

Periodicity Lab

HS-PS1-1

PERIODICITY LAB

Lesson Duration: 60 Minutes + 10 Introductory Lab Prep

Description

This lab has students looking at the reactivity of alkaline earth metals with sulfate using well plates. Students will be creating various solutions of alkaline earth metal solutions and testing these solutions to gauge relative reactivity at different concentrations. In addition to doing the groups for each element. After collecting their data, they will answer various lab analysis questions about reactivity trends of metals, draw their models, and determine how this trend would differ for non-metals.

Use the included Periodicity Lab Prep Sheet to put your lab together!

This product comes with an answer key!

NGSS Alignment:

Performance Expectation: HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

Disciplinary Core Idea: PS1-4 Structure and Properties of Matter: Every atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. The periodic table orders elements horizontally by the number of protons in the atoms' nucleus and groups those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states.

Cross-Cutting Concepts: Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.

Science and Engineering Practices: Use a model to predict the relationships between systems or between components of a system.

Lesson Objectives

Students will be able to...

1. Identify trends in reactivity of metals and non-metals in the periodic table.

Name _____ Date _____ Period _____

Periodicity Lab Why?

The periodic table can be used to predict the physical and chemical properties of elements and their compounds. This lab activity investigates the reactivity of group 2A ions (Alkaline Earth Metals) with the sulfate ion, SO_4^{2-} . By varying the amount of each group 2A ion present, you will determine the reactivity of each ion, and determine a pattern based on the position of the ion in the periodic table.

In this lab, we will observe the results of reactions involving alkaline earth metal ions and determine a pattern of reactivity of the elements in the family.

Materials:

- | | | |
|----------------|---------------------------|---------------------------|
| • Goggles | • Test tubes | • 0.10 M Sr^{2+} |
| • Well plate | • Distilled water | • 0.10 M Ba^{2+} |
| • Pipets | • 0.10 M Mg^{2+} | • 0.10 M NO_3^- |
| • Filter paper | • 0.10 M Ca^{2+} | |

Procedure:

1. Obtain and put on goggles.
2. Using a pipet, place ~10 drops of distilled water into wells A2-A5, B2-B5, C2-C5, and D2-D5. Wells A1, B1, C1, and D1 should be empty.
3. Using a different pipet for each ion solution, place ~20 drops of Mg^{2+} into well A2, ~20 drops of Ca^{2+} into well B2, ~20 drops of Sr^{2+} into well C2, and ~20 drops of Ba^{2+} into well D2.
4. Using the 10g pipet, remove half the solution from A2 and place it into well A1. Mix the solution in A2 with a test tube.
5. Using the 10g pipet, remove half the solution from A2 and place it into well A3. Mix the solution in A2 with the same test tube.
6. Using the 10g pipet, remove half the solution from A2 and place it into well A4. Mix the solution in A2 with the same test tube.
7. Using the 10g pipet, remove half the solution from A2 and place it into well A5. Mix the solution in A2 with the same test tube.

Periodicity Lab Answer

KJ Lindholm-Leary

A red circular graphic with a gradient, appearing as a semi-circle or a partial circle, located to the right of the author's name.

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Periodicity Lab Answer Introduction

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