

gas variables pogil

gas variables pogil is an essential topic for anyone seeking a deeper understanding of how gases behave under various conditions. This article provides a comprehensive exploration of the principles behind gas variables using the POGIL (Process Oriented Guided Inquiry Learning) approach. Readers will discover the foundational concepts governing gas laws, the significance of variables such as pressure, volume, and temperature, and how POGIL activities facilitate active learning in chemistry. Additionally, the article covers the relationship between different gas variables, real-world applications, and strategies to master gas variables for academic success. With clear explanations and practical insights, this guide is optimized for those aiming to excel in chemistry or enhance their teaching methodology. Dive in to unveil the science behind gas behavior and unlock effective learning strategies.

- Understanding Gas Variables and POGIL Methodology
- The Core Gas Variables: Pressure, Volume, Temperature, and Amount
- Exploring the Relationships Between Gas Variables
- POGIL Activities in Learning Gas Variables
- Real-World Applications of Gas Variables
- Strategies for Mastering Gas Variables POGIL

Understanding Gas Variables and POGIL Methodology

Gas variables pogil is a term that combines two important aspects of chemistry education: the study of gas variables and the Process Oriented Guided Inquiry Learning (POGIL) approach. Gas variables refer to the fundamental properties that describe the state of a gas, including pressure, volume, temperature, and the amount of substance. The POGIL methodology is a student-centered instructional approach designed to encourage active participation, collaboration, and deep understanding through guided inquiry.

By integrating gas variables with POGIL activities, learners engage in hands-on experiences that promote critical thinking and conceptual mastery. This approach moves away from passive memorization, instead guiding students to analyze data, identify patterns, and construct their own understanding of gas laws. The synergy between gas variables and POGIL yields a powerful framework for teaching and learning the intricate principles that govern gases in chemistry.

The Core Gas Variables: Pressure, Volume, Temperature, and Amount

Pressure

Pressure is a key variable in the study of gases, defined as the force exerted by gas particles per unit area on the walls of their container. It is measured in units such as atmospheres (atm), Pascals (Pa), or millimeters of mercury (mmHg). In gas variables pogil activities, students often explore how changes in pressure impact other variables and the overall behavior of gases.

- Atmospheric pressure influences weather and altitude effects.
- Pressure gauges are used in laboratory and industrial settings.
- Understanding pressure is crucial for safe handling of compressed gases.

Volume

Volume represents the amount of space occupied by a gas. It is commonly measured in liters (L) or cubic meters (m^3). In the context of gas laws, volume plays a critical role in determining how gases expand or compress under different conditions. POGIL activities often guide students to investigate volume changes and how they relate to pressure and temperature.

Temperature

Temperature is a measure of the average kinetic energy of gas particles. It is a vital variable that influences the speed and movement of particles within a gas sample. In gas variables pogil exercises, learners examine how temperature changes affect gas behavior, often using Celsius or Kelvin scales for calculations and analysis.

Amount (Moles)

The amount of gas is typically expressed in moles, representing the number of particles or molecules present. This variable is integral to the ideal gas equation and other gas laws, allowing for quantitative relationships between pressure, volume, and temperature. POGIL strategies help students connect mole calculations to observable changes in gas properties.

Exploring the Relationships Between Gas Variables

Boyle's Law: Pressure and Volume

Boyle's Law describes the inverse relationship between pressure and volume for a fixed amount of gas at constant temperature. As pressure increases, volume decreases, and vice versa. In gas variables pogil activities, students use data sets and graphical analysis to uncover this relationship and apply it to real-world scenarios such as scuba diving and syringes.

Charles's Law: Volume and Temperature

Charles's Law states that the volume of a gas is directly proportional to its temperature, provided pressure remains constant. This law explains why balloons expand when heated and contract when cooled. POGIL exercises guide learners to model these changes, interpret graphs, and relate them to everyday phenomena.

Gay-Lussac's Law: Pressure and Temperature

Gay-Lussac's Law focuses on the direct relationship between pressure and temperature at constant volume. As temperature increases, so does pressure. This law is crucial for understanding safety protocols with pressurized containers and offers a practical context for POGIL activities in laboratory settings.

The Combined Gas Law

The Combined Gas Law integrates Boyle's, Charles's, and Gay-Lussac's laws into a single equation, allowing for the analysis of changing pressure, volume, and temperature simultaneously. Gas variables pogil modules help students practice using this law to solve complex problems and make predictions about gas behavior.

POGIL Activities in Learning Gas Variables

Structure of POGIL Activities

POGIL activities are designed to facilitate inquiry-driven learning through teamwork and structured guidance. In the context of gas variables, these activities encourage students to analyze experimental data, interpret graphs, and draw conclusions based on evidence. Each activity typically includes roles such as facilitator, recorder, and spokesperson to ensure effective collaboration.

Benefits of POGIL for Gas Variables

- Promotes active engagement and participation.
- Encourages critical thinking and problem-solving.
- Fosters deeper understanding of gas laws and variables.
- Develops communication and teamwork skills.
- Improves retention and application of concepts.

Example POGIL Activities for Gas Variables

Sample POGIL activities include investigating the effects of pressure on volume using syringes, modeling temperature changes with balloon expansion, and analyzing real data from gas reactions. These exercises are tailored to help students visualize abstract concepts and apply gas laws to laboratory experiments.

Real-World Applications of Gas Variables

Industrial and Laboratory Settings

Understanding gas variables is vital in numerous industrial and laboratory contexts. Engineers and scientists use gas laws to design pressurized systems, control chemical reactions, and ensure safety in handling gases. POGIL activities often incorporate case studies from these environments to connect theory to practice.

Environmental and Atmospheric Science

Gas variables play a significant role in environmental studies, such as analyzing greenhouse gas emissions, predicting weather patterns, and understanding atmospheric pressure changes. Mastery of gas laws through pogil exercises enables students to interpret scientific data and contribute to solutions for environmental challenges.

Medical Applications

Medical professionals rely on gas variables to administer anesthesia, manage respiratory therapies, and maintain safe conditions in hyperbaric treatments. POGIL methodologies help students grasp these concepts, preparing them for careers that require precise control and understanding of gas behavior.

Strategies for Mastering Gas Variables POGIL

Active Engagement and Collaboration

Success in gas variables pogil requires consistent participation and teamwork. Students should take on active roles, communicate ideas clearly, and support peers in group discussions. Collaborative learning deepens understanding and builds confidence in applying gas laws.

Utilizing Visual Aids and Models

Visual resources such as diagrams, graphs, and physical models enhance comprehension of gas variables. POGIL activities often incorporate these tools to help learners connect abstract equations to tangible phenomena.

Practice and Review

- Complete multiple POGIL activities for diverse scenarios.
- Review key equations and relationships regularly.
- Test understanding with practice problems and group quizzes.

Connecting Theory to Real Life

Applying gas variables to everyday situations reinforces learning and highlights their relevance. From inflating tires to cooking at high altitudes, real-life examples make gas laws memorable and practical.

Seeking Support and Feedback

Engage with instructors, peers, and study groups for clarification and feedback. Constructive support accelerates problem-solving and mastery of challenging concepts.

Questions and Answers about gas variables pogil

Q: What are the main gas variables studied in gas variables pogil activities?

A: The main gas variables are pressure, volume, temperature, and amount (moles). POGIL activities focus on understanding how these variables interact

and affect gas behavior.

Q: How does the POGIL methodology enhance learning about gas laws?

A: POGIL encourages active participation, critical thinking, and collaboration, helping students construct their own understanding of gas laws through inquiry-based exercises.

Q: Why is it important to understand the relationships between gas variables?

A: Understanding these relationships allows students to predict and explain changes in gas behavior under different conditions, which is essential in scientific, industrial, and medical settings.

Q: What is the purpose of using roles in POGIL activities?

A: Assigning roles such as facilitator, recorder, and spokesperson ensures effective collaboration, accountability, and structured learning within the group.

Q: Can gas variables pogil be applied outside the classroom?

A: Yes, the principles learned through gas variables pogil apply to real-world scenarios such as environmental monitoring, industrial design, and medical procedures.

Q: What strategies help students succeed in gas variables pogil?

A: Active engagement, collaboration, practice with visual aids, connecting theory to real life, and seeking feedback are effective strategies for mastering gas variables.

Q: How do gas laws relate to everyday phenomena?

A: Gas laws explain common events like tire pressure changes, balloon inflation, and cooking at different altitudes by describing how pressure, volume, and temperature interact.

Q: What is the role of visual aids in understanding gas variables?

A: Visual aids such as diagrams and graphs help students grasp complex relationships between gas variables and make abstract concepts more accessible.

Q: How does temperature affect the pressure of a gas?

A: According to Gay-Lussac's Law, increasing the temperature of a gas at constant volume results in increased pressure due to faster particle movement.

Q: What real-world careers benefit from mastering gas variables pogil concepts?

A: Careers in chemistry, engineering, environmental science, medicine, and laboratory research all benefit from a strong understanding of gas variables and the POGIL approach.

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Mastering Gas Variables: A Deep Dive into the POGIL Activities

Are you grappling with the complexities of gas laws and feeling overwhelmed by the sheer number of variables involved? Understanding the relationship between pressure, volume, temperature, and the amount of gas is crucial for success in chemistry, and the POGIL (Process-Oriented Guided Inquiry Learning) activities provide an excellent framework for mastering these concepts. This comprehensive guide will delve into the world of gas variables within the POGIL context, equipping you with the knowledge and strategies to confidently tackle any related problem. We'll explore key concepts, offer practical tips, and provide a clear understanding of how to effectively utilize the POGIL approach to learn about gas variables.

Understanding the Key Gas Variables

Before diving into POGIL activities, a solid grasp of the fundamental gas variables is essential. These are the factors that influence the behavior of gases:

Pressure (P)

Pressure is the force exerted by gas molecules per unit area. It's typically measured in atmospheres (atm), kilopascals (kPa), or millimeters of mercury (mmHg). Higher pressure indicates more frequent and forceful collisions of gas molecules with their container.

Volume (V)

Volume represents the space occupied by the gas. It's usually expressed in liters (L) or milliliters (mL). Changes in volume directly affect the space available for gas molecules to move, influencing pressure and other variables.

Temperature (T)

Temperature is a measure of the average kinetic energy of gas molecules. It's crucial to use the Kelvin scale (K) in gas law calculations, as it's an absolute temperature scale, meaning it starts at absolute zero (0 K). Higher temperatures mean faster-moving molecules and increased pressure.

Amount of Gas (n)

The amount of gas is typically expressed in moles (mol), representing the number of gas particles present. A greater number of moles means more particles colliding and thus higher pressure, all other factors being equal.

Navigating POGIL Activities on Gas Variables

POGIL activities encourage collaborative learning and problem-solving through guided inquiry. Here's how to effectively utilize POGIL activities to master gas variables:

1. Read Carefully and Actively:

Don't passively read the POGIL activity. Actively engage with the text, highlighting key concepts, and formulating questions. Understanding the underlying principles before tackling the problems is

crucial.

2. Collaborate Effectively:

POGIL activities are designed for group work. Engage in active discussions with your peers, sharing ideas and perspectives. Different viewpoints can help illuminate challenging concepts.

3. Focus on the "Why":

Don't just aim for the correct answer. Understand the reasoning behind each step. POGIL activities encourage you to explain your thought process, reinforcing your understanding.

4. Utilize Visual Aids:

Draw diagrams, charts, and graphs to visualize the relationships between gas variables. Visual representations can significantly improve understanding and problem-solving.

5. Seek Clarification:

Don't hesitate to ask questions if you encounter difficulties. Your instructor or classmates can provide valuable insights and guidance.

Common Gas Laws Explored in POGIL Activities

POGIL activities often cover various gas laws, including:

Boyle's Law:

Describes the inverse relationship between pressure and volume at a constant temperature ($P_1V_1 = P_2V_2$).

Charles's Law:

Shows the direct relationship between volume and temperature at a constant pressure ($V_1/T_1 = V_2/T_2$).

Gay-Lussac's Law:

Illustrates the direct relationship between pressure and temperature at a constant volume ($P_1/T_1 = P_2/T_2$).

Ideal Gas Law:

Combines all variables into a single equation ($PV = nRT$), where R is the ideal gas constant.

Mastering the Ideal Gas Law with POGIL

The Ideal Gas Law ($PV = nRT$) is a cornerstone of gas chemistry. POGIL activities often focus on mastering this equation through various scenarios and problem-solving exercises. Understanding the equation and the units involved is critical for success. Remember to always use consistent units throughout your calculations.

Conclusion

Successfully navigating POGIL activities on gas variables requires careful preparation, active engagement, and collaborative learning. By understanding the key variables, employing effective problem-solving strategies, and utilizing the resources available, you can master this crucial aspect of chemistry. Remember, the POGIL approach encourages a deeper understanding than simply memorizing formulas - it's about grasping the underlying principles that govern the behavior of gases.

FAQs

1. What is the ideal gas constant (R), and what are its units? The ideal gas constant (R) is a proportionality constant that relates the pressure, volume, temperature, and amount of gas. Its value and units depend on the units used for the other variables; common values include 0.0821 L·atm/mol·K and 8.314 J/mol·K.
2. How do I choose the correct gas law to use for a specific problem? Identify the variables that are held constant. If temperature is constant, use Boyle's Law; if pressure is constant, use Charles's Law; and if volume is constant, use Gay-Lussac's Law. If none are constant, use the Ideal Gas Law.
3. What are some common mistakes to avoid when working with gas variables? Common errors include using incorrect units, forgetting to convert Celsius to Kelvin, and misinterpreting the relationships between variables. Carefully review your work and ensure consistency in units.
4. How can I improve my understanding of gas laws beyond the POGIL activities? Practice solving a wide range of problems, utilize online resources and tutorials, and seek help from your instructor or peers when needed. Visualizing concepts through animations or simulations can also be helpful.
5. Are there limitations to the Ideal Gas Law? The Ideal Gas Law assumes gases behave ideally, neglecting intermolecular forces and the volume occupied by gas molecules. At high pressures and low temperatures, real gases deviate significantly from ideal behavior, requiring more complex equations for accurate calculations.

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in an appropriate ratio in the same place and at the same time. Gas exchange is determined by the ventilation-perfusion ratio in each of the gas exchange units of the lung. In the normal lung ventilation and perfusion are well matched, and the ventilation-perfusion ratio is remarkably uniform among lung units, such that the partial pressure of oxygen in the blood leaving the pulmonary capillaries is less than 10 Torr lower than that in the alveolar space. In disease, the disruption to ventilation-perfusion matching and to diffusional transport may result in inefficient gas exchange and arterial hypoxemia. This volume covers the basics of pulmonary gas exchange, providing a central understanding of the processes involved, the interactions between the components upon which gas exchange depends, and basic equations of the process.

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result will be a marked improvement in your teaching and your students' learning.

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education, is part of the job of university researchers and it has often been implicitly assumed that the competences required for good research activity also guarantee good teaching practice. On the other side, and perhaps more important, is the fact that the problems to be afforded in doing research in education are complex problems that require a knowledge base not restricted to the disciplinary physics knowledge but enlarged to include cognitive science, communication science, history and philosophy. The topics discussed here look at some of the facets of the problem by considering the interplay of the development of cognitive models for learning Physics with some reflections on the Physics contents for contemporary and future society with the analysis of teaching strategies and the role of experiments the issue of assessment

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gas variables pogil: Calculus-Based Physics I Jeffrey W. Schnick, 2009-09-24 Calculus-Based Physics is an introductory physics textbook designed for use in the two-semester introductory physics course typically taken by science and engineering students. This item is part 1, for the first semester. Only the textbook in PDF format is provided here. To download other resources, such as text in MS Word formats, problems, quizzes, class questions, syllabi, and formula sheets, visit: <http://www.anselm.edu/internet/physics/cbphysics/index.html> Calculus-Based Physics is now available in hard copy in the form of two black and white paperbacks at www.LuLu.com at the cost of production plus shipping. Note that Calculus-Based Physics is designed for easy photocopying. So, if you prefer to make your own hard copy, just print the pdf file and make as many copies as you need. While some color is used in the textbook, the text does not refer to colors so black and white hard copies are viable

gas variables pogil: The Language of Science Education William F. McComas, 2013-12-30 The Language of Science Education: An Expanded Glossary of Key Terms and Concepts in Science Teaching and Learning is written expressly for science education professionals and students of science education to provide the foundation for a shared vocabulary of the field of science teaching and learning. Science education is a part of education studies but has developed a unique vocabulary that is occasionally at odds with the ways some terms are commonly used both in the field of education and in general conversation. Therefore, understanding the specific way that terms are used within science education is vital for those who wish to understand the existing literature or make contributions to it. The Language of Science Education provides definitions for 100 unique terms, but when considering the related terms that are also defined as they relate to the targeted words, almost 150 words are represented in the book. For instance, "laboratory instruction" is accompanied by definitions for openness, wet lab, dry lab, virtual lab and cookbook lab. Each key term is defined both with a short entry designed to provide immediate access following by a more extensive discussion, with extensive references and examples where appropriate. Experienced readers will recognize the majority of terms included, but the developing discipline of science education demands the consideration of new words. For example, the term blended science is offered as a better descriptor for interdisciplinary science and make a distinction between project-based and problem-based instruction. Even a definition for science education is included. The Language of Science Education is designed as a reference book but many readers may find it useful and enlightening to read it as if it were a series of very short stories.

gas variables pogil: Teaching Programming Across the Chemistry Curriculum Ashley Ringer McDonald, Jessica A. Nash, 2022 Sponsored by the ACS Division of Chemical Education.

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Industry explores practical guidance on the strategic planning process for airport board members, directors, department leaders, and other employees; aviation industry associations; a variety of airport stakeholders, consultants, and other airport planning professionals; and aviation regulatory agencies. A workbook of tools and sequential steps of the strategic planning process is provided with the report as on a CD. The CD is also available online for download as an ISO image or the workbook can be downloaded in pdf format.

gas variables pogil: POGIL Shawn R. Simonson, 2023-07-03 Process Oriented Guided Inquiry Learning (POGIL) is a pedagogy that is based on research on how people learn and has been shown to lead to better student outcomes in many contexts and in a variety of academic disciplines. Beyond facilitating students' mastery of a discipline, it promotes vital educational outcomes such as communication skills and critical thinking. Its active international community of practitioners provides accessible educational development and support for anyone developing related courses. Having started as a process developed by a group of chemistry professors focused on helping their students better grasp the concepts of general chemistry, The POGIL Project has grown into a dynamic organization of committed instructors who help each other transform classrooms and improve student success, develop curricular materials to assist this process, conduct research expanding what is known about learning and teaching, and provide professional development and collegiality from elementary teachers to college professors. As a pedagogy it has been shown to be effective in a variety of content areas and at different educational levels. This is an introduction to the process and the community. Every POGIL classroom is different and is a reflection of the uniqueness of the particular context – the institution, department, physical space, student body, and instructor – but follows a common structure in which students work cooperatively in self-managed small groups of three or four. The group work is focused on activities that are carefully designed and scaffolded to enable students to develop important concepts or to deepen and refine their understanding of those ideas or concepts for themselves, based entirely on data provided in class, not on prior reading of the textbook or other introduction to the topic. The learning environment is structured to support the development of process skills -- such as teamwork, effective communication, information processing, problem solving, and critical thinking. The instructor's role is to facilitate the development of student concepts and process skills, not to simply deliver content to the students. The first part of this book introduces the theoretical and philosophical foundations of POGIL pedagogy and summarizes the literature demonstrating its efficacy. The second part of the book focusses on implementing POGIL, covering the formation and effective management of student teams, offering guidance on the selection and writing of POGIL activities, as well as on facilitation, teaching large classes, and assessment. The book concludes with examples of implementation in STEM and non-STEM disciplines as well as guidance on how to get started. Appendices provide additional resources and information about The POGIL Project.

gas variables pogil: Barriers and Opportunities for 2-Year and 4-Year STEM Degrees National Academies of Sciences, Engineering, and Medicine, National Academy of Engineering, Policy and Global Affairs, Board on Higher Education and Workforce, Division of Behavioral and Social Sciences and Education, Board on Science Education, Committee on Barriers and Opportunities in Completing 2-Year and 4-Year STEM Degrees, 2016-05-18 Nearly 40 percent of the students entering 2- and 4-year postsecondary institutions indicated their intention to major in science, technology, engineering, and mathematics (STEM) in 2012. But the barriers to students realizing their ambitions are reflected in the fact that about half of those with the intention to earn a STEM bachelor's degree and more than two-thirds intending to earn a STEM associate's degree fail to earn these degrees 4 to 6 years after their initial enrollment. Many of those who do obtain a degree take longer than the advertised length of the programs, thus raising the cost of their education. Are the STEM educational pathways any less efficient than for other fields of study? How might the losses be stemmed and greater efficiencies realized? These questions and others are at the heart of this study. Barriers and Opportunities for 2-Year and 4-Year STEM Degrees reviews research on the roles that people, processes, and institutions play in 2-and 4-year STEM degree production. This study pays

special attention to the factors that influence students' decisions to enter, stay in, or leave STEM majors—quality of instruction, grading policies, course sequences, undergraduate learning environments, student supports, co-curricular activities, students' general academic preparedness and competence in science, family background, and governmental and institutional policies that affect STEM educational pathways. Because many students do not take the traditional 4-year path to a STEM undergraduate degree, *Barriers and Opportunities* describes several other common pathways and also reviews what happens to those who do not complete the journey to a degree. This book describes the major changes in student demographics; how students view, value, and utilize programs of higher education; and how institutions can adapt to support successful student outcomes. In doing so, *Barriers and Opportunities* questions whether definitions and characteristics of what constitutes success in STEM should change. As this book explores these issues, it identifies where further research is needed to build a system that works for all students who aspire to STEM degrees. The conclusions of this report lay out the steps that faculty, STEM departments, colleges and universities, professional societies, and others can take to improve STEM education for all students interested in a STEM degree.

gas variables pogil: *The Carbon Cycle* T. M. L. Wigley, D. S. Schimel, 2005-08-22 Reducing carbon dioxide (CO₂) emissions is imperative to stabilizing our future climate. Our ability to reduce these emissions combined with an understanding of how much fossil-fuel-derived CO₂ the oceans and plants can absorb is central to mitigating climate change. In *The Carbon Cycle*, leading scientists examine how atmospheric carbon dioxide concentrations have changed in the past and how this may affect the concentrations in the future. They look at the carbon budget and the missing sink for carbon dioxide. They offer approaches to modeling the carbon cycle, providing mathematical tools for predicting future levels of carbon dioxide. This comprehensive text incorporates findings from the recent IPCC reports. New insights, and a convergence of ideas and views across several disciplines make this book an important contribution to the global change literature.

gas variables pogil: *Safer Makerspaces, Fab Labs, and STEM Labs* Kenneth Russell Roy, Tyler S. Love, 2017-09 Safer hands-on STEM is essential for every instructor and student. Read the latest information about how to design and maintain safer makerspaces, Fab Labs and STEM labs in both formal and informal educational settings. This book is easy to read and provides practical information with examples for instructors and administrators. If your community or school system is looking to design or modify a facility to engage students in safer hands-on STEM activities then this book is a must read! This book covers important information, such as: Defining makerspaces, Fab Labs and STEM labs and describing their benefits for student learning.· Explaining federal safety standards, negligence, tort law, and duty of care in terms instructors can understand.· Methods for safer professional practices and teaching strategies.· Examples of successful STEM education programs and collaborative approaches for teaching STEM more safely.· Safety Controls (engineering controls, administrative controls, personal protective equipment, maintenance of controls).· Addressing general safety, biological and biotechnology, chemical, and physical hazards.· How to deal with various emergency situations.· Planning and design considerations for a safer makerspace, Fab Lab and STEM lab.· Recommended room sizes and equipment for makerspaces, Fab Labs and STEM labs.· Example makerspace, Fab Lab and STEM lab floor plans.· Descriptions and pictures of exemplar makerspaces, Fab Labs and STEM labs.· Special section answering frequently asked safety questions!

gas variables pogil: *POGIL Activities for High School Biology* High School POGIL Initiative, 2012

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gas variables pogil: *Electronic Portfolios 2.0* Darren Cambridge, Kathleen Blake Yancey,

Barbara Cambridge, 2023-07-03 Higher education institutions of all kinds—across the United States and around the world—have rapidly expanded the use of electronic portfolios in a broad range of applications including general education, the major, personal planning, freshman learning communities, advising, assessing, and career planning. Widespread use creates an urgent need to evaluate the implementation and impact of eportfolios. Using qualitative and quantitative methods, the contributors to this book—all of whom have been engaged with the Inter/National Coalition for Electronic Portfolio Research—have undertaken research on how eportfolios influence learning and the learning environment for students, faculty members, and institutions. This book features emergent results of studies from 20 institutions that have examined effects on student reflection, integrative learning, establishing identity, organizational learning, and designs for learning supported by technology. It also describes how institutions have responded to multiple challenges in eportfolio development, from engaging faculty to going to scale. These studies exemplify how eportfolios can spark disciplinary identity, increase retention, address accountability, improve writing, and contribute to accreditation. The chapters demonstrate the applications of eportfolios at community colleges, small private colleges, comprehensive universities, research universities, and a state system.

gas variables pogil: Introduction to Materials Science and Engineering Elliot Douglas, 2014 This unique book is designed to serve as an active learning tool that uses carefully selected information and guided inquiry questions. Guided inquiry helps readers reach true understanding of concepts as they develop greater ownership over the material presented. First, background information or data is presented. Then, concept invention questions lead the students to construct their own understanding of the fundamental concepts represented. Finally, application questions provide the reader with practice in solving problems using the concepts that they have derived from their own valid conclusions. KEY TOPICS: What is Guided Inquiry?; What is Materials Science and Engineering?; Bonding; Atomic Arrangements in Solids; The Structure of Polymers; Microstructure: 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.

gas variables pogil: Tools of Chemistry Education Research Diane M. Bunce, Renée S. Cole, 2015-02-05 A companion to 'Nuts and Bolts of Chemical Education Research', 'Tools of Chemistry Education Research' provides a continuation of the dialogue regarding chemistry education research.

gas variables pogil: It's Just Math Marcy H. Towns, Kinsey Bain, Jon-Marc G. Rodriguez, 2020-06 At the interface between chemistry and mathematics, this book brings together research on the use mathematics in the context of undergraduate chemistry courses. These university-level studies also support national efforts expressed in the Next Generation Science Standards regarding the importance of skills, such as quantitative reasoning and interpreting data. Curated by award-winning leaders in the field, this book is useful for instructors in chemistry, mathematics, and physics at the secondary and university levels.

gas variables pogil: *POGIL Activities for AP* Chemistry* Flinn Scientific, 2014

gas variables pogil: *Biology for AP® Courses* Julianne Zedalis, John Eggebrecht, 2017-10-16
Biology for AP® courses covers the scope and sequence requirements of a typical two-semester Advanced Placement® biology course. The text provides comprehensive coverage of foundational research and core biology concepts through an evolutionary lens. Biology for AP® Courses was designed to meet and exceed the requirements of the College Board's AP® Biology framework while allowing significant flexibility for instructors. Each section of the book includes an introduction based on the AP® curriculum and includes rich features that engage students in scientific practice and AP® test preparation; it also highlights careers and research opportunities in biological sciences.

gas variables pogil: Overcoming Students' Misconceptions in Science Mageswary Karpudewan, Ahmad Nurulazam Md Zain, A.L. Chandrasegaran, 2017-03-07 This book discusses the importance of identifying and addressing misconceptions for the successful teaching and learning of science across all levels of science education from elementary school to high school. It suggests teaching approaches based on research data to address students' common misconceptions. Detailed descriptions of how these instructional approaches can be incorporated into teaching and learning science are also included. The science education literature extensively documents the findings of studies about students' misconceptions or alternative conceptions about various science concepts. Furthermore, some of the studies involve systematic approaches to not only creating but also implementing instructional programs to reduce the incidence of these misconceptions among high school science students. These studies, however, are largely unavailable to classroom practitioners, partly because they are usually found in various science education journals that teachers have no time to refer to or are not readily available to them. In response, this book offers an essential and easily accessible guide.

gas variables pogil: *Chemistry 2e* Paul Flowers, Klaus Theopold, Richard Langley, Edward J. Neth, William R. Robinson, 2019-02-14 Chemistry 2e is designed to meet the scope and sequence requirements of the two-semester general chemistry course. The textbook provides an important opportunity for students to learn the core concepts of chemistry and understand how those concepts apply to their lives and the world around them. The book also includes a number of innovative features, including interactive exercises and real-world applications, designed to enhance student learning. The second edition has been revised to incorporate clearer, more current, and more dynamic explanations, while maintaining the same organization as the first edition. Substantial improvements have been made in the figures, illustrations, and example exercises that support the text narrative. Changes made in Chemistry 2e are described in the preface to help instructors transition to the second edition.

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