

Use your "gold sheet" to fill in the blanks below.

1. 1 mL = 0.001 L  
 2. 1 Mm = 1,000,000 m  
 3. 1 kg = 1000 g  
 4. 1 dam = 10 m  
 5. 1 ng = 0.000 000 001 g  
 6. 1 hL = 100 L  
 7. 1 dm<sup>3</sup> = 1 L  
 8. 1 mL = 1 cm<sup>3</sup>  
 9. 1 m<sup>3</sup> = 1000 L  
 10. 25.15°C = 298.30 K  
 11. 85.5°F = 29.7 °C = 302.9 K

$$\begin{array}{r} 273.15 \\ + 25.15 \\ \hline 298.30 \end{array}$$



Nutrition Facts	
Serving Size 1 can	
Servings Per Container 1	
Amount Per Serving	
Calories 140	
	% Daily Value*
Total Fat 0g	0%
Sodium 45mg	2%
Total Carbohydrate 39g	13%
Sugars 39g	
Protein 0g	
Not a significant source of fat, calories, saturated fat, trans fat, cholesterol, fiber, vitamin A, vitamin C, calcium and iron.	
*Percent Daily Values are based on a 2,000 calorie diet.	

12. Read the label to the left. How many kilocalories of energy are present in a can of Coca-cola?

$$140 \text{ calories} \times \frac{1 \text{ Kcal}}{1000 \text{ cal}} = 0.140 \text{ Kcal}$$

13. Use the data in the label to determine the number of  $\mu\text{g}$  of sugar present in a can of Coke.

$$39 \text{ g} \times \frac{1 \mu\text{g}}{0.000001 \text{ g}} = 39000000 \mu\text{g} \text{ or } 3.9 \times 10^7 \mu\text{g}$$

14. Use the data in the label to determine the number of  $\text{dag}$  of sodium in a can of Coke.

$$45 \text{ mg} \times \frac{0.001 \text{ g}}{1 \text{ mg}} \times \frac{1 \text{ dag}}{10 \text{ g}} = 0.0045 \text{ dag} \text{ or } 4.5 \times 10^{-3} \text{ dag}$$

15. How many  $\text{dm}^3$  of Gatorade are there in one bottle of Gatorade?

$$591 \text{ mL} \times \frac{0.001 \text{ L}}{1 \text{ mL}} \times \frac{1 \text{ dm}^3}{1 \text{ L}} = 0.591 \text{ dm}^3$$

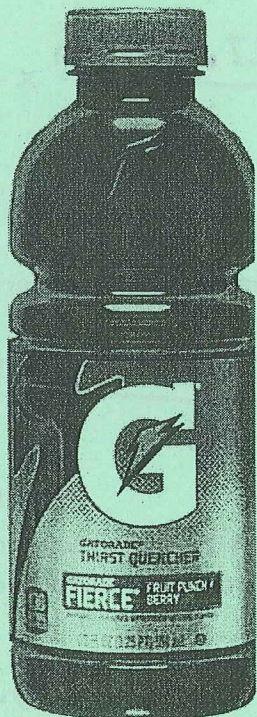
16. How many  $\text{dg}$  of potassium are present in one bottle of Gatorade?

$$75 \text{ mg} \times \frac{0.001 \text{ g}}{1 \text{ mg}} \times \frac{1 \text{ dg}}{0.1 \text{ g}} = 0.75 \text{ dg}$$

17. How many  $\text{ng}$  of sodium are present in one bottle of Gatorade?

$$270 \text{ mg} \times \frac{0.001 \text{ g}}{1 \text{ mg}} \times \frac{1 \text{ ng}}{0.000000001 \text{ g}} = 2.7 \times 10^8 \text{ ng}$$

Nutrition Facts	
Serving Size 1 Bottle (591 mL)	
Amount Per Serving	
Calories 130	
	% Daily Value*
Total Fat 0g	0%
Sodium 270mg	11%
Potassium 75mg	2%
Total Carbohydrate 34g	11%
Sugars 34g	
Protein 0g	
Not a significant source of calories from fat, saturated fat, trans fat, cholesterol, dietary fiber, vitamin A, vitamin C, calcium, and iron.	
*Percent Daily Values are based on a 2,000 calorie diet.	



WATER, SUGAR, DEXTROSE, CITRIC ACID, SALT, SODIUM CITRATE, NATURAL FLAVOR, MONOPOTASSIUM PHOSPHATE, GUM ARABIC, RED-40, GLYCEROL ESTER OF ROSIN



18. The current men's world record in the 100 meter dash is 9.58 seconds, set by Jamaica's Usain Bolt in 2009. The women's world record of 10.49 seconds was set by American Florence Griffith-Joyner in 1988.

Convert Bolt's time in the 100 meters to hs.

$$9.58 \cancel{s} \times \frac{1 \text{ hs}}{100 \cancel{s}} = \boxed{0.0958 \text{ hs}}$$

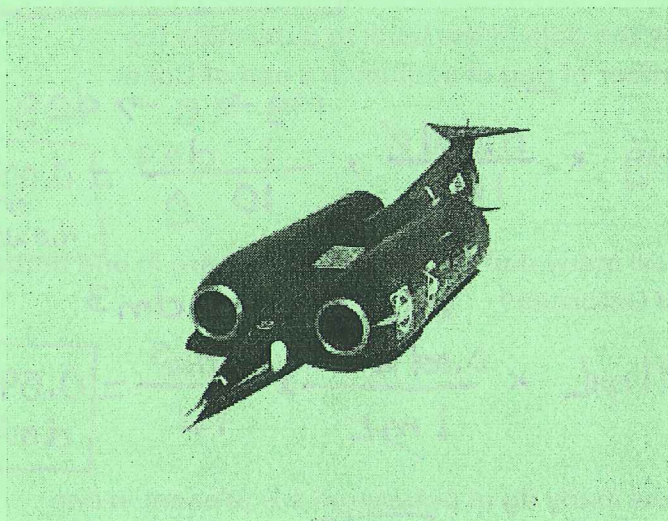
Convert Griffith-Joyner's time in the 100 meters to ps.

$$10.49 \cancel{s} \times \frac{1 \text{ ps}}{.000\,000\,000\,001 \cancel{s}} = \boxed{1.049 \times 10^{13} \text{ ps}}$$

19. Mike Powell currently holds the world record of 8.95 meters (29 feet, 4.25 inches) in the long jump. How many mm did he jump?

$$8.95 \cancel{m} \times \frac{1 \text{ mm}}{.001 \cancel{m}} = \boxed{8950 \text{ mm}}$$

20. The official land-speed record (measured over one mile) is 1,227.985 km/h (763.035 mi/h), set by Andy Green (UK) on 15 October 1997 in the Black Rock Desert, Nevada, USA, in Thrust SSC shown below.



What is Andy's record in cm/s?

$$\frac{1,227.985 \cancel{km}}{1 \cancel{h}} \times \frac{1000 \cancel{m}}{1 \cancel{km}} \times \frac{1 \text{ cm}}{.01 \cancel{m}} \times \frac{1 \cancel{h}}{60 \cancel{min}} \times \frac{1 \text{ min}}{60 \text{ s}} = \boxed{34,110.69 \text{ cm/s}}$$

What is Andy's record in hm/min?

$$\frac{1,227.985 \cancel{km}}{1 \cancel{h}} \times \frac{1000 \cancel{m}}{1 \cancel{km}} \times \frac{1 \text{ hm}}{100 \cancel{m}} \times \frac{1 \cancel{h}}{60 \cancel{min}} = \boxed{204.6642 \text{ hm/min}}$$

21. The official highest recorded temperature is 134°F, which was measured on 10 July, 1913 at Greenland Ranch, Death Valley, California, USA. Convert this temperature to Celsius and Kelvin.

$$^{\circ}\text{C} = \frac{(134 - 32)}{1.8} = \boxed{56.7^{\circ}\text{C}}$$

$$\text{K} = 273.15 + 56.7 = \boxed{329.9 \text{ K}}$$