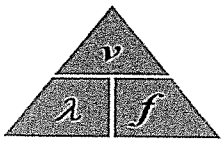
Name:_____ Period:_____

Calculating Wave Speed, Frequency and λ

This worksheet is designed to give you some practice using the general wave equation: $v=\lambda f$. You'll be expected to use this equation correctly or the upcoming chapter test, sound lab and test.



$v = \lambda \times f$

1.) Frequency = 5 Hz
Wavelength = 100m
Speed =
$v = \lambda f$ $v = 500 m/s$

2.) Frequency = 20 Hz
Wavelength = 200 m
Speed =
$v = \lambda f$ $v = 4,000 m/s$

3.) Frequency = 27 Hz
Wavelength = 150 m
Speed =
$v = \lambda f$ $v = 4,050 m/s$

4.) Frequency = 27 Hz
Wavelength =
Speed= 46 m/s
$\lambda = \frac{v}{f}$ $\lambda = 1.7 m$

5.) Frequency =
Wavelength = 502 km
Speed= 100 m/s
$f = v/\lambda$ $f = 2 \times 10^{-4}$ Hz

6.) Frequency = $f = \frac{v}{\lambda}$
Wavelength = 326 m
Speed = 14 m/s
$f = 0.043$ Hz

7.) Frequency = 97 Hz
Wavelength = 1378 km
Speed = $v = \lambda f$ $v = 133,666,000 \frac{m}{s}$

8.) Frequency = 78 Hz
Wavelength = 1378 km
Speed =
$v = \lambda f$ $v = 107,484,000 \frac{m}{s}$

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9. What is the v if λ = 8 m and f = 20 Hz? $v = 160\ m/s$

10. What is the λ if v = 50 m/s and f = 25 Hz? $\lambda = 2\ m$

11. What is the f if v = 50 m/s and λ = 10 m? $f = 5\ Hz$

12. What is the v if λ = 1 m and f = 345 Hz? $v = 345\ m/s$

13. What is the λ if v = 100 m/s and f = 3 Hz? $\lambda = 33.33\ m$

14. What is the f if v = 120 m/s and λ = 3 m? $f = 40\ Hz$

15. What is the v if λ = 3 m and f = 10 Hz? $v = 30\ m/s$

16. What is the λ if v = 345 m/s and f = 790 Hz? $\lambda = 0.44\ m$

17. What is the f if v = 345 m/s and λ = .25 m? $f = 1,380\ Hz$

18. Joe the whistle maker knows that the maximum volume for a whistle will occur if the length of the whistle is exactly ¼ of the wavelength. If Joe must make a whistle that plays at a pitch of 320 Hz, how long will the whistle be?

19. How long is the wavelength of KAJA radio whose broadcast frequency is 97.1 MHz? (97.1 MHz =97,100,000 Hz and v = 300,000,000 m/s)

20. Using the velocity of sound at 343 m/s and given the frequencies of a piano scale, compute the wavelengths of that scale.

#18 $v = 343\ m/s$ $f = 320\ Hz$

$$\lambda = \frac{343\ m/s}{320\ Hz} = 1.07\ m$$

$$1/4(1.07\ m) = 0.27\ m$$

#19

$$\lambda = \frac{300,000,000\ m/s}{97,100,000\ Hz} = 3.09\ m$$

#20

$$\lambda = \frac{343\ m/s}{64\ Hz} = \qquad \lambda = \frac{343\ m/s}{128\ Hz}$$

$$\lambda = \frac{343\ m/s}{256\ Hz} \qquad \lambda = \frac{343\ m/s}{512\ Hz} \qquad \lambda = \frac{343\ m/s}{1,024\ Hz}$$