



SUPER POWER: Clockwork & machinery!

PENDULUM

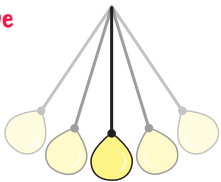
LAB NOTES...

WHAT'S GOING ON?

Pendulums are weights on sticks which swing back and forwards in a set rhythm. The speed of the swing depends on the distance of the weight from the top of the pendulum. Clocks which have pendulums inside use the swinging to keep their gears turning and keep the clock ticking.

To be accurate, a pendulum needs to be predictable, which means it needs to swing at the same speed every time.

When a pendulum swings, it does this by changing the stored energy, which we call "potential energy" into movement, which we call "kinetic energy".



How much kinetic energy a pendulum has can depend on how far away the weight is from the top of the pendulum, as well as how heavy the weight is and how far it has to travel to get between the top and bottom points of a swing. Pendulum clocks are not perfect - they do lose a little bit of energy on every swing, which means that they slow down a little bit over time and have to be re-calibrated to keep them as accurate as possible.

TO MAKE YOUR PENDULUM...

BUILD TIME
20
MINS

1. Watch the video of Nanogirl making her pendulum.
2. Make three long paper straws by rolling and taping strips of paper around a pencil.
3. Cut a 2cm section off each straw and stick each one to the tops of the long straw to make a 'T' shape.
4. Divide your blu-tack into three equal pieces and roll each into a sausage shape.
5. Place one sausage at the bottom of one straw, the second sausage halfway up the length of the second straw and the last sausage close to the top of the third straw.
6. Tape your long stick onto a tabletop so that half of it is sticking out over the edge.
7. Slide the top of your three straws onto the stick making sure they don't touch each other.
8. These are your pendulums!
9. Pull them back the same amount one by one and observe how fast they swing when you let them go!

YOU WILL NEED

- Tape.....○
- Scissors.....○
- Paper.....○
- Pencil.....○
- Long straight stick.....○
e.g. skewer or long spoon handle
- Large lump of blue tack.....○
or plasticine to use as weight

If you move all the weights to the same place on the straws, do all your pendulums swing at the same speed?

How many times in 10 seconds does each pendulum swing?

What happens if you add more weight to the straws?

Can you adjust your weight so that the pendulum swings exactly once per second?

Have you seen something like this used to keep time before?