WAVES: BIGGER WIGGLE, MORE ENERGY

How amplitude tells us about energy in a wave



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TODAY WE WILL...



WE ARE LEARNING TO

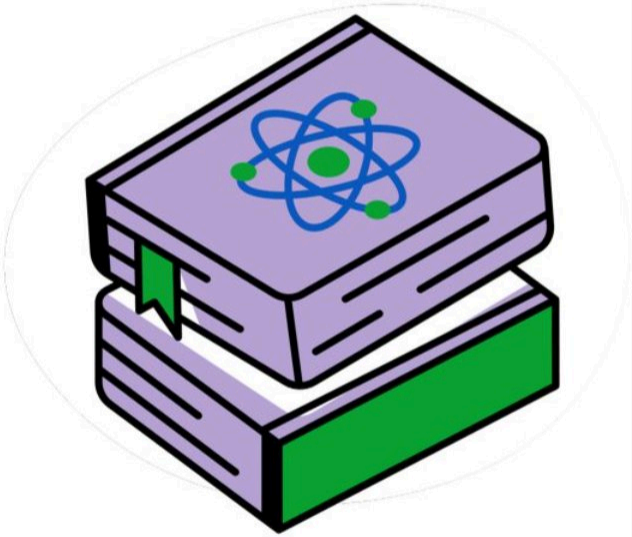
- Model waves and measure amplitude correctly
- Use math to link amplitude to energy
- Compare low- and high-energy waves

SUCCESS LOOKS LIKE

- ✓ I can find amplitude on a wave diagram
- ✓ I can show energy grows as amplitude squared

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KEY WORDS



amplitude

height from rest position to crest or trough

energy

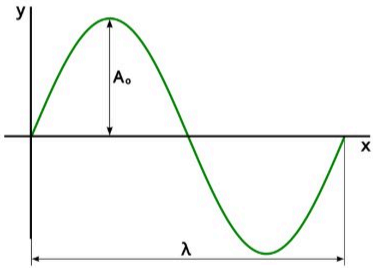
what a wave carries to do work

intensity

power delivered per area

transverse wave

parts move up and down as wave moves along



Badseed , using work by Josemonterd

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DOUBLE IT, QUADRUPLE IT

4x

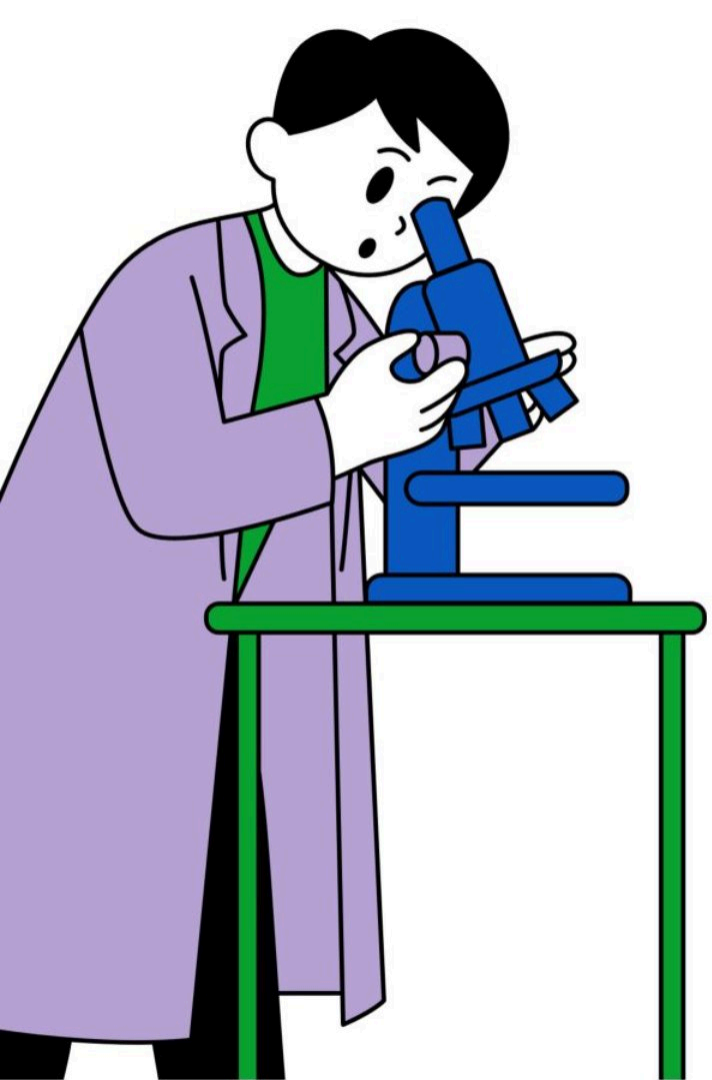
more energy when you double amplitude

Energy goes like amplitude squared, so small height gains pack a big punch.





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WHAT SHOULD WE TEST?

Which pair would best show an energy difference in class?

A Loud clap vs soft clap

B Big rope shake vs small shake

C Bright lamp vs dim lamp

Vote with your hands, then explain why.

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SEE ENERGY GROW



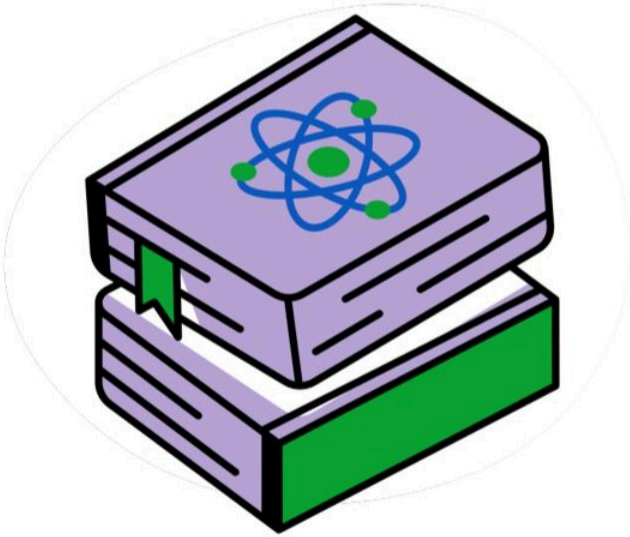
▶ 0:00 – 4:30

- Watch how push changes height
- Listen for amplitude and energy words
- Spot what stays same besides height



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FROM PUSH TO POW!



Push harder on first coil

↓

Coil moves farther from rest

↓

Amplitude gets bigger

↓

Wave carries much more energy

↓

Far end gets hit harder

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THE MATH BEHIND IT

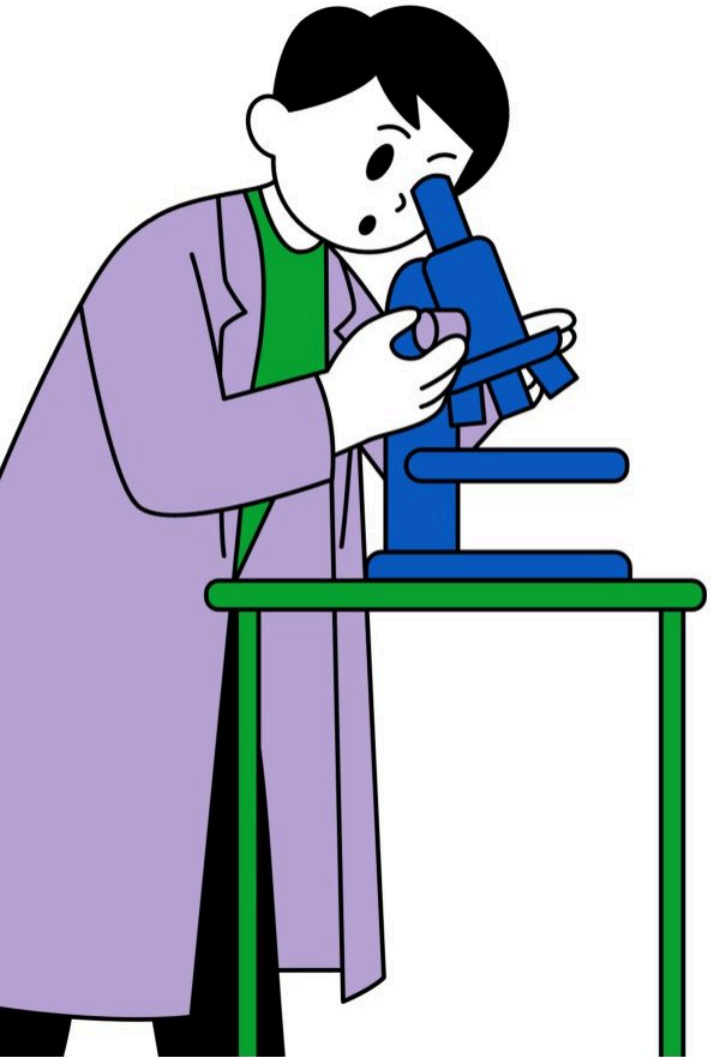


▶ 0:00 – 4:40

- Watch for the squaring rule
- Check the 1, 4, 9 pattern
- Think how to draw the model



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YOUR TASK

In pairs, draw 3 waves with amplitudes 1, 2, and 3 units and model their energy.

1. Draw waves, label amplitude from middle line
2. Calculate relative energy as amplitude squared: 1, 4, 9
3. Rank waves and predict effect at end

10 min

In pairs

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PULL IT TOGETHER



amplitude = wave height

double height = 4x energy

louder, brighter, bigger = more energy

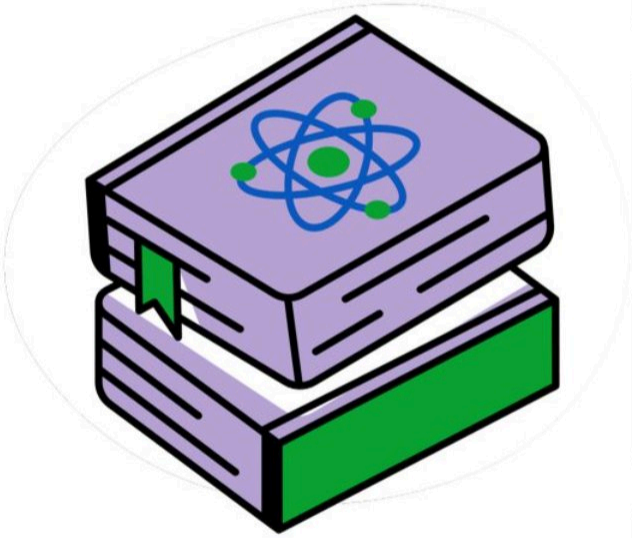
Wave Energy

energy goes as amplitude squared

waves move energy, not matter

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QUICK QUIZ



1. What is amplitude?
2. Amplitude doubles from 1 to 2. What happens to energy?
3. Amplitude triples from 1 to 3. What happens to energy?
4. Do waves mainly carry matter or energy?

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