

SCIENCE WORLD

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BACKGROUND SCIENCE:

There are many different forces at work in this system. Gravity is working to pull down the heavier weight. When the smaller weight is held at an angle, it behaves like a pendulum and swings down in such a way as to convert potential to kinetic energy. Conservation of angular momentum makes the weight swing faster as the rope gets shorter and so eventually it moves fast enough to make a complete rotation around the bar. Lastly, after enough rotations around the bar there is enough friction between the rope and the bar to support the heavy weight.

MATERIALS:

- A "heavier" weight (e.g. plastic wine glass, plastic bottle, a key)
- A variety of "lighter" weights (e.g. washers)
- String, approximately 1m length
- Scissors
- A pencil

WHAT TO DO:

- Select a string to use for your first test. Tie the heavier weight to one end of the string and the lighter weight to the other end.
- Hold the pencil horizontally and away from your body in one hand. In the other hand, drape the string over the pencil so that the heavier weight hangs straight down on one side of the pencil and the lighter weight is held up at a bit of an angle on the other side.
- Let go of the lighter weight.

**WONDERINGS:**

- What forces can you identify at work in this experiment?
- Try changing these independent variables and see what happens:
 - The type/texture of string (e.g. thin, thick, stretchy, rough, smooth)
 - The length of the string (what if it's longer? What if it's shorter?)
 - The weights on each end (what if there's a bigger difference in weights? Smaller difference? What if there's more weight on both ends?)
 - The size/shape/slipperiness of the pencil (e.g. round, multisided, thick thin, smooth, rough)