Name _____ Date _____ Class _____

The International System of Units

For each statement, fill in the blank with the correct word(s) or number(s).

1. Units accepted according to the International System are called ___?___. 1. _____
2. The fundamental units of the International System are called ___?___. 2. _____
3. The number of these fundamental units is ___?___. 3. _____
4. Word fragments, such as *centi-* and *kilo-*, that can be attached to the names of fundamental units are called ___?___. 4. _____
5. Units made up of combinations of fundamental units are called ___?___. 5. _____
6. The gram is a unit of ___?___. 6. _____
7. The number of grams in a kilogram is ___?___. 7. _____
8. The cubic decimeter is a unit of ___?___. 8. _____
9. One thousandth of a cubic decimeter is equal to a ___?___. 9. _____
10. The meter is a unit of ___?___. 10. _____
11. One centimeter equals ___?___ of a meter. 11. _____
12. The second is a unit of ___?___. 12. _____
13. The abbreviation of *kilogram* is ___?___. 13. _____
14. The abbreviation of *cubic meter* is ___?___. 14. _____
15. The abbreviation of *meter* is ___?___. 15. _____
16. The abbreviation of *second* is ___?___. 16. _____
17. The abbreviation of *cubic centimeter* is ___?___. 17. _____
18. The abbreviation of *millimeter* is ___?___. 18. _____
19. The abbreviation of *cubic decimeter* is ___?___. 19. _____
20. The abbreviation of *microgram* is ___?___. 20. _____

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CONCEPTS

A. Metric Prefixes

Match the prefixes with their equivalents. Write the letter of the correct value on the space provided.

_____ 1. nano

_____ 2. centi

_____ 3. kilo

_____ 4. deci

_____ 5. milli

_____ 6. micro

A. 1/1000 (thousandth)
B. 1000 (thousand)
C. 1/10 (tenth)
D. 1/1 000 000 (millionth)
E. 1/1 000 000 000 (billionth)
F. 1/100 (hundredth)
G. 10 (ten)

B. Derived Units

EXAMPLE: Conversion

Convert 750 cm^3 to dm^3.

Solving process:

$$\frac{750\ \cancel{cm^3}}{} \left| \frac{1\ dm^3}{1000\ \cancel{cm^3}} \right. = 0.75\ dm^3$$

(For a more detailed presentation, check the example on pages 30–31 in the textbook.)

Convert.

1. _____ milligrams = 84 grams
2. _____ meters = 177 millimeters
3. _____ centimeters = 56 meters
4. _____ grams = 9.3 kilograms
5. _____ mL = 2.2 L
6. _____ mL = 500 cm^3
7. _____ dm^3 = 4.0 L
8. _____ cm^3 = 3.34 m^3
9. _____ seconds = 4.00 hours
10. _____ grams = 844 milligrams
11. _____ meters per second = 95 kilometers per hour
12. _____ minutes = 7 days

Practice Problems

Solve each of the following by using conversion factors and the factor-label method. Be sure to give the answers with the correct number of significant figures and to label all numbers with the appropriate units.

1. Calculate the number of kilometers (km) there are in 105 meters (m).

2. How many meters (m) are there in 2.0043×10^{-5} kilometers (km)?

3. A piece of property is found to be 499 decimeters (dm) long. What is the value of this length in centimeters (cm)?

4. Calculate the number of kilometers (km) there are in 1.549 micrometers (μm).

5. Calculate the length, in centimeters (cm), of an object that is 7.8835×10^{5} millimeters (mm) long.

6. How many millimeters are there in 5.97×10^{-6} meters (m)?

7. How many decimeters (dm) are there in 8.062 95 millimeters (mm)?

8. Calculate the number of centimeters (cm) there are in 6 245 101 kilometers (km).

9. How many meters (m) are there in 0.0031 kilometer (km)?

10. A very small object is found to have a length of 3.44×10^{-4} meter (m). Express this length in micrometers (μm).

11. Calculate the number of milligrams (mg) there are in 10.00 kilograms (kg).

12. A book is found to have a mass 0.6321 kilogram (kg). Calculate its mass in grams (g).

13. How many decigrams (dg) are there in 0.822 microgram (μg)?

14. Expressed in centigrams (cg), the mass of an object is 458 cg. What is the object's mass in milligrams (mg)?

15. Calculate the number of kilograms (kg) in 7.66×10^{5} grams (g).

16. How many kilograms (kg) are there in 2.023×10^{-3} milligram (mg)?

17. An object has a mass of 89.00 grams (g). Express this mass in centigrams (cg).

18. Calculate the number of micrograms (μg) in 0.000 311 gram (g).

19. What is the mass, in decigrams (dg), of an object whose mass is found to be 1.94×10^{-1} gram (g)?

20. Calculate the number of milligrams (mg) in 6.2×10^{4} micrograms (μg).

21. Calculate the number of cubic centimeters (cm^3) there are in 0.500 cubic decimeter (dm^3).

22. How many cubic meters (m^3) are there in 4312 cubic centimeters (cm^3)?

23. How many cubic decimeters (dm^3) are there in 1.733×10^{5} cubic meters (m^3)?

24. The volume of a sample of water is found to be 86.3 cubic centimeters (cm^3). What is the volume of the sample in cubic millimeters (mm^3)?

25. How many cubic decimeters (dm^3) are there in 5.94×10^{10} cubic centimeters (cm^3)?

26. Calculate the number of cubic centimeters (cm^3) in 16 cubic meters (m^3).

27. How many cubic millimeters (mm^3) are there in an object whose volume is found to be 8.3014×10^{-2} cubic meter (m^3)?

28. How many cubic kilometers (km^3) are there in 4.261×10^{4} cubic meters (m^3)?

29. Calculate the volume, in cubic decimeters (dm^3), of a rectangular object that is 1.07 m long, 0.2233 m wide, and 0.895 m high. (Recall that $V = l \times w \times h$.)

30. What is the volume, in cubic centimeters (cm^3), of a rectangular object that is 587 mm long, 93.5 mm wide, and 107.2 mm high?