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Allowing Students to Explore Simple Physics and Marketing in English Class

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I teach ninth grade English at Hill Regional Career Magnet High School in New Haven, Connecticut. Being a magnet high school, Career focuses on two main areas: Health/Science and Business. We are continually trying to integrate these areas into every aspect of our students' academic lives. This inter-disciplinary approach increases students' awareness of the connectedness life and academics offers. We offer **82 minute periods** rotating on an every other day schedule, which allows for deeper concentration on a single subject if warranted. The offered unit should take four to seven class days (approximately two to three weeks).

Being an English teacher it is imperative that I give the students the opportunity to acquire and maintain certain skills that will help them no matter what career they choose in the future. For example, students generally do not see the connection between being able to write a paper and practicing brain surgery or selling a car. Many adults today could not make that connection. However, most of us know that good writing feeds into learning good communications skills and learning how to improve one's writing and thinking abilities. But, again, on the average most students will not see the connection until late in their academic career. By expanding students' knowledge of expository writing, especially in science, they will have the opportunity to become better at expressing how something works and thinking about how to improve the product.

Why Teach This Unit

By bringing in science and business to the ninth grade English class I am giving the students their first opportunity to bridge the career areas and opportunities offered in high school. Most, if not all high schools teach science and business in some fashion (biology, physics, chemistry, keyboarding, computers, etc.), so this unit will be helpful to most high school English curricula, and possibly, with few changes, middle school English. I have tried to write it in simple scientific terms (terms that I, as an English teacher, can understand) in order to make it accessible to the non-scientific, so that science can extend, as it already naturally does, beyond the high school lab walls.

The unit combines science, writing, speaking, and marketing in a way to prepare students for the real world. The students are asked to research how something works, design the product or reproduce it on paper, create an ad campaign and present it to the class. This allows them an opportunity to utilize hands-on experience to increase their knowledge of an area of their choosing. This also allows them the opportunity to practice

expository writing on how something works. Also, the students are asked to create an advertising campaign, which will increase their knowledge of advertising techniques and to learn how other people perceive things. They will then be asked to present their entire project to the class, which allows them the opportunity to practice speaking and marketing skills. This unit brings together a wide variety of areas that allow students to develop and grow around a scientific concept outside of a science classroom while encompassing the basic tenets of three of the Connecticut state standards:

> Science Standard 1: Students will experience an inquiry-based learning environment in which they are free to ask questions, seek information and validate explanations in thoughtful and creative ways. Students also will understand that the processes, ways of knowing and conceptual foundations of science are interdependent and inextricably bound. ("Science Curriculum Framework", 6/28/03)
> Language Arts Standard 1: Students will read and respond in individual, literal, critical, evaluative ways to literary, informational, and persuasive texts.
> Language Arts Standard 2: Students will produce written, oral, and visual texts to express, develop and substantiate ideas and experiences.("Language Arts Curriculum Framework", 6/28/03).

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The Importance of Teaching Students Simple Physics

Tools have been an important part of our lives since the stone age. For the most part, they are what separate us from the other species on the earth. One does not need to know the physics behind how tools work; however, in order to understand higher level physics, the basic ideas and concepts can be found in these simple machines.

No matter what profession one chooses for life, be it a writer or, to use a former example, a brain surgeon, one must use some sort of tool. Understanding the physics behind the tool allows one to utilize it to its fullest capacity. A writer needs to understand the flow of the ink from the tube in order to fully maximize its use, so that he/she does not waste money replacing a tool that may not be broken. A brain surgeon definitely needs to understand the physics behind his or her tools. Suction, sutures, scalpel all require a knowledge of physics to completely take full advantage of. Even people who are not part of the workforce are still subject to the laws of physics.

Force, motion and gravity affect us all. We do not need to know the formulas or the specific Newton's law regarding physics to make it in this world. But knowing certain things makes life a lot simpler, and allows us to make complex technological advances. Knowing the basis for how small things work allow learners to move on to more advanced material. Combining simple machines allowed for technological advances. A knowledge of the concepts of physics isn't necessary to invent machines. Tools were invented before physics was defined. The inventor or user didn't think to himself or herself, "This works because of physics"; they just worked through trial and error. If it worked, then it worked. If it didn't, back to the drawing board. Many flying machines not were tried before the word physics was invented. People didn't give up. They tried and tried until they succeeded in building a flying machine: the airplane.

Only through physics and an understanding of physics, or more specifically aerodynamics, could the airplane be perfected so that today tens of thousands of flights occur daily, usually without incident.

Students need to be given an opportunity in a safe environment to explore through trial and error the many dimensions of physics. In order to be as self-sufficient as possible, students need to know how to properly operate the basic tools one would find in a tool kit. One should know the basic functions of these inventions. There is no greater satisfaction than creating a thing from beginning to end. Students need practice in creation. One does not any longer go into any department store and buy an assembled computer desk, it's not practical. When the kit is opened, tools are needed to properly assemble to set. One needs to know the importance of choosing screws for certain jobs rather than nails. Observing screws and nails in high school will show the students the significance of having an **inclined plane** over a smooth surface.

Basics of Physics - Building a Common Vocabulary

This brings us to the basics of physics. I am going to take this opportunity to water-down the scientific principles of physics to make it accessible. First, students and teachers need to have a common vocabulary concerning the **scientific method, linear measurements, friction** and **inertia** . Next, simple machines **(the inclined plane, the lever, the wheel and axle, and the pulley**) are discussed. These are the basic things students and teachers will need to know about in order to move on to the projects.

The **scientific method** never wavers. A hypothesis is developed; the experiment is planned and run carefully to collect information; measurements are taken thoroughly and recorded properly; and, the hypothesis is checked for support (Goodwin, 18). The question asked is, "Does the evidence collected support the hypothesis?" If yes, success. If no, the method is followed again where another hypothesis is developed.

Careful **measurements** need to be taken so that the experiment may be duplicated by others. Many of the projects require linear measurements. The most common type of linear measurer is the 12 inch ruler. The ruler, as other measurers, uses both the English and metric system. The English system is generally used in the United States, whereas the metric system is most commonly used in other countries. "Scientists all over the world, even those living in the United States, prefer the metric system" (Friedhoffer, 22) because it is easier to convert. This system uses grams, meters, liters, and the Celsius scale. The English system uses pounds, inches, yards, miles, and the Fahrenheit scale. It is a bit more awkward when it comes to conversions. That is why a good calculator is sometimes warranted. Tape measures allow for longer measurements than regular rulers. Both systems are generally shown on tape measures. Calipers go where rulers and tape measures cannot. There are two main types of calipers: open-jawed and Vernier. Open-jawed calipers are opened to take the measurement, then put against a ruler to get the measurement number. Vernier calipers are more precise because the measurement scale is right on the tool.

Friction and **gravity** keeps us grounded. **Friction** is "a force that exists between any two surfaces that are in contact with each other. This force resists the motion of the two surfaces." (Friedhoffer, 26) This friction will build up heat. To reduce friction lubricants can be added. "Lubricants coat surfaces that are in contact with each other . The surfaces then ride on a thin layer of the lubricant." (30) This reduces heat and wear on the two opposing surfaces.

While gravity keeps us grounded, **inertia** keeps us moving. Sir Isaac Newton's first law of motion states the following: "An object in motion will stay in motion in a straight line unless acted upon by an outside force, and an object at rest will stay at rest unless acted upon by an outside force." (34) Without gravity, later explained, a bullet shot from a gun would continue forever unless it came upon something to stop it. Gravity is the outside force that acts upon it to bring it to the ground. The second part of the law means that unless the bullet is fired from the gun or unloaded, it will stay in the chamber forever. It isn't going anywhere unless acted upon by an outside force. A force is a push or a pull exerted on an object. Amusement parks take advantage of force, motion and friction to provide stimulating rides for park-goers. Imagine being on an anti-gravity merry-go-round that didn't have any friction - you'd go on forever or slip out of your restraint.

There are many simple machines everyone should know how to use. Many of us just use them without fully understanding the scientific principle behind them. A screw works better than a nail because it grips, but most people are satisfied just pounding in a nail into the wall and hanging a picture. So, if we understand the basic scientific principles behind these simple machines we will make better choices when it comes to our own lives.

Here are the simple machines we are going to look at: the inclined plane, the lever, the wheel and axle, and the pulley.

If you have ever walked up a ramp you have had experience with an **inclined plane** . This simple idea is put to use in many wonderful ways. As mentioned before, the screw is an example of an inclined plane at work. Even a nail utilizes inclined planes. Its head is chiseled to a point. There are many inclined planes coming together. This allows the nail to go into the wood. "Inclined planes take advantage of the fact that pressure is multiplied as the surface area decreases." (39). With a dull nail, more force is needed because the surface area of the point is increased. A sharp nail needs little force to do the job. Axes, hatchets and mauls take advantage of the inclined plane also. Two inclined planes come together to create a sharp cutting edge. When swung, the maul (large axe), the axe and hatchet (a small axe) utilize moving inertia and the inclined plane to chop. The splitting wedge is used in combination with a sledge hammer. "The inclined planes on either side of the blade force the log to split apart."(40) The ladder is also an inclined plane because in order for it to be useful it needs to rest against something. Stairs are also an inclined plane. A screws' threading creates an inclined plane that helps hold things together. Many simple experiments can be done with screws and other inclined planes. The students might hypothesis on the effect of changing the slant of the inclined plane and its efficiency. For example, decreasing the inclined plane on a screw will allow for a stronger hold in a wall.

The **lever** is also seen everywhere. "A lever is a bar that turns about a pivot point and is used to transfer and/or multiply force." (52) A fulcrum is the pivot point of a lever. It is the point where the balance is needed to lift or move an object. "Levers can help you to multiply input force when you want to accomplish work." (Ibid) There are many different types of levers, each with its own mechanical advantage. An example of a first-class lever is the see-saw. The first-class lever is helpful in "magnifying force and distance." (Ibid) The claw hammer and the pry bar are also good examples of first-class levers. Scissors are two connected first-class levers that have long handles so that the force exerted is magnified at the cutters. The second-class lever has the fulcrum at the other end and force is exerted up at the free end to lift the resistance. The wheel barrow is a perfect example of this type of lever. The third-class lever has the fulcrum at one end, with the input force in the middle and the force pushing down. The hammer, as a nail driver, is this type of lever. Picture your hand holding the hammer. This is the fulcrum (your wrist). The head of the hammer is the force and the head of the nail is the resistance. The input force is your hand moving down.

The **wheel and axle** is a very identifiable tool set that reduces friction to aid in the carrying of objects while magnifying input force and speeds. "As the wheel rotates, the outer portion of the wheel (the circumference) moves a greater distance than the inner portion of the wheel. This greater movement provides a mechanical advantage." (67) There are many different experiments that can be done with the wheel and axle. Take a faucet. If you take the knob off it is almost impossible to turn the water on. But once the knob is replaced, the force exerted on the knob is magnified at the center, thereby turning the water on. There are many types of wheel and axle mechanisms. Casters, the wheelbarrow, the screwdriver, the circular saw, and the hand drill are all types of wheel and axle tools. The hand drill's wheel is special because it contains gears. A gear has teeth which decrease slippage. Gears can mesh with other gears or a chain, such as in a bicycle or chainsaw. "Gears can increase the mechanical advantage and change the direction of the input forces." (75)

Pulleys exist in almost all houses. A pulley utilizes the wheel and axle idea to change the direction of an applied force. A rope or cable is wrapped around a wheel which is attached to a bale (a cage-like device) that is attached to an axle. A clothes line is a simple pulley. You pull on one side and the other side moves away and vice versa. Window shades some times utilize small pulleys with ropes. A compound pulley (block and tackle) is used to "multiply and change the direction of an applied force." (80) Many pulleys are put together

so that the task is easier. The only difference is that the rope must be longer and you must pull farther, not harder. It decreases the effort needed (work) to lift larger objects.

Many of the above tools work well alone. However, as technology evolved, it became more and more evident that combining these tools increased output while decreasing the effort needed. Adjustable wrenches, vises, vise grips, and bolt cutters take advantage of the combination of simple tools. It utilizes both the lever and the inclined plane. The arms work as compound levers, while the cutting edges are inclined planes. The input force is magnified as the two levers (handles) are brought together, which bring together the two steel inclined planes. This makes for a tool that cuts through bolts.

Ideas for Projects

Before going out on their own, students should have a basic knowledge of how to use simple tools. For the unit students will be asked to discuss how the object utilizes one or more of the above concepts. The following is a partial list of typical objects. The list can be expanded to meet the needs of the classroom.

- Automobile -- a very exhaustive project. You might want to narrow.
- Chainsaw
- Bicycle
- Lock and key
- Can opener
- Zipper
- Fishing Rod
- Nutcracker
- Nail clippers
- Bathroom Scale
- Manual Typewriter
- Water wheel
- Wind mill
- Dentist's drill
- Manual Lawn mower
- Mechanical Clock
- Lawn Sprinkler
- The Sewing Machine
- Block and tackle
- Tower Crane
- Escalator or Elevator
- Hand drill
- Combine Harvester
- Window Shade
- Car Seat Belt
- Apple Peeler
- Winch
- Car Brakes
- Yo-Yo
- Screwdriver

- And anything else mentioned in the material above

All of the objects above employ the physics concepts described, most in combination with each other. Students should be able to identify and explain most of the concepts used in their chosen object. Many of these can be found fully explained in David Macaulay's The New Way Things Work, which comes in CD-Rom or book form. Students can explore the medium of their choice. If possible, the CD-Rom version is useful for whole class introduction. Having on hand a simple tool kit that has examples of each of the simple machines would be extremely beneficial to student learning. Also, www.howstuffworks.com is a great site that shows how things work with pictures and simple explanations. (They also offer a CD-Rom.) You would need a connection to the internet to access this material.

The Importance of Teaching Students Marketing and Advertising

Media Literacy

No matter how you look at it, teenagers are the prime target of advertisers. Therefore, people between the ages of 13 and 18 need to know how they are being manipulated by television, radio and print mediums. They need to be aware of the techniques utilized by advertisers in order to become better consumers. However, in knowing these techniques, students will also become better self-promoters of their own ideas. They will learn to "work the system that works against them." Many of the standards set forth by local, state, federal and international institutions apply to media literacy in order to better educate the populace of the role of the media.

The basics of advertising are simple. Get the consumer to consume. Buy this product, not because you want it, but because you need it. You need it in order to be happy. "Advertising manipulates our needs, our longings, and our insecurities." (Krueger, 28) Advertisers use many ways to hook the consumer. **Glittering generalities, testimonial, plain folk, bandwagon, and card stacking** are all ways advertisers sell their products. Glittering generalities is "speaking in broad sweeping terms without qualifications: 'Clinical studies prove that four out of five people lost weight successfully with Dexatrim.'" (Krueger, 22). What study? Who did the study? Can the results be duplicated. (Ironically, this is not a very scientifically sound use of advertising, but the technique does sell Dexatrim.) A testimonial is just that: a famous or well-known person testifies to the veracity of the product. The plain folk method uses plain folks, just like you and me, to sell the product. This shows that it is accessible to the public. Everyone can own a Moto-Yacht. Hop on the bandwagon because if you don't, you will miss out. The bandwagon method uses the "you snooze, you lose" mentality. Don't be left behind, says the bandwagon. All cigarette and alcohol ads use the card stacking method (Ibid), which emphasizes only the positive while de-emphasizing the negative. There are other methods advertisers employ to sell products, but the above mentioned are the most common and most identifiable. Students need to be aware of these techniques and should be able to identify them readily.

Looking at Great Ad Campaigns

One way to begin to identify advertising techniques is to look at a few successful ad campaigns. Nike, Apple Computer, and Absolut Vodka have had terrific marketing strategies. These products are all readily identifiable. Nike has used a simple slogan, "Just do it" to catapult to the largest sports brand in the world (Ind, 171). Using sports celebrities to hawk their wares, Nike employs the testimonial technique to a tee. "The teenagers who represent the core of the target market buy Nike because it's the brand worn by their sporting heroes and because the advertising reinforces the image of the brand as the style leader." (174) Apple Computer, on the other hand, uses plain folks to sell their computers. Apple Computer touts itself as people-friendly, not corporate Big Brother. "Apple advertising, like the product, is designed to be accessible." (208) People could relate to the new advertisements for this computer because in the past, most computer ads were beyond the intellectual reach of every day folk. Apple brought the computer down to the level of plain folks. Absolut Vodka used a simplistic card stacking method. Actually, the company used a minimalist approach to advertising. Absolut Perfection is written under an Absolut Vodka bottle with a halo above it. In the mid-eighties this began a campaign that still flourishes in its simplicity. An altered bottle on a page with a catchy two to three word slogan always started with Absolut. "A lot of competitors are trying to duplicate the Absolut

style of advertising, but they haven't worked out what the one thing in the Absolut advertising is that works: it's the quirkiness of the visual and the humour of the line." (30) No negatives of alcohol are mentioned, just the positive of humor. Just like all great advertising, it truly sticks in your mind.

Marketing the Object of the Project

Marketing, according to Peter Drucker a famous management learder, is "the whole firm, taken from the customer's point of view." (Hiam, 19) A marketing strategy combines many things in order to sell a product. For purposes of this unit this section is going to focus on defining the message, creativity and print advertising because these are the basics of marketing that will be developed later in the student's career. In other areas of their academic lives students will be asked to write to a specific audience, take a position and support it. A side note: The CAPT (Connecticut Academic Performance Test) asks students to do just this in the Inter-disciplinary Test.

When marketing a product, a target audience needs to be defined. It would not be wise to sell breath mints to recluses. But it would be wise to sell them to corporate coffee drinkers/smokers. These are the people who would need this product; therefore, it makes sense to market breath mints to them. Students need to be able to define who their product is targeted to and create a campaign that does just that.

In creating the campaign the advertising techniques need to be taken in to account. Who or what is your audience going to listen to? "Creativity is making nonobvious connections between things or ideas." (56) Bartles and James used the plain folks technique in a very creative manner. They had two older men sitting on a porch holding wine coolers. The end tag was "Thank you for your support." One would not naturally connect older gentlemen, country porches and wine coolers, yet this creative ad became an icon for wine coolers. The men were non-threatening and no busty blondes were used to hock the light tasting beverage. People generally want visually stimulating copy that makes them want to buy the product. It is about "building relationships between your brand and your prospects." (65)

This creativity comes from thinking outside the box. Brilliant marketing ideas don't just appear out of nowhere. Thinking about the product, how it is used, and by whom is all part of a good advertising campaign. Brainstorming, wishful thinking, analogies, pass-along, classic questions, and competitive teams are all suggestions made by Marketing for Dummies by Alexander Hiam. Playing around with words, colors, and layout will add to the message that we, as consumers, need this product.

Print advertising has been around for a long time. For local and regional markets, it is the most highly desirable way to market a product. It is "the most flexible and effective all-around advertising medium." (125) Print advertising can range from a simple brochure to a full page magazine ad to a catalogue selling the wares. They need to be, above all, visually stimulating. The layout needs to be clean and easily accessible to the target audience. Think about a layout targeted to teens that has too much writing. It won't work. Teens, as do most of the general public, want the easy way out. "A picture is worth a thousand words." There are many parts to a print ad: headline, copy or body copy, visual, trademark, and slogan.

1. **Headline** : The large-print words that first attract the eye, usually at the top of the page;
2. **Copy or body copy** : The main text, set in a readable size such as might be used in the main text of a book or magazine;
3. **Visual** : An illustration that makes a visual statement.
4. **Trademark** : A unique design that represent the brand or company; and,

5. Slogan : An optional element consisting of a short phrase evoking the spirit or personality of the brand. (126-127)

All of these combined, create recognizable and long-lasting images in our minds. They make us want, need, to buy the product.

The Unit

The Goals

Through this unit students will:

1. Experience an inquiry-based learning environment in which they are free to ask questions, seek information and validate explanations in thoughtful and creative ways. ("Science Curriculum Framework")
2. Read and respond in individual, literal and creative ways to written and visual informational texts.
3. Produce written, oral, and visual texts to express, develop and substantiate ideas and experiences. ("Language Arts Curriculum Framework")

Lesson One

Objectives

The students will define simple machines; explore their environments for examples of simple machines; define the scientific method; and, choose an object they would like to explore.

Materials

Materials include an unfamiliar object, such as an apple peeler and apple, black board, dictionaries or other reference, and list of objects. (A simple tool kit or CD-Rom of How Things Work, would increase student active participation.)

Initiation

Initiation into the lesson plan can be done many different ways, with one of the ways being a summary of the above narrative. I will proceed by giving a summary of the benefits of learning about science and combining it with marketing because of the focus of the magnet themes of Career High School.

Activities

The activity through which they will explore these simple machines is as follows:

In groups of three or four, the students are given the definitions of simple machines separate from their names and asked to match them with a time limit of 10 to 15 minutes depending on the class. This gives the students the opportunity to become familiar with the names and definitions. If a group is stumped, ask them how a machine might be used in every day life. Next, ask one student from each group to define the machines on the board. Go through the lists and ask the students about inconsistencies if there are any. Ask the students how they could verify the definitions. List these on the board. (Dictionary, internet, library, science manual/textbook, etc.) Have students copy down the correct definitions in their notebook. Ask students to volunteer to draw pictures of simple machines on the board and at their desks. This is a pre-step to the entire unit for they will have to draw their simple machines later.

Next, ask the students where such machines could be found in the classroom. This will allow the students to explore their own environment for simple machines. They should be able to come up with at least ten things that use simple machines. List them on the board. (Door wedge, hinges, blinds, pencil sharpener, zippers, inclined desks, pencil tips, over-head screen, etc.) Bring out the tool kit (or CD-Rom of How Things Work or How Stuff Works and a Destination Computer) and ask students how each tool works. Match them each to the definitions in their notebook.

Hand out the list of objects. This list will allow students the opportunity for independent exploration outside of their classroom. Ask them to independently choose an object of their own liking. They will work on these independently as researchers but may use others for help. Each student will be evaluated on his/her own presentation.

As a class you might explore an object many students are not familiar with, such as the apple peeler or any other object. (Note: It might be wise to have such an object handy along with an apple). Ask the class if they know what the scientific method is. Define as a class. Check definition. Then, apply the scientific method to the apple peeler. Hypothesize on how it would work and what simple machines might be used by looking at the apple and trying to figure out how to peel it. (You can also use an apple-corer.) Now check your hypothesis by using your own apple peeler. As the wheel and axle turns the apple, the inclined plane peels the skin off. What ever object you choose, you should keep this object for later experimentation.

Homework

For homework each student should find as much information on their object as possible and bring the information to class. Two books or four pages of internet information will help. They should also try to find the object or pictures of the object, something suitable for class.

Lesson Two

Objectives

The students will read their researched materials for information taking notes as they read; organize their information using an outline, using citations if necessary; compose an expository essay using their outline.

Materials

Materials include *The New How Things Work* by David Macaulay (and other reference books listed in the bibliography),

Activities

Discuss what the students discovered about their object. Discuss how their objects work and use the principles of simple machines. Refer back to the apple peeler (or other chosen object from the tool kit, perhaps). Discuss how the apple peeler works. Ask students to look through their research material and write down notes as to how their objects work. If students did not find enough source material, have on hand reference books. Model this on the board using the apple peeler as your own object. Tell students that if you take any information directly from a source it needs to be put in quotes and where the information came from needs to be put in parenthesis. Re-wording information avoids this. This will force students to reword information.

Ask the students to think about ways their object is currently used in today's society. Model using your apple peeler. The apple peeler allows for the apple to be peeled easily and efficiently, with little waste. The simple machine allows for less work on your part. It takes the labor out of peeling apples. This is the basic idea behind machines. Take notes on the board as you think about these things. Ask students to take notes from their books or think of ideas on their own.

Now the big questions: Using the ideas and concepts behind simple machines, how can the object be made to be more efficient? How can we get the object to work harder for us? With the apple peeler, the crank could be modified along with the inclined plane to produce a more efficient peeling machine. Now, most common objects have been already modified to almost perfection, but students should be given the opportunity to explore and rethink conventional ideas. Everything can be modified to meet some need. Ask the students to jot down their notes on this area.

Now students have three areas completed: how their object works, its uses in every day life, and how to improve the object. These three things are organized in an outline. The basic five paragraph outline has three different sections: introduction, body, and conclusion. The three areas become the essay's body each with the same layout:

T.S.(Topic Sentence)

DS1 (Detail Sentence 1)

DS2 (Detail Sentence 2)

DS3 (Detail Sentence 3)

C.S. (Concluding Sentence)

The students need to create five layouts, which represent the five paragraphs. Each layout has its own topic sentence and concluding sentence. The three body paragraphs deal with how the object works, its uses, and suggested improvements. The expository essay follows a step-by-step method describing each part in

increments. Students are instructed to fill in their outlines and complete their first drafts either in class or for homework depending on their ability level. Ask them to bring art material to class along with their first drafts. Generally, I allow students who have completed their homework to work on arts and crafts during class-time. This adds an incentive to their completion of homework. Ask students to bring arts and crafts material to class.

Lesson Three

Objectives

The students will utilize knowledge and understanding of simple machines to draw or create their object; become familiar with advertising techniques through exploration of terms and ideas.

Materials

Materials include basic arts and crafts materials, any reference materials (including any kind of kit you can borrow possibly from the science department), (tool kit, if possible).

Initiation

Today you are going to become marketing geniuses. You are going to design your object that you wrote about last night and come up with an advertising campaign, which will be presented to the class and displayed in the room. First we need to look at designing the object.

Activities

For this activity, the teacher models how something works, while drawing a picture on the board or actually creating the object. The teacher can use the existing apple peeler (or other used object) and draw this on the board. Allow students to help with the design constructively. While drawing the teacher explains how the object works. For a further step, ask the students what could be modified on the object to make it more efficient. This allows students to utilize the information on simple machines that they learned earlier. Allow for these modifications to be made on the object. Now you have your own product.

Next, the teacher asks the students to do the same with their own object. The students use the arts and crafts materials and their own essays to further the project. This allows students to utilize different modalities to demonstrate understanding of the concepts.

Once these are completed it is now time to learn about the different types of advertising techniques. The teacher, through questioning ascertains as many techniques from the students using examples from television. For example, how does Nike sell their products? Through the use of testimonial and plain folks. Go through each of the techniques making sure students understand these basic ideas and vocabulary words.

Now it is time to look at print advertising. Ask the students to think of things that need to be in magazine ads.

1. Headline: The large-print words that first attract the eye, usually at the top of the page;
2. Copy or body copy: The main text, set in a readable size such as might be used in the main text of a book or magazine;
3. Visual: An illustration that makes a visual statement.

4. Trademark: A unique design that represent the brand or company; and,
5. Slogan: An optional element consisting of a short phrase evoking the spirit or personality of the brand. (Hiam, 126-127)

These things need to be present in their own advertisements for their object.

Homework

Create a rough draft of your ad using the rubric for help. Be sure you are able to explain each of the techniques you used and be sure to include the five basic elements of magazine ads. Be sure to bring your written essay to class.

Lesson 4

Objective

The students will peer edit and critique the advertising campaigns so that they meet certain standards.

Material

Material needed is a copy of the rubric for each student. (See below.)

Initiation

Today we are going to critique each other's ads to make sure they meet the needs of the unit.

Activities

Today is a day of sharing. I have created a rubric that each of you must complete on your own and someone else's project. This should take us the whole period and if you did not complete your assignment you cannot participate in this peer evaluation and you must work on your project today in class. Everyone needs to be working.

Last night you should have used the rubric to help you complete the assignment. Today you need to go through and check your project for each of the sections on the rubric. You need to check off on the rubric that you did indeed complete that section. You have about 15 minutes to complete this.

Now you need to exchange projects with a peer and your peer will go through your project and check off your rubric. There is a section for comments. These comments need to be constructive: they need to help the creator of the project. If you liked a particular part, say so. If you did not like a particular part, say why but not because "It sucks." You have 20-30 minutes.

Now, go over the rubric with the person who's campaign you critiqued. Discuss what you liked and what they could change to make their project better. You have 10 minutes.

Homework

Everyone has now gone over their own project and the project of another person. Tomorrow you will be asked to present your ad campaign for the class. You will be evaluated on information and creativity. Tonight you need to take home your rubric and fine-tune your ad campaign project. Some of you may need to work on your essay, others may need to work on the campaign. The presentation should include a reading of your essay and the presentation of your ad. Please hand in your rubric tomorrow before your presentation.

Your Name:

Your Object:

Rubric for Simple Machine Ad Campaign

Concept Your Check Peer Check Comments Teacher Check

Simple Machine

Essay - 5 Paragraphs _____ _____ _____ _____

Introduction _____ _____ _____ _____

Body

How it Works _____ _____ _____ _____

Used in Society _____ _____ _____ _____

Modification _____ _____ _____ _____

Conclusion _____ _____ _____ _____

Ad Campaign

Drew or Made Object _____ _____ _____ _____

Modified Object _____ _____ _____ _____

Advertising Techniques Used: Need 2

Glittering generalities _____ _____ _____ _____

Testimonial _____ _____ _____ _____

Plain folk _____ _____ _____ _____

Bandwagon _____ _____ _____ _____

Card stacking _____ _____ _____ _____

Magazine Ad Techniques:

Headline _____ _____ _____ _____

Copy or body copy _____ _____ _____ _____

Visual _____ _____ _____ _____

Trademark _____ _____ _____ _____

Slogan _____ _____ _____ _____

Creativity _____ _____ _____ _____

Overall Comments:

Rubric Grade: (For Teacher Use) _____

Read Essay Aloud:_____ Presented Ad Campaign: _____

Presentation Grade:_____

Lesson 4

Objective

The students will demonstrate understanding of knowledge acquired by giving an oral presentation of essay on simple machines and ad campaign.

Activity

Collect student rubrics. The students present their projects individually. Teacher evaluates each according to the rubric.

In closing, I hope that each one of you has a basic understanding of how things work. It is also hoped that each of you has thought about how changing an already made object might improve its performance and/or efficiency. The world is your playground. Use it, change it, make it yours. Advertising tells us to buy, buy, buy, but one day you are going to be asked to sell yourselvesto colleges and places of employment. Make yourself more marketable by learning about the things around you. In today's stressful world things don't need to be so difficult. Think about how to make the tools around you work for you.

Bibliography

Friedhoffer, Bob. *Physics Lab in a Hardware Store* . Franklin Watts: New York, NY, 1996.

Hiam, Alexander. *Marketing for Dummies* . IDG Books: Chicago, IL, 1997.

Ind, Nicholas. *Great Advertising Campaigns* . NTC Business Books: Lincolnwood, IL, 1993.

Krueger, Ellen and Mary T. Christel. *Seeing and Believing* . Boynton/Cook: Portsmouth, NH, 2001

"Language Arts Curriculum Framework." Connecticut State Department of Education: Division of Teaching and Learning. March 1998. http://www.state.ct.us/sde/dtl/curriculum/frlanga.pdf (6/28/03).

Macaulay, David. The New Way Things Work. Houghton Mifflin: Boston, 1998.

"Science Curriculum Framework." Connecticut State Department of Education: Division of Teaching and Learning. March 1998 http://www.state.ct.us/sde/dtl/curriculum/frsci.pdf (6/28/03)

Annotated Teachers' Bibliography

Advertising Tricks Without Gimmicks. Job Skills For Career Video Series. The Princess Co. LTD. The School Co.: Vancouver, WA, 1991. (Sixteen minute video dedicated to showing students good advertising techniques without showy gimmicks.)

Cassidy, John *Explorabook: A Kids' Science Museum in a Book* . Klutz Press: Palo Alto, CA, 1991. (An excellent reference book that allows students to explore concepts right in the book.)

Friedhoffer, Bob. *Physics Lab in a Hardware Store* . Franklin Watts: New York, NY, 1996. (Excellent resource for the concepts of simple machines.)

Gardner, Robert. *Experiments with Motion* . Enslow Pub.: Springfield, NJ, 1995. (Another excellent reference book that explores experiments that show the concepts related to motion.)

Hamlin, Sonya. *How to Talk So People Listen* . Harper & Row: New York, 1988. (This book explains how to give great presentations in front of an audience. Gives students the skills to communicate more effectively.)

Hiam, Alexander. *Marketing for Dummies* . IDG Books: Chicago, IL, 1997. (Simple and easy to read reference for the teaching of marketing.)

Ind, Nicholas. *Great Advertising Campaigns* . NTC Business Books: Lincolnwood, IL, 1993. (Very interesting reading on the great advertising campaigns of the 20th Century, foreign and American.)

Krueger, Ellen and Mary T. Christel. *Seeing and Believing* . Boynton/Cook: Portsmouth, NH, 2001. (Excellent reference for teaching media literacy.)

Lafferty, Peter. *Forces & Motion.* DK Publishing: New York, 1992. (Excellent reference and resource for concepts concerning simple machines.)

Macaulay, David. *The New Way Things Work* . Houghton Mifflin: Boston, 1998. (All of Macaulay's books deal with how things work. The writing and illustrations clearly show the reader simple and complex concepts. *The Way Things Work* series also includes a kit and CD-Roms, which allow students more exploration of concepts.)

Why Ads Work: The Power of Self-Deception . Learning Seed: Lake Zurich, Illinois, 1996. (This is one of an excellent video series concerning advertising. This tape deals with the concept of self-deception and is 23 minutes long.)

www.howstuffworks.com is an excellent on-line resource that guides students through, in simple terms, how everyday (and not-so-everyday) things work. Many pictures and simple explanations are used. The simple machine source can be found using the side bars (engineering) or this website address: http://science.howstuffworks.com/channel.htm?ch=science&sub=sub-engineering

http://www.state.ct.us/sde/dtl/curriculum/ is where you can find the Connecticut State Guidelines for curriculum standards.

Annotated Student Resources

Cassidy, John *Explorabook: A Kids' Science Museum in a Book* . Klutz Press: Palo Alto, CA, 1991. (An excellent reference book that allows you to explore concepts right in the book.)

Friedhoffer, Bob. *Physics Lab in a Hardware Store* . Franklin Watts: New York, NY, 1996. (Excellent resource for the concepts of simple machines.)

Hiam, Alexander. *Marketing for Dummies.* IDG Books: Chicago, IL, 1997. (Simple and easy to read reference for the learning of marketing.)

Ind, Nicholas. *Great Advertising Campaigns* . NTC Business Books: Lincolnwood, IL, 1993. (Very interesting reading on the great advertising campaigns of the 20th Century, foreign and American.)

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Macaulay, David. *The New Way Things Work* . Houghton Mifflin: Boston, 1998. (All of Macaulay's books deal with how things work. The writing and illustrations clearly show the reader simple and complex concepts. *The Way Things Work* series also includes a kit and CD-Roms, which allow students more exploration of concepts; available at on-line bookstores and elsewhere.)

www.howstuffworks.com is an excellent on-line resource that shows you how things work from a block and tackle to zippers. You can use this web address to go directly to simple machines: http://science.howstuffworks.com/channel.htm?ch=science&sub=sub-engineering They also have a CD-Rom that is more academically-inclined than The Way Things Work.

A List of Materials for Classroom Use

A simple tool kit that includes examples of simple machines

Basic Arts and Crafts

Destination Computer (not necessary, but helpful if used in conjunction with the CD-Rom of How Things Work.)

Friedhoffer, Bob. *Physics Lab in a Hardware Store*

Hiam, Alexander. *Marketing for Dummies*

Internet Connection (not necessary, but helpful)

Macaulay, David. *The New Way Things Work*

Rubric - given in this paper