

Pendulums of Varying Weights

The location of the weight, not the amount of weight, affects how fast a pendulum swings.

Try this:

- Remove the weights from these two pendulums. Lift both pendulums to one side, and then let them swing. Notice that, if you start them swinging at the same time, they return to their starting points at the same time.
- Add a weight to the bottom of the pendulum on the right. Swing both pendulums again and notice that they still swing at the same rate.
- Now add a weight in the middle of the pendulum on the left. Notice that the pendulum with the weight in the middle swings faster than the pendulum with the weight on the bottom.

What's going on?

In the 17th century, Galileo found that different weights, dropped an equal distance, hit the earth at the same time. His experiment proved that gravity makes all falling objects accelerate at the same rate, no matter how much they weigh. That's why these pendulums behave the way they do.

When you add a weight to the bottom of the pendulum on the right, you make it heavier. But since weight doesn't change the effect of gravity on an object, the two pendulums still swing at the same rate.

When you add a weight to the middle of the other pendulum, however, you effectively make it shorter. Shorter pendulums swing faster than longer ones do, so the pendulum on the left swings faster than the pendulum on the right.