

Work Defined

This woman is working in her garden. This man also appears to be working. We might think that the man who is struggling to move the rock is working harder than the woman who is using a trowel or small garden shovel to dig up the soil.

However, to a scientist, only the woman is actually doing work. The man may be straining and his muscles might ache, but because the rock isn't moved, he is doing no work. The woman, however, is accomplishing work because she is lifting and moving the soil from one place to another.

Scientists define work very specifically, and to them, work is accomplished only when a force is used to move an object a distance. Scientists have a formula that is used to calculate the amount of work accomplished. Work equals force times the distance moved. In the English system of measurement, the force is measured in pounds and the distance, in feet.

So if a person picks up a garbage can with 15 pounds of garbage and moves it 3 feet off the ground, the amount of work is 45 foot-pounds. In the English system, work is measured in foot pounds. In the metric system, the Newton is used to measure force, and the meter is used to measure distance.

If someone lifts a suitcase with a force of 50 newtons 1 meter off the ground, they have done 50 newton meters of work. A newton meter or joule is the unit of measurement used in the metric system to represent work or energy. 1 joule is equal to something weighing 1 newton lifted 1 meter.

Let's calculate the amount of work being done by this man as he works with this exercise equipment. Each bar weighs 10 pounds. He is lifting 20 pounds 2 feet. The formula is work equals force times distance. So the work the exerciser has accomplished is 40 foot-pounds.
