

GETTING STARTED

TRY THIS ACTIVITY: THE MINERAL CONTENT OF MILK

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Observations (answers will vary):

	Whole milk	Skim milk
Mass of evaporating dish (g)	32.791	32.794
Mass of milk residue (minerals) + evaporating dish (g)	32.810	32.809
Mass of milk residue (minerals) (g)	0.019	0.018

- (a) There does not seem to be a significant difference between the mineral content of whole milk and that of skim milk.
 (b) Whole milk and skim milk have approximately the same mineral content by mass.

2.1 AMOUNTS IN CHEMISTRY: MASS, MOLES, AND MOLAR MASS

PRACTICE

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Understanding Concepts

- $$m_{\text{H}} = (\text{percent abundance hydrogen-1} \times \text{atomic mass hydrogen-1})$$

$$+ (\text{percent abundance hydrogen-2} \times \text{atomic mass hydrogen-2})$$

$$= (0.99985 \times 1.01 \text{ u}) + (0.00015 \times 2.01 \text{ u})$$

$$= 1.01 \text{ u} + 0.000302 \text{ u}$$

$$m_{\text{H}} = 1.01 \text{ u}$$

The relative atomic mass of hydrogen is 1.01 u.

- The atomic mass unit is the standard mass used to determine the relative masses of all elements. The atomic mass unit, u , is equal to one-twelfth the mass of a carbon-12 atom.
- $$m_{\text{HBr}} = m_{\text{H}} + m_{\text{Br}}$$

$$= 1.01 \text{ u} + 79.90 \text{ u}$$

$$m_{\text{HBr}} = 80.91 \text{ u}$$

The molecular mass of hydrogen bromide is 80.91 u.

- $$m_{\text{C}_6\text{H}_{12}\text{O}_6} = 6(m_{\text{C}}) + 12(m_{\text{H}}) + 6(m_{\text{O}})$$

$$= 6(12.01 \text{ u}) + 12(1.01 \text{ u}) + 6(16.00 \text{ u})$$

$$= 72.06 \text{ u} + 12.12 \text{ u} + 96.00 \text{ u}$$

$$m_{\text{C}_6\text{H}_{12}\text{O}_6} = 180.18 \text{ u}$$

The molecular mass of glucose is 180.18 u.

- $$m_{\text{NaHCO}_3} = m_{\text{Na}} + m_{\text{H}} + m_{\text{C}} + 3(m_{\text{O}})$$

$$= 22.99 \text{ u} + 1.01 \text{ u} + 12.01 \text{ u} + 3(16.00 \text{ u})$$

$$m_{\text{NaHCO}_3} = 84.01 \text{ u}$$

The formula unit mass of sodium hydrogen carbonate is 84.01 u.