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*Supporting K-12 English Language Learners in Science* Oct 07 2022 The contribution of this book is to synthesize important common themes and highlight the unique features, findings, and lessons learned from three systematic, ongoing research and professional learning projects for supporting English learners in science. Each project, based in a different region of the U.S. and focused on different age ranges and target populations, actively grapples with the linguistic implications of the three-dimensional learning required by the Framework for K-12 Science Education and the Next Generation Science Standards. Each chapter provides research-based recommendations for improving the teaching of science to English learners. Offering insights into teacher professional learning as well as strategies for measuring and monitoring how well English learners are learning science and language, this book tells a compelling and inclusive story of the challenges and the opportunities of teaching science to English learners.

**A Framework for K-12 Science Education** Jul 04 2022 Science, engineering, and technology permeate nearly every facet of modern life and hold the key to solving many of humanity's most pressing current and future challenges. The United States' position in the global economy is declining, in part because U.S. workers lack fundamental knowledge in these fields. To address the critical issues of U.S. competitiveness and to better prepare the workforce, A Framework for K-12 Science Education proposes a new approach to K-12 science education that will capture students' interest and provide them with the necessary foundational knowledge in the field. A Framework for K-12 Science Education outlines a broad set of expectations for students in science and engineering in grades K-12. These expectations will inform the development of new standards for K-12 science education and, subsequently, revisions to curriculum, instruction, assessment, and professional development for educators. This book identifies three dimensions that convey the core ideas and practices around which science and engineering education in these grades should be built. These three dimensions are: crosscutting concepts that unify the study of science through their common application across science and engineering; scientific and engineering practices; and disciplinary core ideas in the physical sciences, life sciences, and earth and space sciences and for engineering, technology, and the applications of science. The overarching goal is for all high school graduates to have sufficient knowledge of science and engineering to engage in public discussions on science-related issues, be careful consumers of scientific and technical information, and enter the careers of their choice. A Framework for K-12 Science Education is the first step in a process that can inform state-level decisions and achieve a

research-grounded basis for improving science instruction and learning across the country. The book will guide standards developers, teachers, curriculum designers, assessment developers, state and district science administrators, and educators who teach science in informal environments.

**Selecting Instructional Materials** Nov 03 2019 The National Science Education Standards set broad content goals for teaching grades K-12. For science teaching programs to achieve these goals—indeed, for science teaching to be most effective—teachers and students need textbooks, lab kits, videos, and other materials that are clear, accurate, and help students achieve the goals set by the standards. *Selecting Instructional Materials* provides a rigorously field-tested procedure to help education decisionmakers evaluate and choose materials for the science classroom. The recommended procedure is unique, adaptable to local needs, and realistic given the time and money limitations typical to school districts. This volume includes a guide outlining the entire process for school district facilitators, and provides review instruments for each step. It critically reviews the current selection process for science teaching materials—in the 20 states where the state board of education sets forth a recommended list and in the 30 states where materials are selected entirely by local decisionmakers. *Selecting Instructional Materials* explores how purchasing decisions are influenced by parent attitudes, political considerations, and the marketing skills of those who produce and sell science teaching materials. It will be indispensable to state and local education decisionmakers, science program administrators and teachers, and science education advocates.

*Science Formative Assessment, Volume 1* Jun 10 2020 Formative assessment informs the design of learning opportunities that take students from their existing ideas of science to the scientific ideas and practices that support conceptual understanding. *Science Formative Assessment* shows K-12 educators how to weave formative assessment into daily instruction. Discover 75 assessment techniques linked to the Next Generation Science Standards and give classroom practices a boost with: Descriptions of how each technique promotes learning Charts linking core concepts at each grade level to scientific practices Implementation guidance, such as required materials and student grouping Modifications for different learning styles Ideas for adapting techniques to other content areas

**Problem-Based Learning in the Life Science Classroom K-12** Feb 16 2021

*Teaching with Purpose* Mar 08 2020 Making a case for a research-based teaching rationale -- Elements of a research-based rationale -- Developing a research-based rationale -- Implementing your rationale and becoming a mentor

**The Role of the National Science Foundation in K-12 Science and Math Education** Oct 27 2021

*Reading, Writing, and Inquiry in the Science Classroom, Grades 6-12* Sep 01 2019 This resource covers reading and writing practices, science standards, and sample lessons to help educators successfully integrate literacy and science instruction in any classroom.

[The Role of Public Policy in K-12 Science Education](#) Aug 25 2021 The goal of this volume of *Research in Science Education* is to examine the relationship between science education policy and practice and the special role that science education researchers play in influencing policy. It has been suggested that the science education research community is isolated from the political process, pays little attention to policy matters, and has little influence on policy. But to influence policy, it is important to understand how policy is made and how it is implemented. This volume sheds light on the intersection between policy and practice through both theoretical discussions and practical examples. This book was written primarily about science education policy development in the context of the highly decentralized educational system of the United States. But, because policy development is fundamentally a social activity involving knowledge, values, and personal and community interests, there are similarities in how education policy gets enacted and implemented around the world. This volume is meant to be useful to science education researchers and to practitioners such as teachers and administrators because it provides information about which aspects of the science education enterprise are affected by state, local, and national policies. It also provides helpful information for researchers and practitioners who wonder how they might

influence policy. In particular, it points out how the values of people who are affected by policy initiatives are critical to the implementation of those policies.

**Computer Science in K-12** Jun 03 2022 Coding teaches our students the essence of logical thinking and problem solving while also preparing them for a world in which computing is becoming increasingly pervasive. While there's excitement and enthusiasm about programming becoming an intrinsic part of K-12 curricula the world over, there's also growing anxiety about preparing teachers to teach effectively at all grade levels. This book strives to be an essential, enduring, practical guide for every K-12 teacher anywhere who is either teaching or planning to teach computer science and programming at any grade level. To this end, readers will discover: An A-to-Z organization that affords comprehensive insight into teaching introductory programming. 26 chapters that cover foundational concepts, practices and well-researched pedagogies related to teaching introductory programming as an integral part of K-12 computer science. Cumulatively these chapters address the two salient building blocks of effective teaching of introductory programming--what content to teach (concepts and practices) and how to teach (pedagogy). Concrete ideas and rich grade-appropriate examples inspired by practice and research for classroom use. Perspectives and experiences shared by educators and scholars who are actively practicing and/or examining the teaching of computer science and programming in K-12 classrooms.

Taking Science to School Mar 20 2021 What is science for a child? How do children learn about science and how to do science? Drawing on a vast array of work from neuroscience to classroom observation, Taking Science to School provides a comprehensive picture of what we know about teaching and learning science from kindergarten through eighth grade. By looking at a broad range of questions, this book provides a basic foundation for guiding science teaching and supporting students in their learning. Taking Science to School answers such questions as: When do children begin to learn about science? Are there critical stages in a child's development of such scientific concepts as mass or animate objects? What role does nonschool learning play in children's knowledge of science? How can science education capitalize on children's natural curiosity? What are the best tasks for books, lectures, and hands-on learning? How can teachers be taught to teach science? The book also provides a detailed examination of how we know what we know about children's learning of science--about the role of research and evidence. This book will be an essential resource for everyone involved in K-8 science education--teachers, principals, boards of education, teacher education providers and accreditors, education researchers, federal education agencies, and state and federal policy makers. It will also be a useful guide for parents and others interested in how children learn.

Teaching Science in Elementary and Middle School Feb 05 2020 Teaching Science in Elementary and Middle School offers in-depth information about the fundamental features of project-based science and strategies for implementing the approach. In project-based science classrooms students investigate, use technology, develop artifacts, collaborate, and make products to show what they have learned. Paralleling what scientists do, project-based science represents the essence of inquiry and the nature of science. Because project-based science is a method aligned with what is known about how to help all children learn science, it not only helps students learn science more thoroughly and deeply, it also helps them experience the joy of doing science. Project-based science embodies the principles in A Framework for K-12 Science Education and the Next Generation Science Standards. Blending principles of learning and motivation with practical teaching ideas, this text shows how project-based learning is related to ideas in the Framework and provides concrete strategies for meeting its goals. Features include long-term, interdisciplinary, student-centered lessons; scenarios; learning activities, and "Connecting to Framework for K-12 Science Education" textboxes. More concise than previous editions, the Fourth Edition offers a wealth of supplementary material on a new Companion Website, including many videos showing a teacher and class in a project environment.

*Attracting PhDs to K-12 Education* Feb 28 2022 The National Research Council (NRC) has undertaken a three-phase project to explore the possibility of a program to attract science, mathematics and engineering PhDs to careers in K-12 education. The first phase of the project surveyed the interests of recent PhDs in science and mathematics in pursuing careers in secondary education. Analysis of the Phase I data suggests that a significant percentage of PhDs might be interested in pursuing careers in secondary education under some circumstances. This report from the second phase of the project presents a proposal for a national demonstration program to determine how one might prepare PhDs to be productive members of the K-12 education community. The proposed program is designed to help meet the needs of the nation's schools, while providing further career opportunities for recent PhDs in science, mathematics and engineering.

*Visible Learning for Science, Grades K-12* Jan 30 2022 In the best science classrooms, teachers see learning through the eyes of their students, and students view themselves as explorers. But with so many instructional approaches to choose from—inquiry, laboratory, project-based learning, discovery learning—which is most effective for student success? In *Visible Learning for Science*, the authors reveal that it's not which strategy, but when, and plot a vital K-12 framework for choosing the right approach at the right time, depending on where students are within the three phases of learning: surface, deep, and transfer. Synthesizing state-of-the-art science instruction and assessment with over fifteen years of John Hattie's cornerstone educational research, this framework for maximum learning spans the range of topics in the life and physical sciences. Employing classroom examples from all grade levels, the authors empower teachers to plan, develop, and implement high-impact instruction for each phase of the learning cycle: Surface learning: when, through precise approaches, students explore science concepts and skills that give way to a deeper exploration of scientific inquiry. Deep learning: when students engage with data and evidence to uncover relationships between concepts—students think metacognitively, and use knowledge to plan, investigate, and articulate generalizations about scientific connections. Transfer learning: when students apply knowledge of scientific principles, processes, and relationships to novel contexts, and are able to discern and innovate to solve complex problems. *Visible Learning for Science* opens the door to maximum-impact science teaching, so that students demonstrate more than a year's worth of learning for a year spent in school.

*K-12 Science Curriculum Framework* Dec 29 2021 "In accordance with RSA 193-C relative to the New Hampshire Educational Improvement and Assessment Program, the purpose of this framework is to serve: (1) as the basis for the development of assessment instruments to be administered, statewide, at the end-of-grades six and ten; and (2) as a guide for making local decisions about curriculum development and delivery." A set of standards, organized by themes, to explain skills and knowledge where students should be able to demonstrate proficiency. The themes are: science as inquiry; science, technology and society; life science; earth/space science; physical science; and unifying themes and concepts.

*Rubrics for Assessing Student Achievement in Science Grades K-12* May 22 2021 Foreword by Jay McTighe This concise handbook offers over 100 ready-to-use performance lists, holistic rubrics, and analytic rubrics appropriate for K-12 science classroom programs.

**Science and Engineering for Grades 6-12** Aug 01 2019 It is essential for today's students to learn about science and engineering in order to make sense of the world around them and participate as informed members of a democratic society. The skills and ways of thinking that are developed and honed through engaging in scientific and engineering endeavors can be used to engage with evidence in making personal decisions, to participate responsibly in civic life, and to improve and maintain the health of the environment, as well as to prepare for careers that use science and technology. The majority of Americans learn most of what they know about science and engineering as middle and high school students. During these years of rapid change for students' knowledge, attitudes, and interests, they can be engaged in learning science and engineering through schoolwork that piques their curiosity about the phenomena around them in ways that are relevant to their local surroundings and to their culture. Many decades

of education research provide strong evidence for effective practices in teaching and learning of science and engineering. One of the effective practices that helps students learn is to engage in science investigation and engineering design. Broad implementation of science investigation and engineering design and other evidence-based practices in middle and high schools can help address present-day and future national challenges, including broadening access to science and engineering for communities who have traditionally been underrepresented and improving students' educational and life experiences. Science and Engineering for Grades 6-12: Investigation and Design at the Center revisits America's Lab Report: Investigations in High School Science in order to consider its discussion of laboratory experiences and teacher and school readiness in an updated context. It considers how to engage today's middle and high school students in doing science and engineering through an analysis of evidence and examples. This report provides guidance for teachers, administrators, creators of instructional resources, and leaders in teacher professional learning on how to support students as they make sense of phenomena, gather and analyze data/information, construct explanations and design solutions, and communicate reasoning to self and others during science investigation and engineering design. It also provides guidance to help educators get started with designing, implementing, and assessing investigation and design.

Teaching Climate Change for Grades 6-12 Dec 05 2019 Looking to tackle climate change and climate science in your classroom? This timely and insightful book supports and enables secondary science teachers to develop effective curricula ready to meet the Next Generation Science Standards (NGSS) by grounding their instruction on the climate crisis. Nearly one-third of the secondary science standards relate to climate science, but teachers need design and implementation support to create empowering learning experiences centered around the climate crisis. Experienced science educator, instructional coach, and educational leader Dr. Kelley T. Le offers this support, providing an overview of the teaching shifts needed for NGSS and to support climate literacy for students via urgent topics in climate science and environmental justice - from the COVID-19 pandemic to global warming, rising sea temperatures, deforestation, and mass extinction. You'll also learn how to engage the complexity of climate change by exploring social, racial, and environmental injustices stemming from the climate crisis that directly impact students. By anchoring instruction around the climate crisis, Dr. Le offers guidance on how to empower students to be the agents of change needed in their own communities. A range of additional teacher resources are also available at [www.empoweredscienceteachers.com](http://www.empoweredscienceteachers.com).

K-12 Science and Math Education Across the Federal Agencies Nov 27 2021

Integrating Aerospace Science Into the Curriculum, K-12 Apr 01 2022 Provides classroom-tested ideas and projects for teachers to use in teaching students about the history of aerospace from ancient to modern times

**Art & Science** Apr 20 2021 For the first time, the award-winning Education Department of the J. Paul Getty Museum is making one of its much-lauded K-12 curricula available nationwide in an attractive and inexpensive print format. Art & Science was developed by the Getty's expert educators, scientists, curators, and conservators, and tested by classroom teachers, and it connects to national and California state standards. Teachers and parents will find engaging lessons and activities divided into beginning, intermediate, and advanced levels for step-by-step learning. Art & Science mines the treasures of the Getty Museum to explore the many intersections of the visual arts with scientific disciplines. Full-color images of antiquities, decorative arts, drawings, manuscripts, painting, photography, and sculpture illuminate lesson plans about, for example: • The laws of physics that keep a bronze sculpture of a juggler from tipping over • The science that allows photographers to manipulate light and capture images on paper • The processes of radiation and convection that turn clay into porcelain • Scientific observation of the natural world as the subject for art • How scientists removed 2,000 years of oxidation and encrustation to reveal a priceless ancient sculpture The curriculum also contains a trove of resources, including handouts, "Questions for Teaching," a timeline, glossary, and list of print and web sources for further research. There are also

links to additional related lessons and images available on the Getty website. The full-page color images and special “lay flat” binding of Art & Science make it ideal for use with a digital document reader.

[The Guidebook of Federal Resources for K-12 Mathematics and Science](#) Jan 18 2021 Contains directories of federal agencies that promote mathematics and science education at elementary and secondary levels; organized in sections by agency name, national program name, and state highlights by region.

*STEM Integration in K-12 Education* Nov 15 2020 STEM Integration in K-12 Education examines current efforts to connect the STEM disciplines in K-12 education. This report identifies and characterizes existing approaches to integrated STEM education, both in formal and after- and out-of-school settings. The report reviews the evidence for the impact of integrated approaches on various student outcomes, and it proposes a set of priority research questions to advance the understanding of integrated STEM education. STEM Integration in K-12 Education proposes a framework to provide a common perspective and vocabulary for researchers, practitioners, and others to identify, discuss, and investigate specific integrated STEM initiatives within the K-12 education system of the United States. STEM Integration in K-12 Education makes recommendations for designers of integrated STEM experiences, assessment developers, and researchers to design and document effective integrated STEM education. This report will help to further their work and improve the chances that some forms of integrated STEM education will make a positive difference in student learning and interest and other valued outcomes.

*Science Curriculum Topic Study* May 02 2022 Making scientific literacy happen within the new vision of science teaching and learning. Engage students in using and applying disciplinary content, scientific and engineering practices, and crosscutting concepts within curricular topics, and they will develop a scientifically-based and coherent view of the natural and designed world. The latest edition of this best-seller will help you make the shifts needed to reflect current practices in curriculum, instruction, and assessment. The book includes: • An increased emphasis on STEM • 103 separate curriculum topic study guides • Connections to content knowledge, curricular and instructional implications, concepts and specific ideas, research on student learning, K-12 articulation, and assessment

**A Framework for K-12 Science Education** Nov 08 2022 Science, engineering, and technology permeate nearly every facet of modern life and hold the key to solving many of humanity's most pressing current and future challenges. The United States' position in the global economy is declining, in part because U.S. workers lack fundamental knowledge in these fields. To address the critical issues of U.S. competitiveness and to better prepare the workforce, A Framework for K-12 Science Education proposes a new approach to K-12 science education that will capture students' interest and provide them with the necessary foundational knowledge in the field. A Framework for K-12 Science Education outlines a broad set of expectations for students in science and engineering in grades K-12. These expectations will inform the development of new standards for K-12 science education and, subsequently, revisions to curriculum, instruction, assessment, and professional development for educators. This book identifies three dimensions that convey the core ideas and practices around which science and engineering education in these grades should be built. These three dimensions are: crosscutting concepts that unify the study of science through their common application across science and engineering; scientific and engineering practices; and disciplinary core ideas in the physical sciences, life sciences, and earth and space sciences and for engineering, technology, and the applications of science. The overarching goal is for all high school graduates to have sufficient knowledge of science and engineering to engage in public discussions on science-related issues, be careful consumers of scientific and technical information, and enter the careers of their choice. A Framework for K-12 Science Education is the first step in a process that can inform state-level decisions and achieve a research-grounded basis for improving science instruction and learning across the country. The book will guide standards developers, teachers,

curriculum designers, assessment developers, state and district science administrators, and educators who teach science in informal environments.

**Integrating Computer Science Across the Core** Jan 06 2020 Integrating Computer Science Across the Core is a guide to systematizing computer science and computational thinking practices in your school. While most books explain how to teach computer science as a stand-alone discipline, this innovative approach will help you leverage your existing curriculum to deepen and expand students' learning experiences in all content areas. Effective, equitable, and sustainable, this blueprint provides principals, curriculum directors, directors of technology, and other members of your school or district leadership team with suggested organizational structures, tips for professional learning, and key resources like planning instruments.

**Investigating the Influence of Standards** Jun 30 2019 Since 1989, with the publication of Curriculum and Evaluation Standards for Mathematics by the National Council of Teachers of Mathematics, standards have been at the forefront of the education reform movement in the United States. The mathematics standards, which were revised in 2000, have been joined by standards in many subjects, including the National Research Council's National Science Education Standards published in 1996 and the Standards for Technical Literacy issued by the International Technology Education Association in 2000. There is no doubt that standards have begun to influence the education system. The question remains, however, what the nature of that influence is and, most importantly, whether standards truly improve student learning. To answer those questions, one must begin to examine the ways in which components of the system have been influenced by the standards. Investigating the Influence of Standards provides a framework to guide the design, conduct, and interpretation of research regarding the influences of nationally promulgated standards in mathematics, science, and technology education on student learning. Researchers and consumers of research such as teachers, teacher educators, and administrators will find the framework useful as they work toward developing an understanding of the influence of standards.

Problem-based Learning in the Physical Science Classroom, K-12 Jun 22 2021 "This book presents a discussion of the PBL structure and its application for the K-12 physical science classroom. It also includes a collection of PBL problems developed as part of the Problem-Based Learning Project for Teachers, a National Science Foundation-funded professional development program that used the PBL framework to help teachers develop a deeper understanding of science concepts in eight different content strands. The problems presented in this book were developed by content experts who facilitated the workshops and revised the problems over the course of four iterations of the workshops"--

Handbook of Research on Integrating Computer Science and Computational Thinking in K-12 Education Jul 24 2021 As technology continues to develop and prove its importance in modern society, certain professions are acclimating. Aspects such as computer science and computational thinking are becoming essential areas of study. Implementing these subject areas into teaching practices is necessary for younger generations to adapt to the developing world. There is a critical need to examine the pedagogical implications of these technological skills and implement them into the global curriculum. The Handbook of Research on Integrating Computer Science and Computational Thinking in K-12 Education is a collection of innovative research on the methods and applications of computer science curriculum development within primary and secondary education. While highlighting topics including pedagogical implications, comprehensive techniques, and teacher preparation models, this book is ideally designed for teachers, IT consultants, curriculum developers, instructional designers, educational software developers, higher education faculty, administrators, policymakers, researchers, and graduate students.

**The Impact of State and National Standards on K-12 Science Teaching** Sep 25 2021 This book addresses the expectations toward the science standards of various stakeholders including students, parents, teachers, administrators, higher education science and science education faculty members, politicians, governmental and professional agencies, and the business community. This book also investigates how the science standards

have been translated into practice at the K-12 school district level, addressing issues around professional development, curriculum, assessment/evaluation, and accountability. The fundamental questions to be addressed are: (1) What is the response in terms of trends and patterns, of the educational system to the introduction of the national and state science standards since the late 1980's? and (2) What is the impact of the introduction of the science standards on teachers, classrooms, and students?

*Science Education Partnerships* Dec 17 2020

*Make It Stick* Oct 03 2019 Discusses the best methods of learning, describing how rereading and rote repetition are counterproductive and how such techniques as self-testing, spaced retrieval, and finding additional layers of information in new material can enhance learning.

**Place-Based Science Teaching and Learning** May 10 2020 Forty classroom-ready science teaching and learning activities for elementary and middle school teachers Grounded in theory and best-practices research, this practical text provides elementary and middle school teachers with 40 place-based activities that will help them to make science learning relevant to their students. This text provides teachers with both a rationale and a set of strategies and activities for teaching science in a local context to help students engage with science learning and come to understand the importance of science in their everyday lives.

**Powerful Teaching** Jul 12 2020 Unleash powerful teaching and the science of learning in your classroom Powerful Teaching: Unleash the Science of Learning empowers educators to harness rigorous research on how students learn and unleash it in their classrooms. In this book, cognitive scientist Pooja K. Agarwal, Ph.D., and veteran K-12 teacher Patrice M. Bain, Ed.S., decipher cognitive science research and illustrate ways to successfully apply the science of learning in classrooms settings. This practical resource is filled with evidence-based strategies that are easily implemented in less than a minute—without additional prepping, grading, or funding! Research demonstrates that these powerful strategies raise student achievement by a letter grade or more; boost learning for diverse students, grade levels, and subject areas; and enhance students' higher order learning and transfer of knowledge beyond the classroom. Drawing on a fifteen-year scientist-teacher collaboration, more than 100 years of research on learning, and rich experiences from educators in K-12 and higher education, the authors present highly accessible step-by-step guidance on how to transform teaching with four essential strategies: Retrieval practice, spacing, interleaving, and feedback-driven metacognition. With Powerful Teaching, you will: Develop a deep understanding of powerful teaching strategies based on the science of learning Gain insight from real-world examples of how evidence-based strategies are being implemented in a variety of academic settings Think critically about your current teaching practices from a research-based perspective Develop tools to share the science of learning with students and parents, ensuring success inside and outside the classroom Powerful Teaching: Unleash the Science of Learning is an indispensable resource for educators who want to take their instruction to the next level. Equipped with scientific knowledge and evidence-based tools, turn your teaching into powerful teaching and unleash student learning in your classroom.

*Science Teacher Educators as K-12 Teachers* Sep 13 2020 Science teacher educators prepare and provide professional development for teachers at all grade levels. They seek to improve conditions in classroom teaching and learning, professional development, and teacher recruitment and retention. *Science Teacher Educators as K-12 Teachers: Practicing What We Teach* tells the story of sixteen teacher educators who stepped away from their traditional role and entered the classroom to teach children and adolescents in public schools and informal settings. It details the practical and theoretical insights that these members of the Association of Science Teacher Educators (ASTE) earned from experiences ranging from periodic guest teaching to full-time engagement in the teaching role. *Science Teacher Educators as K-12 Teachers* shows science teacher educators as professionals engaged in reflective analysis of their beliefs about and experiences with teaching children or adolescents science. With their ideas

about instruction and learning challenged, these educators became more aware of the circumstances today's teachers face. Their honest accounts reveal that through teaching children and adolescents, teacher educators can also renew themselves and expand their identities as well as their understanding of themselves in the profession and in relation to others. Science Teacher Educators as K-12 Teachers will appeal to all those with an interest in science education, from teacher educators to science teachers, as well as teacher educators in other disciplines. Its narratives and insights may even inspire more teacher educators to envision new opportunities to serve teachers, K-12 learners and the local community through a variety of teaching arrangements in public schools and informal education settings.

**Teaching K-12 Science and Engineering During a Crisis** Sep 06 2022 The COVID-19 pandemic is resulting in widespread and ongoing changes to how the K-12 education system functions, including disruptions to science teaching and learning environments. Students and teachers are all figuring out how to do schooling differently, and districts and states are working overtime to reimagine systems and processes. This is difficult and stressful work in the middle of the already stressful and sometimes traumatic backdrop of the global pandemic. In addition, students with disabilities, students of color, immigrants, English learners, and students from under-resourced communities have been disproportionately affected, both by the pandemic itself and by the resulting instructional shifts. Teaching K-12 Science and Engineering During a Crisis aims to describe what high quality science and engineering education can look like in a time of great uncertainty and to support practitioners as they work toward their goals. This book includes guidance for science and engineering practitioners - with an emphasis on the needs of district science supervisors, curriculum leads, and instructional coaches. Teaching K-12 Science and Engineering During a Crisis will help K-12 science and engineering teachers adapt learning experiences as needed to support students and their families dealing with ongoing changes to instructional and home environments and at the same time provide high quality in those experiences.

**A Leader's Guide to Science Curriculum Topic Study** Aug 13 2020 The Curriculum Topic Study (CTS) process, funded by the US National Science Foundation, helps teachers improve their practice by linking standards and research to content, curriculum, instruction, and assessment. Key to the core book Science Curriculum Topic Study, this resource helps science professional development leaders and teacher educators understand the CTS approach and how to design, lead, and apply CTS in a variety of settings that support teachers as learners. The authors provide everything needed to facilitate the CTS process, including: a solid foundation in the CTS framework; multiple designs for half-day and full-day workshops, professional learning communities, and one-on-one instructional coaching; facilitation, group processing, and materials management strategies; and a CD-ROM with handouts, PowerPoint slides, and templates. By bringing CTS into schools and other professional development settings, science leaders can enhance their teachers' knowledge of content, improve teaching practices, and have a positive impact on student learning.

**K-12 Math and Science Education** Oct 15 2020

*Successful K-12 STEM Education* Aug 05 2022 Science, technology, engineering, and mathematics (STEM) are cultural achievements that reflect our humanity, power our economy, and constitute fundamental aspects of our lives as citizens, consumers, parents, and members of the workforce. Providing all students with access to quality education in the STEM disciplines is important to our nation's competitiveness. However, it is challenging to identify the most successful schools and approaches in the STEM disciplines because success is defined in many ways and can occur in many different types of schools and settings. In addition, it is difficult to determine whether the success of a school's students is caused by actions the school takes or simply related to the population of students in the school. Successful K-12 STEM Education defines a framework for understanding "success" in K-12 STEM education. The book focuses its analysis on the science and mathematics parts of STEM and outlines criteria

for identifying effective STEM schools and programs. Because a school's success should be defined by and measured relative to its goals, the book identifies three important goals that share certain elements, including learning STEM content and practices, developing positive dispositions toward STEM, and preparing students to be lifelong learners. A successful STEM program would increase the number of students who ultimately pursue advanced degrees and careers in STEM fields, enhance the STEM-capable workforce, and boost STEM literacy for all students. It is also critical to broaden the participation of women and minorities in STEM fields. Successful K-12 STEM Education examines the vast landscape of K-12 STEM education by considering different school models, highlighting research on effective STEM education practices, and identifying some conditions that promote and limit school- and student-level success in STEM. The book also looks at where further work is needed to develop appropriate data sources. The book will serve as a guide to policy makers; decision makers at the school and district levels; local, state, and federal government agencies; curriculum developers; educators; and parent and education advocacy groups.

**Computer Science K-12: Imagining the Possibilities!** Apr 08 2020 Whether you are an experienced teacher or someone new to the field, you'll find this book to be full of resources and information for schools looking to bring engaging and dynamic computer science to its students. If you are new to the field, or still researching if computer science fits in your school, you can use this book as a guide to help you understand that CS really is, research what kinds of technologies work in the classroom, the differences between the many programming languages, type of available curricula, training, recruitment, online communities, format of your classroom, and even pedagogical style. If you are an experienced computer science teacher looking for new ideas, new approaches, and new ways to engage students through a project-based approach, you will discover numerous proven strategies and case studies to help you take your CS program to the next level -- Back cover.