

## 47.3: Procedures

### Thinking about Prefixes

1. Use the table of prefixes to complete an ordered list of the most common multiples used in physical science: **micro**, **mega**, **nano**, **kilo**, **centi**, and **milli**.. List these prefixes in order by powers of ten, from largest to smallest. Then write the scientific notation and the standard notation for the prefix word.

*Example:* **giga** = **10<sup>9</sup>** = **1,000,000,000**

2. Think about what the words “Mega Millions Lottery” means. If you won 300 Mega Millions, how many millions of dollars would you have won?

### Metric to Metric

3. Utilize differences in powers of ten or a number line to “move” within the metric system of units.

- a. centimeters = \_\_\_\_\_ meters
- b. 2,000 meters = \_\_\_\_\_ kilometers
- c. 650 nanometers = \_\_\_\_\_ meters
- d. 20 millimeters = \_\_\_\_\_ meters
- e. 20 grams = \_\_\_\_\_ kilograms

### Time

4. Use your knowledge of seconds minutes and hours.
  - a. 1 hour = \_\_\_\_\_ seconds
  - b. 1 hour = \_\_\_\_\_ nanoseconds
  - c. 1 day = \_\_\_\_\_ seconds
5. There are 365 days in a standard calendar year. Write your current age in years and convert this to seconds.
6. If you were able to blink every nanosecond for an hour, how many times would blink?

### English to Metric & Metric to English

7. Use **appropriate** conversion factors to convert from one system of units to another.
  - a. 65 mph = \_\_\_\_\_ kph
  - b. 65 mph = \_\_\_\_\_ m/s
  - c. 60 inches = \_\_\_\_\_ centimeters
  - d. 60 inches = \_\_\_\_\_ meters
  - e. 20 m/s = \_\_\_\_\_ mph
  - f. 20 cm = \_\_\_\_\_ inches

### Common American Quantities

8. Write your approximate weight and convert this to Newtons.
9. Cargo ships carry many megatons of consumer products. How many pounds are in 500 Megatons of cargo? (1 ton = 2000 lbs)
10. The length of an American Football field is 100 yards. How many meters are in 100 yards?

### Measurements in 2D and 3D

11. An accent rug measures 4 feet by 6 feet.
  - a. Calculate the area of the rug in square feet (ft<sup>2</sup>), and then convert the units from square feet (ft<sup>2</sup>) to square meters (m<sup>2</sup>).

- b. Convert each of the two given measurements (4 feet and 6 feet) to meters. Then multiply the two measurements in meters to obtain the area in square meters ( $\text{m}^2$ ).
- c. Compare the answers you obtained in parts a, and b. Are the numbers the same; did you calculate the same square meters with the two different processes?
12. A gift box measures 12 inches by 8 inches and is 3 inches tall. Calculate the volume, and then convert the volume from cubic inches ( $\text{in}^3$ ) to cubic centimeters ( $\text{cm}^3$ ).

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