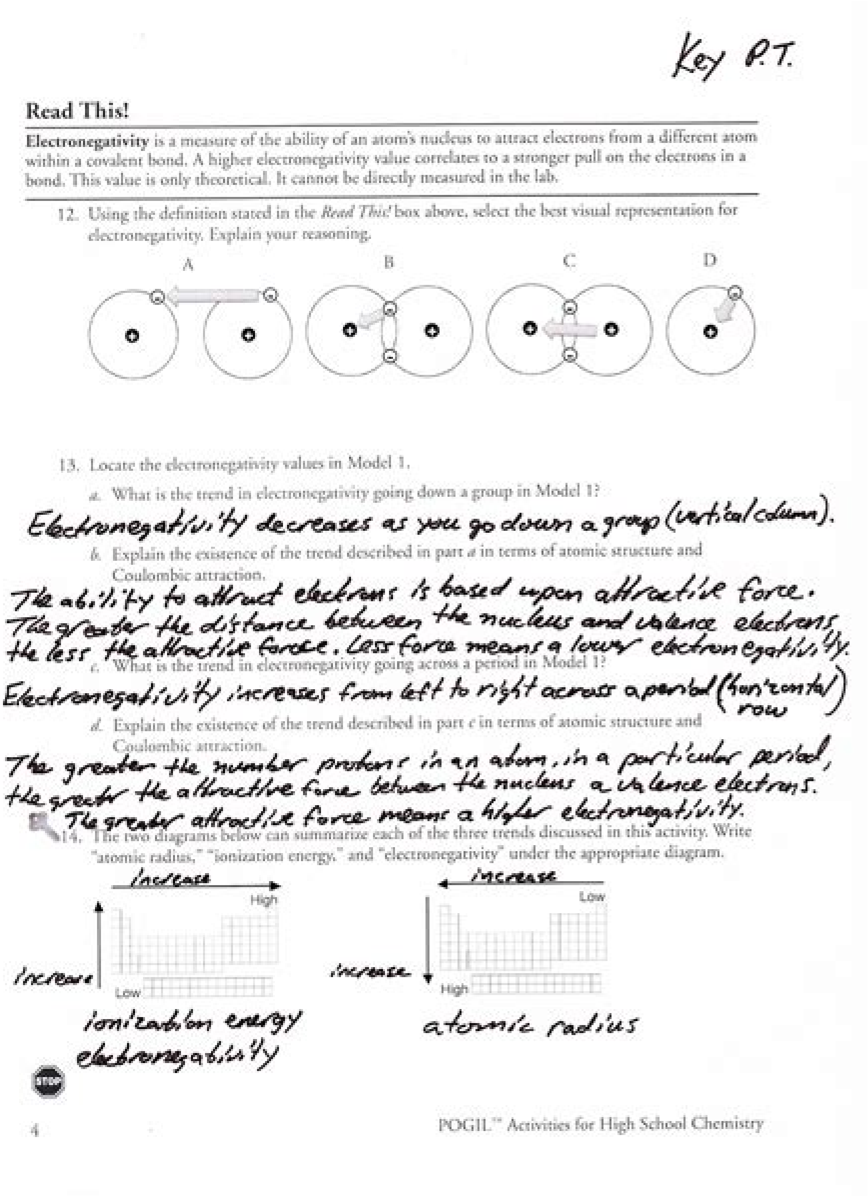
Periodic Trends Pogil



Key P.T.

Read This!

Electronegativity is a measure of the ability of an atom's nucleus to attract electrons from a different atom within a covalent bond. A higher electronegativity value correlates to a stronger pull on the electrons in a bond. This value is only theoretical. It cannot be directly measured in the lab.

12. Using the definition stated in the *Read This!* box above, select the best visual representation for electronegativity. Explain your reasoning.

A B C D

13. Locate the electronegativity values in Model 1.

a. What is the trend in electronegativity going down a group in Model 1?

Electronegativity decreases as you go down a group (vertical column).

b. Explain the existence of the trend described in part *a* in terms of atomic structure and Coulombic attraction.

The ability to attract electrons is based upon attractive force. The greater the distance between the nucleus and valence electrons, the less the attractive force. Less force means a lower electronegativity.

c. What is the trend in electronegativity going across a period in Model 1?

Electronegativity increases from left to right across a period (horizontal row)

d. Explain the existence of the trend described in part *c* in terms of atomic structure and Coulombic attraction.

The greater the number protons in an atom, in a particular period, the greater the attractive force between the nucleus a valence electrons. The greater attractive force means a higher electronegativity.

14. The two diagrams below can summarize each of the three trends discussed in this activity. Write "atomic radius," "ionization energy," and "electronegativity" under the appropriate diagram.

ionization energy
electronegativity

atomic radius

4 POGIL™ Activities for High School Chemistry

Mastering Periodic Trends: A Deep Dive into POGIL Activities

Are you struggling to grasp the complexities of periodic trends? Do you find yourself overwhelmed by the sheer volume of information surrounding electronegativity, ionization energy, and atomic radius? This comprehensive guide provides a detailed exploration of POGIL (Process Oriented Guided Inquiry Learning) activities designed to help you master periodic trends. We'll delve into why POGIL is effective, explore specific examples of how it's applied to periodic trends, and offer strategies for maximizing your learning through these interactive exercises. Get ready to transform your understanding of the periodic table!

Understanding the Power of POGIL for Periodic Trends

POGIL activities are a game-changer for science education. Unlike traditional lectures, POGIL fosters active learning by placing the responsibility of understanding on the student. Instead of passively receiving information, students collaboratively work through carefully structured activities, prompting critical thinking and problem-solving skills. This approach is particularly beneficial when tackling the nuances of periodic trends, which require a deep understanding of underlying atomic structure and electron configuration.

By working through POGIL activities on periodic trends, you'll:

Develop a deeper conceptual understanding: POGIL encourages you to analyze data, draw conclusions, and predict behaviors, resulting in a more robust understanding than simply memorizing facts.
Improve critical thinking skills: The collaborative nature of POGIL encourages discussion and debate, refining your ability to evaluate information and form reasoned judgments.
Enhance problem-solving abilities: POGIL activities often present challenging scenarios that require you to apply your knowledge to unfamiliar situations.
Build collaborative skills: Working effectively in groups is a key skill in science and beyond; POGIL provides valuable practice in this area.

Key Periodic Trends Explored Through POGIL

POGIL activities on periodic trends typically cover a range of crucial concepts, including:

Atomic Radius: Across and Down the Table

POGIL exercises often present data tables of atomic radii for various elements. By analyzing this data, students discover the trends: atomic radius generally increases down a group (due to added electron shells) and decreases across a period (due to increased nuclear charge). Students may be asked to explain these trends using principles of electron shielding and effective nuclear charge.

Ionization Energy: The Energy to Lose an Electron

Understanding ionization energy – the energy required to remove an electron from an atom – is crucial. POGIL activities might involve predicting ionization energies based on position on the periodic table. Students learn to relate ionization energy to atomic radius and effective nuclear charge, explaining why ionization energy generally increases across a period and decreases down a group.

Electronegativity: The Battle for Electrons

Electronegativity, the tendency of an atom to attract electrons in a chemical bond, is another key trend. POGIL activities might involve predicting the polarity of bonds based on electronegativity differences between atoms. This helps students understand concepts like polar and nonpolar molecules and their properties.

Electron Affinity: The Attraction to Gain an Electron

While less frequently emphasized than other trends, electron affinity (the energy change when an atom gains an electron) also exhibits periodic trends. POGIL activities can explore the exceptions and irregularities within this trend, leading to a more nuanced understanding of atomic behavior.

Effective Strategies for Tackling POGIL Periodic Trends Activities

To maximize the benefits of POGIL, employ these strategies:

Engage actively: Don't just passively read; actively participate in discussions and contribute your ideas.
Collaborate effectively: Work together with your group members, sharing ideas and perspectives.
Ask questions: Don't hesitate to ask your instructor or peers for clarification if you're stuck.
Reflect on your learning: Take time to review what you've learned and identify areas where you need further clarification.
Connect concepts: Try to link the concepts you're learning in POGIL to other areas of chemistry.

Conclusion

Mastering periodic trends is a cornerstone of success in chemistry. POGIL activities offer a powerful and engaging approach to learning these essential concepts. By actively participating in these collaborative exercises and employing effective learning strategies, you can achieve a deeper and more meaningful understanding of the periodic table and its underlying principles. Remember, the key is active engagement and thoughtful collaboration.

FAQs

1. Are there specific POGIL activities readily available for periodic trends? Many educational

resources and textbooks incorporate POGIL activities, and searching online for "periodic trends POGIL activities" will yield several options. Your instructor may also provide specific materials.

2. What if I struggle with a particular POGIL activity? Don't hesitate to seek help from your instructor, classmates, or online resources. The collaborative nature of POGIL means there's support readily available.

3. How can I best prepare for a POGIL activity on periodic trends? Review fundamental concepts like electron configuration, atomic structure, and basic periodic table organization before starting the activity.

4. Can POGIL activities be used for advanced periodic trends topics? Yes, POGIL's adaptable nature allows for its application to more advanced topics like effective nuclear charge calculations or the irregularities observed in ionization energies of transition metals.

5. Are there alternative learning methods that complement POGIL for periodic trends? Absolutely! Supplementing POGIL with videos, interactive simulations, and practice problems will further solidify your understanding. A multifaceted approach to learning is usually the most effective.

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Phase Diagrams; Diffusion; Microstructure: Kinetics; Mechanical Behavior; Materials in the Environment; Electronic Behavior; Thermal Behavior; Materials Selection and Design. MasteringEngineering, the most technologically advanced online tutorial and homework system available, can be packaged with this edition. MasteringEngineering is designed to provide students with customized coaching and individualized feedback to help improve problem-solving skills while providing instructors with rich teaching diagnostics. Note: If you are purchasing the standalone text (ISBN: 0132136422) or electronic version, MasteringEngineering does not come automatically packaged with the text. To purchase MasteringEngineering, please visit: www.masteringengineering.com or you can purchase a package of the physical text + MasteringEngineering by searching the Pearson Higher Education web site. MasteringEngineering is not a self-paced technology and should only be purchased when required by an instructor. MARKET: For students taking the Materials Science course in the Mechanical & Aerospace Engineering department. This book is also suitable for professionals seeking a guided inquiry approach to materials science.

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