

**Objective: SWBAT convert from one unit to another by way of conversion factors and describe in writing what the solutions to problems mean to the real world.**

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## Warm-Up

1. Solve the proportion

$$\frac{76}{x} = \frac{213}{423} \Rightarrow \frac{32148}{213} = 150.92$$

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## **Measurement Conversion**

**ELG N.3 Use units to solve problems**

**Key Word: Conversion Factor**

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### **Conversions Factors to know:**

**1 inch = 2.54 centimeters**

**1 gallon = 3.79 liters**

**1 hour = 60 minutes**

**1 ounce = 28.9 grams**

**1 yard = 0.926 meters**

**1 meter = 3.25 feet**

**1 mile = 5280 feet**

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When dealing with unit conversions there are two ways to approach them.

One way is if you are converting units to the same units.

This is going to allow us to use a simple proportion to solve it.

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## Practice

1. On Sunday you plan on studying for 893 minutes. How many hours is that?

$$\frac{893 \text{ min.}}{x \text{ hrs}} \times \frac{60 \text{ min}}{1 \text{ hr}}$$

$$\frac{893.1}{60} = x = 14.8 \text{ hrs}$$

14 hrs 53 min

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## Practice

2. I walked 5 meters today, how many feet is that?

$$\begin{array}{r} 5\text{m} \\ \hline x\text{ft} \end{array} \quad \begin{array}{r} 1\text{m} \\ \hline 3.25\text{ft} \end{array}$$
$$\frac{5 \cdot 3.25}{1} = x = 16.25\text{ft}$$
$$16\frac{1}{4}\text{ft} = 16\text{ft } 3\text{in}$$

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**Another way we convert units is using multiplication.**

**We use this method when we have to convert multiple units.**

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### Practice

3. I drove 45 miles/hour, how many ft/sec is that?

$$\begin{array}{c} \frac{\text{mi}}{\text{hr}} \rightarrow \frac{\text{ft}}{\text{sec}} \\ \hline \begin{array}{c|c|c|c} 45 \cancel{\text{mi}} & 5280 \text{ft} & 1 \cancel{\text{hr}} & 1 \cancel{\text{min}} \\ \hline 1 \cancel{\text{hr}} & 1 \cancel{\text{mi}} & 60 \cancel{\text{min}} & 60 \text{sec} \end{array} \\ \hline \frac{45 \cdot 5280 \text{ ft}}{60 \cdot 60 \text{ sec}} = \frac{237600 \text{ ft}}{3600 \text{ sec}} = \frac{66 \text{ ft}}{1 \text{ sec}} \end{array}$$



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### Practice

4. A horse can travel 44 miles per hour, how many centimeters per second is that?

$$\frac{\text{mi}}{\text{hr}} \rightarrow \frac{\text{cm}}{\text{sec}}$$

$$\begin{array}{c} \frac{44 \cancel{\text{mi}}}{1 \cancel{\text{hr}}} \cdot \frac{5280 \cancel{\text{ft}}}{1 \cancel{\text{mi}}} \cdot \frac{12 \cancel{\text{in}}}{1 \cancel{\text{ft}}} \cdot \frac{2.54 \cancel{\text{cm}}}{1 \cancel{\text{in}}} \cdot \frac{1 \cancel{\text{hr}}}{60 \cancel{\text{min}}} \cdot \frac{1 \cancel{\text{min}}}{60 \text{sec}} \\ \hline \frac{44 \cdot 5280 \cdot 12 \cdot 2.54 \text{ cm}}{60 \cdot 60 \text{ sec}} = \frac{708113.6 \text{ cm}}{3600 \text{ sec}} = \frac{1967 \text{ cm}}{1 \text{ sec}} \end{array}$$

1,234,560 cm  $\rightarrow$  ft

$$\frac{1234560 \cancel{\text{cm}} / 1 \cancel{\text{in}}}{2.54 \cancel{\text{cm}} / 12 \cancel{\text{in}}} \quad \text{ft}$$

$$\frac{1234560 \text{ ft}}{2.54 \cdot 12} = \frac{1234560 \text{ ft}}{30.48} = 40503.9 \text{ ft} = 40504 \text{ ft}$$

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**Warm- Up**

**1. 543790 seconds to days**

**2. 43 miles per hour to inches per minute**

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Warm- Up

1. 17 years to minutes

8,225,280 min

$$\frac{17\text{yr}}{1} \cdot \frac{12\text{mon}}{1\text{yr}} \cdot \frac{4\text{weeks}}{1\text{month}} \cdot \frac{7\text{days}}{1\text{week}} \cdot \frac{24\text{hr}}{1\text{day}} \cdot \frac{60\text{min}}{1\text{hr}}$$

2.  $6.54 \times 10^8$  meters to kilometers. (1000m = 1 km)

$$\frac{6.54 \times 10^8 \text{m}}{1} \cdot \frac{1\text{km}}{1000\text{m}} = \frac{654,000,000}{1000} = 6.54 \times 10^5 \text{km}$$

$3.55 \times 10^9$  seconds to days

$$\frac{3.55 \times 10^9 \text{ sec}}{1} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ day}}{24 \text{ hr}}$$

$$\frac{3550000000}{60 \cdot 60 \cdot 24} = \frac{3550000000}{86400}$$

$$\underline{41087.9 \text{ days}}$$

$$4.10879 \times 10^4$$