DOWNLOAD PDF WHAT DO WE KNOW ABOUT WRITING AND SCIENCE?

Chapter 1 : Evidence: How Do We Know What We Know? | Exploratorium

The major difference between science writing and writing in other academic fields is the relative importance placed on certain stylistic elements. This handout details the most critical aspects of scientific writing and provides some strategies for evaluating and improving your scientific prose.

Ask students to brainstorm words, terms, or phrases they associate with a topic. The teacher and students record these associations in the K column of their charts. This is done until students run out of ideas. K Column Suggestions Have questions ready to help students brainstorm their ideas. Encourage students to explain their associations. This is especially important for those associations that are vague or unusual. The teacher and students record these questions in the W column of their charts. This is done until students run out of ideas for questions. If students respond with statements, turn them into questions before recording them in the W column. W Column Suggestions Ask an alternative question for generating ideas for the W column. Be sure not too add too many of your own questions, however. The majority of the questions in the W column should be student-generated. Have students read the text and fill out the L column of their charts. Students should look for the answers to the questions in their W column. Students can fill out their L columns either during or after reading. L Column Suggestions In addition to answering the W column questions, encourage students to write in the L column anything they found especially interesting. To distinguish between the answers to their questions and the ideas they found interesting, have students code the information in their L columns. For example, they can put a check mark next to the information that answers questions from the K column. And they can put a star next to ideas that they found interesting. Have students consult other resources to find out the answers to questions that were not answered in the text. Discuss the information that students recorded in the L column. A teaching model that develops active reading of expository text. Example Following is an example of a completed K-W-L chart that students might complete if they were reading a text about gravity.

Chapter 2 : The 3 Golden Rules Of Writing A Science Fiction Book

Penny Bailey on science writing: 'You need to know how to tell a good story' Our blog to accompany the Wellcome Trust Science Writing Prize asks top science writers about their craft. Today.

Maria Grant and Diane Lapp Four actions help teachers foster citizens who are critical thinkers about science-related issues. Jacqueline, a 12th grader, is purchasing her first car and feels torn as she balances conflicting desires and messages. She yearns to be seated behind the wheel of a stylish vehicle, a yearning fueled by advertisements portraying women in luxurious cars. She also cares about how the fuel emissions of different brands of cars will affect air quality and the environment. Jacqueline realizes she needs more informationâ€”including information on carbon emissions, the ozone layer, and global warmingâ€”to make a careful decision. Every day, the need to make decisions related to science confronts young people. Although buying a car might seem to be a financial or lifestyle issue, the choice connects to environmental science. Fortunately, Jacqueline has practiced solving problems, analyzing data, and making informed, data-driven decisions in her science classes; and she understands that her decisions today can affect the environment she will live in tomorrow. She reads about the strengths and weaknesses of each model, including pricing and resale value, and makes notes to guide her decision making. Critical Literacy as Personal Empowerment As part of working toward scientific literacy for students, teachers must consider the concept of critical literacy. Just look at the number of science-related issues that directly affect human beingsâ€”global warming, access to clean water, and the availability of renewable energy, to name just a fewâ€”and ask yourself two questions: Do most students think about the effect of these issues on their everyday lives? Do our students consider the roles they might play in changing how a science-connected problem is resolved over the coming decades? Probably not, unless they are taught to do so. A key part of being critically literate is becoming involved in issues beyond the personal. Informed acts that make a difference in societyâ€—whether as simple as casting a ballot for or against an environmental issue or as complex as working on the research and development of a new alternative fuel sourceâ€—are characteristic of individuals who possesses critical science literacy. As a science educator and a literacy educatorâ€—who are also both high school teachers and university professorsâ€—we propose four actions to promote critical literacy in science classrooms. Identify science topics of interest. An astute science educator can weave real-world science topics into a standards-based curriculum without sacrificing a moment of purposeful instructional time. A look at global warming in the physics classroom can lead to a basic discussion of water density or to a sophisticated explanation of the Stefan-Boltzmann law which can be used to determine how much energy the sun gives off and to calculate the temperature of Earth, both crucial elements in understanding global warming. Such conversations lend relevance to what might otherwise be an isolated discussion of theory. And students who think critically about germane issues are more likely to be interested, active participants in the classroom. We believe every standards-based notion needs to be connected to the real world. Consider the following suggestions for topics: X-rays and the human body connected to anatomy and nuclear medicine. The effects of drugs on the body and mind related to anatomy, neuroscience, and health. Oil spills connected to oceanography, geology, and marine biology. Drought and water use connected to geology and earth science. The effect of natural disasters connected to geology and earth science and health. Classroom science teachers must build an extensive list of this type before they plan their lessons and then invite students to own the list by adding topics that they would enjoy studying. The goal is to make students want to live science. Engage students in reading the research. For background science information, science-related texts are the first resource to examine. Unfortunately, students often stumble in reading science textbooks or scholarly articles, which generally use unfamiliar, multisyllabic words and sentences that require extensive background knowledge. Science educators must generate connections among science concepts, societal issues, and the vocabulary students will meet in textbooks. Consider a chapter on water in an earth science textbook that deals with concepts aligned with the science standards: The book might use such terminology as fluvial systems, flow management, and restoration. These are important terms for any relevant conversation on water use, but likely unfamiliar ones.

An understanding of where and how river waters originate and issues related to human use and reuse of water could help motivate students to learn such terms and build a foundation that would eventually allow for an expanded discussion of flow management and restoration. One strategy is to assemble an array of topic-related texts from various sources, including trade books, news articles, and even poems. Scientists in the field often read every article they can find on a topic to build background knowledge and gain an understanding of terminology currently used in a particular field of study; they call this practice "reading the research. The Story of Water on Earth Kids Can Press, provide access to water-related vocabulary and foundational ideas about water use, both of which are essential to higher-level reading on the topic. A collection of news articles related to pertinent water-use issues might ignite passion and spark related conversation among newly motivated students. Lists of science-related trade books and reading resources are available from the National Science Teachers Association and the American Association for the Advancement of Science. Consider the so-called "toilet to tap" proposals that provoked debate in San Diego in the s. The idea is that toilet water from one community can be cleaned and pumped back into reservoirs that provide water to the home taps of other communities. Although a heated argument led to the demise of the initial proposal, the practice of reusing toilet water has been tried in numerous communities. This is a real-world, relevant issue that some states may soon present for the approval of voters, a population that will shortly include our middle and high school students. Teach students to read like scientists. They must also develop the ability to read and think like scientists. This means developing strategies for reading scientific writing and building a deep understanding of related vocabulary. One of the best ways for teachers to help students learn how to comprehend a science text is to model the thinking that occurs while reading graphs, charts, data tables, and data analysis sections. Proficient science readers will read the text that correlates to a table of data, for example, and then study the table, looking for features like units of measure, data range values, and column titles. They will then look back at the text to reread, or continue reading, in an effort to connect this information to the text. A teacher can conduct a think-aloud while reading so students can learn what proficient science reading looks and sounds like. For instance, 9th grade science teacher Ms. Kim looks at a chart in a text and says, "I think this is showing the percentage of freshwater on earth. I know that I just read in the text that freshwater means there are little or no dissolved salts in the water. Likewise, a teacher can model how to recognize typical text patterns in science writing, show how to use root words to determine word meaning, or connect prior knowledge to new ideas. A teacher might say, I remember last week when we read about how water is transferred through an aqueduct, or a long system of canals and tunnels, between Colorado and Southern California. Maybe the aqueduct near Washington, D. Guide learners to evaluate data. Students need to understand how to evaluate data sources. Numbers connected to chemicals found in seawater sampled near the explosion of the British Petroleum oil well in Louisiana would probably hold no meaning for the untrained student. Students need to understand where data were collected, how they were collected, and what they represent. Although data collection may not always be possible in a classroom lab, a teacher can ensure that students have opportunities to review real-world data from multiple sources. Environmental Protection Agency for real data on everything from the level of oceanic sediments to the locations of toxic chemical storage sites in the United States. Students could analyze numerous sources of data related to the recent oil spill in the Gulf of Mexico. For example, in small groups students might compare online sources showing U. They could create a compare-and-contrast chart and write a summary of their conclusions and lingering questions. Beyond Car Shopping Teaching focused on fostering critical literacy has far-reaching implications. As young people like Jacqueline experience such instruction, they become more perceptive about the world around them and more empowered to make decisions about how they interact with that world. Reading and writing in science: Tools to develop disciplinary literacy. Examining the juxtaposition of issue, author, and self. Multicultural Perspectives, 12 3 , â€” The science students need to know. Educational Leadership, 67 1 , 28â€”

Chapter 3 : What We Know about Writing, Grades

Back in , I wrote a newspaper column expanding on Feynman's example, identifying a set of similar principles and ideas that educated people ought to know about science.

Alamy 1 What is the universe made of? Astronomers face an embarrassing conundrum: Over the past 80 years it has become clear that the substantial remainder is comprised of two shadowy entities â€” dark matter and dark energy. The former, first discovered in , acts as an invisible glue, binding galaxies and galaxy clusters together. Astronomers are closing in on the true identities of these unseen interlopers. Four billion years ago, something started stirring in the primordial soup. A few simple chemicals got together and made biology â€" the first molecules capable of replicating themselves appeared. We humans are linked by evolution to those early biological molecules. But how did the basic chemicals present on early Earth spontaneously arrange themselves into something resembling life? How did we get DNA? What did the first cells look like? Some say life began in hot pools near volcanoes, others that it was kick-started by meteorites hitting the sea. Astronomers have been scouring the universe for places where water worlds might have given rise to life, from Europa and Mars in our solar system to planets many light years away. Radio telescopes have been eavesdropping on the heavens and in a signal bearing the potential hallmarks of an alien message was heard. Astronomers are now able to scan the atmospheres of alien worlds for oxygen and water. The next few decades will be an exciting time to be an alien hunter with up to 60bn potentially habitable planets in our Milky Way alone. We do, however, have bigger brains than most animals â€" not the biggest, but packed with three times as many neurons as a gorilla 86bn to be exact. A lot of the things we once thought distinguishing about us â€" language, tool-use, recognising yourself in the mirror â€" are seen in other animals. Scientists think that cooking and our mastery of fire may have helped us gain big brains. The harder, more philosophical, question is why anything should be conscious in the first place. We spend around a third of our lives sleeping. But scientists are still searching for a complete explanation of why we sleep and dream. Animal studies and advances in brain imaging have led us to a more complex understanding that suggests dreaming could play a role in memory, learning and emotions. Rats, for example, have been shown to replay their waking experiences in dreams, apparently helping them to solve complex tasks such as navigating mazes. When they meet , both disappear in a flash of energy. Our best theories suggest that the big bang created equal amounts of the two, meaning all matter should have since encountered its antimatter counterpart, scuppering them both and leaving the universe awash with only energy. Researchers are sifting data from experiments like the Large Hadron Collider trying to understand why, with supersymmetry and neutrinos the two leading contenders. Our universe is a very unlikely place. Alter some of its settings even slightly and life as we know it becomes impossible. It may sound crazy, but evidence from cosmology and quantum physics is pointing in that direction. Now we have to put all that carbon back, or risk the consequences of a warming climate. But how do we do it? One idea is to bury it in old oil and gas fields. Another is to hide it away at the bottom of the sea. Our nearest star offers more than one possible solution. Another idea is to use the energy in sunlight to split water into its component parts: The hope is that these solutions can meet our energy needs. The fact you can shop safely on the internet is thanks to prime numbers â€" those digits that can only be divided by themselves and one. Public key encryption â€" the heartbeat of internet commerce â€" uses prime numbers to fashion keys capable of locking away your sensitive information from prying eyes. And yet, despite their fundamental importance to our everyday lives, the primes remain an enigma. An apparent pattern within them â€" the Riemann hypothesis â€" has tantalised some of the brightest minds in mathematics for centuries. However, as yet, no one has been able to tame their weirdness. Doing so might just break the internet. Antibiotics are one of the miracles of modern medicine. Yet this legacy is in danger â€" in Europe around 25, people die each year of multidrug-resistant bacteria. Thankfully, the advent of DNA sequencing is helping us discover antibiotics we never knew bacteria could produce. Our tablets and smartphones are mini-computers that contain more computing power than astronauts took to the moon in But if we want to keep on increasing the amount of computing power we carry around in our pockets, how are we going to do it? There are only so many components you can cram on to a computer chip. Has the limit been reached, or is there another way to make a computer? Scientists are considering new materials, such as atomically thin carbon â€" graphene â€" as well as new systems, such as quantum computing. The short answer is no. Not a single disease, but a loose group of many hundreds of diseases, cancer has been around since the dinosaurs and, being caused by haywire genes, the risk is hardwired into all of us. The longer we live, the more likely something might go wrong, in any number of ways. For cancer is a living thing â€" ever-evolving to survive. Robots can already serve drinks and carry suitcases. Ninety-five per cent of the ocean is unexplored. In , Don Walsh and Jacques Piccard travelled seven miles down, to the deepest part of the ocean, in search of answers. Their voyage pushed the boundaries of human endeavour but gave them only a glimpse of life on the seafloor. But on such scales quantum physics probably has something to say too. Except that general relativity and quantum physics have never been the happiest of bedfellows â€" for decades they have withstood all attempts to unify them. We live in an amazing time: Our knowledge of what causes us to age â€" and what allows some animals to live longer than others â€" is expanding rapidly. And since many diseases, such as diabetes and cancer, are diseases of ageing, treating ageing itself could be the key. The number of people on our planet has doubled to more than 7 billion since the s and it is expected that by there will be at least 9 billion of us. Where are we all going to live and how are we going to make enough food and fuel for our ever-growing population? Maybe we can ship everyone off to Mars or start building apartment blocks underground. We could even start feeding ourselves with lab-grown meat. These may sound like sci-fi solutions, but we might have to start taking them more seriously. Time travellers already walk among us. At that speed the effect is minuscule, but ramp up the velocity and the effect means that one day humans might travel thousands of years into the future. Nature seems to be less fond of people going the other way and returning to the past, however some physicists have concocted an elaborate blueprint for a way to do it using wormholes and spaceships. The Big Questions in Science:

DOWNLOAD PDF WHAT DO WE KNOW ABOUT WRITING AND SCIENCE?

Chapter 4 : Top 10 things everybody should know about science | Science News

A brief writing assignment at the end of class, focusing on the day's lesson and discussions, is a great way to reinforce the material, support long-term recall of the key lesson points and help build writing skills all at the same time.

But Thursday, July 17, was not the typical discussion: I was privileged to join three science experts as witnesses at the U. Others in the Capitol hearing room were Vinton G. Fienberg , professor of statistics and social science at Carnegie Mellon University. Each witness had five minutes to make verbal remarks in addition to the written testimony. Below is a text of mine. This In-Depth Report includes all of the full-length testimonies, a video of the hearing and other articles about funding and basic research. Scientific American started the first branch of the U. Albert Einstein wrote for Scientific American, as have more than Nobel laureates and many winners of the U. National Medals of Science and Technology. It reaches more than 3. Science is the engine of prosperity. Economists have said that a third to a half of U. The cars and trains that got us here today, our smart phones, the energy that lights this chamber, the clothes we wear, the food we eat: All of these were developed and improved through research. But before these applications existed, researchers had to study the basic concepts that provided a sound foundationâ€"and they did those studies not necessarily knowing where they would lead. But knowing how spacetime works helps make our measurements from orbiting GPS satellites accurate. The NIH started funding her work in Examples like Elizabeth Blackburn show why providing steady and sufficient support for basic research should be a national priority. Typical funding grants average five years long. It takes time to run the experiments, gather the data, analyze it properly, and confirm the findings. And our own track record proves that steady federal funding support leads to success. It also provides a good return. Basic research can be inspiring. It has more than a million volunteer citizen scientists! The Maker movement is such a phenomenon that the U. Because of the length of time needed for research, also, the sequester cuts will affect progress for years to come in forestalled and canceled work, and will disproportionately affect and discourage our younger researchers. Meanwhile, countries such as China are nipping at our heels. A strong STEM education pipeline is also critical. Department of Commerce, and our leading technology companies are often challenged to fill the necessary openings. For one more view, I turned to a member of the next generation. I asked her what she would say about science. Science is a system for exploring, and for innovation. It can form a path for our young people in a competitive global marketplace. And it can fire our imagination. Thank you for your kind attention.

Chapter 5 : Teaching Science Literacy - Educational Leadership

Science is a systematic and logical approach to discovering how things in the universe work. It is also the body of knowledge accumulated through the discoveries about all the things in the universe.

So what is it about sci-fi stories that readers love so much, and how can authors use that knowledge to create their own sci-fi masterpieces? The problem is that most science fiction writers would disagree, claiming the films belong in the fantasy genre. Science fiction is just that, fiction about science. The science might be invented , and it might be of any stripe: The ancestor of science fiction is H. Those books involved things that are very unlikely to happen or are actually impossible, but they are ways of exploring possibilities and human nature and the way people react to certain things. The story is of a jedi knight on a quest to save a princess. The castle may be a star ship, the duels fought with laser swords, but the futuristic tech is never used as a lens through which to examine our own world. Just want to write about strange lands and weird characters? When writing sci-fi, know your thesis. What are you talking about? Use your world as a case study, almost an experiment, which will prove your point to the reader. Of course stories are more than one thing, but keeping your thesis central has many benefits when writing sci-fi. Knowing the point of your fictional world will stop inconsistencies. Views on entertainment, dress, behavior, and literature are scattered throughout, giving the reader the impression of a totally consistent world. Orwell is able to create this impression because he has a clear idea of the philosophy behind the society from the start: Write them down and stick them in your work space. She uses knowledge of fundamentalist religious treatment of women, as well as the history of slavery and war, to craft a world which feels real because it is built on a real understanding of misogyny. What happened in our own past when new cultures met? What is it like gaining or losing a sense? Accounts of the best and worst in humanity are available in myriad forms. Details sell sci-fi â€" your research will pay off in time. They make the world seem real , validating your thesis by ensuring the story constantly rings true. No matter how strange your aliens, monsters, or other beings, there are realistic details just waiting for you to find them. It may be true that every story has already been told, but every day there are new ways to examine the human condition. What does social media tell us about humanity, and what might it look like in the future? What new insights does your sci-fi offer? Click To Tweet What is new or unique about your questions? Appreciating your audience Sci-fi is often the first foray into new ideas. Even as we explore the possibility of real artificial intelligence, we already have vast libraries on the resulting moral quandaries, and writing on space travel predated actual attempts by centuries. Writing other worlds or societies can be incredibly tricky, especially when it comes to setting aside your own experiences and biases. Are you a sci-fi fan or a sci-fi sceptic? What was your first sci-fi story and how did it influence your world view? Let me know in the comments.

Chapter 6 : NEA - K-W-L (Know, Want to Know, Learned)

Even as we explore the possibility of real artificial intelligence, we already have vast libraries on the resulting moral quandaries, and writing on space travel predated actual attempts by centuries.

We advise on the ways of preparing yourself and of using experts to make your task easier. In the following chapter we discuss ways of writing bright, interesting stories and conclude with some solutions to common problem areas. They think these subjects are either too complicated for them to understand or too boring for their audience. This does not need to be so. With the proper preparation, and by following a few simple rules, reporting science and technology can be one of the most interesting jobs a journalist can do. And it certainly does not have to be difficult. What is science and technology? Like good scientists, let us start by defining what we mean by science and technology. Science is the organised study of Man and the universe by means of observation, measurement and experiments. Scientists try to find the rules which govern the universe. Technology is the practical application of science. Although there is a distinction between them, science and technology overlap in so many ways that we will treat them as a single field in this chapter. When our ancestors decided on the best season for planting yams, they usually took into account the season, the weather, the amount of water available, the fertility of the soil and a host of other factors. This was simple science. When they dug the soil with a pointed stick or built paddy fields, this was technology. Today, science and technology have become more complex as we learn more about our universe and develop ways of changing it. Also, because there is so much more knowledge available, scientists are forced to specialise in particular areas, to keep pace with advances. Science and technology today range all the way from basically theoretical subjects such as quantum physics to more practical subjects like medicine, agriculture and engineering. Some subjects, such as agriculture and medicine have everyday practical benefits for mankind. Others, such as astronomy, help us understand our universe but do not have an immediate practical effect on us. There is a host of other fields such as physics, chemistry, zoology, marine biology, geology, ecology, medicine, psychology, mechanical and electrical engineering - the list is enormous and growing every year. Science and technology is too important for journalists to ignore. Whether you are a specialist or a general reporter, you should remember the following basic facts principles: You are a bridge between the world of science and your community. You do not need to know as much as the scientists. You simply need to be able to put the relevant parts of their knowledge into words which your audience can understand. You do not have to understand the whole of any field of science yourself, but you must not write anything you do not understand. If you write something you do not understand, you risk making errors. Although the aim of scientists is precision, and the aim of journalists is simplicity, there should be no conflict between the two. You must be able to express the precise details of science accurately in simple terms. That is the real challenge of reporting science and technology. Most science and technology will have human applications. For every story, you must ask yourself: Remember the four criteria for what makes news. Some science, such as astronomy, has no impact on our everyday lives, but is interesting in what it tells us about our universe. The task here is to report it in an interesting and informative way. You must always be accurate. Science is built on accuracy. Your readers or listeners usually trust science. Often, in fields such as medicine, their lives may depend on it. You should not alarm them by making sensational claims which may not be true. These are some general rules. How can you apply them in practice? In particular, when reporting science and technology, you should remember the following: Build up a basic knowledge Science and technology is a huge field, but each subject usually has some basic rules which govern it. If you understand these rules, you will be able to work out the rest of the topic, even though you will not understand all the details. In medicine, for example, you need to understand the basic parts of the body and their functions. You do not need to know all the ingredients in blood, but you should know that blood is the main system of transporting nutrients, chemicals and waste throughout the body. A good high school education in science should give you enough knowledge of the basic rules to get started. After that, you must take every opportunity to increase your knowledge. Read widely Science and technology advance so quickly that you must keep up to date. Read articles on science and technology. Read books on basic science encyclopedias are a good place to start. Avoid textbooks which are too complicated. Instead, look for books which explain their subject in simple terms for ordinary, non-scientific readers. Ask people expert in each field for advice on the best books for your needs - something clear and simple. Make contacts Get to know as many scientists and technologists as you can. They can give you advice on subjects you do not understand and, like any good contact, they will be a useful source of story ideas. Do not expect an expert in one field to be able to help in another. Few electrical engineers, for example, will know what lymph glands do in the body. Make as wide a range of contacts as you can, across all the fields of science and technology. Choose people who can give you a story ideas, b background information and c the names of people you should ask for further details. Try to establish at least one contact from each major scientific field such as medicine, environmental science, agriculture and fishing, geology, engineering or any other fields which are especially important in your society. Keep in regular contact with them. You can quote them in your stories if they are experts in the particular field about which you are writing, but it is better to go to the expert who is best able to give you the specific information you need. Some scientists are better at explaining their work in simple terms than others. When you are researching a story, go to the contact most suited to your particular need. For example, one zoologist may be able to explain the background to a new development, but you may have to ask the head of the university department or the director of the research station for any official comments. Do not forget that scientists often work in teams. If one member cannot help, another might be able to. Technicians and laboratory assistants can be a very good source of story ideas, but do not rely on them for the official version of a story. If they give you a story idea, seek out the scientist concerned for details. Building trust Many scientists do not trust journalists. They may not think you are capable of reporting their work properly or they may have had a bad experience with a journalist in the past. They may have been misquoted or seen errors in a story. You have to show that you can be trusted. It will help if you do some background research of your own before interviewing them, so that you can show you know the basic facts about their field. It is not enough to tell them you can be trusted; you have to show it in every story that you write. If you make careless errors or do not keep a promise, you will lose their trust for ever. Dig for the truth Being friendly does not mean you have to believe everything a person says. Much of science is built on experiments and on trial-and-error. In many fields, a number of scientists may be working on the same topic, and may reach different conclusions. They are often competing against each other to be the first with a result. They may occasionally make big claims to show how important they are or to justify money being spent on their research. Be especially careful about scientists who say their work will benefit mankind. In many cases it will, but in others it may not. For example, a scientist may tell you that a new drug will help people to relax, but he may not tell you that it increases their risk of getting cancer. The side-effects of science can be more damaging than the benefits from it. Therefore, you must question their claims by asking probing questions. If you still feel unhappy about what you have been told, go to other experts in that field and ask for further information. Be sceptical Both science and journalism are based on being sceptical and questioning what people say. Galileo would never have proved the world was round by believing what most other scientists of his era were telling him. Bob Woodward and Carl Bernstein would never has exposed the corrupt Watergate Scandal if they had trusted the White House press denials. As a journalist with the power to influence people, you will be asked to accept at face value all sorts of claims. Science and technology companies will offer you all sorts of free samples, advice and even prepared news stories to promote their products. They will disguise this by saying these are important medical breakthroughs. Always question their claims and always balance what they say by seeking and reporting opposing views. Drug manufacturers and research companies are increasing offering television journalists ready-made and professionally-packaged news reports of a new medical breakthrough or wonder drug. In many cases they may be beneficial but a good journalist â€” like a good scientist â€” must always ask hard questions and inform readers and listeners honestly and fairly.

Chapter 7 : K-W-L Chart - ReadWriteThink

If you look at your examples for when the show has 'deteriorated', there is a common denominator. The show is not able to(or chooses not to) use the book source material and the author of the source material is less involved.

History of science Science in a broad sense existed before the modern era and in many historical civilizations. In particular, it was the type of knowledge which people can communicate to each other and share. For example, knowledge about the working of natural things was gathered long before recorded history and led to the development of complex abstract thought. This is shown by the construction of complex calendars, techniques for making poisonous plants edible, public works at national scale, such as those which harnessed the floodplain of the Yangtse with reservoirs, [25] dams, and dikes, and buildings such as the Pyramids. However, no consistent conscious distinction was made between knowledge of such things, which are true in every community, and other types of communal knowledge, such as mythologies and legal systems. It is thought that early experimentation with heating and mixing of substances over time developed into alchemy. Early cultures Main article: History of science in early cultures Clay models of animal livers dating between the nineteenth and eighteenth centuries BCE, found in the royal palace in Mari, Syria Neither the words nor the concepts "science" and "nature" were part of the conceptual landscape in the ancient near east. Nature philosophy In the classical world, there is no real ancient analog of a modern scientist. Instead, well-educated, usually upper-class, and almost universally male individuals performed various investigations into nature whenever they could afford the time. For this reason, it is claimed these men were the first philosophers in the strict sense, and also the first people to clearly distinguish "nature" and "convention. They were mainly speculators or theorists , particularly interested in astronomy. This was a reaction to the Sophist emphasis on rhetoric. The Socratic method searches for general, commonly held truths that shape beliefs and scrutinizes them to determine their consistency with other beliefs. Socrates was later, in the words of his Apology, accused of corrupting the youth of Athens because he did "not believe in the gods the state believes in, but in other new spiritual beings". Socrates refuted these claims, [43] but was sentenced to death. Motion and change is described as the actualization of potentials already in things, according to what types of things they are. In his physics, the Sun goes around the Earth, and many things have it as part of their nature that they are for humans. Each thing has a formal cause , a final cause , and a role in a cosmic order with an unmoved mover. The Socratics also insisted that philosophy should be used to consider the practical question of the best way to live for a human being a study Aristotle divided into ethics and political philosophy. Aristotle maintained that man knows a thing scientifically "when he possesses a conviction arrived at in a certain way, and when the first principles on which that conviction rests are known to him with certainty". During late antiquity, in the Byzantine empire many Greek classical texts were preserved. Many Syriac translations were done by groups such as the Nestorians and Monophysites. Medieval science postulated a ventricle of the brain as the location for our common sense , [53]: Byzantine science , Science in the medieval Islamic world , and European science in the Middle Ages Because of the collapse of the Western Roman Empire due to the Migration Period an intellectual decline took place in the western part of Europe in the s. In contrast, the Byzantine Empire resisted the attacks from the barbarians, and preserved and improved upon the learning. However, the general fields of science or " natural philosophy " as it was called and much of the general knowledge from the ancient world remained preserved through the works of the early Latin encyclopedists like Isidore of Seville. In the Byzantine empire , many Greek classical texts were preserved. Al-Kindi â€" was the first of the Muslim Peripatetic philosophers, and is known for his efforts to introduce Greek and Hellenistic philosophy to the Arab world. In addition, classical Greek texts started to be translated from Arabic and Greek into Latin, giving a higher level of scientific discussion in Western Europe. Demand for Latin translations grew for example, from the Toledo School of Translators ; western Europeans began collecting texts written not only in Latin, but also Latin translations from Greek, Arabic, and Hebrew. The influx of ancient texts caused the Renaissance of the 12th century and the flourishing of a synthesis of Catholicism and Aristotelianism known as Scholasticism in western Europe , which became a new geographic center of science. An experiment in this period would be understood as a careful process of observing, describing, and classifying. Renaissance and early modern science Astronomy became more accurate after Tycho Brahe devised his scientific instruments for measuring angles between two celestial bodies , before the invention of the telescope. Scholars slowly came to realize that the universe itself might well be devoid of both purpose and ethical imperatives. The development from a physics infused with goals, ethics, and spirit, toward a physics where these elements do not play an integral role, took centuries. This allowed the theoretical possibility of vacuum and motion in a vacuum. A direct result was the emergence of the science of dynamics. New developments in optics played a role in the inception of the Renaissance , both by challenging long-held metaphysical ideas on perception, as well as by contributing to the improvement and development of technology such as the camera obscura and the telescope. Before what we now know as the Renaissance started, Roger Bacon , Vitello , and John Peckham each built up a scholastic ontology upon a causal chain beginning with sensation, perception, and finally apperception of the individual and universal forms of Aristotle. He found that all the light from a single point of the scene was imaged at a single point at the back of the glass sphere. The optical chain ends on the retina at the back of the eye. Kepler did not reject Aristotelian metaphysics, and described his work as a search for the Harmony of the Spheres. Galileo Galilei , regarded as the father of modern science. Descartes emphasized individual thought and argued that mathematics rather than geometry should be used in order to study nature. Bacon emphasized the importance of experiment over contemplation. Bacon further questioned the Aristotelian concepts of formal cause and final cause, and promoted the idea that science should study the laws of "simple" natures, such as heat, rather than assuming that there is any specific nature, or " formal cause ", of each complex type of thing. This new science began to see itself as describing " laws of nature ". This updated approach to studies in nature was seen as mechanistic. Bacon also argued that science should aim for the first time at practical inventions for the improvement of all human life. Age of Enlightenment Main article: Age of Enlightenment Isaac Newton , shown here in a portrait, made seminal contributions to classical mechanics , gravity , and optics. Newton shares credit with Gottfried Leibniz for the development of calculus. As a precursor to the Age of Enlightenment , Isaac Newton and Gottfried Wilhelm Leibniz succeeded in developing a new physics, now referred to as classical mechanics , which could be confirmed by experiment and explained using mathematics. Leibniz also incorporated terms from Aristotelian physics , but now being used in a new non-teleological way, for example, " energy " and " potential " modern versions of Aristotelian " energeia and potentia ". This implied a shift in the view of objects: Where Aristotle had noted that objects have certain innate goals that can be actualized, objects were now regarded as devoid of innate goals. In the style of Francis Bacon, Leibniz assumed that different types of things all work according to the same general laws of nature, with no special formal or final causes for each type of thing. Societies and academies were also the backbone of the maturation of the scientific profession. Another important development was the popularization of science among an increasingly literate population. Some historians have marked the 18th century as a drab period in the history of science ; [79] however, the century saw significant advancements in the practice of medicine , mathematics , and physics ; the development of biological taxonomy ; a new understanding of magnetism and electricity ; and the maturation of chemistry as a discipline, which established the foundations of modern chemistry. In this respect, the lessons of history and the social structures built upon it could be discarded. The nineteenth century is a particularly important period in the history of science since during this era many distinguishing characteristics of contemporary modern science began to take shape such as: Combustion and chemical reactions were studied by Michael Faraday and reported in his lectures before the Royal Institution: The Chemical History of a Candle , Both John Herschel and William Whewell systematized methodology: His theory of natural selection provided a natural explanation of how species originated, but this only gained wide acceptance a century later. The laws of conservation of energy , conservation of momentum and conservation of mass suggested a highly stable universe where there could be little loss of resources. With the advent of the steam engine and the industrial revolution , there was, however, an increased understanding that all forms of energy as defined by Newton were not equally useful; they did not have the same energy quality. This realization led to the development of the laws of thermodynamics , in which the cumulative energy quality of the universe is seen as constantly declining: The phenomena that would allow the deconstruction of the atom were discovered in the last decade of the 19th century: In the next year came the discovery of the first subatomic particle, the electron.

Chapter 8 : Science - Wikipedia

The 20 big questions in science From the nature of the universe (that's if there is only one) to the purpose of dreams, there are lots of things we still don't know - but we might do soon. A new.

March 14, Science writing and editing: How to write scientific names The Latin scientific name of a species, be it plant, animal, bacterium, fungus, etc. For example, the domestic cat is known as Felis catus. Although the genus name can be used on its own there are several other species in genus Felis, for instance the wildcat, Felis silvestris , the species name never appears on its own. The basic rule for writing a scientific name Use both genus and species name: Italicize the whole name. Capitalize only the genus name. In the past you would capitalize the species designation if it was derived from a proper name, e. Rules for abbreviating the genus name After the first use, the genus name can be abbreviated to just its initial: When a section of the text might be displayed on its own, you might want to spell out the name in full the first time it appears there. For instance, some academic journals require that you write out the genus in full the first time it is used in the abstract, and in all tables and table captions. When you introduce the name of another species in the same genus, you can use the abbreviated genus name for the new species: If you are discussing two species that belong to different genera that nevertheless start with the same letter, say, Leopardus pardalis, the ocelot, and the Canada lynx, Lynx canadensis, it is better not to abbreviate their genus names. Abbreviations of more than one letter: Some organisms, such as the famous study organisms E. Names of taxonomic levels above the genus level The names of higher taxonomic levels family, order, class, phylum or division, and kingdom should be capitalized but not italicized see Chicago 8. A common name that is derived from a genus name, such as gorilla, is not capitalized either see Chicago 8. Names of taxonomic levels below the species level Below the level of species there are subspecies and varieties. The subspecies name is italicized. In zoology, the subspecies is not indicated by any label; it just follows the species name: If the subspecies name is the same as the species name, it can be abbreviated: The insecticide BTK is produced by Bacillus thuringiensis var. The meadow contained several sedge plants Carex sp. The forest floor contained several species of pixie cup lichen Cladonia spp. The species author and the sp. The author name is not italicized: The straightleaf rush is Juncus orthophyllus Coville. The name may be abbreviated. The European meadow rush is Juncus inflexus L. If the author name is in parentheses, that indicates that the species was originally assigned to a different genus. Wikipedia has a comprehensive entry on binomial nomenclature. A useful source on prokaryote nomenclature. Cambridge University Press,

Chapter 9 : Why Science Is Important - Scientific American

We might say Jacqueline is critically literate in science, meaning she has the ability to read, write, think, and talk about real-world science issues (Lapp & Fisher,). Critical Literacy as Personal Empowerment.

Successful teachers of writing have found ways to support and extend self-selection of writing topics. Voices from the Middle , Volume 9 Number 1, September 2. All families and communities engage with literacy and literacy-related activity. Creating ways to bridge these activities and school writing experiences ensures greater participation and success with school tasks. The project grew to encompass those goals and more. English Journal , Volume 90 Number 5, May 3. The "language arts" develop in concert. Drawing supports writing, writing supports reading; opportunity to use multiple expressions of language increases language learning and ability. Kathy Bussert-Webb illustrates how art provides a medium through which a group of young, pregnant, middle school women connected reading and writing to their lives. Seventh and eighth grade teacher, Elizabeth Canaday, describes curriculum developed by three middle school teachers, in collaboration with the education department of a museum, in which students learn and practice the skills involved in visual observation and apply them to reading and writing. Voices from the Middle , Volume 4 Number 3, September 4. Writing is a social activity; writing instruction should be embedded in social contexts. Students can take responsibility in shaping the classroom structures that facilitate their work. Becky Sipe describes her first year of teaching in , sharing six lessons she learned. English Journal , Volume 90, Number 1, September 5. Language learning proceeds most successfully when students use language for meaningful purposes. Lynn Nelson describes a week unit in an eighth-grade English class focusing on social-action writing, detailing how the process involved convincing students of their ability to make a difference, studying persuasive writing, reading and discussing to wake up their social consciences. Voices from the Middle , Volume 6, Number 4, May 6. Experience with a particular kind of writing is the best indicator of performance; extensive reading and writing within a particular genre or domain increases performance. Isoke Nia describes a year-long study of writing genre. The authors describe their approach to poetry writing with at-risk students over a week period, structuring activities to initiate poetry as language play, selecting model poems that are developmentally appropriate, and organizing writing assignments. Voices from the Middle , Volume 5 Number 1, February 7. Writing is effectively used as a tool for thinking and learning throughout the curriculum. What would happen if science and writing were presented as interrelated ways of knowing about the world? Read and borrow from the lessons she developed in this article. Voices from the Middle , Volume 4 Number 2, April Linda Rief and colleague Chris Hall describe how, after studying the Holocaust and other human-rights issues in their eighth-grade language-arts classes, students felt compelled to create a permanent memorial and reminder. Voices from the Middle , Volume 6, Number 4, May 8. Language is a form of cultural capital and some forms of language have more power in society than other forms. ELL educator Brett Elizabeth Blake suggests that, in order to re-invigorate writing in schools, educators need to remind themselves of the importance of the tools of the writing process to help them explore the distinct and multiple voices and texts. Language Arts , Volume 78, Number 5, May 9. Assessment that both benefits individual writers and their teachers? South Carolina educator P. Planned responses to the writers in your classroom can prove to be invaluable and enable students to stretch their ability as writers. In "Conferring in the writing workshop," five experienced teachers of writing offer their best advice. School Talk , Volume 6 Number 2, January Language skills and conventions grammar, punctuation, spelling are most successfully learned and later used with a combination of carefully targeted lessons applied within the context of meaningful writing. Sixth grade ELA teacher John Edmondson describes how he stopped teaching from grammar texts and instituted a writing workshop, including descriptions of the flak he received from colleagues and parents, encouragement he received from students and from his principal, and how, over time, writing workshops have spread in his school. Voices from the Middle , Volume 6, Number 3, March Veteran writing teacher Tom Romano shares stories, strategies, favorite leads and more as he shepherds student writing through to publication. Voices from the Middle , Volume 8 Number 1, September Authors and teachers who write can offer valuable insights to students by mentoring them into process and making their own writing processes more visible. Tragedy inspired the author to write, and writing mentors gave her the courage to share her writing with her class. By becoming a writer, by experiencing the process with her students, her teaching was renewed. Voices from the Middle , Volume 9, Number 1, September Award-winning author Karen Hesse discusses her writing for children and young adults and how ideas for particular books arose, as well as the research and writing processes that went into them. Includes reviews of nine of her books. Carol Jago advocates for a health balance of criticism and encouragement when responding to student writing. Her article includes usable advice on writing from popular authors and noted scholars, which can be shared with students. Voices from the Middle , Volume 9, Number 1, September Technology provides writers the opportunity to create and present writing in new and increasingly flexible ways, particularly in combination with other media. She shares a sequence of classroom engagements that moved students from film to literature to writing. Voices from the Middle , Volume 8 Number 4, May Gretchen Lee suggests the authentic audience found on the Internet has a profound effect on the quality of student writing in all grades, and that the key to successful technology projects is integrating them into the curriculum so that computers are a means, not an end. Voices from the Middle , Volume 7 Number 3, March Mary Santerre looks at how technology has changed her eighth-grade world of teaching and learning in a variety of ways. Voices from the Middle , Volume 8, Number 1, September The author observes four sixth graders composing nonfiction projects for an integrated unit on Canadian studies, using hypermedia. She ponders issues raised, and whether educators are acknowledging and addressing the discrepancies between the technological haves and have-nots. Language Arts , Volume 78, Number 3, January