Today's Lecture

- ✓Announcements
- ✓Quizzes
- ✓Dimensional Analysis

Announcements

- Office hours
  - Mon, Wed, 11:30-12:30 am
  - Sun,Tue,Thu 12:00-1:00 pm
- Reading
  - Chapter 1, focus on Sections (1.4), (1.5) and **(1.6)**
- Suggested Problems
  - 23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53, 59,61,67,69

Quizzes

Quiz 1: How many significant figures should be shown for the calculation?

- 1
- 2
- 3
- 4
- 5

$$\frac{1.25 + 0.45}{2.734}$$

Quiz 2

How many significant figures are in the measured number 0.082060?

a. 3
b. 4
c. 5
d. 6

Quiz 3

6.03 grams + 7.1 grams = ?

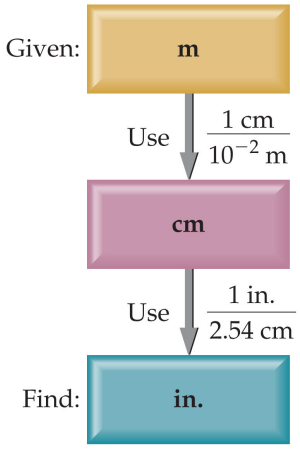
a. 13 grams
b. 13.1 grams
c. 13.13 grams
d. 13.130 grams

Quiz 4

6.03 grams / 7.1 milliliters = ?

a. 0.8 grams/milliliter
b. 0.85 grams/milliliter
c. 0.849 grams/milliliter
d. 0.8492957 grams/milliliter

Dimensional Analysis



- We use dimensional analysis to convert one quantity to another.
- Most commonly dimensional analysis utilizes conversion factors (e.g., 1 in. = 2.54 cm)

$$\frac{1\text{ in.}}{2.54\text{ cm}} \quad \text{or} \quad \frac{2.54\text{ cm}}{1\text{ in.}}$$

Dimensional Analysis

Use the form of the conversion factor that puts the sought-for unit in the numerator.

$$\text{Given unit} \times \frac{\text{desired unit}}{\text{given unit}} = \text{desired unit}$$

Conversion factor

Dimensional Analysis

- For example, to convert 8.00 m to inches,
  - convert m to cm
  - convert cm to in.

$$8.00\ \text{m} \times \frac{100\ \text{cm}}{1\ \text{m}} \times \frac{1\ \text{in.}}{2.54\ \text{cm}} = 315\ \text{in.}$$

Sample Exercise 1.9 Converting Units

If a woman has a mass of 115 lb, what is her mass in grams? (Use the relationships between units given on the back inside cover of the text.)

Practice Exercise

By using a conversion factor from the back inside cover, determine the length in kilometers of a 500.0-mi automobile race.

Answer: 804.7 km

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Sample Exercise 1.10 Converting Units Using Two or More Conversion Factors

The average speed of a nitrogen molecule in air at 25 ° C is 515 m/s. Convert this speed to miles per hour.

Practice Exercise

A car travels 28 mi per gallon of gasoline. How many kilometers per liter will it go?

Answer: 12 km/L

Sample Exercise 1.11 Converting Volume Units

Earth's oceans contain approximately 1.36×10^9 km^3 of water. Calculate the volume in liters.

Practice Exercise

If the volume of an object is reported as 5.0 ft^3, what is the volume in cubic meters?

Answer: 0.14 m^3

Sample Exercise 1.12 Conversions Involving Density

What is the mass in grams of 1.00 gal of water? The density of water is 1.00 g/mL.

Practice Exercise

The density of benzene is 0.879 g/mL. Calculate the mass in grams of 1.00 qt of benzene.

Answer: 832 g

Next Lecture

- Atoms, Molecules, and Ions
  - Chapter 2
    - focus on Sections