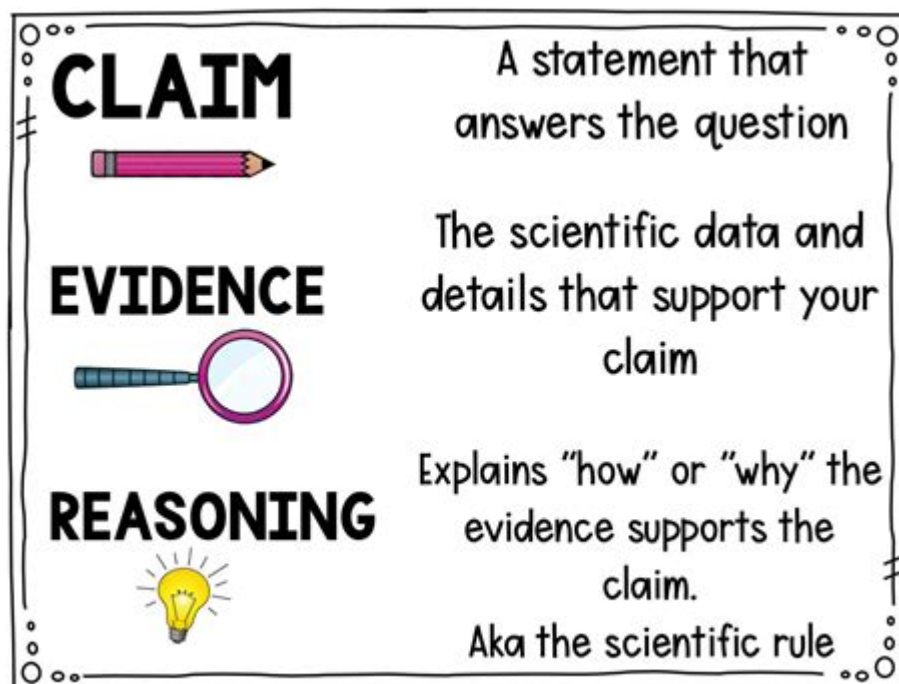


# Cer Science Examples



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## **CER Science Examples: Mastering Claim, Evidence, Reasoning in Scientific Writing**

Are you struggling to effectively communicate your scientific findings? Do you find yourself losing marks on lab reports because you're not properly articulating your data? Then you've come to the right place! This comprehensive guide will explore the crucial CER (Claim, Evidence, Reasoning) framework, providing clear and concise CER science examples to help you master this essential skill for any aspiring scientist. We'll dissect several real-world scenarios, demonstrating how to construct strong, persuasive arguments supported by robust evidence and logical reasoning. By the end of this post, you'll be confident in applying the CER framework to any scientific investigation.

### **What is the CER Framework?**

The CER framework is a powerful tool for structuring scientific arguments. It's a three-part process:

**Claim:** This is your answer to the scientific question. It's a concise statement that summarizes your findings. Think of it as your main takeaway.

**Evidence:** This is the data that supports your claim. This includes observations, measurements, experimental results, and any other relevant factual information. It's the "proof" behind your claim.

Reasoning: This is the explanation that connects your evidence to your claim. It explains why the evidence supports your claim and addresses potential counterarguments. This shows you understand the scientific concepts behind your findings.

## **CER Science Examples: Across Different Scientific Disciplines**

Let's delve into specific CER science examples to solidify your understanding.

### **#### Example 1: Biology – Plant Growth and Sunlight**

Scientific Question: Does the amount of sunlight affect plant growth?

Claim: Plants exposed to more sunlight grow taller than plants exposed to less sunlight.

Evidence: Plant A (exposed to 8 hours of sunlight) grew 15cm in height, while Plant B (exposed to 4 hours of sunlight) grew only 8cm. These measurements were taken over a two-week period, using plants of the same species and size.

Reasoning: The increased growth of Plant A compared to Plant B directly supports the claim. Photosynthesis, the process by which plants convert light energy into chemical energy for growth, requires sunlight. Therefore, increased sunlight exposure leads to increased photosynthesis and subsequently, greater growth.

### **#### Example 2: Chemistry – Reaction Rates and Temperature**

Scientific Question: How does temperature affect the rate of a chemical reaction?

Claim: Increasing the temperature increases the rate of a chemical reaction.

Evidence: The reaction between hydrochloric acid and magnesium ribbon was timed at three different temperatures: 10°C (60 seconds), 20°C (30 seconds), and 30°C (15 seconds). The rate of reaction is inversely proportional to the time taken to complete the reaction.

Reasoning: Higher temperatures provide molecules with more kinetic energy. This increased energy leads to more frequent and forceful collisions between reactant molecules, increasing the likelihood of successful collisions and thus speeding up the reaction rate.

### **#### Example 3: Physics – Newton's Laws of Motion**

Scientific Question: How does the mass of an object affect its acceleration when a constant force is applied?

Claim: Objects with greater mass will experience less acceleration when the same force is applied.

Evidence: A 1kg cart accelerated at 2 m/s<sup>2</sup> when a 2N force was applied. A 2kg cart accelerated at only 1 m/s<sup>2</sup> under the same force.

Reasoning: Newton's second law of motion ( $F=ma$ ) states that acceleration is inversely proportional to mass when force is constant. The evidence directly demonstrates this inverse relationship: the heavier cart (greater mass) experienced a lower acceleration.

#### #### Example 4: Earth Science - Weather Patterns and Air Pressure

Scientific Question: How does air pressure relate to weather conditions?

Claim: Low air pressure systems are associated with stormy weather.

Evidence: A barometer reading of 990 millibars was recorded before a significant storm, while a reading of 1015 millibars was recorded during clear, sunny weather. This data was collected over a week-long period.

Reasoning: Low air pressure systems typically indicate rising air masses, leading to cloud formation, precipitation, and often, stormy weather conditions. Conversely, high air pressure systems usually signify stable, descending air, resulting in clear skies and calm weather.

## Developing Strong CER Statements: Tips and Tricks

Specificity is Key: Avoid vague claims and evidence. Use precise measurements and quantitative data wherever possible.

Logical Connections: Ensure your reasoning clearly and explicitly links your evidence to your claim.

Consider Counterarguments: Anticipate potential objections to your claim and address them in your reasoning.

Practice Makes Perfect: The more you practice constructing CER statements, the better you'll become at it.

## Conclusion

Mastering the CER framework is essential for effectively communicating scientific findings. By clearly articulating your claim, providing robust evidence, and explaining the reasoning behind your conclusions, you can create compelling and persuasive arguments. Use these CER science examples as a springboard to develop your own scientific arguments and enhance your scientific communication skills.

## FAQs

1. Can I use the CER framework for informal scientific discussions? Yes, the CER framework is a valuable tool for organizing your thoughts and clarifying your understanding in any scientific context, formal or informal.
2. What if my evidence doesn't fully support my claim? Re-evaluate your claim and evidence. It may be necessary to refine your claim or gather more data. Honesty and transparency are crucial in science.
3. Is there a specific format for writing CER statements? There isn't a rigid format, but clarity and logical flow are paramount. Many educators prefer a paragraph structure, but bullet points or other formats are acceptable as long as the three components are clearly presented.
4. How can I improve my reasoning skills? Practice analyzing data, identifying patterns, and connecting them to scientific principles. Discussions with peers and instructors are also incredibly helpful.
5. Are there any online resources to help me further improve my CER skills? Numerous online resources and educational websites offer further explanations and practice exercises for the CER framework. Searching "CER science worksheets" or "CER science examples" will yield many results.

**cer science examples:** Supporting Grade 5-8 Students in Constructing Explanations in Science Katherine L. McNeill, Joseph S. Krajcik, 2012 I would encourage others to use [this book] as a resource for a professional learning community or department discussion group and the like... absolutely I would recommend it---why? It is simply good for our students' developing understanding of science....---Pamela M. Pelletier, Senior Program Director, Science K-12, Boston Public Schools, Boston, Massachusetts --

**cer science examples:** *The Knowledge Gap* Natalie Wexler, 2020-08-04 The untold story of the root cause of America's education crisis--and the seemingly endless cycle of multigenerational poverty. It was only after years within the education reform movement that Natalie Wexler stumbled across a hidden explanation for our country's frustrating lack of progress when it comes to providing every child with a quality education. The problem wasn't one of the usual scapegoats: lazy teachers, shoddy facilities, lack of accountability. It was something no one was talking about: the elementary school curriculum's intense focus on decontextualized reading comprehension skills at the expense of actual knowledge. In the tradition of Dale Russakoff's *The Prize* and Dana Goldstein's *The Teacher Wars*, Wexler brings together history, research, and compelling characters to pull back the curtain on this fundamental flaw in our education system--one that fellow reformers, journalists, and policymakers have long overlooked, and of which the general public, including many parents, remains unaware. But *The Knowledge Gap* isn't just a story of what schools have gotten so wrong--it also follows innovative educators who are in the process of shedding their deeply ingrained habits, and describes the rewards that have come along: students who are not only excited to learn but are also acquiring the knowledge and vocabulary that will enable them to succeed. If we truly want to fix our education system and unlock the potential of our neediest children, we have no choice but to pay attention.

**cer science examples: What's Your Evidence?** Carla Zembal-Saul, Katherine L. McNeill, Kimber Hersherberger, 2013 With the view that children are capable young scientists, authors encourage science teaching in ways that nurture students' curiosity about how the natural world works including research-based approaches to support all K-5 children constructing scientific explanations via talk and writing. Grounded in NSF-funded research, this book/DVD provides K-5 teachers with a framework for explanation (Claim, Evidence, Reasoning) that they can use to organize everything from planning to instructional strategies and from scaffolds to assessment.

Because the framework addresses not only having students learn scientific explanations but also construct them from evidence and evaluate them, it is considered to build upon the new NRC framework for K-12 science education, the national standards, and reform documents in science education, as well as national standards in literacy around argumentation and persuasion, including the Common Core Standards for English Language Arts (Common Core State Standards Initiative, 2010). The chapters guide teachers step by step through presenting the framework for students, identifying opportunities to incorporate scientific explanation into lessons, providing curricular scaffolds (that fade over time) to support all students including ELLs and students with special needs, developing scientific explanation assessment tasks, and using the information from assessment tasks to inform instruction.

**cer science examples:** *Writing in Middle School Science* Scott Phillips, 2018-06-04 Are you frustrated your middle school science students can't write? Whether you call them Claim, Evidence, Reasoning (CER) or Conclusions Based on Data (CBDs), seemingly all science teachers struggle with student writing. This simple six-sentence, step-by-step, one-day lesson allows students to produce fantastic work in minutes. You'll grade each paper in seconds and truly know who understands the material and who does not. Students will write them in minutes and you'll learn to grade them in seconds! The author went from using them three times per year to more than sixty times per year because they are the most effective method to gauge student understanding. Change the way you teach writing in middle school science forever!

**cer science examples: Helping Students Make Sense of the World Using Next Generation Science and Engineering Practices** Christina V. Schwarz, Cynthia Passmore, Brian J. Reiser, 2017-01-31 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.

**cer science examples:** *Ready, Set, SCIENCE!* National Research Council, Division of Behavioral and Social Sciences and Education, Center for Education, Board on Science Education, Heidi A. Schweingruber, Andrew W. Shouse, Sarah Michaels, 2007-11-30 What types of instructional experiences help K-8 students learn science with understanding? What do science educators, teachers, teacher leaders, science specialists, professional development staff, curriculum designers, and school administrators need to know to create and support such experiences? *Ready, Set, Science!* guides the way with an account of the groundbreaking and comprehensive synthesis of research into teaching and learning science in kindergarten through eighth grade. Based on the recently released National Research Council report *Taking Science to School: Learning and Teaching Science in Grades K-8*, this book summarizes a rich body of findings from the learning sciences and builds detailed cases of science educators at work to make the implications of research clear, accessible, and stimulating for a broad range of science educators. *Ready, Set, Science!* is filled with classroom case studies that bring to life the research findings and help readers to replicate success. Most of these stories are based on real classroom experiences that illustrate the complexities that teachers grapple with every day. They show how teachers work to select and design rigorous and engaging instructional tasks, manage classrooms, orchestrate productive

discussions with culturally and linguistically diverse groups of students, and help students make their thinking visible using a variety of representational tools. This book will be an essential resource for science education practitioners and contains information that will be extremely useful to everyone – including parents – directly or indirectly involved in the teaching of science.

**cer science examples: Teaching Better** Bradley A. Ermeling, Genevieve Graff-Ermeling, 2016-03-03 Discover the power of collaborative inquiry! This unique, visually stunning resource is packed with details to ignite and sustain the collaborative improvement of teaching and learning. Includes US and international case studies, powerful metaphors, application exercises, a leader's guide, a companion website, digital templates, and more. Learn what lesson study and collaborative inquiry can and should look like. Find the guidance you need to lead and support schoolwide, inquiry-based improvement! "A true inspiration for educators who want to improve both their own craft and the methods of the profession." Jim Stigler & James Hiebert, Authors of *The Teaching Gap*

**cer science examples: Science as Inquiry in the Secondary Setting** Julie Luft, Randy L. Bell, Julie Gess-Newsome, 2008 It can be a tough thing to admit: Despite hearing so much about the importance of inquiry-based science education, you may not be exactly sure what it is, not to mention how to do it. But now this engaging new book takes the intimidation out of inquiry. *Science as Inquiry in the Secondary Setting* gives you an overview of what inquiry can be like in middle and high school and explores how to incorporate more inquiry-centered practices into your own teaching. In 11 concise chapters, leading researchers raise and resolve such key questions as: What is Inquiry? What does inquiry look like in specific classes, such as the Earth science lab or the chemistry lab? What are the basic features of inquiry instruction? How do you assess science as inquiry? *Science as Inquiry* was created to fill a vacuum. No other book serves as such a compact, easy-to-understand orientation to inquiry. It's ideal for guiding discussion, fostering reflection, and helping you enhance your own classroom practices. As chapter author Mark Windschitl writes, The aim of doing more authentic science in schools is not to mimic scientists, but to develop the depth of content knowledge, the habits of mind, and the critical reasoning skills that are so crucial to basic science literacy. This volume guides you to find new ways of helping students further along the path to science literacy.

**cer science examples: Handbook of Research on Science Education** Norman G. Lederman, Dana L. Zeidler, Judith S. Lederman, 2023-03-17 Volume III of this landmark synthesis of research offers a comprehensive, state-of-the-art survey highlighting new and emerging research perspectives in science education. Building on the foundations set in Volumes I and II, Volume III provides a globally minded, up-to-the-minute survey of the science education research community and represents the diversity of the field. Each chapter has been updated with new research and new content, and Volume III has been further developed to include new and expanded coverage on astronomy and space education, epistemic practices related to socioscientific issues, design-based research, interdisciplinary and STEM education, inclusive science education, and the global impact of nature of science and scientific inquiry literacy. As with the previous volumes, Volume III is organized around six themes: theory and methods of science education research; science learning; diversity and equity; science teaching; curriculum and assessment; and science teacher education. Each chapter presents an integrative review of the research on the topic it addresses, pulling together the existing research, working to understand historical trends and patterns in that body of scholarship, describing how the issue is conceptualized within the literature, how methods and theories have shaped the outcomes of the research, and where the strengths, weaknesses, and gaps are in the literature. Providing guidance to science education faculty, scholars, and graduate students, and pointing towards future directions of the field, *Handbook of Research on Science Education Research, Volume III* offers an essential resource to all members of the science education community.

**cer science examples: Theoretical Frameworks for Research in Chemistry/science Education** George M. Bodner, MaryKay Orgill, 2007 Part of the Prentice Hall Series in Educational Innovation, this concise new volume is the first book devoted entirely to describing and critiquing the various

theoretical frameworks used in chemistry education/science education research – with explicit examples of related studies. Provides a broad spectrum of theoretical perspectives upon which readers can base educational research. Includes an extensive list of relevant references. Presents a consistent framework for each subject area/chapter. A useful guide for practicing chemists, chemistry instructors, and chemistry educators for learning how to do basic educational research within the context of their own instructional laboratories and classrooms.

**cer science examples:** *Defense of the Scientific Hypothesis* Bradley E. Alger, 2019-09-03  
Defense of Scientific Hypothesis: From Reproducibility Crisis to Big Data sets out to explain and defend the scientific hypothesis. Alger's mission is to counteract the misinformation and misunderstanding about the hypothesis that even seasoned scientists have concerning its nature and place in modern science. Most biological scientists receive little or no formal training in scientific thinking. Further, the hypothesis is under attack by critics who claim that it is irrelevant to science. In order to appreciate and evaluate scientific controversies like global climate change, vaccine safety, etc., the public first needs to understand the hypothesis. Defense of Scientific Hypothesis begins by describing and analyzing the scientific hypothesis in depth and examining its relationships to various kinds of science. Alger then guides readers through a review of the hypothesis in the context of the Reproducibility Crisis and presents survey data on how scientists perceive and employ hypotheses. He assesses cognitive factors that influence our ability to use the hypothesis and makes practical and policy recommendations for teaching and learning about it. Finally, Alger considers two possible futures of the hypothesis in science as the Big Data revolution looms: in one scenario, the hypothesis is displaced by the Big Data Mindset that forgoes understanding in favor of correlation and prediction. In the other, robotic science incorporates the hypotheses into mechanized laboratories guided by artificial intelligence. But in his illuminating epilogue, Alger envisions a third way, the Centaur Scientist, a symbiotic relationship between human scientists and computers.

**cer science examples:** *Uncovering Student Ideas in Science: 25 formative assessment probes* Page Keeley, 2005 V. 1. Physical science assessment probes -- Life, Earth, and space science assessment probes.

**cer science examples:** *Developing a Protocol for Observational Comparative Effectiveness Research: A User's Guide* Agency for Health Care Research and Quality (U.S.), 2013-02-21 This User's Guide is a resource for investigators and stakeholders who develop and review observational comparative effectiveness research protocols. It explains how to (1) identify key considerations and best practices for research design; (2) build a protocol based on these standards and best practices; and (3) judge the adequacy and completeness of a protocol. Eleven chapters cover all aspects of research design, including: developing study objectives, defining and refining study questions, addressing the heterogeneity of treatment effect, characterizing exposure, selecting a comparator, defining and measuring outcomes, and identifying optimal data sources. Checklists of guidance and key considerations for protocols are provided at the end of each chapter. The User's Guide was created by researchers affiliated with AHRQ's Effective Health Care Program, particularly those who participated in AHRQ's DEcIDE (Developing Evidence to Inform Decisions About Effectiveness) program. Chapters were subject to multiple internal and external independent reviews. More more information, please consult the Agency website: [www.effectivehealthcare.ahrq.gov](http://www.effectivehealthcare.ahrq.gov)

**cer science examples:** *Teaching Primary Science Constructively* Keith Skamp, Christine Preston, 2017-09-05 Teaching Primary Science Constructively helps readers to create effective science learning experiences for primary students by using a constructivist approach to learning. This best-selling text explains the principles of constructivism and their implications for learning and teaching, and discusses core strategies for developing science understanding and science inquiry processes and skills. Chapters also provide research-based ideas for implementing a constructivist approach within a number of content strands. Throughout there are strong links to the key ideas, themes and terminology of the revised Australian Curriculum: Science. This sixth edition includes a

new introductory chapter addressing readers' preconceptions and concerns about teaching primary science.

**cer science examples: Teaching Climate Change for Grades 6-12** Kelley T. Le, 2021-06-20 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).

**cer science examples: A Framework for K-12 Science Education** National Research Council, Division of Behavioral and Social Sciences and Education, Board on Science Education, Committee on a Conceptual Framework for New K-12 Science Education Standards, 2012-02-28 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.

**cer science examples: The Science I Know** Suzanna Roman-Oliver, 2024-07-08 The Science I Know: Culturally Relevant Science Lessons from Secondary Classrooms is a collection of culturally relevant lesson plans written by secondary science teachers. Each lesson discusses how the tenets of academic success, cultural competence and critical consciousness that are part of the theory of Culturally Relevant Pedagogy (CRP) are addressed (Ladson-Billings, 1995). Additionally, each lesson plan is structured following the 5E learning cycle (Bybee, 2006) and aligned to the Next Generation Science Standards (NAS, 2012). The goal of this book is to help science teachers understand how to go about designing lessons that are culturally relevant. The hope is that the lessons that are detailed



in each chapter will inspire teachers to draw the cultural knowledge from their students and capitalize on it when designing science lessons. After an introductory chapter that discusses how science education has shifted in recent decades to address the needs of diverse students, the main body of the text is divided into three sections. The first part introduces Culturally Relevant Pedagogy (CRP) as a framework; this is important for those readers unfamiliar with Gloria Ladson-Billings' work. It addresses and discusses the three tenets of CRP (Academic Success, Cultural Competence and Critical Consciousness) and it includes an explanation of how each area can be observed and addressed in science education specifically. The second part features lesson plans from secondary science classrooms written by teachers from different subject areas (i.e., life science, physical science, earth science, etc.). The lesson plans follow the 5E Instructional Model (Bybee et. al., 2006). This model promotes inquiry by guiding teachers in the design of lesson plans that are "based upon cognitive psychology, constructivist-learning theory, and best practices in science teaching." (Duran & Duran, 2004). A brief snapshot of each teacher precedes each lesson plan. A discussion about how each of the CRP tenets is observed appears after each lesson plan. Finally, each plan featured has a section that addresses the concepts of Funds of Knowledge (Moll et al., 1992). This concept guides teachers in the process of identifying and maximizing students' cultural capital in the classroom. Each lesson plan chapter concludes with questions for further consideration for teachers. The last part of the book features best practices for teachers when preparing and planning to implement culturally relevant practices in their classrooms, as well as a lesson plan template for teachers. The Science I Know is not only essential reading for all science teachers interested in utilizing culturally relevant instructional practices in their classroom, but also a valuable tool in the instruction of pre-service teachers in Colleges of Education. The book's structure is ideal for classroom use. Perfect for courses such as: Foundations of Cultural Studies in Education; Education and Culture; Learner Differences; Secondary Science Pedagogy; Culturally Relevant Science; and Multicultural Education

**cer science examples: Knowledge, Society and Reality** León Olivé, 2023-03-13

**cer science examples: What Is This Thing Called Science?** Alan F. Chalmers, 2013-09-15

Co-published with the University of Queensland Press. HPC holds rights in North America and U. S. Dependencies. Since its first publication in 1976, Alan Chalmers's highly regarded and widely read work--translated into eighteen languages--has become a classic introduction to the scientific method, known for its accessibility to beginners and its value as a resource for advanced students and scholars. In addition to overall improvements and updates inspired by Chalmers's experience as a teacher, comments from his readers, and recent developments in the field, this fourth edition features an extensive chapter-long postscript that draws on his research into the history of atomism to illustrate important themes in the philosophy of science. Identifying the qualitative difference between knowledge of atoms as it figures in contemporary science and metaphysical speculations about atoms common in philosophy since the time of Democritus offers a revealing and instructive way to address the question at the heart of this groundbreaking work: What is this thing called science?

**cer science examples: Learning To Teach Science** Justin Dillon, 2003-09-02 In response to requests by science teachers for guidance on the process of mentoring in schools, this text provides an interactive, activities-based resource. It takes into account the progressive development of skills and competencies, for all those involved in the training of science teachers; pre-service, in-service and quality control. Activities are directly related to classroom and laboratory planning, organisation and management and include general question and answer exercises.; The book covers nine areas of science teacher competence crossed with five levels of progression to give a flexible programme of training. Each activity has a commentary for mentors and notes for student teachers, and discusses the rationale behind each activity. Five activities are written specifically to help mentors review progress at each of the five levels.; Additionally, it can be used by: experienced teachers for refreshing their own practice; Heads of Science Departments for upgrading science teaching within the departments; and those concerned with quality control and certification to recommend activities,

taken from the book, to aid further professional development.

**cer science examples: Ada Twist, Scientist** Andrea Beaty, 2016-09-06 Inspired by mathematician Ada Lovelace and physicist Marie Curie, this #1 bestseller from author Andrea Beaty and illustrator David Roberts champions STEM, girl power, and women scientists in a rollicking celebration of curiosity, the power of perseverance, and the importance of asking “Why?” Now a Netflix series! #1 New York Times Bestseller A Wall Street Journal Bestseller A USA Today Bestseller Ada Twist’s head is full of questions. Like her classmates Iggy and Rosie (stars of their own New York Times bestselling picture books Iggy Peck, Architect and Rosie Revere, Engineer), Ada has always been endlessly curious. Even when her fact-finding missions and elaborate scientific experiments don’t go as planned, Ada learns the value of thinking through problems and continuing to stay curious. Ada is an inquisitive second grader who was born to be a scientist. She possesses an unusual desire to question everything she encounters: a tick-tocking clock, a pointy-stemmed rose, the hairs in her dad’s nose, and so much more. Ada’s parents and her teacher, Miss Greer, have their hands full as the Ada’s science experiments wreak day-to-day havoc. On the first day of spring, Ada notices an unpleasant odor. She sets out to discover what might have caused it. Ada uses the scientific method in developing hypotheses in her smelly pursuit. The little girl demonstrates trial and error, while appreciating her family’s full support. In one experiment, she douses fragrances on her cat and attempts to place the frightened feline in the washing machine. For any parent who wants STEM (Science, Technology, Engineering, and Math) to be fun, this book is a source of inspiration that will get children excited about science, school, learning, and the value of asking “Why?” Check out all the books in the Questioners Series: The Questioners Picture Book Series: Iggy Peck, Architect | Rosie Revere, Engineer | Ada Twist, Scientist | Sofia Valdez, Future Prez | Aaron Slater, Illustrator | Lila Greer, Teacher of the Year The Questioners Chapter Book Series: Rosie Revere and the Raucous Riveters | Ada Twist and the Perilous Pants | Iggy Peck and the Mysterious Mansion | Sofia Valdez and the Vanishing Vote | Ada Twist and the Disappearing Dogs | Aaron Slater and the Sneaky Snake Questioners: The Why Files Series: Exploring Flight! | All About Plants! | The Science of Baking | Bug Bonanza! | Rockin’ Robots! Questioners: Ada Twist, Scientist Series: Ghost Busted | Show Me the Bunny | Ada Twist, Scientist: Brainstorm Book | 5-Minute Ada Twist, Scientist Stories The Questioners Big Project Book Series: Iggy Peck’s Big Project Book for Amazing Architects | Rosie Revere’s Big Project Book for Bold Engineers | Ada Twist’s Big Project Book for Stellar Scientists | Sofia Valdez’s Big Project Book for Awesome Activists | Aaron Slater’s Big Project Book for Astonishing Artists

**cer science examples: Primary Science Education** Anne Forbes, 2023-05-31 Primary Science Education: A Teacher's Toolkit is an accessible and comprehensive guide to primary school science education and its effective practice in the classroom. Primary Science Education is structured in two parts: Planning for Science and Primary Science in the Classroom. Each chapter covers fundamental topics, such as: curriculum requirements (including the Australian Curriculum and Australian Professional Standards for Teachers); preparing effective learning sequences with embedded authentic assessment; combining science learning with other learning areas, such as technologies and STEM; and critically analysing the teacher's role in the classroom. The text features short-answer and 'Bringing it Together' questions to encourage readers to consolidate their understanding of key themes. Case studies throughout provide guidance on the classroom experience and Teacher Background Information boxes explore topics where more in-depth knowledge is required. The book is supported by a suite of online resources, including interviews with Australian primary teachers and students, and downloadable activities.

**cer science examples: Planning Science Instruction for Emergent Bilinguals** Edward G. Lyon, Kelly M. Mackura, 2023 This practical resource takes educators through a planning process—from selecting standards to designing learning activities—that weaves together language, literacy, and science in ways that are responsive to emergent bilinguals. Drawing on extensive and current research, the authors show how secondary educators can use students’ own language and lived experiences, coupled with authentic science practices, to provide rich and relevant language

support. Using a science unit as a shared text, readers will learn how to gather rich knowledge about emergent bilinguals, unpack the ideas and language demands of Next Generation Science Standards, strategically embed language and literacy standards in the curriculum, and sequence learning activities around an anchoring phenomenon, a text, and an assessment. In the process, readers will come away with a repertoire of planning tools and examples of how to support emergent bilinguals in using language to collaborate with others and to interpret and produce texts that are central to learning and doing science. Planning Science Instruction for Emergent Bilinguals blends theory and practice so readers understand both how and why this planning process can be used to disrupt social inequity for emergent bilinguals. Book Features: Describes intentional decisions that educators can make when planning a science unit or learning experience. Shows how to weave together Next Generation Science Standards, Common Core English Language Arts Standards, and language development. Provides a model unit about kelp forest ecosystems to illustrate how theory is translated into practice. Demonstrates how to use emergent bilinguals' assets (linguistic skills, family experiences, personal interests) to create engaging science instruction. Provides a set of planning tools, including both blank templates and completed examples, to guide educators through the planning process.

**cer science examples: Good Practice In Science Teaching: What Research Has To Say** Osborne, Jonathan, Dillon, Justin, 2010-05-01 This volume provides a summary of the findings that educational research has to offer on good practice in school science teaching. It offers an overview of scholarship and research in the field, and introduces the ideas and evidence that guide it.

**cer science examples: Arguing From Evidence in Middle School Science** Jonathan Osborne, Brian M. Donovan, J. Bryan Henderson, Anna C. MacPherson, Andrew Wild, 2016-08-30 Teaching your students to think like scientists starts here! Use this straightforward, easy-to-follow guide to give your students the scientific practice of critical thinking today's science standards require. Ready-to-implement strategies and activities help you effortlessly engage students in arguments about competing data sets, opposing scientific ideas, applying evidence to support specific claims, and more. Use these 24 activities drawn from the physical sciences, life sciences, and earth and space sciences to: Engage students in 8 NGSS science and engineering practices Establish rich, productive classroom discourse Extend and employ argumentation and modeling strategies Clarify the difference between argumentation and explanation Stanford University professor, Jonathan Osborne, co-author of The National Resource Council's A Framework for K-12 Science Education—the basis for the Next Generation Science Standards—brings together a prominent author team that includes Brian M. Donovan (Biological Sciences Curriculum Study), J. Bryan Henderson (Arizona State University, Tempe), Anna C. MacPherson (American Museum of Natural History) and Andrew Wild (Stanford University Student) in this new, accessible book to help you teach your middle school students to think and argue like scientists!

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**cer science examples: Finding What Works in Health Care** Institute of Medicine, Board on Health Care Services, Committee on Standards for Systematic Reviews of Comparative Effectiveness Research, 2011-07-20 Healthcare decision makers in search of reliable information that compares health interventions increasingly turn to systematic reviews for the best summary of the evidence. Systematic reviews identify, select, assess, and synthesize the findings of similar but separate studies, and can help clarify what is known and not known about the potential benefits and harms of drugs, devices, and other healthcare services. Systematic reviews can be helpful for clinicians who want to integrate research findings into their daily practices, for patients to make well-informed choices about their own care, for professional medical societies and other organizations that develop clinical practice guidelines. Too often systematic reviews are of uncertain or poor quality. There are no universally accepted standards for developing systematic reviews leading to variability in how conflicts of interest and biases are handled, how evidence is appraised, and the overall scientific rigor of the process. In Finding What Works in Health Care the Institute of Medicine (IOM) recommends 21 standards for developing high-quality systematic reviews of comparative effectiveness research. The standards address the entire systematic review process from the initial steps of formulating the topic and building the review team to producing a detailed final report that synthesizes what the evidence shows and where knowledge gaps remain. Finding What Works in Health Care also proposes a framework for improving the quality of the science underpinning systematic reviews. This book will serve as a vital resource for both sponsors and producers of systematic reviews of comparative effectiveness research.

**cer science examples: The Craft of Scientific Presentations** Michael Alley, 2006-05-17 This timely and hugely practical work provides a score of examples from contemporary and historical scientific presentations to show clearly what makes an oral presentation effective. It considers presentations made to persuade an audience to adopt some course of action (such as funding a proposal) as well as presentations made to communicate information, and it considers these from four perspectives: speech, structure, visual aids, and delivery. It also discusses computer-based projections and slide shows as well as overhead projections. In particular, it looks at ways of organizing graphics and text in projected images and of using layout and design to present the information efficiently and effectively.

**cer science examples: Science, Evolution, and Creationism** Institute of Medicine, National Academy of Sciences, Committee on Revising Science and Creationism: A View from the National Academy of Sciences, 2008-01-28 How did life evolve on Earth? The answer to this question can help us understand our past and prepare for our future. Although evolution provides credible and reliable answers, polls show that many people turn away from science, seeking other explanations with which they are more comfortable. In the book Science, Evolution, and Creationism, a group of experts assembled by the National Academy of Sciences and the Institute of Medicine explain the fundamental methods of science, document the overwhelming evidence in support of biological evolution, and evaluate the alternative perspectives offered by advocates of various kinds of creationism, including intelligent design. The book explores the many fascinating inquiries being pursued that put the science of evolution to work in preventing and treating human disease, developing new agricultural products, and fostering industrial innovations. The book also presents

the scientific and legal reasons for not teaching creationist ideas in public school science classes. Mindful of school board battles and recent court decisions, *Science, Evolution, and Creationism* shows that science and religion should be viewed as different ways of understanding the world rather than as frameworks that are in conflict with each other and that the evidence for evolution can be fully compatible with religious faith. For educators, students, teachers, community leaders, legislators, policy makers, and parents who seek to understand the basis of evolutionary science, this publication will be an essential resource.

**cer science examples: Newtonian Tasks Inspired by Physics Education Research** C. Hieggelke, Steve Kanim, David Maloney, Thomas O'Kuma, 2011-01-05 Resource added for the Physics ?10-806-150? courses.

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**cer science examples: Scientific and Technical Aerospace Reports** , 1990

**cer science examples: Computer Science Education Research** Sally Fincher, Marian Petre, 2004-01-01 This book provides an overview of how to approach computer science education research from a pragmatic perspective. It represents the diversity of traditions and approaches inherent in this interdisciplinary area, while also providing a structure within which to make sense of that diversity. It provides multiple 'entry points'- to literature, to methods, to topics Part One, 'The Field and the Endeavor', frames the nature and conduct of research in computer science education. Part Two, 'Perspectives and Approaches', provides a number of grounded chapters on particular topics or themes, written by experts in each domain. These chapters cover the following topics: \* design \* novice misconceptions \* programming environments for novices \* algorithm visualisation \* a schema theory view on learning to program \* critical theory as a theoretical approach to computer science education research Juxtaposed and taken together, these chapters indicate just how varied the perspectives and research approaches can be. These chapters, too, act as entry points, with illustrations drawn from published work.

**cer science examples: The Science of Health Disparities Research** Irene Dankwa-Mullan, Eliseo J. Pérez-Stable, Kevin L. Gardner, Xinzhi Zhang, Adelaida M. Rosario, 2021-03-01 Integrates the various disciplines of the science of health disparities in one comprehensive volume *The Science of Health Disparities Research* is an indispensable source of up-to-date information on clinical and translational health disparities science. Building upon the advances in health disparities research over the past decade, this authoritative volume informs policies and practices addressing the diseases, disorders, and gaps in health outcomes that are more prevalent in minority populations and socially disadvantaged communities. Contributions by recognized scholars and leaders in the field—featuring contemporary research, conceptual models, and a broad range of scientific perspectives—provide an interdisciplinary approach to reducing inequalities in population health, encouraging community engagement in the research process, and promoting social justice. In-depth chapters help readers better understand the specifics of minority health and health disparities while demonstrating the importance of advancing theory, refining measurement, improving investigative methods, and diversifying scientific research. In 26 chapters, the book examines topics including the

etiology of health disparities research, the determinants of population health, research ethics, and research in African American, Asians, Latino, American Indian, and other vulnerable populations. Providing a unified framework on the principles and applications of the science of health disparities research, this important volume: Defines the field of health disparities science and suggests new directions in scholarship and research Explains basic definitions, principles, and concepts for identifying, understanding and addressing health disparities Provides guidance on both conducting health disparities research and translating the results Examines how social, historical and contemporary injustices may influence the health of racial and ethnic minorities Illustrates the increasing national and global importance of addressing health disparities Discusses population health training, capacity-building, and the transdisciplinary tools needed to advance health equity A significant contribution to the field, *The Science of Health Disparities Research* is an essential resource for students and basic and clinical researchers in genetics, population genetics, and public health, health care policymakers, and epidemiologists, medical students, and clinicians, particularly those working with minority, vulnerable, or underserved populations.

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**cer science examples: *Guide to Scientific Computing in C++*** Joe Pitt-Francis, Jonathan Whiteley, 2012-02-15 This easy-to-read textbook/reference presents an essential guide to object-oriented C++ programming for scientific computing. With a practical focus on learning by

example, the theory is supported by numerous exercises. Features: provides a specific focus on the application of C++ to scientific computing, including parallel computing using MPI; stresses the importance of a clear programming style to minimize the introduction of errors into code; presents a practical introduction to procedural programming in C++, covering variables, flow of control, input and output, pointers, functions, and reference variables; exhibits the efficacy of classes, highlighting the main features of object-orientation; examines more advanced C++ features, such as templates and exceptions; supplies useful tips and examples throughout the text, together with chapter-ending exercises, and code available to download from Springer.

**cer science examples:** Toward a Democratic Science Richard Harvey Brown, 1998-01-01 In this important book, a leading authority in the field of social theory and communication shows how science is a rhetorical and narrative activity--a story well told. Richard Harvey Brown argues that expert knowledge is a form of power and explains how a narrative view of science can integrate science within a democratic civic discourse, as in the movement for environmental justice in the United States.

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