

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 reactivity 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 shells.

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

Minjie Lin

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

Periodicity Lab Answer:

Hands-On General Science Activities With Real-Life Applications Pam Walker, Elaine Wood, 2008-04-21 In this second edition of Hands On General Science Activities with Real Life Applications Pam Walker and Elaine Wood have completely revised and updated their must have resource for science teachers of grades 5 12 The book offers a dynamic collection of classroom ready lessons projects and lab activities that encourage students to integrate basic science concepts and skills into everyday life

Laboratory Manual for Fundamentals of Chemistry 3/E Jo A. Beran, 1988

Scientific and Technical Aerospace Reports, 1994 Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database

Cloud Nucleation C. Guy Suits, 2013-10-22 The Collected Works of Irving Langmuir Volume 11 Cloud Nucleation presents the papers written by Dr Irving Langmuir on the study of artificial nucleation of clouds to produce precipitation The compilation provides the study of every possible aspect of cloud and weather modification This volume contains chapters that are devoted to the discussion of such subjects as the nucleation of clouds with dry ice the analysis of photographic data showing the effects produced by supercooled clouds with ice nuclei the production of rain by a chain reaction in cumulus clouds at temperatures above freezing nucleation of clouds with silver iodide and basic discoveries underlying weather modification Meteorologists will find the book interesting and invaluable

Sustainable Green Chemistry Mark Anthony Benvenuto, 2017-04-10 Sustainable Green Chemistry the 1st volume of Green Chemical Processing covers several key aspects of modern green processing The scope of this volume goes beyond bio and organic chemistry highlighting the ecological and economic benefits of enhanced sustainability in such diverse fields as petrochemistry metal production and wastewater treatment The authors discuss recent progresses and challenges in the implementation of green chemical processes as well as their transfer from academia to industry and teaching at all levels Selected successes in the greening of established processes and reactions are presented including the use of switchable polarity solvents actinide recovery using ionic liquids and the removal of the ubiquitous bisphenol A molecule from effluent streams by phytodegradation

Fixed Point Theory And Applications - Proceedings Of The Second International Conference Kok Keong Tan, 1992-08-08 This volume contains current works of researchers from twelve different countries on fixed point theory and applications Topics include in part nonexpansive mappings multifunctions minimax inequalities applications to game theory and computation of fixed points It is valuable to pure and applied mathematicians as well as computing scientists and mathematical economists

Energy Research Abstracts, 1992-10

Chaos Kathleen T. Alligood, Tim D. Sauer, James A. Yorke, 2006-04-06 Developed and class tested by a distinguished team of authors at two universities this text is intended for courses in nonlinear dynamics in either mathematics or physics The only prerequisites are calculus differential equations and linear algebra Along with discussions of the major topics including discrete dynamical systems chaos fractals nonlinear

differential equations and bifurcations the text also includes Lab Visits short reports that illustrate relevant concepts from the physical chemical and biological sciences There are Computer Experiments throughout the text that present opportunities to explore dynamics through computer simulations designed for use with any software package And each chapter ends with a Challenge guiding students through an advanced topic in the form of an extended exercise Merrill

Chemistry-Lab.Manual Smoot,1994-07 **The Chemical News and Journal of Physical Science** ,1920 **Chemical News and Journal of Physical Science** William Crookes,James H. Gardiner,Gerald Druce,H. W. Blood-Ryan,1920

Report of the ... Meeting British Association for the Advancement of Science. Meeting,1920 *The Chemical News* ,1920 *Applied Mechanics Reviews* ,1981 **Report of the Annual Meeting** British Association for the Advancement of Science. Meeting,1920 Handbook of Research on Modern Cryptographic Solutions for Computer and Cyber Security Gupta, Brij,Agrawal, Dharma P.,Yamaguchi, Shingo,2016-05-16 Internet usage has become a facet of everyday life especially as more technological advances have made it easier to connect to the web from virtually anywhere in the developed world However with this increased usage comes heightened threats to security within digital environments The Handbook of Research on Modern Cryptographic Solutions for Computer and Cyber Security identifies emergent research and techniques being utilized in the field of cryptology and cyber threat prevention Featuring theoretical perspectives best practices and future research directions this handbook of research is a vital resource for professionals researchers faculty members scientists graduate students scholars and software developers interested in threat identification and prevention **Nuclear Science Abstracts** ,1970-07 *ERDA Energy Research Abstracts* ,1983 **Report summaries** United States. Environmental Protection Agency,1983 **Human Factors Engineering Bibliographic Series** ,1965

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Table of Contents Periodicity Lab Answer

1. Understanding the eBook Periodicity Lab Answer
 - The Rise of Digital Reading Periodicity Lab Answer
 - Advantages of eBooks Over Traditional Books
2. Identifying Periodicity Lab Answer
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Periodicity Lab Answer
 - User-Friendly Interface
4. Exploring eBook Recommendations from Periodicity Lab Answer
 - Personalized Recommendations
 - Periodicity Lab Answer User Reviews and Ratings
 - Periodicity Lab Answer and Bestseller Lists
5. Accessing Periodicity Lab Answer Free and Paid eBooks

- Periodicity Lab Answer Public Domain eBooks
- Periodicity Lab Answer eBook Subscription Services
- Periodicity Lab Answer Budget-Friendly Options
- 6. Navigating Periodicity Lab Answer eBook Formats
 - ePub, PDF, MOBI, and More
 - Periodicity Lab Answer Compatibility with Devices
 - Periodicity Lab Answer Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Periodicity Lab Answer
 - Highlighting and Note-Taking Periodicity Lab Answer
 - Interactive Elements Periodicity Lab Answer
- 8. Staying Engaged with Periodicity Lab Answer
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Periodicity Lab Answer
- 9. Balancing eBooks and Physical Books Periodicity Lab Answer
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Periodicity Lab Answer
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Periodicity Lab Answer
 - Setting Reading Goals Periodicity Lab Answer
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Periodicity Lab Answer
 - Fact-Checking eBook Content of Periodicity Lab Answer
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development

- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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