

Chapter 3 The Basic Skills of the Biotechnology Workplace

1. English to Metric Units

1 mile per hour = 0.447 m/s

1 meter per second = 2.237 mph

1 Newton of force = 0.2248 lb.

1 pound = 4.4484 N

1 centimeter = 0.3937 in.

1 inch = 2.5400 cm

1 kilogram of mass = 35.28 oz.

1 ounce = 28.35 grams

1 joule of energy = 0.7376 ft.lb

1 foot pound = effort to lift a pound a foot
= 1.3557 J

1 Newton.meter of torque = 0.7376 lb.ft

1 pound foot (foot pound) = 1.3558 N.m

2. Metric to English Units

| Metric Unit | English Unit | Multiply the Metric Unit By: |
|----------------------------------|-----------------|------------------------------|
| millimeter-mm | inch | .03937 |
| meter-m | foot | 3.28084 |
| meter-m | yard | 1.09361 |
| kilometer-km | mile | .62137 |
| square meters-m ² | square yard | 1.19599 |
| hectare-ha | acre | 2.47105 |
| square kilometer-km ² | square mile | .38610 |
| liter-L | quart | 1.05669 |
| liter-L | gallon | .26417 |
| gram-g | ounce | .03527 |
| kilogram-kg | pound | 2.20462 |
| degree Celsius- C | Fahrenheit | (Temp C x 1.8) + 32 |
| meter per second - m/s | feet per second | 3.28084 |
| kilometer per hour-km/h | miles per hour | .62137 |

Example of converting from English Units to SI Units:

$$45 \text{ miles} \times \frac{5280 \text{ ft}}{1 \text{ mile}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}} \times \frac{1 \text{ m}}{100 \text{ cm}} \times \frac{1 \text{ km}}{1000 \text{ m}} = 72.42 \text{ km}$$

1. What are some guidelines for determining the most appropriate tool for measuring specific volumes or masses?
2. Describe how to select, set, and use a variety of micropipets within their designated ranges to accurately measure small volumes.
3. What is the B \leftrightarrow S rule?
4. What steps would you take to calculate the amount of solute needed to make a specified solution.
5. Define the term **buffer** . Why is the use of buffers so important to the work of a biotechnologist. Describe how you would calculate a specified dilution from a concentrated stock solution or buffer.