**CHEMISTRY 2022-23 November 23, 2022**

**Today’s Agenda (Day 57)**

1. HOUSEKEEPING ITEMS

**🡪**  BRING: ammonia, effervescent tablets, Epsom salts

1. Homework Check:

🡪 Practice Problems 9.1 – 9.5

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1. Class Activity:

🡪 **LAUNCH LAB 10: How much is a mole?** - see p. 2 of the document

 **\*Work in PAIRS**

🡪 MONDAY: DAY 1: Chapter 10 PPT Review

1. Section 10.1 – Measuring Matter
2. Section 10.2 – Mass and the Mole
3. Section 10.3 – Moles of Compounds
4. Section 10.4 – Empirical and Molecular Formulas
5. Section 10.5 – Formulas of Hydrates

HOMEWORK:

* READ: Chapter 10 – The Mole
* COMPLETE:
* STUDY: Chapter 9 Test, Chapter 9 - 11 Vocabulary Quiz

Chapter 10 – The Mole

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Avogadro’s number | Empirical formula | hydrate | Molar mass | Mole | Molecular formula | Percent composition |

Chapter 11 – Stoichiometry

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Actual yield | Excess reactant | Limiting reactant | Mole ratio | Percent yield | Stoichiometry | Theoretical yield |

REMINDERS:

* TEST: **Ch 10 🡪 Dec. 1**
* TEST: **Ch 11 🡪 Dec. 8**
* **MIDTERM EXAM: Ch 1 - 11**

**CHEMISTRY 2022-23 LAUNCH LAB**

**CHAPTER 10 LAUNCH LAB – How Much is a Mole?**

Counting large numbers of items is easier when you use counting units such as decades or dozens. Chemists use a counting unit called the mole.

**Procedure **

1. Read and complete the lab safety form.

2. Select an item to measure, such as a paper clip, gum drop, or marshmallow, from the choices provided by your teacher. WARNING: Do not eat or taste any items used in the lab.

3. Use a ruler to measure the length of your item to the nearest 0.1 cm.

**Analysis**

1. Calculate If a mole is 6.02 × 10 23 items, how far will a mole of your items, placed end-to-end lengthwise, extend into space? Express your answer in meters.

2. Calculate Convert the distance in Question 1 to light-years (ly). (1 ly = 9.46 × 10 15 m)

3. Compare the distance you calculated in Question 2 with these astronomical distances:

a. distance to nearest star (other than the Sun) = 4.3 ly

b. distance to the center of our galaxy = 30,000 ly

c. distance to nearest galaxy = 2 × 10 6 ly

**Inquiry**

Compare your item to another used by one of your classmates.

Would a mole of your item have the same mass as a mole of the other item?

Design an investigation to determine if there is a relationship between mass and moles.

**CHEMISTRY 2022-23 PRACTICE PROBLEMS**

**CHAPTER 10 – The Mole**

**Practice Problems 10.1 –** Converting Particles to Moles



**Practice Problems 10.2 –** Mole-to-Mass Conversion



**Practice Problems 10.3 –** Mass-to-Mole Conversion



**Practice Problems 10.4 –** Mass-to-Atoms Conversion

**Practice Problems 10.5 –** Atoms-to-Mass Conversion



**Practice Problems 10.6 –** Mole Relationships from a Chemical Formula



**Practice Problems 10.7 –** Mole-to-Mass Conversion for Compounds



**Practice Problems 10.8 –** Mass-to-Mole Conversion for Compounds

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 **Practice Problems 10.9 –** Conversion from Mass to Moles to Particles

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 **Practice Problems 10.10 –** Calculating Percent Composition



 **Practice Problems 10.11 –** Empirical Formula from Percent Composition



**Practice Problems 10.12 –** Determining a Molecular Formula

**Practice Problems 10.13 –** Calculating an Empirical Formula from Mass Data



 **Practice Problems 10.14 –** Determining the Formula of a Hydrate



**CHEMISTRY 2022-23 MINI LAB**

**CHAPTER 10 MINI LAB – Analyze Chewing Gum**

Are sweetening and flavoring added as a coating or mixed throughout chewing gum?

**Procedure **

1. Read and complete the lab safety form.

2. Unwrap two pieces of chewing gum. Place each piece on a weighing paper. Measure and record each mass using a balance. WARNING: Do not eat any items used in the lab.

3. Add 150 mL of cold tap water to a 250-mL beaker. Place one piece of chewing gum in the water, and stir with a stirring rod for 2 min.

4. Pat the gum dry using paper towels. Measure and record the mass of the dried gum.

5. Use scissors to cut the second piece of gum into small pieces. Repeat Step 3 using fresh water. Keep the pieces from clumping together. **WARNING: Use caution with scissors**.

6. Use a 10-cm × 10-cm piece of window screen to strain the water from the gum. Pat the gum dry using paper towels. Measure and record the mass of the dried gum.

**Analysis**

1. Calculate For the uncut piece of gum, calculate the mass of sweeteners and flavorings that dissolved in the water. The mass of sweeteners and flavorings is the difference between the original mass of the gum and the mass of the dried gum.

2. Calculate For the gum cut into small pieces, calculate the mass of dissolved sweeteners and flavorings.

3. Apply For each piece of gum, determine the percent of the original mass from the soluble sweeteners and flavorings.

4. Infer What can you infer from the two percentages? Is the gum sugar-coated or are the sweeteners and flavorings mixed throughout?

**CHEMISTRY 2022-23 LAUNCH LAB**

**CHAPTER 9 LAUNCH LAB – How do you know when a chemical change has occurred**

An indicator is a chemical that is added to the substances in a chemical reaction to show when change occurs.

**Procedure **

1. Read and complete the lab safety form.

2. Measure 10.0 mL of distilled water in a 25-mL graduated cylinder and pour it into a 100-mL beaker. Using a pipette, add one drop of 0.1M ammonia to the water. WARNING: Ammonia vapors are extremely irritating.

3. Stir 15 drops of universal indicator into the solution with a stirring rod. Observe the solution’s color. Measure its temperature with a thermometer.

4. Drop an effervescent tablet into the solution. Observe what happens. Record your observations, including any temperature change.

**Analysis**

1. Describe any changes in the color or temperature of the solution.

2. Explain Was a gas produced? If so, what did you observe to support this conclusion?

3. Analyze Did a physical change or a chemical change occur? Explain.

**Inquiry**

What does the universal indicator tell you about the solution? Design an experiment to support your prediction.

**CHEMISTRY 2022-23 MINI LAB**

**CHAPTER 9 MINI LAB – Observe a Precipitate – Forming Reaction**

**How do two liquids form a solid?**

**Procedure** 

1. Read and complete the lab safety form.

2. Place 50 mL distilled water in a 150-mL beaker.

3. Measure about 4 g NaOH pellets on a balance. Add the NaOH pellets to the beaker one at a time. Mix with a stirring rod until each NaOH pellet dissolves before adding the next pellet.

4. Measure about 6 g Epsom salts (MgSO4) and place it in another 150-mL beaker. Add 50 mL distilled water to the Epsom salts. Mix with another stirring rod until the Epsom salts dissolve.

5. Slowly pour the Epsom salts solution into the NaOH solution. Record your observations.

6. Stir the new solution. Record your observations.

7. Allow the precipitate to settle, then decant the liquid from the solid into a 100-mL graduated cylinder. 8. Dispose of the solid as instructed by your teacher.

**Analysis**

1. Write a balanced chemical equation for the reaction between the NaOH and MgSO4. Note that most sulfate compounds exist as ions in aqueous solutions.

2. Write the complete ionic equation for this reaction.

3. Determine which ions are spectator ions, then write the net ionic equation for this reaction.