When we climb stairs do we do any work? What energy change is taking place here?

<u>Answer:</u>

The first law of thermodynamics states that when work is done to a system its energy state changes by the same amount. This equates work and energy.

At the start position (h=0) potential energy is:

$$E_p(start) = 0;$$

At the end of the stairs:
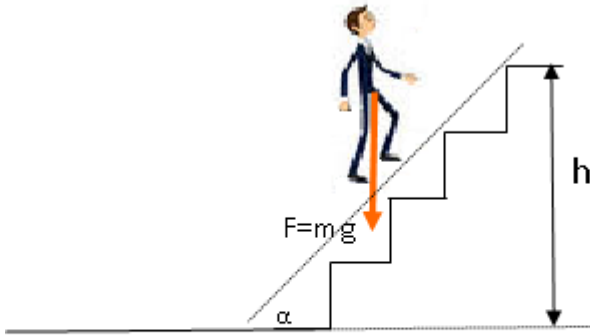
$$E_p(end) = mgh$$

Where g is

h is height of the stairs.

assume that the speed in the start and finish is the same and neglecting friction:

$$W = E_p(end) - E_p(start) = mgh$$

$$\boxed{W = mgh}$$

From other point of view

:

work is a scalar quantity that can be described as the product of a force times the distance through which it acts, and it is called the work of the force.

If we climb stairs with the constant speed $v = const$, thus: $a = 0$;

So neglecting friction:

$$\vec{F}_{work} = -m * \vec{g}$$

In projection on vertical axis:

$$F_{work} = m * g * \sin \alpha$$

Thus:

Work is:

$$W = F_{work} * d$$

Where d is distance

$$d = \frac{l}{\sin \alpha}$$

So:

$$\boxed{W = m * g * h}$$