Warm up

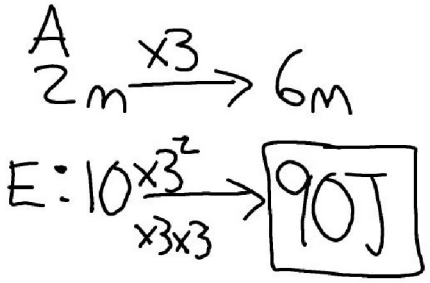
- Draw and label a longitudinal wave with wavelength and amplitude
- Draw and label a transverse wave with wavelength and amplitude

Energy carried by a wave

- A greater amplitude = greater energy
- If you double the amplitude, you quadruple the energy
  - A * 2 E * 2 * 2
  - A *3 E * 3 * 3
  - A * 4 E * 4 * 4

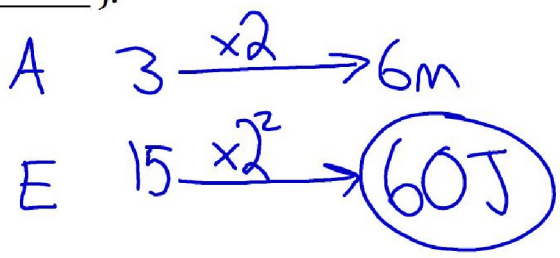
Example

- A wave has a height of 2 m. If it's amplitude is increased to 6 m, then it's energy will go from 10 J to _____ J.



Practice

- A wave has a height of 3 m. If it's amplitude is increased to 6 m, then it's energy will go from 15 J to _____ J.



Practice

- A wave has a height of 3 m. If it's amplitude is increased to 6 m, then it's energy will go from 15 J to _____ J.

Energy Carried by a wave

- When waves spread out in two dimensions the amplitude of a wave goes down quadratically (with the square of distance).
- So when a wave moves 2 m it's amplitude is ¼ as big
- So when a wave moves 3 m it's amplitude is 1/9 as big
- So when a wave moves 4 m it's amplitude is 1/16 as big

(Sound, Water on a pond)

Examples

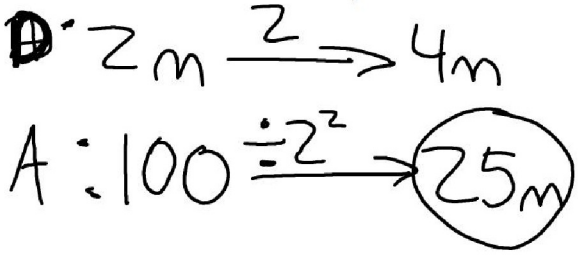
- A 60 m tall wave is 1 m from its source. How big will the wave be when it is 4 m from its source?

D $1 \xrightarrow{\times 4} 4$

A $60 \xrightarrow[\times \frac{1}{4^2}]{\div 4^2}$ 3.75m

Practice

- A 100 m tall wave is 2 m from its source. How big will the wave be when it is 4 m from its source?



Cool Down

- Describe the rarefaction of a longitudinal wave (in words)
- Describe (in words) the amplitude of a longitudinal wave
- Can you draw a wave and label frequency? If so, how?

Cool Down

- Describe the rarefaction of a longitudinal wave (in words)
- Describe (in words) the amplitude of a longitudinal wave
- Can you draw a wave and label frequency? If so, how?