

1.2.1 THE IMPORTANCE OF UNITS

from Hands-On Chemistry (Herr & Cunningham)

Concepts to Investigate: Fundamental units, derived units, factor labels, dimensions.

Materials: none.

Principles and Procedures: When crossing the border to Canada, American motorists are often surprised to see speed limits of "90" or "100". If they don't realize that Canadians measure speed in kilometers/hr while Americans measure in miles/hr (1.00 mile/hr = 1.61 kilometers/hr; 60 miles/hr = 97 km/hr) they may soon be in for trouble with the law. If, for example, an American motorist accelerates until her speedometer (measured in miles/hr) reaches "100", she will be traveling 38 miles/hr over the posted speed limit of 100 km/hr since a speed of 100 km/hr is equal to only 62 miles/hr. As this example illustrates, measurements without units are meaningless and may lead to serious misunderstandings. Everything that can be measured must be expressed with appropriate units.

Units in everyday life: We use units everyday, often without even realizing it. In the statements that follow you will find a wide variety of interesting facts, but each is missing a crucial piece of information -- the dimensions (units)! All the statements are meaningless until you supply the appropriate units. On the basis of your experiences, try to match the appropriate units from the list provided.

carats	feet	kilometers	milligrams
cm	grams/ml	kilowatt-hours	pounds
degrees Celsius	inches	liters	stories
degrees Fahrenheit	kcal (Cal)	megabars	tons
	kilograms	miles	yards
		miles per hour	

- America's tallest building (Sears Tower in Chicago) is 110 ___ high.
- The Empire State Building in New York is 1250 ___ high.
- The Nile is the world's longest river. It is 4180 ___ long.
- The Amazon River in South America is ___ 6296 long.
- The coldest temperature ever recorded was -128.6 ___ in Vostok, Antarctica in 1983.
- The highest recorded temperature in the United States was in Death Valley, California when the mercury reached 57 ___!
- The world record rainfall occurred in Cherrapunji, India where 1042 ___ of rain fell in one year.
- The largest recorded hailstone to ever fall landed in Coffeyville, Kansas in 1979. It had a diameter of 44.5 ___ !
- The longest punt in NFL history was by Steve O'Neal of the new York Jets. He kicked the football 98 ___.
- The largest seed in the world is that of the coc-de-mer coconut tree, which may weigh as much as 40 ___!
- The world's largest meteorite is located in Southwest Africa. It weighs 650 _____ .
- The most popular soft drink in the World is currently Coca Cola□. More than 210 million _____ were consumed each day in 1990.
- The largest diamond in the world was mined from South Africa in 1905 and weighs 3,106 _____ .
- Earth is the densest of the nine planets, with an average density of 5.515 _____ .
- The world's fastest aircraft is the *Lockheed SR-71 Blackbird*, clocking a record speed of 2,193.67 _____.
- The largest gold nugget ever found had a mass of 100 _____ !
- One large chicken egg contains an average of 274 ___ cholesterol.
- A 16-year old male requires an average of 2800 ___ of energy per day while a an average 16-year old female requires only 2100_____.
- The United States produces and consumes more electric energy than any other nation. Each year the United States produces over 2500 billion _____ .
- The largest pressure ever developed in a laboratory was 1.70 _____, used to solidify hydrogen in 1978.