



microphone

RESONANCE OF A STRING

• MATERIAL •

- a guitar
- a smartphone



mechanics

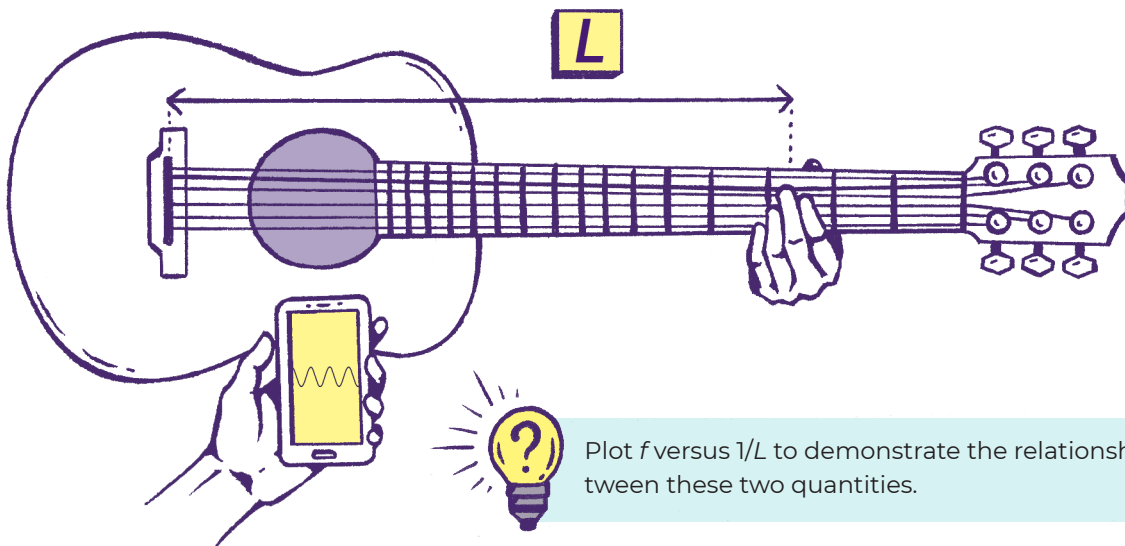
• CHALLENGE •

Determine how the resonant frequency of a string varies with its length.

• OVER TO YOU •

Choose a string (rather sharp) from the guitar to work on. Pressing the string at the handle creates a blocking point (a vibration node) that sets the length L of the string. While holding the blocking point, pinch the string to half its length: the note emitted corresponds to the fundamental mode of the string resonance. Use your smartphone to measure its frequency f and characterize this note.

Determine how the frequency of the note emitted changes when you change the length of the string.



Plot f versus $1/L$ to demonstrate the relationship between these two quantities.

• THE ULTIMATE CHALLENGE •



When you blow on the neck of a bottle, a note is emitted by resonance. By adding water in the bottle, the volume of air in the bottle is diminished. Determine the relationship between the frequency of the note the volume of air in that bottle.

Which quantities should be plotted in order to do so (look for "Helmholtz resonance")?