Mole Conversion Game Question Solutions
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Questions with a yellow highlighter means that it can be a bit tricky.

1. How many moles are in 6.50g of NaCl?

$$6.50\text{g NaCl} \times \frac{1\ \text{mol}}{58.8\text{g NaCl}} = \textbf{0.111 mol NaCl}$$

2. How many Oxygen atoms are in 5.89mol of carbon dioxide?

$$5.89\text{mol } CO_2 \times \frac{6.022\times10^{23}\text{atoms}}{1\ \text{mol}} \times \frac{2\text{atoms O}}{1\ \text{molecule}} = \textbf{7.09 x } \mathbf{10^{24}}\textbf{ atoms O}$$

3. How many atoms are in 55g of H_2SO_4?

$$55\text{g } H_2SO_4 \times \frac{6.022 \times 10^{23}\text{atoms}}{1\ \text{mol}} \times \frac{1\text{mol}}{98.1\text{ g } H_2SO_4} = \textbf{3.4 atoms } \mathbf{H_2SO_4}$$

4. How many grams are in 4.56 mol of potassium phosphide?

$$4.56\text{ mol } K_3P \times \frac{148.3\text{ g } K_3P}{1\ \text{mol}} = \textbf{676 g } \mathbf{K_3P}$$

5. The molar mass of potassium cyanide is 65.12g/mol. About 300 mg of KCN will kill a person. If a spy puts 0.005 mol of KCN into a target's coffee, will he be dead when he drinks the coffee?

Convert 300 mg into grams:
Since 1 mg=0.001g, 300mg=0.3g

The spy puts:

$$0.005\text{ mol KCN} \times \frac{65.12\text{ g KCN}}{1\ \text{mol}} = 0.326\text{ g KCN into the coffee}$$

Since 0.3g of KCN can kill a person, the target will be dead if he drinks the coffee. He will

digest 0.326g of KCN.

6. Determine the number of molecules in 567.2g of $C_4H_{10}O$.

$$567.2\text{ g } C_4H_{10}O \times \frac{1\text{ mol}}{74\text{ g } C_4H_{10}O} = \textbf{7.665 molecules } \mathbf{C_4H_{10}O}$$

7. What is the number 6.022×10^{23} called?

Avogadro's number. If you don't believe it? Check out Ms.Chen's powerpoint for the proof.
http://sites.google.com/site/msppmchen/home

8. How many grams of glucose, $C_6H_{12}O_6$ are in 6.63×10^{23} molecules of glucose?

$$6.63 \times 10^{23}\text{ molecules } C_6H_{12}O_6 \times \frac{1\text{ mol}}{6.022 \times 10^{23}} \times \frac{180\text{ g } C_6H_{12}O_6}{1\text{ mol}} = \textbf{198 g } \mathbf{C_6H_{12}O_6}$$

9. How many moles of methanol,CH_3OH,are there in 6.53×10^{23} molecules of methanol?

$$6.53 \times 10^{23}\text{ molecules } CH_3OH \times \frac{1\text{ mol}}{6.022 \times 10^{23}\text{ molecules}} = \textbf{1.08 mol } \mathbf{CH_3OH}$$

10. Find the capicity in mLthat 10.0 moles of NaCl would occupy.
(Hint: density of NaCl is 2.17 g/mL)

$$10.0\text{ mol NaCl} \times \frac{58.45\text{ g NaCl}}{1\text{ mol NaCl}} \times \frac{1\text{ mL NaCl}}{2.17\text{ g NaCl}} = \textbf{269 mL NaCl}$$