At the cracking point of the nutcracker, the arms move a much smaller distance—only about a quarter of an inch. Because they move one-sixth the distance of the other end in your hand, they apply six times the force, or 60 pounds of pressure. Your force has been amplified six times.

Work = force x distance

Squeezing the nutcracker =
60 pounds of force x .25 inches

Working it out

Work is effort, or force, exerted over a distance. Mathematically, the relationship looks like this:

Work = force x distance (W=Fd)

The farther you spread out a certain amount of work—that is, the greater distance that the work covers—the less force you have to exert. That's the basic idea behind mechanical advantage.

Your hand doesn't have enough force on its own to crush a nut, but a nutcracker—a tool that is really a pair of levers—can get the job done through mechanical advantage.

At the handle end of the nutcracker, your hand squeezes with 10 pounds of force, and the arms of the nutcracker move about 1.5 inches in distance to crack the nut.

Work = force x distance

Squeezing the nutcracker =
10 pounds of force x 1.5 inches