

## Atomic Mass and the Atomic Mass Unit

### Mass Number

The number of particles in an atom that add to the mass of the atom, the protons ( $p^+$ ) and neutrons ( $n^0$ )

$$\text{Mass \#} = p^+ + n^0$$

### Atomic Mass

The mass of an atom based on the mass of the protons ( $p^+$ ) and neutrons ( $n^0$ ) in **atomic mass units** (*amu*) or grams (*g*)

### Atomic Mass Unit (amu)

The number of particles in an atom that add to the mass of the atom, the protons ( $p^+$ ) and neutrons ( $n^0$ )

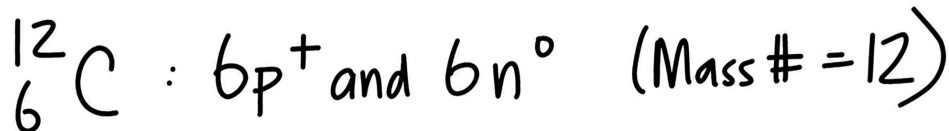
$$1 \text{ amu} = 1.67 \times 10^{-24} \text{ g}$$

### Average Atomic Mass

The mass of all isotopes of an atom averaged together based on the **relative abundance**, the % of all atoms each isotope occupies

9

## Comparing Atomic Mass (*amu and grams*)



Atomic Mass (amu)

$${}^{12}_6\text{C}_{\text{mass}} = \underline{12 \text{ amu}}$$

$${}^{13}_6\text{C}_{\text{mass}} = \underline{13 \text{ amu}}$$

Atomic Mass (g)

$$1 \text{ amu} = 1.67 \times 10^{-24} \text{ g}$$

$${}^{12}_6\text{C}_{\text{mass}} = \underline{2.004 \times 10^{-23} \text{ g}}$$

$${}^{13}_6\text{C}_{\text{mass}} = \underline{2.171 \times 10^{-23} \text{ g}}$$

10

## Atomic Mass and the Electron

$$p^+_{\text{mass}} = 1.67 \times 10^{-24} \text{ g}$$

$$n^0_{\text{mass}} = 1.67 \times 10^{-24} \text{ g}$$

$$e^-_{\text{mass}} = 9.11 \times 10^{-28} \text{ g}$$

$^{12}_6\text{C} \text{ (6}p^+, 6e^-, 6n^0\text{)}$	
With electrons	$  \begin{array}{l}  6 \cdot 1.67 \times 10^{-24} \text{ g} \\  6 \cdot 1.67 \times 10^{-24} \text{ g} \\  6 \cdot 9.11 \times 10^{-28} \text{ g}  \end{array}  \quad 2.0043 \times 10^{-24} \text{ g}  $
Without electrons	$  \begin{array}{l}  6 \cdot 1.67 \times 10^{-24} \text{ g} \\  6 \cdot 1.67 \times 10^{-24} \text{ g}  \end{array}  = 2.004 \times 10^{-24} \text{ g}  $
$e^- \text{ only add mass at } \pm 0.0003 \text{ g}$	