4th Grade Ngss Science Units

When it’s time for a game change, you need a guide to the new rules. Helping Students Make Sense of the World Using Next Generation Science and Engineering Practices provides a play-by-play understanding of the practices strand of A Framework for K–12 Science Education (Framework) and the Next Generation Science Standards (NGSS). Written in clear, nontechnical language, this book provides a wealth of real-world examples to show you what’s different about practice-centered teaching and learning at all grade levels. The book addresses three important questions: 1. How will engaging students in science and engineering practices help improve science education? 2. What do the eight practices look like in the classroom? 3. How can educators engage students in practices to bring the NGSS to life? Helping Students Make Sense of the World Using Next Generation Science and Engineering Practices was developed for K–12 science teachers, curriculum developers, teacher educators, and administrators. Many of its authors contributed to the Framework’s initial vision and tested their ideas in actual science classrooms. If you want a fresh game plan to help students work together to generate and revise knowledge—not just receive and repeat information—this book is for you.

A winning educational formula of engaging lessons and powerful strategies for science teachers in numerous classroom settings The Teacher’s Toolbox series is an innovative, research-based resource providing teachers with instructional strategies for students of all levels and abilities. Each book in the collection focuses on a specific content area. Clear, concise guidance enables teachers to quickly integrate low-prep, high-value lessons and strategies in their middle school and high school classrooms. Every strategy follows a practical, how-to format established by the series editors. The Science Teacher's Toolbox is a classroom-tested resource offering hundreds of accessible, student-friendly lessons and strategies that can be implemented in a variety of educational settings. Concise chapters fully explain the research basis, necessary technology, Next Generation Science Standards correlation, and implementation of each lesson and strategy. Favoring a hands-on approach, this bookprovides step-by-step instructions that help teachers to apply their new skills and knowledge in their classrooms immediately. Lessons cover topics such as setting up labs, conducting experiments, using graphs, analyzing data, writing lab reports, incorporating technology, assessing student learning, teaching all-ability students, and much more. This book enables science teachers to: Understand how each strategy works in the classroom and avoid common mistakes Promote culturally responsive classrooms Activate and enhance prior knowledge Bring fresh and engaging activities into the classroom and the science lab Written by respected authors and educators, The Science Teacher's Toolbox: Hundreds of Practical Ideas to Support Your Students is an invaluable aid for upper elementary, middle school, and high school science educators as well those in teacher education programs and staff development professionals.

Douglas Llewellyn focuses on teaching science through an inquiry-based process, showing teachers how to implement inquiry using the three "Rs" of inquiry--restructuring, retooling, and reculturing. Inquire Within helps teachers design inquiries for their students and also provides ready-to-use inquiry lessons. Updates to the Third Edition include: Alignment with the new Common Core State Standards and the Next Generation Science Standards A central focus on making and defending scientific arguments (i.e. argumentation) Guidance on developing the prerequisite attitude and mindset for becoming an inquiry- and argument-based teacher How to balance the meaning (the disposition) as well as the mechanics (the how-to) of inquiry and argumentation Background on self-directed learning Practice in climbing the ladder of professional improvement Many new vignettes of inquiry and argument-based activities that integrate language arts with science. New sections tie inquiry-based instruction to classroom management, language literacy, the nature of science, multiple intelligence, communication skills, and scientific argumentation. The Third Edition is now closely aligned with Teaching High School Science Through Inquiry and Argumentation

Next Generation Science Standards identifies the science all K-12 students should know. These new standards are based on the National Research Council's A Framework for K-12 Science Education. The National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and Achieve have partnered to create standards through a collaborative state-led process. The standards are rich in content and practice and arranged in a coherent manner across disciplines and grades to provide all students an internationally benchmarked science education. The print version of Next Generation Science Standards complements the nextgenscience.org website and: Provides an authoritative offline reference to the standards when creating lesson plans Arranged by grade level and by core discipline, making information quick and easy to find Printed in full color with a lay-flat spiral binding Allows for bookmarking, highlighting, and annotating

The process of developing models, known as modeling, allows scientists to visualize difficult concepts, explain complex phenomena and clarify intricate theories. In recent years, science educators have greatly increased their use of modeling in teaching, especially real-time dynamic modeling, which is central to a scientific investigation. Modeling in science teaching is being used in an array of fields, everything from primary sciences to tertiary chemistry to college physics, and it is sure to play an increasing role in the future of education. Models and Modeling: Cognitive Tools for Scientific Enquiry is a comprehensive introduction to the use of models and modeling in science education. It identifies and describes many different modeling tools and presents recent applications of modeling as a cognitive tool for scientific enquiry.

Teaching Science in Elementary and Middle School integrates principles of learning and motivation with practical teaching ideas for implementing them. Paralleling what scientists do, project-based learning (PBL) represents the essence of inquiry and the nature of science, and engages children and teachers in investigating meaningful, real-world questions about the world around them. This text provides concrete strategies on teaching using a project-based approach and on meeting the principles in A Framework for K–12 Science Education and the Next Generation Science Standards (NGSS). Features include strategies for planning long-term, interdisciplinary, student-centered units; scenarios to help readers situate new experiences; and a wealth of supplementary material on the Companion Website. Features in the Fifth Edition: Integrates research-based findings from the National Research Council’s Taking Science to School, A Framework for K–12 Science Education, and NGSS to engage learners and help them make sense of phenomena in using disciplinary core ideas, science and engineering practices, and crosscutting concepts Gives attention to cultural diversity throughout the chapters, with an added focus on working with English Language Learners Describes how to develop and use assessments that require students to make use of their knowledge to solve problems or explain phenomena Illustrates how to use PBL to make connections to Common Core Standards for Mathematics and English Language Arts Provides examples of project-based lessons and projects to illustrate how teachers can support children in engaging in scientific and engineering practices, such as asking questions, designing investigations, constructing models and developing evidence-based explanation

Currently, many states are adopting the Next Generation Science Standards (NGSS) or are revising their own state standards in ways that reflect the NGSS. For students and schools, the implementation of any science standards rests with teachers. For those teachers, an evolving understanding about how best to teach science represents a significant transition in the way science is currently taught in most classrooms and it will require most science teachers to change how they teach. That change will require learning opportunities for teachers that reinforce and expand their knowledge of the major ideas and concepts in science, their familiarity with a range of instructional strategies, and the skills to implement those strategies in the classroom. Providing these kinds of learning opportunities in turn will require profound changes to current approaches to supporting teachers' learning across their careers, from their initial training to continuing professional development. A teacher's capability to improve students'

scientific understanding is heavily influenced by the school and district in which they work, the community in which the school is located, and the larger professional communities to which they belong. Science Teachers' Learning provides guidance for schools and districts on how best to support teachers' learning and how to implement successful programs for professional development. This report makes actionable recommendations for science teachers' learning that take a broad view of what is known about science education, how and when teachers learn, and education policies that directly and indirectly shape what teachers are able to learn and teach. The challenge of developing the expertise teachers need to implement the NGSS presents an opportunity to rethink professional learning for science teachers. Science Teachers' Learning will be a valuable resource for classrooms, departments, schools, districts, and professional organizations as they move to new ways to teach science.

Findings generated by recent research in science education, international debate on the guiding purposes of science education and the nature of scientific and technological literacy, official and semi-official reports on science education (including recommendations from prestigious organizations such as AAAS and UNESCO), and concerns expressed by scientists, environmentalists and engineers about current science education provision and the continuing low levels of scientific attainment among the general population, have led to some radical re-thinking of the nature of the science curriculum.

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

Differentiated Lessons and Assessements: Science, Grade 4Teacher Created Resources

In one comprehensive resource, this superb handbook covers everything you need to know about the subject. It brings together leading experts from the fields of psychology and education, combining theory and applied empirical research on such crucial topics as conceptualization, types of intelligence, developmental considerations, and ethical and legal concerns. Particular attention is given to social and family contexts, and evidence-based strategies and interventions offer solid guidelines on assessment, curriculum design, and encouraging and nurturing talent – from preschool through adolescence.

Annotation. Published in cooperation with the ERIC Clearinghouse on Information and Technology and the AECT, this volume of EMTY provides essential and timely information that helps you practice your profession in a dynamic and changing field. Respected authors in the field have contributed essays that address technological trends in education and training.

This book synthesizes the most current literature and research on scientific inquiry and nature of science in K-12 instruction. It is unique in its presentation of the distinctions and overlaps of inquiry and nature of science as instructional outcomes. The text would be appropriate for individuals preparing to become science teachers as well as experienced teachers. Researchers and teachers will find the text interesting as it carefully explores the subtleties and challenges of designing curriculum and instruction for integrating inquiry and nature of science.

This inaugural handbook documents the distinctive research field that utilizes history and philosophy in investigation of theoretical, curricular and pedagogical issues in the teaching of science and mathematics. It is contributed to by 130 researchers from 30 countries; it provides a logically structured, fully referenced guide to the ways in which science and mathematics education is, informed by the history and philosophy of these disciplines, as well as by the philosophy of education more generally. The first handbook to cover the field, it lays down a much-needed marker of progress to date and provides a platform for informed and coherent future analysis and research of the subject. The publication comes at a time of heightened worldwide concern over the standard of science and mathematics education, attended by fierce debate over how best to reform curricula and enliven student engagement in the subjects. There is a growing recognition among educators and policy makers that the learning of science must dovetail with learning about science; this handbook is uniquely positioned as a locus for the discussion. The handbook features sections on pedagogical, theoretical, national, and biographical research, setting the literature of each tradition in its historical context. It reminds readers at a crucial juncture that there has been a long and rich tradition of historical and philosophical engagements with science and mathematics teaching, and that lessons can be learnt from these engagements for the resolution of current theoretical, curricular and pedagogical questions that face teachers and administrators. Science educators will be grateful for this unique, encyclopaedic handbook, Gerald Holton, Physics Department, Harvard University This handbook gathers the fruits of over thirty years’ research by a growing international and cosmopolitan community Fabio Bevilacqua, Physics Department, University of Pavia

Problem-based learning (PBL) represents a widely recommended best practice that facilitates both student engagement with challenging content and students' ability to utilize that content in a more flexible manner to support problem-solving. This edited volume includes research that focuses on examples of successful models and strategies for facilitating preservice and practicing teachers in implementing PBL practices in their current and future classrooms in a variety of K-12 settings and in content areas ranging from the humanities to the STEM disciplines. This collection grew out of a special issue of the Interdisciplinary Journal of Problem-Based Learning. It includes additional research and models of successful PBL implementation in K-12 teacher education and classroom settings.

This book provides a theoretical basis and practical strategies to counter resistance to learning to teach for diversity (in culturally and gender-inclusive ways), and resistance to teaching for understanding (using student-centered and inquiry-based pedagogical approaches). Teacher educators from across the United States present rich narratives of their experiences in helping prospective and practicing teachers learn to teach for diversity and for understanding in a variety of mathematics and science contexts. Mathematics and science education has been slow to respond to issues of diversity and equity. Preparing Mathematics and Science Teachers for Diverse Classrooms: Promising Strategies for Transformative Pedagogy helps to begin a network for support and collaboration among teacher educators in science and mathematics who work for multicultural education and equity. A unique and much-needed contribution, this book is an essential resource for teacher educators, K-12 teachers who work as student teacher supervisors and cooperating teachers, and graduate students in mathematics and science education, and a compelling text for science and mathematics methods courses.

Practical strategies, activities, and assessments help teachers differentiate lessons to meet the individual needs, styles, and abilities of students. Each unit of study includes key concepts, discussion topics, vocabulary, and assessments in addition to a wide range of activities for visual, logical, verbal, musical, and kinesthetic learners. Helpful extras include generic strategies and activities for differentiating lessons and McREL content standards.

This book presents innovations in teaching and learning science, novel approaches to science curriculum, cultural and contextual factors in promoting science education and improving the standard and achievement of students in East Asian countries. The authors in this book discuss education reform and science curriculum changes and promotion of science and STEM education, parental roles and involvement in children's education, teacher preparation and professional development and research in science education in the context of international benchmarking tests to measure the knowledge of mathematics and science such as the Trends in Mathematics and Science Study (TIMSS) and achievement in science, mathematics and reading like Programme for International Student Assessment (PISA). Among the high achieving countries, the performance of the

students in East Asian countries such as Singapore, Taiwan, Korea, Japan, Hong Kong and China (Shanghai) are notable. This book investigates the reasons why students from East Asian countries consistently claim the top places in each and every cycle of those study. It brings together prominent science educators and researchers from East Asia to share their experience and findings, reflection and vision on emerging trends, pedagogical innovations and research-informed practices in science education in the region. It provides insights into effective educational strategies and development of science education to international readers.

Literacy and popular culture are intrinsically linked as forms of communication, entertainment, and education. Students are motivated to engage with popular culture through a myriad of mediums for a variety of purposes. Utilizing popular culture to bridge literacy concepts across content areas in K-12 settings offers a level playing field across student groups and grade levels. As concepts around traditional literacy education evolve and become more culturally responsive, the connections between popular culture and disciplinary literacy must be explored. Disciplinary Literacy Connections to Popular Culture in K-12 Settings is an essential publication that explores a conceptual framework around pedagogical connections to popular culture. While highlighting a broad range of topics including academic creativity, interdisciplinary storytelling, and skill development, this book is ideally designed for educators, curriculum developers, instructional designers, administrative officials, policymakers, researchers, academicians, and students.

Learn how educators are using Minecraft® as a powerful instructional tool to engage students and teach subjects as varied as math and humanities. This book offers ten classroom projects from teachers using Minecraft® to teach math, science, languages, and more. Each project includes learning objectives, project organization and tasks, and ideas for reflection and assessments. You'll also find detailed instructions for setting up and running a Minecraft® server in the classroom, both the regular and the popular MinecraftEdu versions. In this book, you'll discover What Minecraft® is and why it's such an engaging tool for the classroom. How to set up and administer servers that students use for their projects. What MinecraftEdu is, how to set up and manage it, and how to use its teacher controls. Techniques for using the game in special-education settings. Step-by-step instructions for printing 3D models of your classroom projects. Ways to use the game in a variety of different subject areas. You'll find essential advice and captivating projects for using Minecraft® to enhance students' learning experience from educators using Minecraft® in the Classroom: Shane Asselstine, Dan Bloom, André Chercka, Adam Clarke, Stephen Elford, Colin Gallagher, David Lee, John Miller, Eric Walker, and James York. Minecraft® is a trademark of Mojang Synergies/Notch Development AB. This book is not affiliated with or sponsored by Mojang Synergies/Notch Development AB.

With an emphasis on the Next Generation Science Standards (NGSS), this thesis examined traditional teacher centered versus student-centered science instruction in a fourth-grade elementary school classroom. As part of a two year study, the following variables were measured: (a) student academic achievement, (b) student motivation, and (c) student engagement. A total of sixty-eight fourth-grade students participated in this study. Throughout the 2017-2018 academic year, thirty-two students took part in the initial student-centered science class. During the 2018-2019 academic year, thirty-six students participated in a completely student-centered science classroom. Across both academic years, and during a twelve-week unit on Energy and Waves, students interacted in groups with weekly investigations, answered relevant questions, and participated in whole-class discussions. A comparison between eighteen students in the initial (2017-2018) student-centered (shifting from teacher-centered) classroom and eighteen students in the completely (2018-2019) student-centered classroom was conducted. Student data was collected in the form of (a) student science notebooks, (b) student science achievement scores, (c) interest in science surveys, and d) student motivation and engagement rubrics. Study results indicate that student academic achievement in science increased when the completely student-centered instruction was utilized. In addition, student motivation and engagement towards the content being taught increased when the completely student-centered approach to teaching science was used by the teacher. This study provides important findings regarding the transition from traditional teachercentered science instruction to the use of an NGSS oriented student-centered teaching approach.

Now more than ever, as a worldwide STEM community, we need to know what pre-collegiate teachers and students explore, learn, and implement in relation to computer science and engineering education. As computer science and engineering education are not always "stand-alone" courses in pre-collegiate schools, how are pre-collegiate teachers and students learning about these topics? How can these subjects be integrated? Explore six articles in this book that directly relate to the currently hot topics of computer science and engineering education as they tie into pre-collegiate science, technology, and mathematics realms. There is a systematic review article to set the stage of the problem. Following this overview are two teacher-focused articles on professional development in computer science and entrepreneurship venture training. The final three articles focus on varying levels of student work including pre-collegiate secondary students' exploration of engineering design technology, future science teachers' (collegiate students) perceptions of engineering, and pre-collegiate future engineers' exploration of environmental radioactivity. All six articles speak to computer science and engineering education in pre-collegiate forums, but blend into the collegiate world for a look at what all audiences can bring to the conversation about these topics.

Researchers have suggested that students' learning should take place through an inquiry process similar to the way scientists work. In April of 2013, The Next Generation Science Standards were released with the goal of creating a more meaningful, authentic science experience. Teaching science as a process of inquiry and explanation helps students think past the subject matter and form a deeper understanding of how science applies broadly to everyday life. Some teachers report that they are not prepared to implement inquiry-based teaching in science, due to several obstacles such as lack of self-efficacy, limited content knowledge' limited pre-service training, limited professional development and limited understanding of the inquiry process. Research has shown that a distinguishing feature of effective professional development is the teachers' active

involvement in being able to identify their own learning needs and then develop learning experiences that will meet those goals. One way this can be accomplished is through reflection and collaboration with team members. I incorporated inquiry-based teaching methods into my classroom, while teaching a 6-week unit on the water cycle. This self-study reflects on the lessons that were taught, changes that needed to be made to future lessons, what content knowledge I needed to improve on, and I identified steps that could be taken to overcome challenges and weaknesses of implementing the NGSS into my classroom.

Turn natural curiosity into deep, lasting learnings! Help students transform their playful wonderings into deeper questions about content—and develop the higher-level thinking skills they need for success in school and in life. In this invaluable resource you'll find simple, yet systematic ways to develop authentic student inquiry that fosters deep learning. This new edition features: Updates based on the latest research around inquiry-based teaching Examples for K–8 across subject areas New emphasis on critical thinking about technologies New and updated activities, checklists, templates, and implementation tools Alignment with Common Core and Next Generation Science Standards

With an increasing demand for science background in an increasing number of occupations and low science scores nationwide, elementary schools are in need of a Science, Technology, Engineering and Mathematics (STEM) curriculum that encompasses the new Next Generation Science Standards (NGSS). This project is intended to be a guide for fourth grade teachers to begin implementing STEM into their routine curriculum. This program is prepared using Discrepant Events, Inquiry Based Learning, the Five E Planning Model and Science Language Development. The curriculum consists of three units that follow NGSS Earth Space Science (ESS) standards: Erosion, Plate Tectonics and Earthquakes. It was developed for the initial use with a fourth grade classroom in a rural community within San Diego County. This curriculum will assist both new and experienced teachers with the structure and implementation of STEM in their classroom.

As new classroom resources are developed, educators strive to incorporate digital media advancements into their curriculum to provide an enriched learning experience for students with exceptional intelligence, as well as students in need of supplementary instruction. Though the resources exist, their effective use in the classroom is currently lacking. Cases on Instructional Technology in Gifted and Talented Education provides educators with real-life examples and research-based directions for the use of digital media resources in classrooms at all academic levels. This reference work will appeal to educators and researchers interested in enriching P-12 classrooms in order to extend student learning and promote effective e-learning in the classroom.

This book focuses on the representation of nature in science education in schools in the United States. Given the importance of our relationship with the nonhuman world for the fate of our planet, this work gives special attention to the representation, instruction, and understanding of the relationship between the social and the natural world. It also proposes an alternative, sustainability science-based conceptual framework for ecology and environmental science topics in science education, which is compatible with the current social-ecological understanding of life in the Anthropocene epoch.

Literacy learning clubs are highly motivating small-group collaborations that can improve tweens' and teens' academic achievement, support their social-emotional development, and increase their enjoyment of reading and writing. This book explains the research basis for the author's approach and offers practical instructions for implementation in English language arts, social studies, science, and mathematics classrooms, illustrated with detailed case examples. Links to the Common Core State Standards are identified, and multimodal methods and new literacies emphasized throughout. User-friendly features include end-of-chapter reflection questions and suggested activities. The Appendix provides reproducible planning forms and handouts that can be downloaded and printed in a convenient 8 1/2" x 11" size.

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.

With a focus on what mathematics and science educators need to know about academic language used in the STEM disciplines, this book critically synthesizes the current knowledge base on language challenges inherent to learning mathematics and science, with particular attention to the unique issues for English learners. These key questions are addressed: When and how do students develop mastery of the language registers unique to mathematics and to the sciences? How do teachers use assessment as evidence of student learning for both accountability and instructional purposes? Orienting each chapter with a research review and drawing out important Focus Points, chapter authors examine the obstacles to and latest ideas for improving STEM literacy, and discuss implications for future research and practice.

Grounded in decades of research, the Schoolwide Enrichment Model (SEM) has been successfully implemented at hundreds of schools across the world. Now, The Schoolwide Enrichment Model in Science: A Hands-on Approach for Engaging Young Scientists takes high-engagement learning one step further by applying SEM teaching strategies to the science curriculum. In this book, teachers learn how to engage students and to teach the skills needed to complete meaningful, in-depth investigations in science. Activities are connected to the Next Generation Science Standards (NGSS) and current policy recommendations calling for the meaningful integration of technology and promoting thinking

and doing like young scientists over rote memorization. Easy to read and use, the book incorporates many practical suggestions, as well as reproducible student and teacher handouts.

The core assumption of this book is the interconnectedness of humans and nature, and that the future of the planet depends on humans' recognition and care for this interconnectedness. This comprehensive resource supports the work of pre-service and practicing elementary teachers as they teach their students to be part of the world as engaged citizens, advocates for social and ecological justice. Challenging readers to more explicitly address current environmental issues with students in their classrooms, the book presents a diverse set of topics from a variety of perspectives. Its broad social/cultural perspective emphasizes that social and ecological justice are interrelated. Coverage includes descriptions of environmental education pedagogies such as nature-based experiences and place-based studies; peace-education practices; children doing environmental activism; and teachers supporting children emotionally in times of climate disruption and tumult. The pedagogies described invite student engagement and action in the public sphere. Children are represented as 'agents of change' engaged in social and environmental issues and problems through their actions both local and global.

The Handbook of Research on STEM Education represents a groundbreaking and comprehensive synthesis of research and presentation of policy within the realm of science, technology, engineering, and mathematics (STEM) education. What distinguishes this Handbook from others is the nature of integration of the disciplines that is the founding premise for the work – all chapters in this book speak directly to the integration of STEM, rather than discussion of research within the individual content areas. The Handbook of Research on STEM Education explores the most pressing areas of STEM within an international context. Divided into six sections, the authors cover topics including: the nature of STEM, STEM learning, STEM pedagogy, curriculum and assessment, critical issues in STEM, STEM teacher education, and STEM policy and reform. The Handbook utilizes the lens of equity and access by focusing on STEM literacy, early childhood STEM, learners with disabilities, informal STEM, socio-scientific issues, race-related factors, gender equity, cultural-relevancy, and parental involvement. Additionally, discussion of STEM education policy in a variety of countries is included, as well as a focus on engaging business/industry and teachers in advocacy for STEM education. The Handbook's 37 chapters provide a deep and meaningful landscape of the implementation of STEM over the past two decades. As such, the findings that are presented within provide the reader with clear directions for future research into effective practice and supports for integrated STEM, which are grounded in the literature to date.

In this digital age, faculty, teachers, and teacher educators are increasingly expected to adopt and adapt pedagogical perspectives to support student learning in instructional environments featuring online or blended learning. One highly adopted element of online and blended learning involves the use of online learning discussions. Discussion-based learning offers a rich pedagogical context for creating learning opportunities as well as a great deal of flexibility for a wide variety of learning and learner contexts. As post-secondary and, increasingly, K-12 institutions cope with the rapid growth of online learning, and an increase in the cultural diversity of learners, it is critical to understand, at a detailed level, the relationship between online interaction and learning and how educationally-effective interactions might be nurtured, in an inclusive way, by instructors. The Handbook of Research on Online Discussion-Based Teaching Methods is a cutting-edge research publication that seeks to identify promising designs, pedagogical and assessment strategies, conceptual models, and theoretical frameworks that support discussion-based learning in online and blended learning environments. This book provides a better understanding of the effects and both commonalities and differences of new tools that support interaction, such as video, audio, and real-time interaction in discussion-based learning. Featuring a wide range of topics such as gamification, intercultural learning, and digital agency, this book is ideal for teachers, educational software developers, instructional designers, IT consultants, academicians, curriculum designers, researchers, and students.

SCIENCE STORIES helps preservice and inservice teachers contextualize what it looks like to engage their students in meaningful science experiences. Using narratives about science teaching and learning in real-world classrooms, this text demonstrates learning, important content, and strategies in action. Author Janice Koch's approach guides teachers in discovering and exploring their scientific selves, enabling them to learn from students' experiences and become effective scientific explorers in their own classrooms. Featuring connections to the Next Generation Science Standards (NGSS), the text empowers teachers to infuse science into their own classrooms by answering such questions as, "Where do I start?" and "How do I use the new standards?" SCIENCE STORIES contains comprehensive chapters on key science disciplinary core ideas, such as life science, physical science, and earth and space science, as well as a chapter that considers student assessment and self-assessment. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

This book offers a comprehensive introduction to Nature of Science (NOS), one of the most important aspects of science teaching and learning, and includes tested strategies for teaching aspects of the NOS in a variety of instructional settings. In line with the recommendations in the field to include NOS in all plans for science instruction, the book provides an accessible resource of background information on NOS, rationales for teaching these targeted NOS aspects, and – most importantly – how to teach about the nature of science in specific instructional contexts. The first section examines the why and what of NOS, its nature, and what research says about how to teach NOS in science settings. The second section focuses on extending knowledge about NOS to question of scientific method, theory-laden observation, the role of experiments and observations and distinctions between science, engineering and technology. The dominant theme of the remainder of the book is a focus on teaching aspects of NOS applicable to a wide variety of instructional environments.

This book focuses on arts-based classroom practices that can be used to support English Language Learners. Recognizing that all children learn differently, but that the needs of children learning a new language are particularly unique, each chapter offers innovative in which arts-based methods can support learning across content areas. This book also recognizes the intersectionality of language and socio-economic status that exists for many ELLs. Framing knowledge of two languages as an asset for children who otherwise may come from low resource contexts is an important feature of these chapters. This edited book offers resources and practical suggestions from teachers who have successfully integrated the arts into their curriculum. It is a useful resource for classroom teachers and other practioners who work with ELL learners from K-12.

Supplement your science curriculum with 180 days of daily practice! This invaluable classroom resource provides teachers with weekly science units that build students' content-area literacy, and are easy to incorporate into the classroom. Students will analyze and evaluate scientific data and scenarios, improve their understanding of science and engineering practices, answer constructed-response questions, and increase their higher-order thinking skills. Each week covers a particular topic within one of three science strands: life science, physical science, and Earth and space science. Aligned to Next Generation Science Standards (NGSS) and state standards, this resource includes digital materials. Provide students with the skills they need to think like scientists with this essential resource!

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