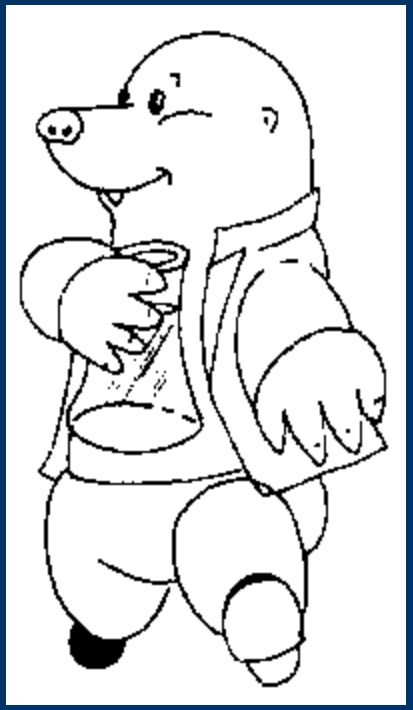
Cycle 2 Chemistry II Lesson 1

Introduction to the “Mole”

LAB THURSDAY! DRESS ACCORDINGLY!

Agenda:

- Mole Presentation
- “What is a Mole” Handout



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A "Mole" is the SI unit for Amount of a substance

- A Mole is equal to 6.022×10^{23} particles.
  - This is known as "Avogadro's Number"
  - Use this when you convert mass↔number of atoms or molecules

- A Mole is one "Molar Mass" of an element or compound
  - Add up element masses from your Periodic Table!
  - Use this when you convert grams↔moles

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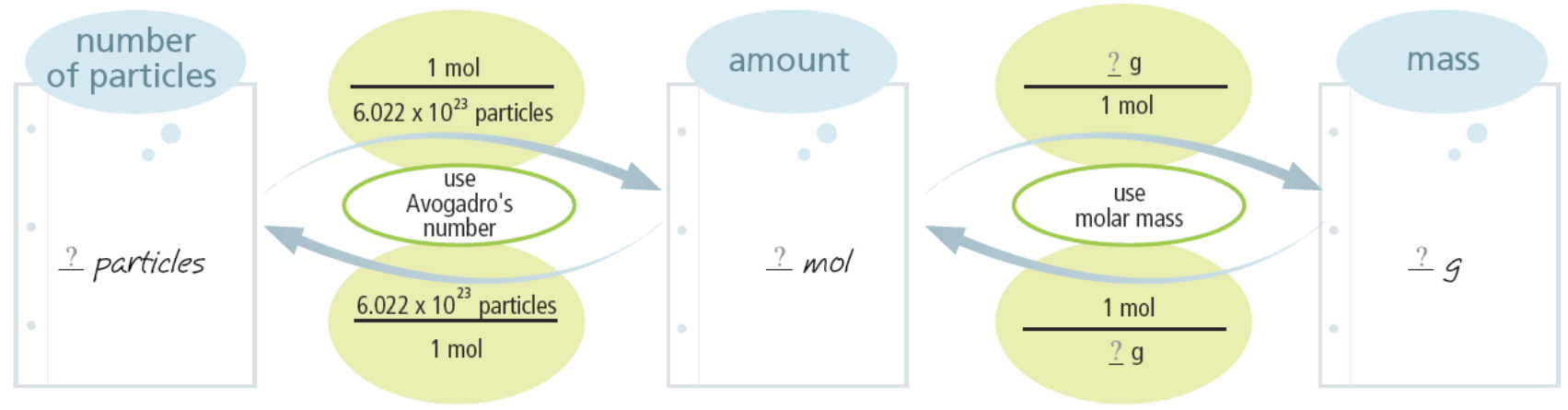
Converting Between Mass, Amount, and Number of Particles



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The Mole's Two Jobs : particles ↔ moles ↔ grams

Use 6.022×10^{23}	Use Periodic Table
When calculating number of ATOMS or MOLECULES	When calculating number of GRAMS
Mainly useful in TEXTBOOK problems	Useful in book problems and in CHEMISTRY LABS

A "Mole" provides a CONNECTION between grams and numbers of atoms or molecules!

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Molar Mass

6.02×10^{23} iron atoms = 1 mol iron = 55.78 g of iron

55.78 g/mol = molar mass of iron

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Chapter menu

Resources

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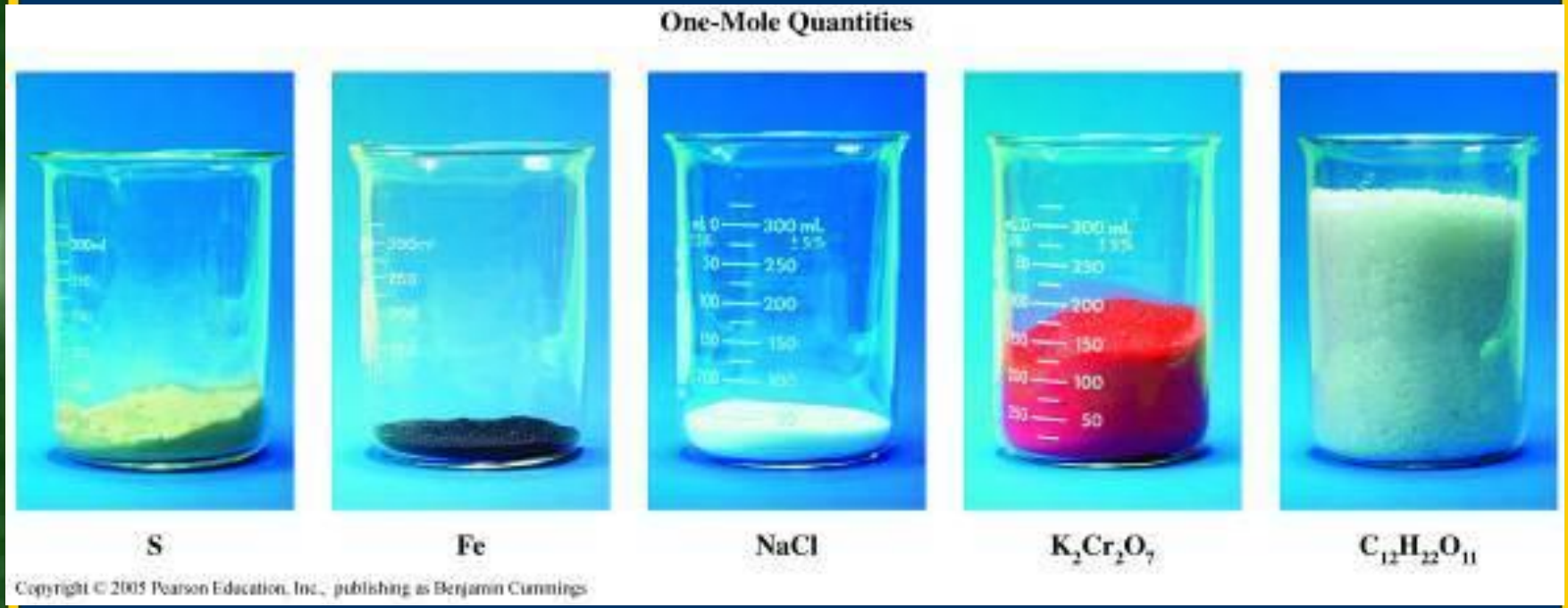
One Mole of Different Substances:



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Calculating Molar Mass:

Use your Periodic Table. Add up Atomic Mass to get mass of one mole in grams

1 mole Fe = 55.845 g

1 mole C = 12.011 g

1 mole He = 4.0026 g

1 mole NaCl = 22.990 g + 35.453 g = 58.443 g

1 mole H_2O = 2 x (1.0079 g) + 15.999 g = 18.015 g

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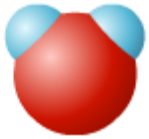
Molar Mass



H_2O

Water molecule

Play

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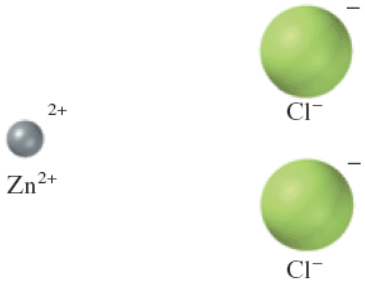
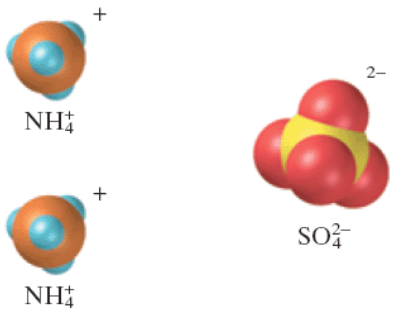
Calculating Molar Mass for Ionic Compounds

Formula	Formula unit	Calculation of molar mass
$ZnCl_2$		1 Zn = 1 × 65.39 g/mol = 65.39 g/mol + 2 Cl = 2 × 35.45 g/mol = 70.90 g/mol $ZnCl_2$ = 136.29 g/mol
$ZnSO_4$		1 Zn = 1 × 65.39 g/mol = 65.39 g/mol 1 S = 1 × 32.07 g/mol = 32.07 g/mol + 4 O = 4 × 16.00 g/mol = 64.00 g/mol $ZnSO_4$ = 161.46 g/mol
$(NH_4)_2SO_4$		2 N = 2 × 14.01 g/mol = 28.02 g/mol 8 H = 8 × 1.01 g/mol = 8.08 g/mol 1 S = 1 × 32.07 g/mol = 32.07 g/mol + 4 O = 4 × 16.00 g/mol = 64.00 g/mol $(NH_4)_2SO_4$ = 132.17 g/mol

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