

Chemistry 105 Fall 2005
Advanced Practice Problems - Unit Conversions

- 1) A physician's order for medication stipulates that the amount taken per day should not exceed 2.0 mg per kg of body weight. What is the maximum daily dose (mg) for someone who weighs 145 pounds?
- 2) A wildlife survey team has cataloged birds using field equipment that measures in inches and weighs in ounces. Their data need to be converted to metric units. A bittern was recorded to be 15.4 inches long and weighs 34.5 ounces (16 ounces = 1 lb exactly). Convert these to millimeters and grams.
- 3) A lake in northern Manitoba has a surface area of $4.57 \times 10^7 \text{ ft}^2$ and an average depth of 15.0 feet. Calculate the total volume of the water in the lake in cubic meters and in liters.
- 4) In the human body, the densities of bone, muscle and fat are approximately 3.0 g/cm^3 , 1.06 g/cm^3 and 0.90 g/cm^3 respectively. Convert these densities to pounds per cubic foot.
- 5) You are in Toronto and happen to see a weather report on television that says the current temperature in Detroit is 24.6°C . Convert this to degrees Fahrenheit and kelvins. Normal body temperature is 98.6°F . What is normal body temperature in $^\circ\text{C}$?
- 6) Calculate the area (ft^2) of an oil slick that would result from spilling a 220. liter drum of oil in the sea if the oil slick is 0.100 cm thick. ($1 \text{ mL} = 1 \text{ cm}^3$ exactly)
- 7) The average volume of blood plasma in adults is 3.10 L. The density of blood plasma is 1.03g/cm^3 . How many pounds of blood plasma are there in the body?
- 8) The maximum acceptable level for a certain pollutant in soil is 15.0 parts per million (ppm; that is 15.0 grams pollutant in 1 million grams of soil). What is the maximum number of milligrams of pollutant that could be in 10.0 pounds of soil?

ANSWERS

- 1) 130 mg
- 2) 391 mm; 978 g
- 3) 1.94×10^{10} L; 1.94×10^7 m³
- 4) $190 \text{ lb}\cdot\text{ft}^{-3}$; $66.2 \text{ lb}\cdot\text{ft}^{-3}$; $56 \text{ lb}\cdot\text{ft}^{-3}$
- 5) 76.3 °F; 297.8 K; 37.0 °C
- 6) 2370 ft²
- 7) 7.04 lb
- 8) 68.0 mg pollutant