

Example: You need 1.75 moles of iron. What mass of iron do you need to weigh out on the balance?

$$55.85 \text{ g Fe} = 1 \text{ mol Fe}$$

$$1.75 \text{ mol Fe} \times \frac{55.85 \text{ g Fe}}{1 \text{ mol Fe}} = 97.7 \text{ g Fe}$$

WHAT ABOUT COMPOUNDS? FORMULA WEIGHT

Example: 25.0 g of WATER contain how many MOLES of water molecules?
(H₂O)

$$\begin{array}{r} \text{H}_2\text{O} \quad \text{H: } 2 \times 1.008 = 2.016 \\ \quad \quad \quad \text{O: } \underline{1 \times 16.00 = 16.00} \\ \quad \quad \quad \quad \quad \quad 18.016 \end{array}$$

FORMULA WEIGHT of water

Formula weight = mass of one mole of either an element OR a compound!

$$18.016 \text{ g H}_2\text{O} = 1 \text{ mol H}_2\text{O}$$

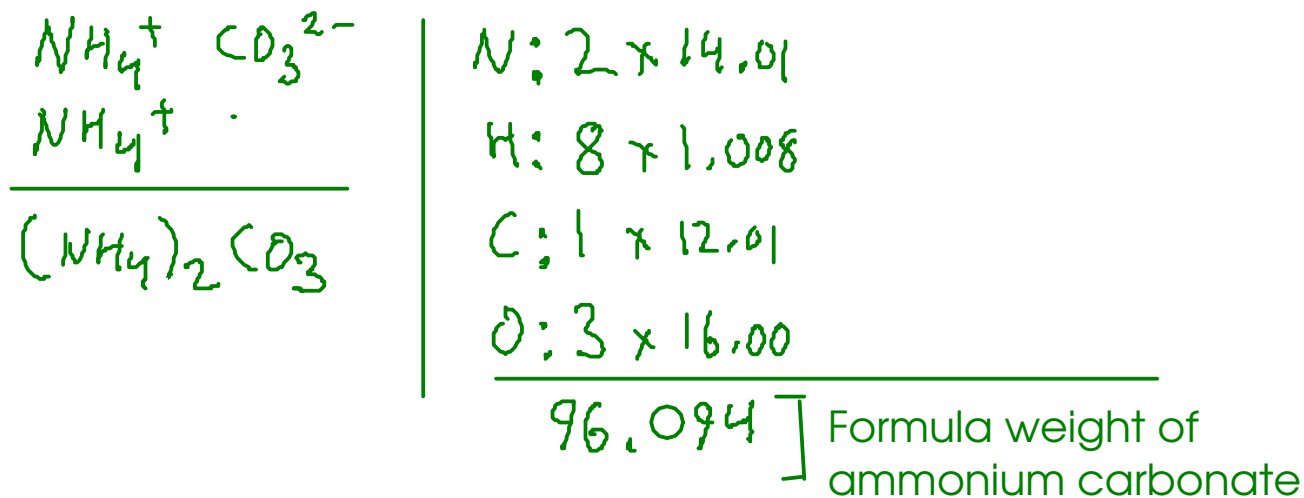
$$25.0 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.016 \text{ g H}_2\text{O}} = 1.39 \text{ mol H}_2\text{O}$$

Formula weight goes by several names:

- For atoms, it's the same thing as ATOMIC WEIGHT
- For molecules, it's called MOLECULAR WEIGHT
- Also called "MOLAR MASS"

Example: How many grams of ammonium carbonate do we need to weigh out to get 3.65 moles of ammonium carbonate?

First, find the formula of ammonium carbonate:



$$96.094 \text{ g } (\text{NH}_4)_2\text{CO}_3 = 1 \text{ mol } (\text{NH}_4)_2\text{CO}_3$$

$$3.65 \text{ mol } (\text{NH}_4)_2\text{CO}_3 \times \frac{96.094 \text{ g } (\text{NH}_4)_2\text{CO}_3}{1 \text{ mol } (\text{NH}_4)_2\text{CO}_3} = \boxed{351 \text{ g } (\text{NH}_4)_2\text{CO}_3}$$