Question.

You generate a wave in a spring, stretched out on the floor, by oscillating your hand back and forth at a frequency of 1.6 Hz. The wave has a 1.5m wavelength. If the wave takes 2.9s to travel to the other end of the spring and back to your hand, what is the length of the stretched spring?

Given:

$v = 1.6\ Hz$

$\lambda = 1.5\ m$

$t = 2.9\ s$

Find:

$L = ?$

Solution.

For wave propagation in the medium we have the following equality:

$$\lambda = c \cdot T = \frac{c}{v}$$

c is the speed of wave in medium;

T is the period of oscillation.

Therefore, $c = \lambda \cdot v$.

The length of spring is equal to:

$$L = c \cdot t = \lambda \cdot v \cdot t$$

Calculate:

$$L = 1.5 \cdot 1.6 \cdot 2.9 = 6.96\ m$$

Answer. $L = \lambda \cdot v \cdot t = 6.96\ m$