

Discovery Lab Post-Visit Activities Advanced ChemLab Grades 9-12

We hope that you enjoyed your visit to the Orlando Science Center! As a means of enhancing and extending your students' Discovery Lab experience into the classroom, we are providing you with these post-visit materials to share with your class.

Discussion Topics:

- In the lab, we separated mixtures by their physical properties. Think about what physical properties of a substance are. What are some other methods that separate mixtures?
- In the lab, we did an experiment to see how temperature affects reaction rates. A lot of chemical reactions happen in cooking. What types of chemical reactions happens when you're cooking, and how are the reactions related to temperature?
- Given the mixture, you had to create a method to separate it. Sometimes scientists aren't always given a direct procedure of how to complete a task, they're just given the expected result. What is an example of another time that creation of a method is (or was) required?

In Class Activities:

- One sign of a chemical reaction is the production of gas. A characteristic of gas is that it fills up whatever container it is in. If a lot of gas is produced in a small space, the pressure increases. If the pressure is released quickly, it can produce thrust. You can utilize this thrust to make a pop rocket. You need a film canister with a lid, some water, and an effervescent antacid tablet. Open the film canister and fill it about halfway with water. Put some safety goggles on. Break the tablet in half and quickly drop the effervescent antacid tablet into canister. QUICKLY put the top on, turn it upside-down, and then step back. The gas produced will increase the pressure inside the canister and cause it to pop up and away from the ground, like a rocket!
- The liquid in a black marker is a solution. Do you think the pigment in a maker can be separated? You need a coffee filter, a black washable marker, a black permanent marker, water and isopropyl alcohol. You will have 4 different tests. Put a dot of the permanent marker on each of two filters. Put a dot of the washable marker on each of the two other filters. Use a dropper to drop about 4 drops of water; onto one of the permanent marker dots and one onto the washable marker drops. Then drop about 4 drops of alcohol onto the remaining dots. Observe what happens. Black ink is a mixture of several colored dyes. The different colored dyes move different distances, depending on the color and the type of liquid used.
- Chemical changes can separate matter. In this experiment, you can separate the substances that make up pennies (copper coating and zinc interior). Collect pennies that were made after 1983. Scrape off copper coating on a rough surface. This will scratch off the copper coating and reveal the zinc interior. Place pennies in a beaker of hydrochloric acid (liquid toilet bowl cleaner, muriatic acid, or hydrochloric acid solution). Let pennies sit in the acid for several days. When the pennies start to float in the liquid, they are done. Place beaker under running water for several minutes before handling pennies. Take out pennies and make observations. The copper should now be paper-thin and the zinc interior should be missing.

Math Problems:

- If you have a liter of water and add 25 mL of water to it, how much water will you have total?
- A certain reaction takes 5 seconds at 60 °C and 7.5 seconds at 85 °C. How long will a reaction take at 90 °C?
- Complete the chart:

Tool	Measures	SI Unit
Ruler	Length	
	Mass	
		Seconds
		Kelvin

Writing Prompt:

During the lab, we tested how temperature affected the reaction rate. Think about how molecules are different in solids, liquids and gasses. Use what you know about reactions and states of matter to explain why temperature affects the rate of reaction.

Art Project:

Create a poster explaining the steps of how to separate a mixture by its physical properties. Think about the process your group took to separate the mixture using the necessary tools and what they helped to separate.

Additional Resources:

Janice VanCleave's Chemistry for Every Kid: 101 Easy Experiments that Really Work by Janice VanCleave

Adventures With Atoms and Molecules: Chemistry Experiments for Young People by Robert Mebane and Thomas Rybolt

Chemistry (DK Eyewitness Books) by Ann Newmark