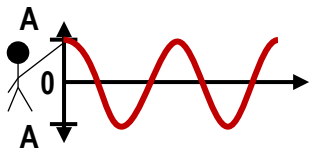
CONCEPT: AVERAGE POWER OF WAVES ON STRINGS



- Waves carry _____ through space, *not matter*.
  - To continuously produce a wave, you must supply Energy over Time, which is _____.

$$P_{avg} = \frac{E}{\Delta t} = \_\_\_\_\_$$

EXAMPLE: You continuously whip a taut string with a mass density μ = 0.05 kg/m with a tension of 100.0 N. How much average power must be supplied to the string to create waves at a frequency of 60.0 Hz and an amplitude of 6.00 cm?

WAVES
$v = \lambda f$
$v = \sqrt{\frac{F_T}{\mu}}$ (for *strings only*)
$k = \frac{2\pi}{\lambda}$
$\omega = \frac{2\pi}{T} = 2\pi f$

PROBLEM**:** A horizontal string is stretched with a tension of 90 N, and the speed of transverse waves for the wire is 400 m/s**.** What must the amplitude of a 70.0 Hz traveling wave be for the average power carried by the wave to be 0.365 W?

A) 2.9 mm
B) 4.1 mm
C) 0.2 mm
D) 0.017 mm

WAVES
$v = \lambda f$ (all waves)
$v = \sqrt{\frac{F_T}{\mu}}$ (for *strings only*)
$k = \frac{2\pi}{\lambda}$
$\omega = \frac{2\pi}{T} = 2\pi f$
$P_{avg} = \frac{1}{2}\omega^2 A^2 v\mu$