

Lecture Tutorials For Introductory Geoscience Answer Key

There are many reasons to be curious about the way people learn, and the past several decades have seen an explosion of research that has important implications for individual learning, schooling, workforce training, and policy. In 2000, How People Learn: Brain, Mind, Experience, and School: Expanded Edition was published and its influence has been wide and deep. The report summarized insights on the nature of learning in school-aged children; described principles for the design of effective learning environments; and provided examples of how that could be implemented in the classroom. Since then, researchers have continued to investigate the nature of learning and have generated new findings related to the neurological processes involved in learning, individual and cultural variability related to learning, and educational technologies. In addition to expanding scientific understanding of the mechanisms of learning and how the brain adapts throughout the lifespan, there have been important discoveries about influences on learning, particularly sociocultural factors and the structure of learning environments. How People Learn II: Learners, Contexts, and Cultures provides a much-needed update incorporating insights gained from this research over the past decade. The book expands on the foundation laid out in the 2000 report and takes an in-depth look at the constellation of influences that affect individual learning. How People Learn II will become an indispensable resource to understand learning throughout the lifespan for educators of students and adults.

The advent of accessible student computing packages has meant that geophysics students can now easily manipulate datasets and gain first-hand modeling experience - essential in developing an intuitive understanding of the physics of the Earth. Yet to gain a more in-depth understanding of physical theory, and to develop new models and solutions, it is necessary to be able to derive the relevant equations from first principles. This compact, handy book fills a gap left by most modern geophysics textbooks, which generally do not have space to derive all of the important formulae, showing the intermediate steps. This guide presents full derivations for the classical equations of gravitation, gravity, tides, earth rotation, heat, geomagnetism and foundational seismology, illustrated with simple schematic diagrams. It supports students through the successive steps and explains the logical sequence of a derivation - facilitating self-study and helping students to tackle homework exercises and prepare for exams.

"Elements of Geology" is a classic geology textbook by W.H. Norton. It views such issues as the scope and aim of geology, how the weather influences geology, the work of groundwater, rivers, and valleys, the work of glaciers, wind, the sea, and its shores.

This fully revised and updated edition introduces the reader to sedimentology and stratigraphic principles, and provides tools for the interpretation of sediments and sedimentary rocks. The processes of formation, transport and deposition of sediment are considered and then applied to develop conceptual models for the full range of sedimentary environments, from deserts to deep seas and reefs to rivers. Different approaches to using stratigraphic principles to date and correlate strata are also considered, in order to provide a comprehensive introduction to all aspects of sedimentology and stratigraphy. The text and figures are designed to be accessible to anyone completely new to the subject, and all of the illustrative material is provided in an accompanying CD-ROM. High-resolution versions of these images can also be downloaded from the companion website for this book at: www.wiley.com/go/nicholssedimentology.

Understanding Earth + Lecture Tutorials in Introductory Geoscience

Reaching Students

Geoscience Education

An Introduction to Neural Networks

Indoor and Outdoor

Astronomy Education

Teaching at Its Best This third edition of the best-selling handbook offers faculty at all levels an essential toolbox of hundreds of practical teaching techniques, formats, classroom activities, and exercises, all of which can be implemented immediately. This thoroughly revised edition includes the newest portrait of the Millennial student; current research from cognitive psychology; a focus on outcomes maps; the latest legal options on copyright issues; and how to best use new technology including wikis, blogs, podcasts, vodcasts, and clickers. Entirely new chapters include subjects such as matching teaching methods with learning outcomes, inquiry-guided learning, and using visuals to teach, and new sections address Felder and Silverman's Index of Learning Styles, SCALE-UP classrooms, multiple true-false test items, and much more. Praise for the Third Edition of Teaching at Its BestEveryone—veterans as well as novices—will profit from reading Teaching at Its Best, for it provides both theory and practical suggestions for handling all of the problems one encounters in teaching classes varying in size, ability, and motivation."—Wilbert McKeachie, Department of Psychology, University of Michigan, and coauthor, McKeachie's Teaching TipsThis new edition of Dr. Nilson's book, with its completely updated material and several new topics, is an even more powerful collection of ideas and tools than the last. What a great resource, especially for beginning teachers but also for us veterans!"—L. Dee Fink, author, Creating Significant Learning ExperiencesThis third edition of Teaching at Its Best is successful at weaving the latest research on teaching and learning into what was already a thorough exploration of each topic. New information on how we learn, how students develop, and innovations in instructional strategies complement the solid foundation established in the first two editions."—Marilla D. Svinicki, Department of Psychology, The University of Texas, Austin, and coauthor, McKeachie's Teaching Tips

Though mathematical ideas underpin the study of neural networks, the author presents the fundamentals without the full mathematical apparatus. All aspects of the field are tackled, including artificial neurons as models of their real counterparts; the geometry of network action in pattern space; gradient descent methods, including back-propagation; associative memory and Hopfield nets; and self-organization and feature maps. The traditionally difficult topic of adaptive resonance theory is clarified within a hierarchical description of its operation. The book also includes several real-world examples to provide a concrete focus. This should enhance its appeal to those involved in the design, construction and management of networks in commercial environments and who wish to improve their understanding of network simulator packages. As a comprehensive and highly accessible introduction to one of the most important topics in cognitive and computer science, this volume should interest a wide range of readers, both students and professionals, in cognitive science, psychology, computer science and electrical engineering.

Reflecting on Practice for STEM Educators is a guidebook to lead a professional learning program for educators working in STEM learning environments. Making research on the science of human learning accessible to educational professionals around the world, this book shows educators how to relate this research to their own practice. Educators’ collective work broadens the scope of an organization’s reach, and through this effort, the organization grows its social capital in its local community and beyond. This book offers opportunities to engage in processes that lead toward organizational learning by attending to the professional growth of the educators. Tran and Halversen show how learning together can shape the language and meanings by which educators do and talk about their work to support visitors’ experiences. The book provides guidance on how teams of educators can build community as they engage in reflective practice. Reflecting on Practice for STEM Educators will be essential reading for leaders of any organization that aims to educate and engage the public in science, technology, engineering, and mathematics. It will be particularly useful to educators who work in museums, zoos, aquariums, botanical gardens, youth organizations, after-school programs, and nature, science, and conservation centres.

Is it possible to bring university research and student education into a more connected, more symbiotic relationship? If so, can we develop programmes of study that enable faculty, students and ‘real world’ communities to connect in new ways? In this accessible book, Dilly Fung argues that it is not only possible but also potentially transformational to develop new forms of research-based education. Presenting the Connected Curriculum framework already adopted by UCL, she opens windows onto new initiatives related to, for example, research-based education, internationalisation, the global classroom, interdisciplinarity and public engagement. A Connected Curriculum for Higher Education is, however, not just about developing engaging programmes of study. Drawing on the field of philosophical hermeneutics, Fung argues how the Connected Curriculum framework can help to create spaces for critical dialogue about educational values, both within and across existing research groups, teaching departments and learning communities. Drawing on vignettes of practice from around the world, she argues that developing the synergies between research and education can empower faculty members and students from all backgrounds to contribute to the global common good.

African Cultural Astronomy

Qualitative Inquiry in Geoscience Education Research

Pythonic Geodynamics

Understanding and Improving Learning in Undergraduate Science and Engineering

Lecture Tutorials in Introductory Geoscience

Special Report of the Intergovernmental Panel on Climate Change

This book presents research in Geoscience Education focusing on indoor and outdoor environments in which teaching geoscience gains particular relevance, significance and contextualization. The research areas that are presented throughout the thirteen chapters cover a wide variety of subjects ranging from educational resources and fieldwork to science models. Chapters discuss specific geoscience topics such as earthquakes, rocks, fossils and minerals. Other chapters present a more interdisciplinary approach addressing topics that aren’t usually examined, such as geomedicine and geothetics, with a specific focus on sustainable development and their alignment with the school curricula. Throughout the book readers can find research-based arguments illustrated with practical examples, which will help them to innovate in their curriculum development area, classroom practices and pre and in-service teachers’ education. The book challenges readers to improve Geoscience Education by changing the ways of teaching, by enabling students to exploit their natural curiosity, and by spurring a learning process that should not be confined to the classroom but rather maintained throughout life.

An exhilarating, time-traveling journey to the solar system’s strangest and most awe-inspiring volcanoes. Volcanoes are capable of acts of pyrotechnical prowess verging on magic: they spout black magma more fluid than water, create shimmering cities of glass at the bottom of the ocean and frozen lakes of lava on the moon, and can even tip entire planets over. Between lava that melts and re-forms the landscape, and noxious volcanic gases that poison the atmosphere, volcanoes have threatened life on Earth countless times in our planet’s history. Yet despite their reputation for destruction, volcanoes are inseparable from the creation of our planet. A lively and utterly fascinating guide to these geologic wonders, Super Volcanoes revels in the incomparable power of volcanic eruptions past and present, Earthbound and otherwise—and recounts the daring and sometimes death-defying careers of the scientists who study them. Science journalist and volcanologist Robin George Andrews explores how these eruptions reveal secrets about the worlds to which they belong, describing the stunning ways in which volcanoes can sculpt the sea, land, and sky, and even influence the machinery that makes or breaks the existence of life. Walking us through the mechanics of some of the most infamous eruptions on Earth, Andrews outlines what we know about how volcanoes form, erupt, and evolve, as well as what scientists are still trying to puzzle out. How can we better predict when a deadly eruption will occur—and protect communities in the danger zone? Is Earth’s system of plate tectonics, unique in the solar system, the best way to forge a planet that supports life? And if life can survive and even thrive in Earth’s extreme volcanic environments—superhot, superacidic, and supersaline surroundings previously thought to be completely inhospitable—where else in the universe might we find it? Traveling from Hawai’i, Yellowstone, Tanzania, and the ocean floor to the moon, Venus, and Mars, Andrews illuminates the cutting-edge discoveries and lingering scientific mysteries surrounding these phenomenal forces of nature.

The National Science Foundation funded a synthesis study on the status, contributions, and future direction of discipline-based education research (DBER) in physics, biological sciences, geosciences, and chemistry. DBER combines knowledge of teaching and learning with deep knowledge of discipline-specific science content. It describes the discipline-specific difficulties learners face and the specialized intellectual and instructional resources that can facilitate student understanding. Discipline-Based Education Research is based on a 30-month study built on two workshops held in 2008 to explore evidence on promising practices in undergraduate science, technology, engineering, and mathematics (STEM) education. This book asks questions that are essential to advancing DBER and broadening its impact on undergraduate science teaching and learning. The book provides empirical research on undergraduate teaching and learning in the sciences, explores the extent to which this research currently influences undergraduate instruction, and identifies the intellectual and material resources required to further develop DBER. Discipline-Based Education Research provides guidance for future DBER research. In addition, the findings and recommendations of this report may invite, if not assist, post-secondary institutions to increase interest and research activity in DBER and improve its quality and usefulness across all natural science disciples, as well as guide instruction and assessment across natural science courses to improve student learning. The book brings greater focus to issues of student attrition in the natural sciences that are related to the quality of instruction. Discipline-Based Education Research will be of interest to educators, policy makers, researchers, scholars, decision makers in universities, government agencies, curriculum developers, research sponsors, and education advocacy groups.

The undergraduate years are a turning point in producing scientifically literate citizens and future scientists and engineers. Evidence from research about how students learn science and engineering shows that teaching strategies that motivate and engage students will improve their learning. So how do students best learn science and engineering? Are there ways of thinking that hinder or help their learning process? Which teaching strategies are most effective in developing their knowledge and skills? And how can practitioners apply these strategies to their own courses or suggest new approaches within their departments or institutions? "Reaching Students" strives to answer these questions. "Reaching Students" presents the best thinking to date on teaching and learning undergraduate science and engineering. Focusing on the disciplines of astronomy, biology, chemistry, engineering, geosciences, and physics, this book is an introduction to strategies to try in your classroom or institution. Concrete examples and case studies illustrate how experienced instructors and leaders have applied evidence-based approaches to address student needs, encouraged the use of effective techniques within a department or an institution, and addressed the challenges that arose along the way. The research-based strategies in "Reaching Students" can be adopted or adapted by instructors and leaders in all types of public or private higher education institutions. They are designed to work in introductory and upper-level courses, small and large classes, lectures and labs, and courses for majors and non-majors. And these approaches are feasible for practitioners of all experience levels who are open to incorporating ideas from research and reflecting on their teaching practices. This book is an essential resource for enriching instruction and better educating students.

Focus on Geology Preliminary Edition

Integrating Spatial Modeling and Decision Analysis

Special Papers

Laboratory Manual for Introductory Geology

The Elements of Geology

Lecture Tutorials for Introductory Geoscience

Geology is everywhere in our daily lives. We are surrounded by materials and resources extracted from the Earth, our climate is changing at alarming rates, and hazards due to Earth's processes are leading to major catastrophes. We will be reliant upon a population of informed citizens to make and vote for policies that protect our Earth, and change that will keep our planet habitable. Therefore, understanding our Earth has never been more important. Understanding Earth leads the way by fully integrating the study of climate science into the core intro geology curriculum. Through strategic placement of the climate science chapters at the beginning of the geomorphology content, we offer a text that places our changing climate as a key force shaping the rest of our discussion on Earth's surficial processes.

Karen Kortz and Jessica Smay bring their highly successful lecture tutorial approach to this easy-to-implement resource for any introductory earth science module. The brief activities here get students actively involved in the practical application of earth science concepts, while helping them navigate common pitfalls and misconceptions.

This is the first scholarly collection of articles focused on the cultural astronomy of the African continent. It weaves together astronomy, anthropology, and Africa and it includes African myths and legends about the sky, alignments to celestial bodies found at archaeological sites and at places of worship, rock art with celestial imagery, and scientific thinking revealed in local astronomy traditions including ethnomathematics and the creation of calendars.

The Handbook offers models of teaching and learning that go beyond the typical lecture-laboratory format and provides rationales for new practices in the college classroom. It is ideal for graduate teaching assistants, senior faculty and graduate coordinators, and mid-career professors in search of reinvigoration.

Inspiring Students with Digital Ink

Impact of Pen and Touch on Education

Promising Practices in Undergraduate Science, Technology, Engineering, and Mathematics Education

Laboratory Manual in Physical Geology

Carbon Dioxide Capture and Storage

Implementations for Fast Computing

IPCC Report on sources, capture, transport, and storage of CO2, for researchers, policy-makers and engineers.

This Physical Geology textbook uses cutting edge research to guide the creation of carefully structured pages that cover topics commonly taught in introductory physical geology courses. The book is focused around images and emphasizes the key concepts Research (e.g. Mayer, 2003) indicates that students learn more deeply: - when extraneous material is excluded rather than included, - from words and pictures than from words alone, - when printed words are placed near rather than far from corresponding pictures, and - when words are presented in conversational rather than formal style. Most traditional geoscience textbooks do not address this research. Although geoscience textbooks are image-rich, the text is often separate from figures, generally with a note in the text referring the student to look at the image.

Research indicates that many students just glance at the images or ignore them altogether, resulting in a less productive learning experience than intended by the authors. Also, most textbooks, even "essentials" versions, tend to have more information than an introductory student can learn in a semester, and the students, therefore, have a difficult time distilling the key concepts from the details. Images play an integral role in the textbook. There are no long blocks of text to read, but, instead, most information is presented incorporated in or around figures. Students therefore examine the images, integrating text and figures, which results in a deeper learning experience. Concepts are represented in multiple ways (photographs, written descriptions, detailed drawings, sketches, graphs, analogies, etc.) to maximize student learning. Because research indicates that students have a difficult time pulling out the key points from images, many of the images in this book are simple, without too many realistic-but-distracting details. Many of the photographs are accompanied by a simplified sketch of the same area illustrating the important geological features shown. The process of comparing two images presenting the same information in different ways (e.g. a photograph and a sketch) directs students to observe the important features and requires students to integrate those two images, strengthening their learning. Simple language is used when writing, and non-essential vocabulary words are omitted, so students will not focus on memorizing definitions without understanding the concepts. The book has a more conversational style than many current textbooks. This textbook presents the key concepts in geoscience without additional distracting details. As a result, this book is shorter than other books currently on the market. The concise nature of the book encourages students to read it. Because it emphasizes the key concepts, students have a better understanding of the fundamentals and will come to class more prepared. Therefore, instructors will be able to cover additional information in class, because the fundamentals are already understood by the students. The themes in the book are plate tectonics, water cycle, rock cycle and how geology and people affect each other. These are concepts that are key in understanding geology and learning why it is relevant in today's society. These three themes are emphasized, and individual topics are

related back to the overarching themes.

This book highlights the latest research in pen and touch, its current use in STEM classrooms, sketching and haptics technologies. Computer and educational scientists from academia and industry presented their research at the Conference on Pen and Touch Technology on Education (CPTTE) 2017 on the advancement of digital ink technology and its applications for college and K-12 classrooms. This book is the synthesis of the presented results and the ideas generated from conference discussions. This volume contains seven parts; exploring topics like sketching forensics, teaching STEM, sketch recognition applications, creating a learning environment with sketching, teaching to sketch, and haptics. The book focuses on intelligent systems using digital ink that enable pen and touch interaction that teach and inspire students. Inspiring Students through Digital Ink is a must-read for anyone wanting to improve today's student experiences and apply innovative approaches in the classroom. Also highlighted are current and future directions in pen and touch research.

This brief, paperback version of the best-selling Earth Science by Lutgens and Tarbuck is designed for introductory courses in Earth science. The text's highly visual, non-technical survey emphasizes broad, up-to-date coverage of basic topics and principles in geology, oceanography, meteorology, and astronomy. A flexible design lends itself to the diversity of Earth science courses in both content and approach. As in previous editions, the main focus is to foster student understanding of basic Earth science principles. Used by over 1.5 million science students, the Mastering platform is the most effective and widely used online tutorial, homework, and assessment system for the sciences. This is the product access code card for MasteringX and does not include the actual bound book. Package contains: MasteringGeology standalone access card

Lecture Tutorials in Introductory Geoscience + Geoportal for the Essential Earth

Essential Earth (Looseleaf) & Lecture Tutorial in Introductory Geoscience

Lecture Tutorials in Earth Science

Physical Geology

Discipline-Based Education Research

Journal of Geoscience Education

This book addresses students and young researchers who want to learn to use numerical modeling to solve problems in geodynamics. Intended as an easy-to-use and self-learning guide, readers only need a basic background in calculus to approach most of the material. The book difficulty increases very gradually, through four distinct parts. The first is an introduction to the Python techniques necessary to visualize and run vectorial calculations. The second is an overview with several examples on classical Mechanics with examples taken from standard introductory physics books. The third part is a detailed description of how to write Lagrangian, Eulerian and Particles in Cell codes for solving linear and non-linear continuum mechanics problems. Finally the last one address advanced techniques like tree-codes, Boundary Elements, and illustrates several applications to Geodynamics. The entire book is organized around numerous examples in Python, aiming at encouraging the reader to learn by experimenting and experiencing, not by theory.

Effective science teaching requires creativity, imagination, and innovation. In light of concerns about American science literacy, scientists and educators have struggled to teach this discipline more effectively. Science Teaching Reconsidered provides undergraduate science educators with a path to understanding students, accommodating their individual differences, and helping them grasp the methods--and the wonder--of science. What impact does teaching style have? How do I plan a course curriculum? How do I make lectures, classes, and laboratories more effective? How can I tell what students are thinking? Why don't they understand? This handbook provides productive approaches to these and other questions. Written by scientists who are also educators, the handbook offers suggestions for having a greater impact in the classroom and provides resources for further research.

For Introductory Geology courses This user-friendly, best-selling lab manual examines the basic processes of geology and their applications to everyday life. Featuring contributions from over 170 highly regarded geologists and geoscience educators, along with an exceptional illustration program by Dennis Tasa, Laboratory Manual in Physical Geology, Tenth Edition offers an inquiry and activities-based approach that builds skills and gives students a more complete learning experience in the lab. The text is available with MasteringGeology(tm); the Mastering platform is the most effective and widely used online tutorial, homework, and assessment system for the sciences. Note: You are purchasing a standalone product; Mastering does not come packaged with this content. If you would like to purchase both the physical text and Mastering search for ISBN-10: 0321944526/ISBN-13: 9780321944528. That package includes ISBN-10: 0321944518/ISBN-13: 9780321944511 and ISBN-10: 0321952200/ ISBN-13: 9780321952202 With Learning Catalytics you can:

Gathering the right kind and the right amount of information is crucial for any decision-making process. This book presents a unified framework for assessing the value of potential data gathering schemes by integrating spatial modelling and decision analysis, with a focus on the Earth sciences. The authors discuss the value of imperfect versus perfect information, and the value of total versus partial information, where only subsets of the data are acquired. Concepts are illustrated using a suite of quantitative tools from decision analysis, such as decision trees and influence diagrams, as well as models for continuous and discrete dependent spatial variables, including Bayesian networks, Markov random fields, Gaussian processes, and multiple-point geostatistics. Unique in scope, this book is of interest to students, researchers and industry professionals in the Earth and environmental sciences, who use applied statistics and decision analysis techniques, and particularly to those working in petroleum, mining, and environmental geoscience.

A Guide for Museums, Out-of-school, and Other Informal Settings

What Research Says about Effective Instruction in Undergraduate Science and Engineering

Ocean literacy for all: a toolkit

Current Archaeoastronomy and Ethnoastronomy research in Africa

Value of Information in the Earth Sciences

A Research-Based Resource for College Instructors

Astronomy is a popular subject for non-science majors in the United States, often representing a last formal exposure to science. Research has demonstrated the efficacy of active learning, but college astronomy instructors are often unaware of the tools and methods they can use to increase student comprehension and engagement. This book focuses on practical implementation of evidence-based strategies that are supported by research literature. Chapter topics include an overview of learner-centered theories and strategies for course design and implementation, the use of Lecture-Tutorials, the use of technology and simulations to support learner-centered teaching, the use of research-based projects, citizen science, World Wide Telescope and planetariums in instruction, an overview of assessment, considerations for teaching at a community college, and strategies to increase the inclusivity of courses.

"Physical Geology is a comprehensive introductory text on the physical aspects of geology, including rocks and minerals, plate tectonics, earthquakes, volcanoes, glaciation, groundwater, streams, coasts, mass wasting, climate change, planetary geology and much more. It has a strong emphasis on examples from western Canada, especially British Columbia, and also includes a chapter devoted to the geological history of western Canada. The book is a collaboration of faculty from Earth Science departments at Universities and Colleges across British Columbia and elsewhere"--BCcampus website.

Get actively involved in the practical application of earth science concepts as you learn to navigate common pitfalls and misconceptions related to content from any introductory earth science course with Lecture Tutorials in Earth Science.

A set of brief worksheets designed to be completed by students working alone or in groups, Lecture Tutorials in Introductory Geoscience engage students in the learning process and make abstract concepts real. Through the use of effective questioning, step-by-step learning, and a progression of simple-to-complex visuals, Lecture Tutorials help students construct correct scientific ideas about often-difficult topics, while dispelling common misconceptions. Research based on extensive classroom use shows that Lecture Tutorials increase student learning more than just a lecture alone.

Earth System History + Lecture Tutorial in Introductory Geoscience

Evidence Based Instruction for Introductory Courses. Volume 1

Foundations of Earth Science

Understanding Earth

Essential Earth + Lecture Tutorials in Introductory Geoscience

Handbook of College Science Teaching

*Lecture Tutorials in Introductory Geoscience*W. H. Freeman*Lecture Tutorials for Introductory Geoscience*Macmillan Higher Education

Developed by three experts to coincide with geology lab kits, this laboratory manual provides a clear and cohesive introduction to the field of geology. Introductory Geology is designed to ease new students into the often complex topics of physical geology and the study of our planet and its makeup. This text introduces readers to the various uses of the scientific method in geological terms. Readers will encounter a comprehensive yet straightforward style and flow as they journey through this text. They will understand the various spheres of geology and begin to master geological outcomes which derive from a growing knowledge of the tools and subjects which this text covers in great detail.

Numerous teaching, learning, assessment, and institutional innovations in undergraduate science, technology, engineering, and mathematics (STEM) education have emerged in the past decade. Because virtually all of these innovations have been developed independently of one another, their goals and purposes vary widely. Some focus on making science accessible and meaningful to the vast majority of students who will not pursue STEM majors or careers; others aim to increase the diversity of students who enroll and succeed in STEM courses and programs; still other efforts focus on reforming the overall curriculum in specific disciplines. In addition to this variation in focus, these innovations have been implemented at scales that range from individual classrooms to entire departments or institutions. By 2008, partly because of this wide variability, it was apparent that little was known about the feasibility of replicating individual innovations or about their potential for broader impact beyond the specific contexts in which they were created. The research base on innovations in undergraduate STEM education was expanding rapidly, but the process of synthesizing that knowledge base had not yet begun. If future investments were to be informed by the past, then the field clearly needed a retrospective look at the ways in which earlier innovations had influenced undergraduate STEM education. To address this need, the National Research Council (NRC) convened two public workshops to examine the impact and effectiveness of selected STEM undergraduate education innovations. This volume summarizes the workshops, which addressed such topics as the link between learning goals and evidence; promising practices at the individual faculty and institutional levels; classroom-based promising practices; and professional development for graduate students, new faculty, and veteran faculty. The workshops concluded with a broader examination of the barriers and opportunities associated with systemic change.

Sedimentology and Stratigraphy

A Student's Guide to Geophysical Equations

Science Teaching Reconsidered

How People Learn II

Reflecting on Practice for STEM Educators