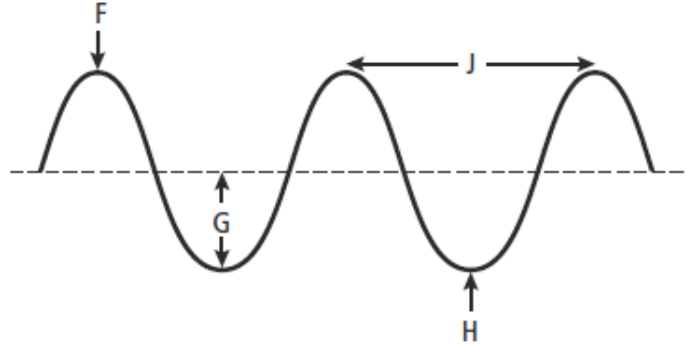


# Review: The Wave Model

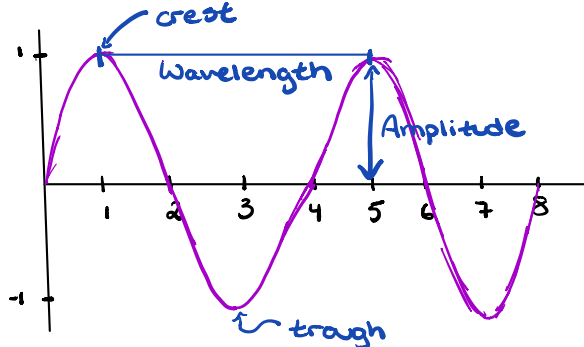
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1. Name each of the following for the diagram below:

- a) F: Crest
- b) G: Amplitude
- c) H: Trough
- d) J: Wavelength



2. Draw a wave with a **wavelength of 4cm** and an **amplitude of 1cm**. Label the crest, the trough, the amplitude and the wavelength. Calculate the frequency. Use a ruler to draw the number line.



$$\begin{aligned} \text{Frequency} &= \frac{\# \text{ cycles}}{\text{second}} \\ &= \frac{1 \text{ cycle}}{4 \text{ seconds}} \\ &= 0.25 \text{ Hz} \end{aligned}$$

3. What is the relationship between wavelength and frequency?

Inverse relationship = as one increases, the other decreases.

4. Use the diagram below to answer the following questions:

a) What is the amplitude of Wave A?

0.5m

b) What is the wavelength of Wave A?

1.0m

c) What is the amplitude of Wave B?

0.4m

d) What is the wavelength of Wave B?

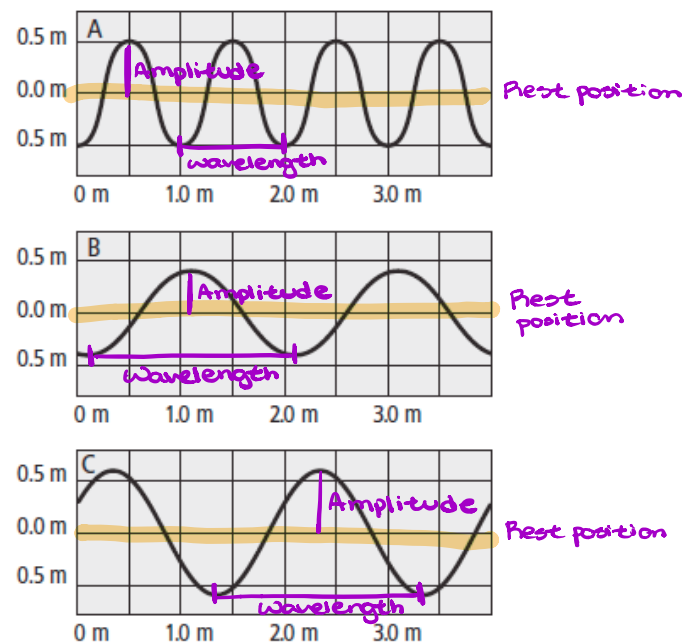
2.0m

e) What is the amplitude of Wave C?

0.6m

f) What is the wavelength of Wave C?

2.0m



5. a) A buzzer vibrates 900 times in 1 second. What is its frequency?

$$\text{Frequency} = \frac{\# \text{ cycles}}{\text{second}} = \frac{900 \text{ vibrations}}{1 \text{ sec}} = 900 \text{ Hz}$$

- b) A guitar string vibrates 880 times in 2 seconds. What is its frequency?

$$\text{Frequency} = \frac{\# \text{ cycles}}{\text{second}} = \frac{880 \text{ vibrations}}{2 \text{ sec}} = 440 \text{ Hz}$$

- c) A ball bounces on the floor 10 times in 50 s. What is its frequency?

$$\text{Frequency} = \frac{\# \text{ cycles}}{\text{second}} = \frac{10 \text{ bounces}}{50 \text{ s}} = 0.2 \text{ Hz}$$

6. Draw a transverse wave and a compression wave. Give an example of each type of wave.

Transverse wave



ex: ocean wave

Compression wave.



ex: slinky.

7. A student performs a frequency experiment on three different pendulums and obtains the following results:

Pendulum	Number of swings	Time to complete all of the swings
A	32	8 s
B	72	18 s
C	210	1 min 20 s = 80 s

- a) Calculate the frequency of each pendulum in Hz.

Pendulum A

$$\text{Frequency} = \frac{\# \text{ cycles}}{\text{second}} = \frac{32 \text{ swings}}{8 \text{ s}} = 4 \text{ Hz}$$

Pendulum B

$$\text{Frequency} = \frac{\# \text{ cycles}}{\text{second}} = \frac{72 \text{ swings}}{18 \text{ s}} = 4 \text{ Hz}$$

Pendulum C

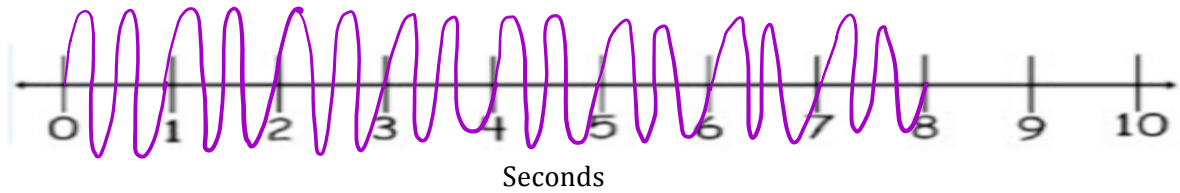
$$\text{Frequency} = \frac{\# \text{ cycles}}{\text{second}} = \frac{210 \text{ swings}}{80 \text{ s}} = 2.625 \text{ Hz}$$

- b) Rank the pendulums from lowest to highest frequency.


Lowest      Highest  
 C < A = B

8. A speedboat zips by on a lake and sends a series of waves toward a dock. The frequency of waves is 2 Hz (2 waves per second). How many wave crests will pass by the dock in 8 s?

16 crests in 8s



9. A female soprano sings at a higher frequency than a male baritone.  
 a) What singer is producing waves of longer wavelength? Explain your answer with a diagram.

Female  
 - Higher frequency  
 - shorter wavelength

Male  
 - shorter frequency  
 - longer wavelength

- b) If both singers sing at an equal volume, which singer is sending more energy out with his or her voice? Or are they both sending out the same energy? Explain your answer with a diagram.

The female singer sends out more energy

↳ Every vibration sends out energy and higher frequency means it sends out energy more frequently.  
 (higher frequency = more energy)

10. Explain how a prism is able to break sunlight up into its component colours.

When light hits a prism, it refracts the white light. Due to the different wavelengths of the colours, they all bend at a different angle

11. Which has a longer wavelength, red light or green light?

Red

12. Which colour refracts more in a prism, yellow or blue?

Blue (shorter wavelength)

13. What's the difference between refraction and reflection?

Refraction: when a wave bends as it passes from one medium to another

Reflection: when a wave rebounds and bounces back

14. Name the colours that will combine to make white light.

R  
O  
Y  
G  
B  
-  
V

Red, green, blue light

15. A light beam that is composed of red and green light is hits a red shirt.

a) What colour of light is absorbed by the shirt?

Green

b) What colour is reflected by the shirt?

Red (the colour we see)

16. Explain how a shirt can look green even though the light falling on it contains red, blue and green.

The shirt is absorbing the red and blue lights and reflecting the green light.

17. Why does a blue hat look black when it is in a dark room?

In a dark room, there is no light which means that no light is being reflected off of the object to reach our eyes.