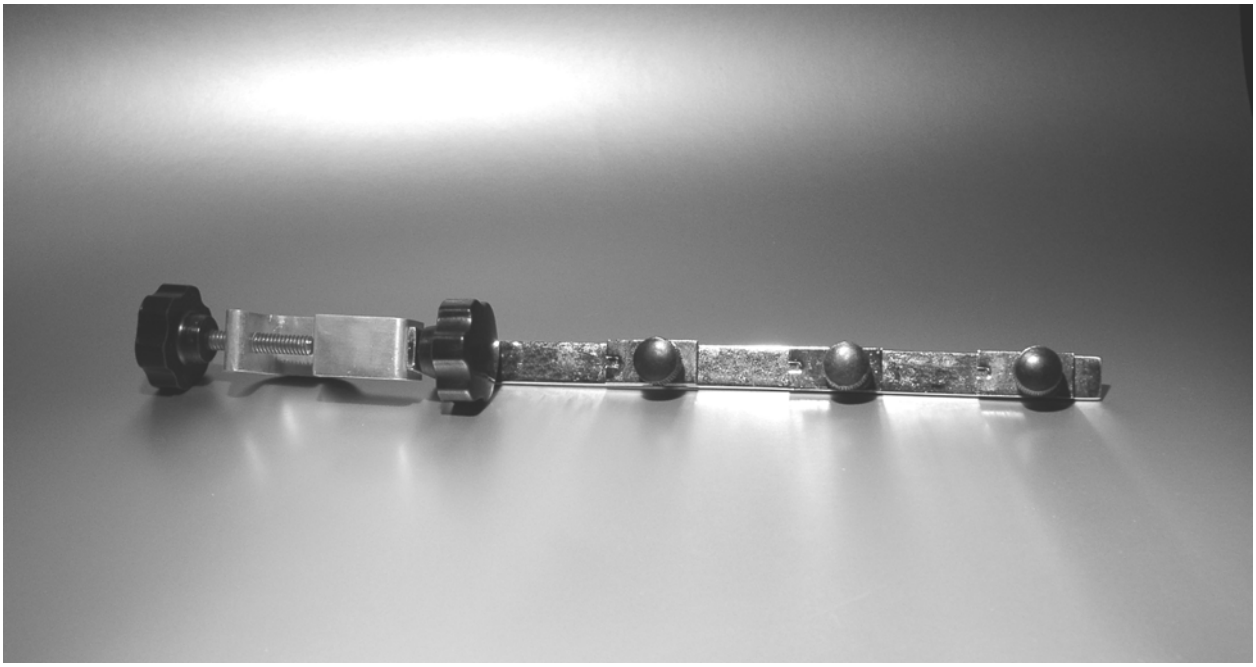
# 611-1860 (40-249) Pendulum Clamp



**Introduction:** The properties of pendulums were first described by Galileo Galilei in 1602. He noted that a mass attached to the end of a string tended to move in arcs, traveling the same distance and taking the same time with each stroke. In fact, the time it took the pendulum to swing was independent of the distance traveled.

Pendulums work due to the force of gravity. When a mass is dropped, it accelerates towards the center of the earth. With the pendulum, the same acceleration occurs, except that the mass cannot leave the string, and thus can move only in a confined path. If the pendulum is released at some point to the right or left of the place the string is attached, the pendulum will move sideways as well as down.

As the pendulum bob moves sideways, it gains momentum. When the bob reaches the end of the string, it ceases accelerating towards the earth, but it's momentum causes it to swing in the opposite direction, moving up and up until gravity stops it and pulls it down again. The bob repeats the process over and over.

There are two key terms used to describe the movement of pendulums: the *amplitude*, and the *period*. Amplitude is the angle between the center point of the arc and the outermost point. The period is the length of time it takes the bob to swing in one complete oscillation.

Different materials will have different amplitudes and periods, because the momentum of the bob will be different. A pendulum bob made out of osmium will have a much shorter period than one made of aerogel.

**Description**: Your pendulum clamp is meant to be used with a vertical support rod. You can use a ring stand, pipe, or other support lass than an inch in diameter. You will notice a bracket on one end of the unit with a screw. Put the bracket around the support post and use the screw to secure it.

On the arm of the unit are four screws. These unscrew by hand. To place a pendulum on the arm, undo the nut you wish to use, wrap the string around the exposed bolt, and tighten the nut. The arm can accommodate three bobs in four positions.

The three bobs included are brass, steel, and pine. The steel is the heaviest while the pine is the lightest. Remember, the mass of the bob determines the period and amplitude.

**Warranty and Parts:**
We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

**May we suggest:**

**611-1285 Stringless Pendulum:** The stringless pendulum demonstrates simple harmonic motion in a way that doesn't seem so tied down. Students will see the period of an oscillating body from a different perspective than the standard string and ball. The period of the 1 inch steel ball can be measured, and the distance to a focal point can be calculated to compare the demonstration to a classic pendulum. Includes pendulum track, 1 inch steel ball, and instructions.

**611-1720 Ballistic Pendulum:** Here's a simple way to observe the relation between kinetic and potential energy. Made of durable metal. It consists of a spring gun from which a ball can be launched horizontally and a block to catch the ball. A freely swinging pendulum moves to a maximum height where a pointer delineates its highest point of ascension. By measuring this height and using conservation of mechanical energy, you can determine the kinetic energy of the pendulum plus projectile. Includes: spring gun fixed on base that fires projectiles at 3 speeds; pendulum and block with mass of 80 grams; scale and pointer to indicate highest point of swing; steel ball; operating instructions.