

The Periodic Law Activity

Name/Number: _____

Introduction The present organization of the elements is a product of the first periodic table published by Dmitri Mendeleev in 1869. The amazing accuracy of his predictions has been very important to chemists in this century. However, the basis of his arrangement was the atomic mass of the elements. This approach proved incorrect as it would have placed some elements in a family with dissimilar properties. Henry Moseley rearranged the table on the basis of the atomic numbers of the elements. In accordance with Moseley's revision, the **periodic law** states: *the properties of the elements are periodic functions of their atomic numbers*. Each of the 115 known elements has a unique set of characteristic properties. These range from solid to gas, lustrous to dull, low to high melting points, various colors, and so on. The elements are arranged within the periodic table into groups or families (vertical columns) and periods (horizontal rows). This arrangement reflects the periodic or repeating nature of the properties of the elements.

Learning Target Students will describe the following trends: atomic radii, ionization energy and electronegativity.

What the Numbers in the boxes mean

Atomic #	Code letter	Symbol
Ionization Energy (kJ/mol)		Phase
Atomic radius (pm)		Electronegativity

Procedure

- Each block on the table represents a different element from the first 4 periods of Groups 1, 2 and 13-18.
- Cut out blocks A - Z.
- The following sets of elements are in families: ZRD, PSIF, JXBE, LHT, QKA, WOV, GUN, and YMC.
- Use the following clues and arrange the elements in their proper order on the blank table provided.

J has an atomic number three times that of T.
 The atomic mass of L is 40.08 amu.
 U has a total of six electrons.
 S is an alkali metal.
 E is a noble gas.
 W is a liquid.
 Z has the smallest atomic mass in its group.
 B has ten protons.
 I has the largest atomic number in its group.
 O has an atomic number larger than V.
 D has the largest atomic mass of its group.
 X has an atomic number one higher than F.

L is an alkaline earth metal.
 S forms a compound with O that is used as a seasoning on food.
 Y is a metalloid.
 O is a halogen.
 The atomic mass of T is more than that of H.
 Q has an atomic mass 2 times that of A.
 M has an atomic number one less than that of A.
 The electrons of N are distributed over three energy levels.
 R has 13 protons in its nucleus.
 A is essential for all animals to breathe.
- When you have placed these 26 elements in their correct position, glue them in place.
- Check with your instructor for the correct answer.

Questions Answer questions 2 and 3 in complete sentences.

- In each block, fill in the element's atomic number in the upper left-hand corner and the element's correct symbol in the upper right hand corner. Attach this table to the FRONT of your lab when you turn it in.
- Define each of the following terms. Then examine your completed table. What *general observations* can be made of trends within *periods and groups* for the following properties? In your answer, include whether the following values tend to increase or decrease across the period and then whether it increases or decreases down a group. Please look at going left to right across the period and from top to bottom in the group.
 - Ionization Energy

Periodic Law Lab Answers

Daniela Niemeyer



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Table of Contents Periodic Law Lab Answers

1. Understanding the eBook Periodic Law Lab Answers
 - The Rise of Digital Reading Periodic Law Lab Answers
 - Advantages of eBooks Over Traditional Books
2. Identifying Periodic Law Lab Answers
 - 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 Periodic Law Lab Answers
 - User-Friendly Interface
4. Exploring eBook Recommendations from Periodic Law Lab Answers
 - Personalized Recommendations
 - Periodic Law Lab Answers User Reviews and Ratings
 - Periodic Law Lab Answers and Bestseller Lists
5. Accessing Periodic Law Lab Answers Free and Paid eBooks
 - Periodic Law Lab Answers Public Domain eBooks
 - Periodic Law Lab Answers eBook Subscription Services
 - Periodic Law Lab Answers Budget-Friendly Options
6. Navigating Periodic Law Lab Answers eBook Formats

- ePub, PDF, MOBI, and More
- Periodic Law Lab Answers Compatibility with Devices
- Periodic Law Lab Answers Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Periodic Law Lab Answers
 - Highlighting and Note-Taking Periodic Law Lab Answers
 - Interactive Elements Periodic Law Lab Answers
- 8. Staying Engaged with Periodic Law Lab Answers
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Periodic Law Lab Answers
- 9. Balancing eBooks and Physical Books Periodic Law Lab Answers
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Periodic Law Lab Answers
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Periodic Law Lab Answers
 - Setting Reading Goals Periodic Law Lab Answers
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Periodic Law Lab Answers
 - Fact-Checking eBook Content of Periodic Law Lab Answers
 - 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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