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Chapter 1 : Teaching Split Digraphs | Adventures in Literacy Land

G. Splitting the Atom The story of the discovery of radioactivity and the structure of the nucleus of the atom, along with the incredible results that followed in this century, is drama of the highest order.

Both heat water into pressurized steam, which drives a turbine generator. The key difference between the two plants is the method of heating the water [source: While coal-powered plants burn fossil fuels, nuclear-powered plants depend on the heat that occurs during nuclear fission, when one atom splits into two and releases energy. Nuclear fission happens naturally every day. Uranium, for example, constantly undergoes spontaneous fission at a very slow rate. Uranium is a common element on Earth and has existed since the planet formed. While there are several varieties of uranium, uranium U is the one most important to the production of both nuclear power and nuclear bombs. U decays naturally by alpha radiation: It throws off an alpha particle, or two neutrons and two protons bound together. Fire a free neutron into a U nucleus and the nucleus will absorb the neutron, become unstable and split immediately. This content is not compatible on this device. The animation above shows a uranium nucleus with a neutron approaching from the top. As soon as the nucleus captures the neutron, it splits into two lighter atoms and throws off two or three new neutrons the number of ejected neutrons depends on how the U atom splits. The process of capturing the neutron and splitting happens very quickly. The decay of a single U atom releases approximately MeV million electron volts. That may not seem like much, but there are lots of uranium atoms in a pound 0. The two atoms that result from the fission later release beta radiation superfast electrons and gamma radiation of their own, too [source: But for all of this to work, scientists have to first enrich a sample of uranium so that it contains 2 to 3 percent more U [source: Three percent enrichment is sufficient for nuclear power plants, but weapons-grade uranium is composed of at least 90 percent U The process of enriching uranium is done via a centrifuge after a gas has been created from the uranium. The force of the centrifuge separates the U atoms from the U atoms. At first, there is only a slight increase in the concentration of U atoms, so the process has to be repeated several times in the centrifuge to increase the enrichment. Making weapons-grade uranium is very difficult and expensive, which is one reason so few countries have nuclear weapons. But these barriers are not insurmountable [source: Another fissionable material, Plutonium is created by bombarding U with neutrons [source:

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Chapter 2 : Nuclear Fission: The Heart of the Reactor | HowStuffWorks

75 videos Play all last land Alexandros Chatzinanos; Kavinsky - Nightcall (Drive Massive Attack - Splitting The Atom (Edouard Salier Version) - Duration:

How "common" is the Common Core? For me, for ELA in particular, for the most part Yes - for me, I consider it to be common. It is what I do every day. There are a few changes that I think will be difficult for everyone including myself but they are changes that we probably should have made a long time ago. Tiered Vocabulary â€" more to come on this topicâ€¦ 2. Now, this is not just your typical run of the mill language. Yes, it includes conventions and their effective use and vocabulary just as the previous standards did but it also has a deeper meaning. In order to do this within small group, I created a rule for the students. They must respond to the previous comment about the text prior to sharing what is on their mind. It creates a group of intensified listeners and it is truly remarkable to see. Now, I have only tried this with my 4th graders so far but this coming year I am going to be working on this with my younger kiddos as well. Finding and using evidence-based answers is a common theme throughout all of the standards K The students need to learn to respond to text. How do you teach that? Well, I start off small. For exampleâ€¦ the focus of instruction for my 4th grade group was on character analysis. I used a mentor text: I choose them based on what I see that are common denominators within the group. My 4th graders had a ton of difficulty with inferencing - ALL. I found this information out just from working with the students. For example, in previous guided reading lessons, I asked deeper questions about why a character did something or what does that a particular action tell us about the character? I would get blank stares!!! So, I showed them. I started off easy. Using pictures â€" asking: Okay so how would you sound if you were happy? You get the idea. Scaffolding at its finest. I then used a guided reading text set a. If they can understand the idea using pictures, they will understand the gist of it when trying to find evidence within the text words of the text. They just need to do it often or more often so it becomes second nature to them. Responding to Reading Being thoughtful about our answering, writing evidence based answers, really delving into the book. I still do read alouds just like I always have. My choice in texts and guided reading texts is much more purposeful. Good teaching is meeting the students where they are and building on what they know. It is what we do. It is scaffolding, guiding, and modeling strategies. Something we have always done. I created a list of mentor texts that go along with each of the 6 essential comprehension strategies. More to come on that in another post. I think creating text-dependent questions is going to be the hardest part. Mainly because I find that it is sooo very time consuming. More to come on this topic as well How has your instruction changed with the adoption of CCSS?

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Chapter 3 : BBC - Manchester - Rutherford: splitting the atom

Splitting The Atom Lyrics: Blind belligerence, lost humanity / Industrial killing 0ut of inward peace / False aberration, garbled ideology / Just an instinct for them to kill / Nuke / Destroy.

By April, Japan lay open to direct assault by land as well as air and sea. How could the United States bring Tokyo to surrender? Three means suggested themselves: The first would involve a lengthy, brutal campaign in which,â€¦ The properties and effects of atomic bombs When a neutron strikes the nucleus of an atom of the isotopes uranium or plutonium , it causes that nucleus to split into two fragments, each of which is a nucleus with about half the protons and neutrons of the original nucleus. In the process of splitting, a great amount of thermal energy , as well as gamma rays and two or more neutrons, is released. Under certain conditions, the escaping neutrons strike and thus fission more of the surrounding uranium nuclei, which then emit more neutrons that split still more nuclei. This series of rapidly multiplying fissions culminates in a chain reaction in which nearly all the fissionable material is consumed, in the process generating the explosion of what is known as an atomic bomb. Sequence of events in the fission of a uranium nucleus by a neutron. Many isotopes of uranium can undergo fission, but uranium, which is found naturally at a ratio of about one part per every parts of the isotope uranium, undergoes fission more readily and emits more neutrons per fission than other such isotopes. Plutonium has these same qualities. These are the primary fissionable materials used in atomic bombs. A small amount of uranium, say 0. If more uranium is added to the assemblage, the chances that one of the released neutrons will cause another fission are increased, since the escaping neutrons must traverse more uranium nuclei and the chances are greater that one of them will bump into another nucleus and split it. At the point at which one of the neutrons produced by a fission will on average create another fission, critical mass has been achieved, and a chain reaction and thus an atomic explosion will result. In practice, an assembly of fissionable material must be brought from a subcritical to a critical state extremely suddenly. One way this can be done is to bring two subcritical masses together, at which point their combined mass becomes a critical one. This can be practically achieved by using high explosives to shoot two subcritical slugs of fissionable material together in a hollow tube. The core of an implosion-type atomic bomb consists of a sphere or a series of concentric shells of fissionable material surrounded by a jacket of high explosives, which, being simultaneously detonated, implode the fissionable material under enormous pressures into a denser mass that immediately achieves criticality. An important aid in achieving criticality is the use of a tamper; this is a jacket of beryllium oxide or some other substance surrounding the fissionable material and reflecting some of the escaping neutrons back into the fissionable material, where they can thus cause more fissions. The fusionable material boosts the fission explosion by supplying a superabundance of neutrons. Fission releases an enormous amount of energy relative to the material involved. When completely fissioned, 1 kg 2. The detonation of an atomic bomb releases enormous amounts of thermal energy, or heat, achieving temperatures of several million degrees in the exploding bomb itself. This thermal energy creates a large fireball, the heat of which can ignite ground fires that can incinerate an entire small city. Convection currents created by the explosion suck dust and other ground materials up into the fireball, creating the characteristic mushroom-shaped cloud of an atomic explosion. The detonation also immediately produces a strong shock wave that propagates outward from the blast to distances of several miles, gradually losing its force along the way. Such a blast wave can destroy buildings for several miles from the location of the burst. Air Force photograph Large quantities of neutrons and gamma rays are also emitted; this lethal radiation decreases rapidly over 1. Materials vaporized in the fireball condense to fine particles, and this radioactive debris, referred to as fallout , is carried by the winds in the troposphere or stratosphere. The radioactive contaminants include such long-lived radioisotopes as strontium and plutonium; even limited exposure to the fallout in the first few weeks after the explosion may be lethal, and any exposure increases the risk of developing cancer. Los Alamos was approved as the site for the main atomic bomb scientific laboratory on November 25, , by Brig. Groves and physicist J. Robert Oppenheimer and was given the code name Project Y. One bomb, using plutonium, was successfully tested on July 16, , at a site km miles south of Albuquerque , New Mexico.

Groves left and J. Robert Oppenheimer working on the Manhattan Project. From The Second World War: Strangelove, and Planet of the Apes. The Decision to Use the Atomic Bomb. The explosion, which had the force of more than 15, tons of TNT, instantly and completely devastated Of this number some 70, were killed immediately, and by the end of the year the death toll had surpassed , The next atomic bomb to be exploded was of the plutonium type; it was dropped on Nagasaki on August 9, , producing a blast equal to 21, tons of TNT. The Japanese initiated surrender negotiations the next day. Atomic bombs were then used on the Japanese cities of Hiroshima and Nagasaki on August 6 and 9, respectively, killing about , Department of Energy Hiroshima bombing rememberedA Japanese woman remembering the bombing of Hiroshima and paying tribute to its victims with water offerings. The great temperatures and pressures created by fission explosion are also used to initiate fusion and thus detonate a thermonuclear bomb. See also nuclear weapon. In the United States began atmospheric testing of atomic bombs in the Pacific. The first phase, known as Operation Crossroads, used Bikini Atoll for two atom bomb tests. The first test, code named Able, detonated a kiloton atomic bomb at an altitude of metres feet on July 1,

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Chapter 4 : Splitting the Atom - Civilization 6 (VI) Wiki

H. Turngren, Minnesota Literacy Council, p.1 GED Science Curriculum "Splitting the Atom, Physical Science - Atoms and Molecules.

Grades 9 through 12 There are two principal reasons for including some knowledge of history among the recommendations. One reason is that generalizations about how the scientific enterprise operates would be empty without concrete examples. Consider, for example, the proposition that new ideas are limited by the context in which they are conceived; are often rejected by the scientific establishment; sometimes spring from unexpected findings; and usually grow slowly, through contributions from many different investigators. Without historical examples, these generalizations would be no more than slogans, however well they might be remembered. A second reason is that some episodes in the history of the scientific endeavor are of surpassing significance to our cultural heritage. These stories stand among the milestones of the development of all thought in Western civilization. Science for All Americans This chapter focuses on benchmarks that address the development of student understanding of selected episodes in the history of science. These benchmarks deal with history, leaving it to benchmarks in other chapters to signal when the related science and technology understandings are to be acquired. Also, it should be noted that little history of science is expected of students before they reach the 6th- to 8th-grade span, and most shows up in the 9th- to 12th-grade span. To appreciate the significance of these historical episodes, students must 1 know or at least be able to follow the science involved, and 2 be able to grasp the main features of the prevailing view at the time. Recognizing that certain episodes in the history of science can enhance the science curriculum certainly does not imply that all science must be taught by reviewing its history or that no other history of science and technology is appropriate in the curriculum. Nor, for that matter, should it be taken to suggest that there is no need for students to study current issues related to the impact of science and technology on society. Some educators have suggested that simple versions of these stories may help students to learn more sophisticated versions in later grades by making the main characters and story lines familiar in the early grades. It is possible, however, that simplified versions may distort both the science and the history, making learning the more sophisticated story difficult. Although this edition of Benchmarks does not recommended particular simplifications for students to learn, teachers and researchers could profit from collaborating in the study of the contribution that simplified stories can make to student understanding. Displacing the Earth from the Center of the Universe The great cosmological revolution usually associated with the name of Nicolaus Copernicus was one of the episodes in history that was truly transforming. It changed, ultimately, the sense most people have of their relation to the physical universe, and it raised difficult questions of human existence that for many people have yet to be resolved satisfactorily. The Copernican Revolution merits study by all students because it illustrates many aspects of the way science works, especially the way in which science, mathematics, and technology are intertwined and the way in which international efforts in science come together. Prior to studying this story during the high-school years, students should become familiar with the night sky at least to the extent of having observed the moon, stars, and some of the planets with the unaided eye and with a telescope. Whether through their own observations, films, or planetarium visits, students should be helped to visualize the phenomenon at the heart of the Copernican Revolutionâ€"the seemingly irregular movement of the planets relative to the starry background. Grades 6 through 8 The scientific groundwork can now be laid to prepare students to take up in high school the issues raised by Copernicus and Galileo. Naked-eye and telescopic observations should continue, supplemented by the use of reference books, videotapes, computer programs, and planetarium visits. The emphasis should be on accurate descriptions of the appearance of the moon, stars, and planets as seen from earth and on the motion of the planets relative to the stars. Analysis of geocentric and heliocentric models can be delayed until high school. Current Version of the Statements By the end of the 8th grade, students should know that Because every object is moving relative to some other object, no object has a unique claim to be at rest. Therefore, the idea of absolute motion or rest is misleading. People have trouble transposing frames of reference, so it is important not to rush through the story and to practice shifting frames of reference in many different physical contexts. There are films that can help show how hard it is to discern which of two objects is in motion. In studying planetary models, it is easy to bog down in making distinctions between rotating and revolving, and getting it straight may not be worth the effort it requires. They were comparably complex, both using circles on circles; and both predicted comparably well where planets would be observed at any specified time. Until Kepler devised a more accurate system with elliptical orbits, choice was a matter of taste. The Copernican Revolution illustrates some of the strains that can occur between science and society when science proposes ideas that seem to violate common sense or to undermine traditional values and beliefs. This part of the story should be included but not presented as the triumph of right over wrong or of science over religion. Current Version of the Statements By the end of the 12th grade, students should know that To someone standing on the earth, it seems as if it is large and stationary and that all other objects in the sky orbit around it. That perception was the basis for theories of how the universe is organized that prevailed for over 2, years. With the model, he was able to predict the motions of the sun, moon, and stars, and even of the irregular "wandering stars" now called planets. This explanation was rejected by nearly everyone because it violated common sense and required the universe to be unbelievably large. Worse, it flew in the face of the belief, universally held at the time, that the earth was at the center of the universe. It was Galileo who found the moons of Jupiter, sunspots, craters and mountains on the moon, and many more stars than were visible to the unaided eye. His descriptions of how things move provided an explanation for why people might notice the motion of the earth. Brahe made very precise measurements of the positions of the planets and stars in an attempt to validate his model. That brought the issue to the educated people of the time and created political, religious, and scientific controversy. Uniting the Heavens and Earth Students should have encountered the relevant physical concepts and laws at several levels of sophistication, at different times, and in different learning contexts prior to undertaking to learn the history associated with Newton. Newtonian synthesis explains the observations and speculations of his time and unifies earth and sky by proposing one set of physics laws for both. Grades 9 through 12 During the grades prior to high school, and during the early high-school years, students need to become familiar with the phenomena that the Newtonian synthesis explains and unifies, the fundamental concepts involved in the model, and the mathematics necessary to make quantitative sense out of such concepts as velocity and acceleration, the second law of motion, and the law of gravitation. Current Version of the Statements By the end of the 12th grade, students should know that Isaac Newton, building on earlier descriptions of motion by Galileo, Kepler, and others, created a unified view of force and motion in which motion everywhere in the universe can be explained by the same few rules. Moreover, his influence has extended far beyond physics and astronomy, serving as a model for other sciences and even raising philosophical questions about free will and the organization of social systems. His mathematical analysis of gravitational force and motion showed that planetary orbits had to be the very ellipses that Kepler had proposed two generations earlier. One of the major difficulties is semantic rather than scientific: No matter how the observer is moving, his or her measurement of the speed of light always comes out the same. Einstein reformulated the laws relating to space, time, mass, and energy so that they would be valid for all observers, whatever their uniform motion might be. So "relativity theory" is as much about what is not relative as about what is. Grades 9 through 12 Relativity is not a topic to be taken up in the elementary- and middle-school years as either history or science. To be sure, a full understanding of relativity theory is far beyond the capacity of most year-olds, but it is far too important to be ignored. By treating relativity historically in high school, it is possible to avoid falling into the trap of trying to teach its technical and mathematical details. Current Version of the Statements By the end of the 12th grade, students should know that As a young man, Albert Einstein, a German scientist, formulated the special theory of relativity, which brought about revolutionary changes in human understanding of nature. Among the counterintuitive ideas of special relativity is that the speed of light is the same for all observers no matter how they or the light source happen to be moving. In addition, nothing can travel faster than the speed of light. Even a tiny amount of matter holds an enormous amount of energy. Many predictions from the theories have been confirmed on both atomic and astronomical scales. Still, the search continues for an even more powerful theory of the architecture of the universe. The more counterintuitive predictions of special relativity occur in situations that humans do not typically experience. Among the surprising ideas of special relativity is that nothing can travel faster than the speed of light, which is the same for all observers no matter how they or the light source happen to be moving. The special theory of relativity is best known for stating that any form of energy has mass, and that matter itself is a form of energy. Extending Time The change in the conception of the age of the earthâ€”from a few thousand to many millions of yearsâ€”proposed by scientists in the s was dramatic and, for most people, beyond belief. The estimated age was unimaginably greater than the prevailing beliefs. People have difficulty imagining time spans that are vastly longer than human experience. In overturning the "sensible" notion that the earth is at most only a few thousand years old, science understandably provoked substantial opposition. The new theory was based on indirect evidence from fossils and rock formations and supported the even less acceptable concept of biological evolution. Thus, this episode is a good one for exploring ways in which age can be estimated and for raising questions about the relationship between science and popular beliefs. Grades 9 through 12 The history of this episode can be taken up after students have studied some earth science. Their study should engage them in thinking of indirect ways to determine the age of things around them and in comparing those methods to ones used by scientists. The study of dating offers excellent opportunities to show the use and importance to science of both technology and mathematics. Current Version of the Statements By the end of the 12th grade, students should know that Prior to the s, many considered the earth to be just a few thousand years old. By the s, scientists were starting to realize that the earth was much older even though they could not determine its exact age. He supported his claim with a wealth of observations of the patterns of rock layers in mountains and the locations of various kinds of fossils. But until the 19th century, most people believed that the earth was created just a few thousand years ago. Moving the Continents The story of why science accepted the idea of moving continents only after long resistance illuminates the conservatism of the scientific enterprise. Contrary to the popular public image of scientists as radicals ready to discard their beliefs instantly in the face of contrary "facts," the plate-tectonics episode shows that it sometimes takes a large accumulation of evidence over an extended period of time to provoke a dramatic shift in what most scientists in a discipline accept as true. The history of the rise of the theory of plate tectonics shows that the acceptance of a theory depends on its explanatory power as well as on the evidence that supports it. In a sense, plate tectonics does for geology what evolution does for biology. Current Version of the Statements By the end of the 12th grade, students should know that As soon as fairly accurate world maps began to appear, some people noticed that the continents of Africa and South America looked as though they might fit together, like a giant jigsaw puzzle. This led some to speculate that they might have once been part of a single giant land mass that broke into pieces and then drifted apart. This idea was repeatedly suggested and rejected because it was hard to imagine that anything that large and apparently immobile could move. This evidence, coupled with a scientifically sound physical explanation for how continents could move, transformed the idea of moving continents into the theory of plate tectonics. It just seemed absurd that anything as massive as a continent could move around. Still, very few contemporary scientists adopted his theory. The theory was seen to provide an explanation for a diverse array of seemingly unrelated phenomena, and there was a scientifically sound physical explanation of how such movement could occur. Understanding Fire Apart from the story of Lavoisierâ€”who he was, when and where he lived, what he did that was so importantâ€”this episode illustrates several aspects of the scientific endeavor. Lavoisier and Dalton were not, of course, solely responsible for the development of the science of chemistry. In the actual study of chemistry and its origins, many of the other strands will need to be brought into the story. Lavoisier and the controversy over the nature of burning provide a dramatic focus for the story. Grades 6 through 8 Students should have opportunities to become familiar with many kinds of safe chemical reactions and with the ways things behave or change in the process, and to gain experience doing elementary qualitative analysis. During this time, students should also gain practice in describing chemical reactions in general, and burning in particular, in terms of elements and compounds, atoms and molecules. They cannot be expected to become knowledgeable about details of atomic structure or bonding. Current Version of the Statements By the end of the 8th grade, students should know that More than years ago, Greek philosophers formulated the idea of atoms as being simple particles beyond the reach of human senses and with the existence of a void between them. He successfully tested the concept of conservation of mass by conducting a series of experiments in which he carefully measured all the substances involved in burning, including the gases used and those given off. As a result, the phlogiston theory was replaced by a theory based on the role of oxygen in burning. This view confirmed what people saw:

Chapter 5 : Man Arrested for Attempting to Split the Atom in his Kitchen | TreeHugger

This article begins by contextualizing MÄ•ori Freehold Land (MFL) within a wider global debate on communal land that is in transition to more individualised forms of tenure.

Chapter 6 : Adventures in Literacy Land

Splitting the Atom GAP, gaps, and other fissile elements. Originally published on November 29, Updated in November of

Chapter 7 : Chapter 10 ~ Benchmarks Online ~ Project ~ AAAS

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Chapter 8 : Atom - Science Games and Videos for Kids

The operating room in the Williams story and the atom-splitting lab in the Fermi story were alike in a sense that they are both places where people must remain silent. The correct option among all the options that are given in the question is the third option or option "C".

Chapter 9 : Splitting the atom of communal land tenure, with specific reference to MÄ•ori freehold land.

I support classroom teachers and work collaboratively to implement a balanced literacy program throughout the grade levels (K-5th). I serve as a resource for teachers, parents and the community. I am responsible for coordinating and providing leadership for the school-wide literacy program.