

Read the passage on the back of this worksheet taken from pages 16-18 of *Prentice Hall Chemistry: The Study of Matter* (1992) and answer the following questions:

1. What two things are compared when a measurement is made? _____

2. What must you do if you want your measurements to be understood by other people? _____

3. What set of units has been defined for scientific work (such as in this class)? _____

4. What is SI an abbreviation for? _____

5. How many base units are there in SI? _____
6. List the names of all the base units in SI: _____

7. What should be capitalized when a unit is named for a person? _____
8. What isn't written in large numbers when using SI? _____
9. What is the symbol for the unit *mole*? _____
10. What unit has the symbol of cd? _____
11. What is the SI base unit for time? _____
12. What are TWO advantages of using SI? _____

13. SI prefixes are based on the number _____.
14. What does the prefix *centi-* mean? _____
15. What is the symbol for centimeter? _____
16. Which SI base unit contains an SI prefix? _____

2-2 The International System of Units

Every measurement is actually a comparison between the quantity being measured and a certain standard quantity called a *unit* of measurement. For example, suppose you measure a fence and find that it is 29.4 meters long. This means that the length of the fence is 29.4 times the length of a standard unit of length called the meter.

Units of measurement are needed for every quantity you wish to measure. You are free to make these any size you wish. You also can give them any names you choose. However, if you want your measurements to mean something to other people, you must agree on the units you will use. By international agreement, a set of units called “The International System of Units” has been defined for scientific work. These units also are called metric units or SI units. SI is an abbreviation for “Le Système International d’Unités,” which is French for “The International System of Units.”

SI has seven base units. The **SI base units** are the fundamental, basic units of The International System of Units. Everything that people now know how to measure can be measured using these seven base units or units derived from them. These base units are listed in Figure 2-3.

In Figure 2-3, notice that the first letter of a unit is never capitalized even when the unit has been named in honor of a person. So the units *ampere* and *kelvin*, named in honor of André Marie Ampère and Lord Kelvin, each begin with a “small” letter. However, the *symbols* for units named after people are capitalized. The symbols for the other units are not.

Writing large numbers using SI. The common practice in the United States when writing large numbers is to separate groups of three digits with commas, as in 79,288 and 14,202,000. The recommended practice in SI is to use a space rather than a comma. Following this recommendation, the numbers just mentioned would be written 79 288 and 14 202 000. Long decimals, such as 5.120276 and 0.000098, are written in SI as 5.120 276 and 0.000 098. This book uses spaces rather than commas, except for four-digit numbers, such as 2750 and 0.4692. In certain contexts, these four-digit whole numbers or decimals are written as shown—without either a comma or a space separating the digits.

SI Base Units		
Quantity	Name	Symbol
length	meter	m
mass	kilogram	kg
time	second	s
amount of substance	mole	mol
thermodynamic temperature	kelvin	K
electric current	ampere	A
luminous intensity	candela	cd

2-3 Advantages of Using SI

Scientists find that, compared with English units (inches, feet, yards, miles, pounds, pints, quarts, gallons, etc.), SI units make measuring and calculating easier. Calculations are easier because measurements that are not whole numbers are expressed as decimals rather than as fractions.

2-4 SI Prefixes

SI prefixes are prefixes that can be used with SI base units to form new SI units that are greater than or less than the base units by some multiple or submultiple of 10. For example, *centi-* is an SI prefix. It means one hundredth (1/100). When *centi-* is used with a base unit to form a new unit, the new unit has a value that is 1/100th the value of the base unit. Thus, when the prefix *centi-* is added to the base unit *meter*, the result is a *centimeter*, which is a length that is 1/100th the length of a meter. The symbol for the new unit is formed simply by combining the symbol for the prefix with the symbol for the base unit. Thus, by combining the symbol *c* of *centi-* with the symbol *m* of *meter*, you get *cm*, which is the symbol for *centimeter*. Figure 2-5 gives the names of the SI prefixes, their symbols, and their meanings.

If you look back to Figure 2-3, you will see that one of the seven base units is the unit for mass, the kilogram. This is the only base unit with a name that, for historical reasons, contains an SI prefix (the prefix *kilo-*).