

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.