PHYSICS IN MOTION
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Unit 1B
Scientific Notation & Unit Conversions
Practice Problems TEACHER

Work each of the following problems. SHOW ALL WORK.

1. **Convert 2.5 feet into inches. (1 ft = 12 in)**

$$\left(\frac{2.5\,ft}{1}\right)\left(\frac{12\,in}{1ft}\right) = \frac{30\,in}{1} = 30\,in$$

2. **Convert 32 centimeters into inches. (1 in = 2.54 cm)**

$$\left(\frac{32\,cm}{1}\right)\left(\frac{1in}{2.54\,cm}\right) = \frac{32\,in}{2.54} = 12.6\,in$$

3. **Convert 68 centimeters into feet.**

$$\left(\frac{68\,cm}{1}\right)\left(\frac{1in}{2.54\,cm}\right)\left(\frac{1ft}{12\,in}\right) = \frac{68\,ft}{30.48} = 2.23\,ft$$

4. **Convert 142 weeks into years. (1 yr = 365.25 d; 1 week = 7 d)**

$$\left(\frac{142\,wk}{1}\right)\left(\frac{7\,d}{1wk}\right)\left(\frac{1yr}{365.25\,d}\right) = \frac{994\,yr}{365.25} = 2.72\,yr$$

5. **Convert 8.1 kilograms into grams.**

Either move the decimal three places to the right (8,100 g) or use a conversion factor:

$$\left(\frac{8.1kg}{1}\right)\left(\frac{1{,}000\,g}{1kg}\right) = \frac{8{,}100\,g}{1} = 8{,}100\,g$$

6. **Convert 376 centimeters into meters.**

Either move the decimal two places to the left (3.76 m) or use a conversion factor:

$$\left(\frac{376\,cm}{1}\right)\left(\frac{0.01m}{1cm}\right) = \frac{3.76\,m}{1} = 3.76\,m$$

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Work each of the following problems. SHOW ALL WORK.

7. Convert 1.5 seconds to milliseconds.

Either move the decimal three places to the right (1,500 ms) or use a conversion factor:

$$\left(\frac{1.5\,s}{1}\right)\left(\frac{1ms}{0.001s}\right) = \frac{1.5\,ms}{0.001} = 1,500\,ms$$

8. Convert 6,400,000 milligrams to kilograms.

$$\left(\frac{6,400,000\,mg}{1}\right)\left(\frac{0.001g}{1mg}\right)\left(\frac{1kg}{1,000\,g}\right) = \frac{6,400\,kg}{1,000} = 6.4\,kg$$

9. Convert the following numbers from standard notation to scientific notation:

-3,600,000,000 = *-3.6×10^{9}*
0.000033 = *3.3×10^{-5}*
48,000,000 = *4.8×10^{7}*
-0.000000053 = *-5.3×10^{-8}*

10. Convert the following numbers from scientific notation to standard notation:

5.2×10^{-4} = *0.00052*
-2.9×10^{5} = *-290,000*
7.1×10^{8} = *710,000,000*
-1.8×10^{-3} = *-0.0018*