

# Chapter 15 section 2

## Wave Properties

GLE: Investigate the types and fundamental properties of waves

**SPI 0707.11.5 Compare and contrast the different parts of a wave.**

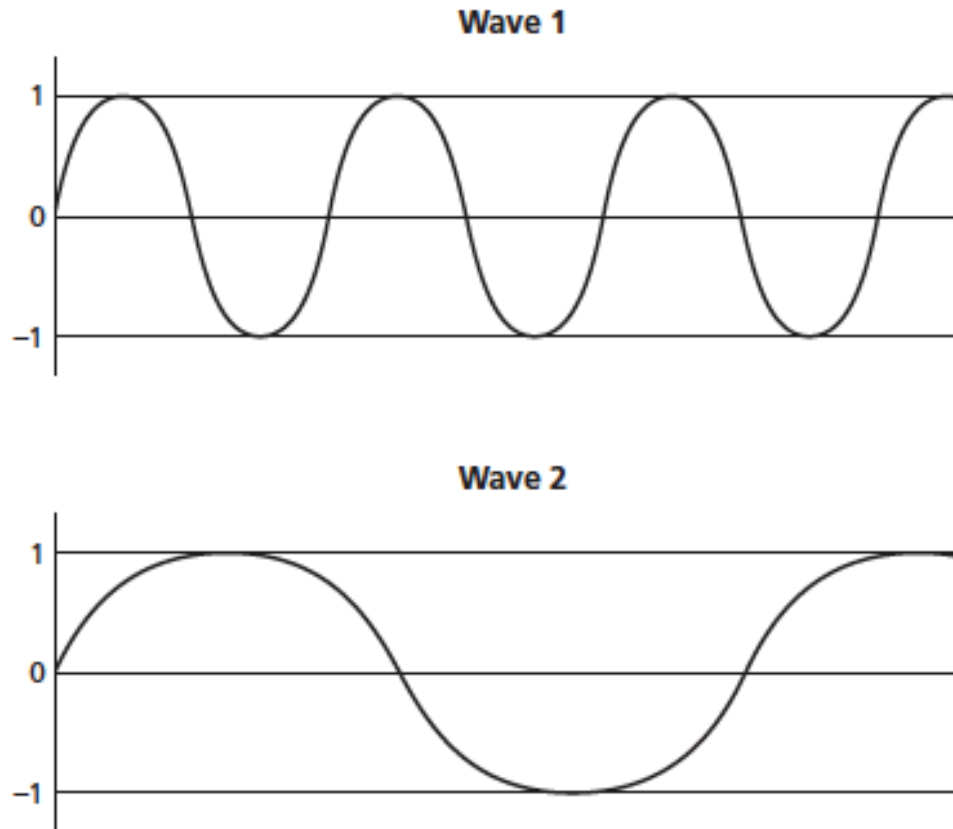
**What** You'll learn

**Why waves travel at different speeds.**

## ***Essential Question:***

- ***How does the frequency of a wave relate to its wavelength?***

32 The diagram below shows two waves.



Which statement best compares the waves?

- F Wave 1 has a greater amplitude than Wave 2.
- G Wave 1 has taller crests than Wave 2.
- H Wave 2 has a higher frequency than Wave 1.
- J Wave 2 has a greater wavelength than Wave 1.

# What Mastery Looks Like

Answer the question and explain why your answer is correct.



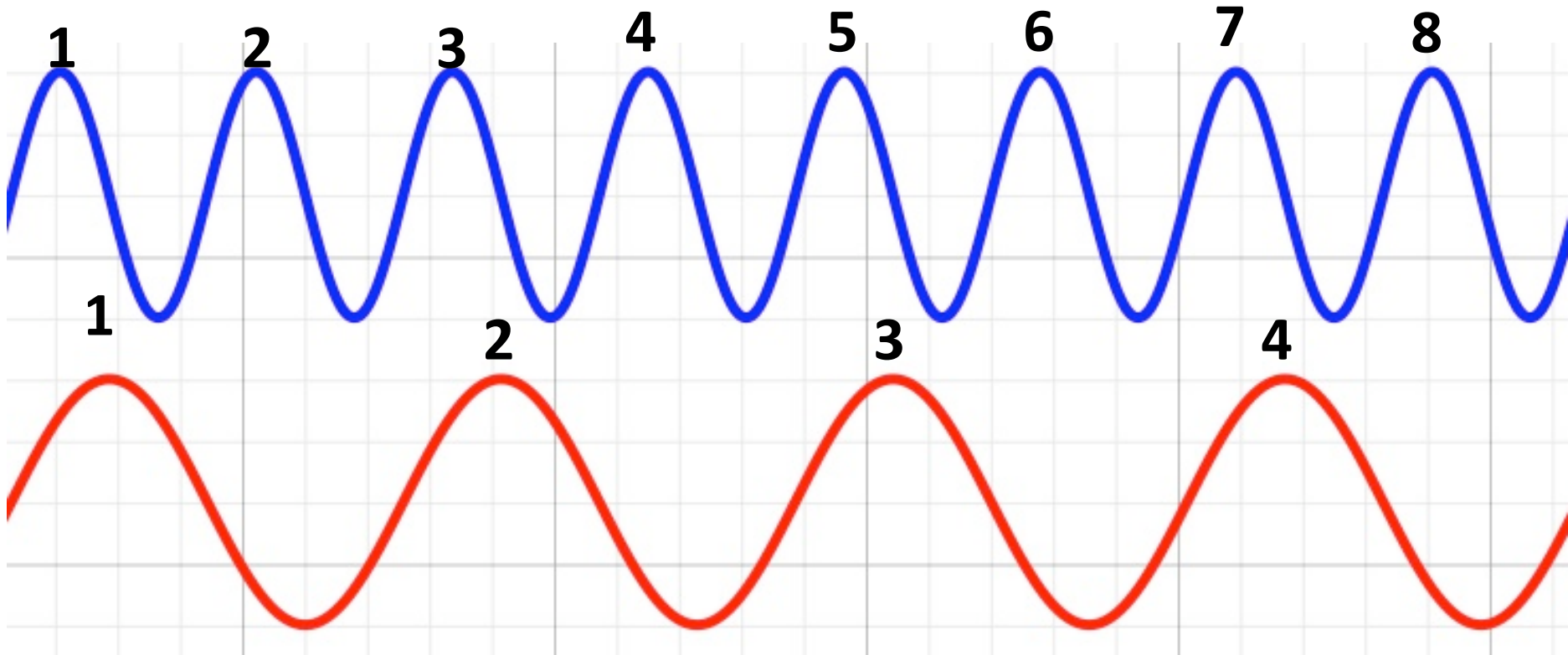
# III. Frequency

- Is the number of wavelengths that pass a point in 1 second.

Unit of frequency is measured in hertz (Hz)

$$\text{Equation – Frequency (Hz)} = \frac{\text{\# of wavelengths}}{\text{time (in seconds)}}$$

With you group,  
Calculate the number of wavelengths.  
What is the frequency for each wave?

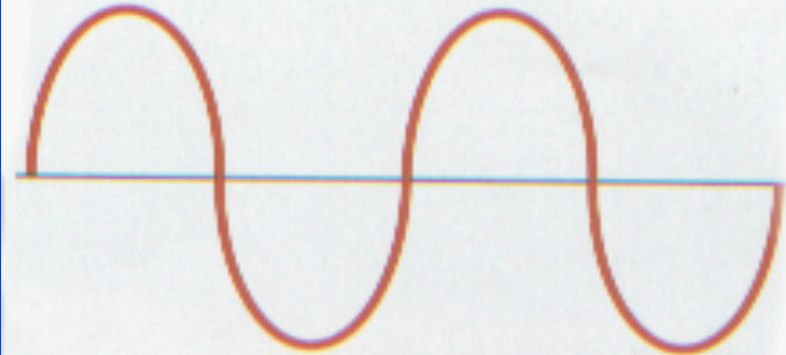


# A. Frequency and Wavelength

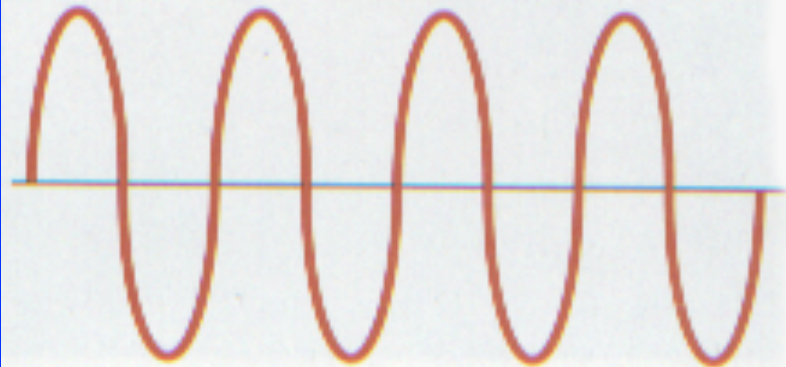
- Small frequency = longer wavelengths.
  - Higher frequency = shorter wavelengths.
  - Therefore, as frequency of a wave increases, its wavelength decreases.
- 
- Think Pair Share
    - **Draw** two waves that have different wavelengths.  
**Circle** the wave with the shortest wavelength.

**Which set of waves  
would have the  
greatest frequency?**

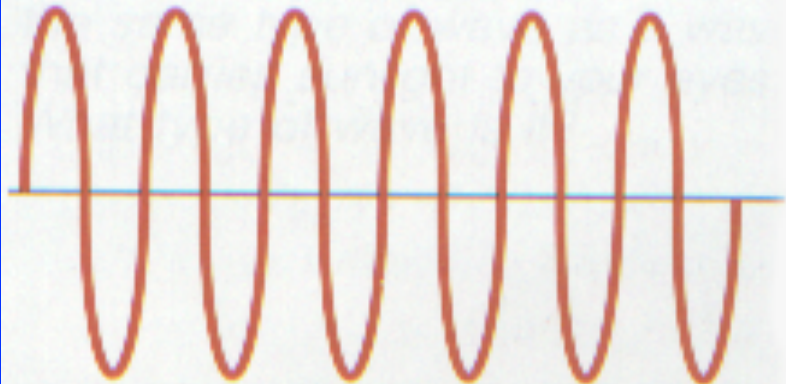
**Wave A**



**Wave B**



**Wave C**

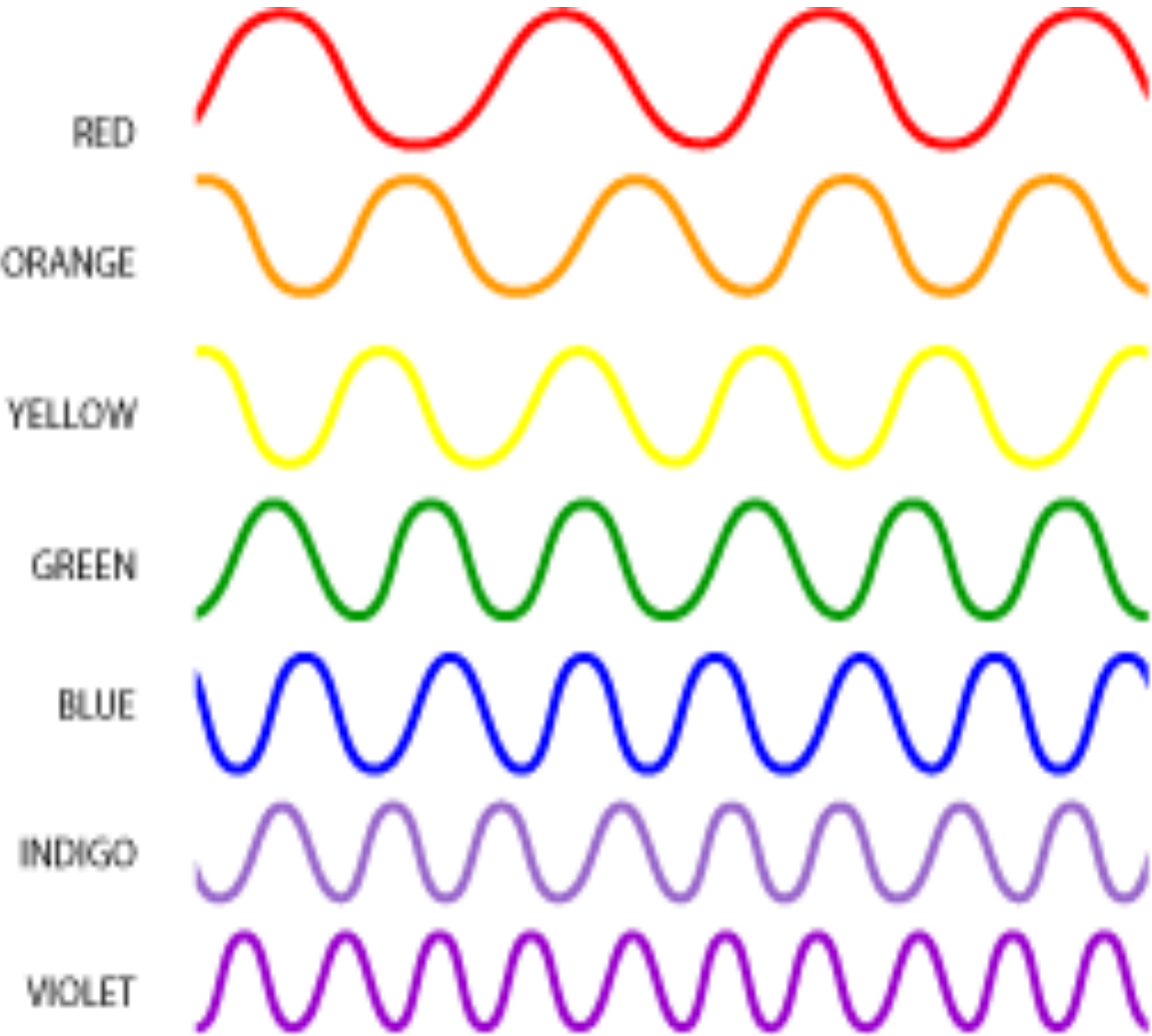


## B. Color and Pitch

- Either wavelength or frequency of a **light wave** determines the color of light and **pitch** of a sound wave.
  - Pitch is how high or low a sound seems to be.
- <https://www.youtube.com/watch?v=qRjiWzui2nE> 6.52 min



# Frequency of light waves



# Frequency of sound waves

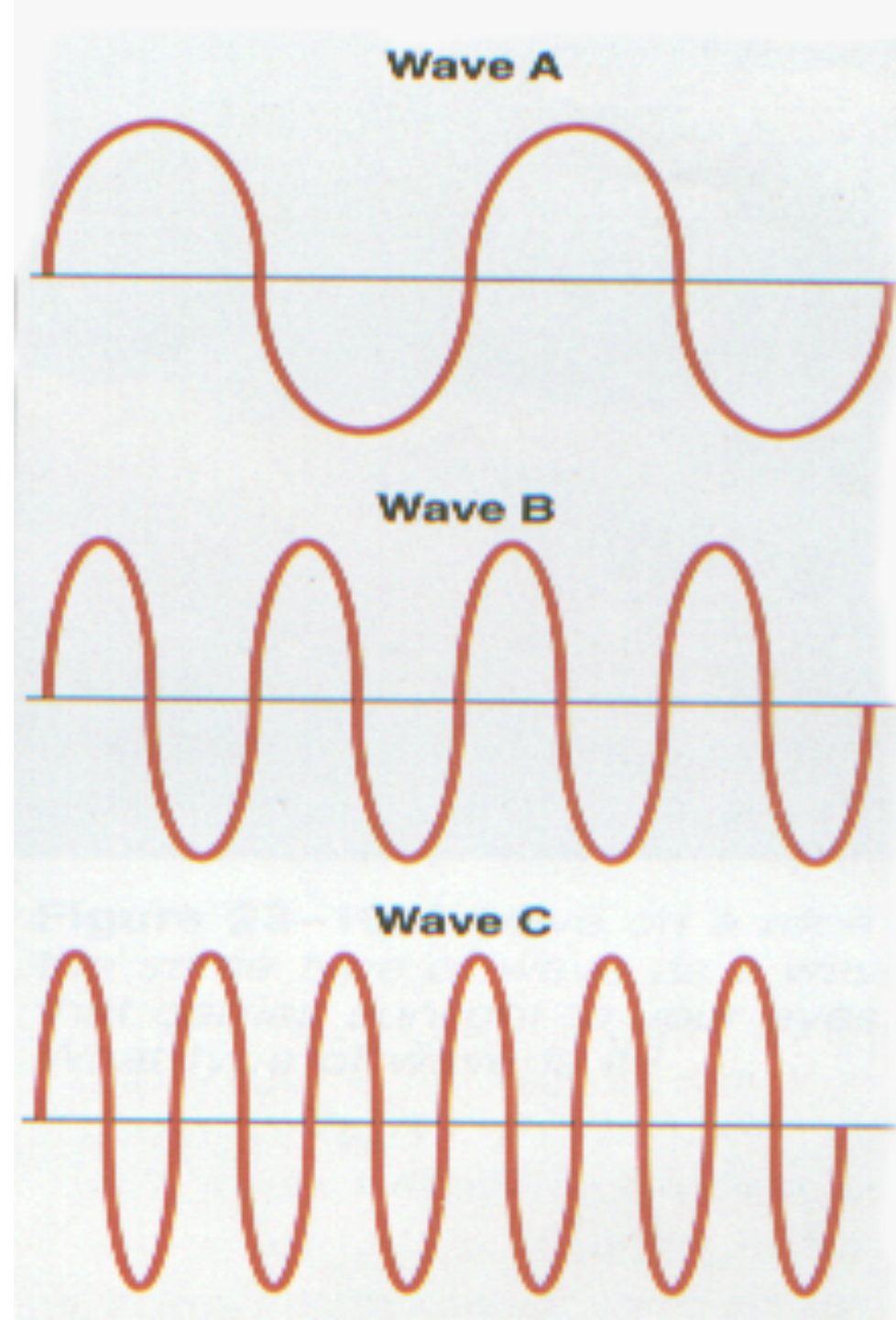


We hear the frequency of sound waves as pitch.

LOW PITCH

MEDIUM PITCH

HIGH PITCH



# IV. Wave Speed

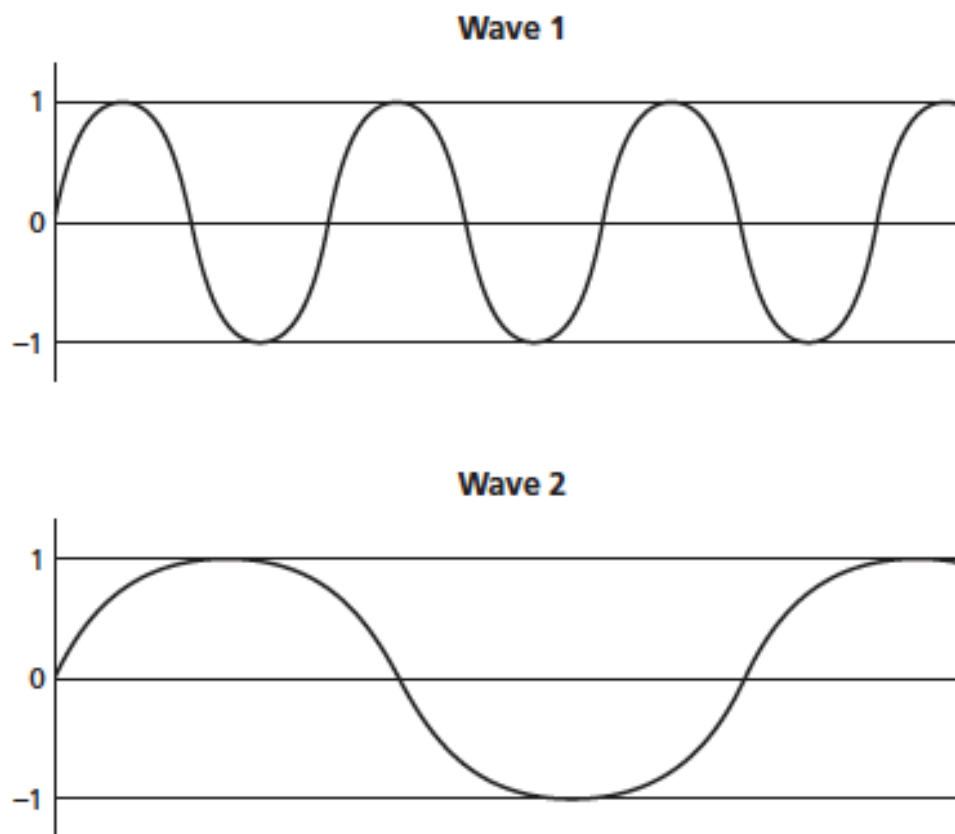
- Light travels in air at a speed of about 300 million m/s and sound about 340 m/s.
- Wave speed depends on the medium
  - Sound travels 340 m/s but 1500m/s in water
  - Mechanical waves travel fastest in solids than gases.
  - Electromagnetic waves travel fastest in a vacuum (in space) where there is no matter at all. In matter, it travels faster in gases than solids.
- The speed of a wave also depends on the temperature of the medium.
  - Sound waves travel faster as temperature increase

## Exit Ticket

Answer the question and explain why your answer is correct.

If time allowed,  
complete  
section 2  
review on page  
463

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