

Six math clues · answer key

Why Electronics Use Sine Waves

Age 8 / Grade 2 math. Add once for each equal group or row. Welcome a drawing or spoken explanation.

Math 1 · 6

$3 + 3 = 6$. There are 2 equal groups of 3.

Math 2 · 8

$2 + 2 + 2 + 2 = 8$. There are 4 equal rows of 2.

Math 3 · 9

$3 + 3 + 3 = 9$. There are 3 equal groups of 3.

Math 4 · 12

$4 + 4 + 4 = 12$. There are 3 equal rows of 4.

Math 5 · 15

$3 + 3 + 3 + 3 + 3 = 15$. There are 5 equal groups of 3.

Math 6 · 20

$5 + 5 + 5 + 5 = 20$. There are 4 equal rows of 5.

Age 8 / Grade 2 math. Six equal-group and array tasks use rows and columns from 2 to 5. Repeated addition gives totals from 6 to 20. These are story counts, not measurements of sound or power.

Reading & writing · answer key

Why Electronics Use Sine Waves

Reading · 1

The seat travels along an arc. A wave graph records its changing back-and-forth position over time.

Reading · 2

As a magnet spins beside wire, the electric push grows, fades, and reverses. Its smooth change follows a sine wave.

Reading · 3

The speaker cone moves in and out, nudging the air. For a pure tone, that motion follows a sine-like rhythm.

Writing

Accept a command spoken, dictated, drawn, or written. Example: "Swing gently, then draw the smooth path you felt."

Age 8, Grade 3 reading, Grade 2 math. A grown-up stays nearby and sets speaker volume low. Keep wall power and plugged-in devices closed and untouched; these are activities with a swing, spring, rope, paper, or an intact battery speaker. Do not open an outlet or take apart a powered device. A small-angle swing is approximately sinusoidal over time; its physical path is an arc. Real spring motion loses energy and settles. AC voltage from an ideal uniformly spinning generator is sinusoidal: relative rotation of a magnet and coil changes magnetic flux through the wire. This is the changing electric push in the story. Grid power also comes from sources with electronic converters, and many devices convert AC to steady DC internally. A speaker cone's motion for a pure tone is approximately sinusoidal; sound travels as pressure changes, not as a rope-shaped path through air. Smooth sine waves can reduce unwanted harmonics in machines and pure tones; digital electronics intentionally use other waveforms. The tracing diorama compares an ideal sine shape with a triangle wave. Its marker and moving paper show position over time, not an electrical experiment or measured device output.

Welcome speech, dictation, invented spelling, or writing. One command is enough. Example: "Swing gently, then draw the smooth path you felt."

Four clues in a wiggle

Why Electronics Use Sine Waves

Quiz 1. Which description best fits a sine wave?

A sine wave is a smooth, repeating wiggle.

Quiz 2. What does a generator change into electrical energy?

A generator changes turning motion into electrical energy; its electric push can change smoothly as it spins.

Quiz 3. How does a speaker make sound?

The cone moves in and out, nudging air. For a pure tone, it follows a sine-like rhythm.

Quiz 4. Do electronics use only sine waves?

Electronics also use other signal shapes and steady power. Sine waves are useful, but they are not the only kind.

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