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# Who Gets to Invent and How Do Inventors Change Our Lives

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> "Since new developments are the products of a creative mind, we must therefore stimulate and encourage that type of mind in every way possible."
>
> George Washington Carver 1

## Introduction

As students approach pre-adolescence, they begin to question the world around them in ever greater ways each day. It is important as children grow that they continue to see how the imagination that has been part of their childhood has been crucial to a large number of adults, inventors. This social studies unit, " Who Gets to Invent and How do Inventors Change Our Lives", will emphasize the importance of creativity to people's lives. The students will focus on American inventors; who they were, and how their inventions changed our lives.

This curriculum unit will be taught to fourth graders, and can be adapted to second to sixth grade. This unit will be a three month study of Inventors and Inventions. This social studies unit will be fully integrated into all parts of the curriculum. Important to the success of this unit is giving the students an open forum to discuss their ideas. Children will form their own opinions about the information they learn about inventors. They need to have opportunities to question the who's and what's about inventions and inventors.

Without inventions, humans would never have advanced from the days of the cave men. In fact, the cave men, themselves, invented simple tools. Even so, inventions often bring problems, as well as progress. With each benefit that a new invention brings, it is arguable that it also has some negative effect on some people and their environment. Students need to be informed about the importance of inventions in a clear honest way.

As well as teaching students about the positive and negative effects of innovations, it is important to educate students about the role racism has played in preventing some people from having opportunities to invent. Furthermore, when some people became inventors, they faced difficulty gaining recognition and profit from their inventions. Credit and acknowledgment for inventions has often gone to white men, leaving other

inventors completely out of history. Women and non-white inventors have long been ignored in the chronology of great inventors throughout history.

As this unit begins, the issue of diverse inventors will be addressed and be discussed throughout the entire study. Children will research an inventor of their choice and write a book report on their inventor. They will need to answer questions about their inventors in the report. Some of the questions will be factual questions, such as where and when were they born, and what was their schooling like. There will also be reflective questions, such as what were the challenges the inventor faced in his or her lifetime.

These reports will be shared with the class orally and children will listen and take notes on each report. After each report, we will discuss what the students have learned about how someone becomes an inventor. We will discuss what characteristics are common among these inventors. We will further discuss the differences of the circumstances each inventor had experienced in order for their inventions to become a reality.

## How Inventors Change Our Lives

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How inventors' products have changed our lives is as important as who they were. Some inventions' influence on human lives are easy to understand. The discovery of fire made it possible for early humans to have a heat source, as well as a way to cook foods, otherwise eaten raw. A major invention thousands of years ago was the wheel. Its inventions allowed for the advancement of agriculture and technology by later inventors. Man now had new opportunities to transport materials. Having capable modes of transportation has been a crucial stepping stone for all societies. Classic examples are Greek and Roman societies. The waterwheel was implemented to enable the creation of early wells and water system, using the Archimedian screw. Easier transportation allowed the construction of roads, bridges and buildings.

Some of the simplest inventions have made the most tremendous changes in the development of civilizations. Beginning with the wheel, these inventions led to the very existence of "civilization". There was now running water, roads and housing. Inventions have greatly changed the lives of man throughout history as early as BC. However, in classic times and continuing in the middle ages, these civilizations were isolated areas of the world. It is important to understand who benefited from inventions and the advancement of technology. 2

The inventions most often recognized as crucial to the advancement of Western civilization have changed predominately the West. Even in this modern day, there are still many societies that do not benefit from the inventions that are seen as paramount to the West. This does not even take into account inventions taken for granted in the United States, such as the computer. Many areas of the world still do not have running water and sewage systems, technological breakthroughs in place over two thousand years ago in select societies.

New products are created each day in the United States to meet the needs and wants of the American people. Sometimes it is difficult to differentiate between the needs of people and what is just wanted as improvements on an old idea. A simple example of a necessary innovations cultures use worldwide are crude tools, such as those used to start fires and then whose functions were expanded to build housing structures. However, there are items which Americans would also consider necessary to their lives, although other cultures would easily disagree. An example of a invention that is common in many American households is guns. Weapons have undergone many improvements over time. However, guns have not improved humanity.

It is also arguable that many other inventions have been at the cost of others .It is important to understand how changes in technology have affected humanity worldwide and how it has changed our environment. There are ways in which simple tools made many choices for humans more viable. Most importantly, many inventions have changed the quality of life for many people. People are able to live longer with access to clean, running water, with refrigeration of food and medicine. The importance of vaccines has changed the life expectancy of people throughout the world who have access to these medicines. However, even the most benign inventions have not been developed with a global framework. We know that even today that simple vaccines are not available worldwide and thousands of needless illnesses and deaths result every year.

Many innovations, that were applauded for their "greatness", have greatly affected the world, although with a negative impact. These inventions are those related to warfare. The creation of weapons was encouraged by the particular culture for their own dominance in the world. With the power gained by acquiring weaponry, colonization of other lands became possible. Colonizers' intent may have been to "civilize" the natives by converting them to their religion, but they never chose to "civilize" the native people by transferring technology to that land and allowing the people the autonomy to create.

With each 'advancement' of weapon technology the impact of wars throughout the world has become more profound on the people it affects, as well as its impact on the environment. Early wars with swords and face to face combat is often considered barbaric today. The advancement of weapons changed slowly over time, but greatly affected the kinds of war being fought. The significant differences between World War I and World War II are hard to ignore. The second World War was ended by the use of atomic warfare. The choice to use the atomic bomb, as difficult as it might have been, was not made face to face with the opponent. The atomic bomb allowed distant destruction of life on the people who lived there and their habitat. The affects of that choice still can be seen in the people of Hiroshima and Nagasaki today. Despite this fact, the atomic bomb is still hailed as a great and necessary invention by millions.

The United States continues to spend billions each year on military spending. To "be all that you can be" is an American motto used to enlist young American men . The protection of this country is put before all else; it is put before the education of youth, before the eradication of the poor, before anyone asks is the money spent necessary? Is the creation of newer and more advanced weapons an imperative? In the post Cold War age, some of these questions have been addressed with the deployment of nuclear weapons. Nevertheless, this line of questioning must continue.

When many Americans are asked about the importance of technological innovations related to war, many affirm their importance as related to America's worldwide domination. However, what most citizens do not realize that the constant proliferation of weapons is not necessary to protect a country already well-supplied with weapons. More important to note is that Americans firmly believe in the newest creations regardless of what they are related to.

Lesson 1: Timelines and Inventions gives students information on when and how inventions were created throughout history. This lesson is important to learn about the changes and growth in technology. Key to this lesson on Timelines is holding class discussions about how different inventions came to be and how they were improved.

American As Apple Pie

> "As a marketer, trend knowledge is invaluable. To be where the consumers are just before they get there, offering these consumers they didn't know they wanted, spells success."

Americans desire to have the newest and best of everything, regardless of social class. This new product may be a new pair of Air Jordans or a new speedboat. In fact, producers constantly look to create new needs and wants to appeal to the American consumer. The desires of Americans to have many choices are not products of the twenty-first century; this desire was the foundation of our country. This country was founded on the ability to have choices and the freedoms to create. During the development of our country, the founding fathers encouraged the need for hard work. Hard work was to be rewarded with purchasing power, even for the average worker.

Today the American dream encompasses more than the opportunity to buy a home, but also to own more material goods than ever. This vision is seen in every American home, especially where the household owns a large screen TV, but little or no furniture. Everything on the television is a push at the consumer to buy, from the clothing and materials goods of the characters on each sitcom to the hour long infomercials. The Home Shopping Network allows the consumer to get what he/he wants without leaving his/her home. Each commercial pushes the consumer to believe that he/she must have the product, and by buying each product the consumer has gained power. The creator of each of these products is aware of the influence of marketing and the consumer nature of Americans.

A prime example of an American invention that was the result of the influence of marketing and the consumer nature of Americans, as well as a prime example of the ill effects of meeting American needs, is the fast food industry. Fast food is designed to meet people's busy lifestyles. It is, however, a huge detriment on the environment. Americans became aware of the problems of fast food packaging with the advent of the Styrofoam box in 1975. McDonalds introduced the box as a way to "protect" the Big Mac and make the sandwich more appealing to the consumer. However, the American public, particularly environmentalists, became aware that Styrofoam did not decompose once it became garbage. Not only was the decomposition of the packaging a problem, the new containers also contained chlorofluorocarbons (CFCs) which were recognized as contributing to the earth's ozone layer. The CFCs were removed from the Styrofoam containers and McDonalds even began recycling the plastic. The environmental groups continued their war against the packaging, and in 1990, plastic containers was an idea of the past. The irony of this environmental tragedy is that the majority of fast food does not stay in the packaging for more than ten minutes. Rarely does the consumer even look at their sandwich longer than thirty seconds! Even though McDonalds and other fast food restaurants now serve their products in paper, fast food remains a huge waste producer. Despite this fact, fast food remains an ever-popular way to eat and to socialize. Fast food is a simple reward for people and the Golden Arches represent the American dream in many ways .4

Fast food is only example of the environmental problems caused by inventions. Some Americans have become more aware of the problems cause by excess material goods and recycle many different products from bottles to clothing to furniture. However, Americans are consumers of many different disposable new products each year. People consume goods for diverse reasons. In Why They Buy, American Consumers Inside and Out, the authors discuss several different reasons why consumers buy. They state that people purchase to meet various needs. For example, consumers who desire to show off and exhibit themselves buy such goods, as fancy jewelry, clothing and cars. Consumers wanting to achieve tasks, purchase such goods as "how-to" books and do-it-yourself kits. These consumers frequent places like Home Depot and Loews. There are numerous reasons why consumers buy, but most often people buy in order to fulfill some need or desire. 5

As seen every weekend in local malls, Americans purchase goods in search of instant gratification for one

reason or another. Americans save less money than any other industrial nation. This fact makes the United States a prime place for innovators even with the most bizarre of product; no matter what you are peddling in the United States, someone will buy it. Examples of the consumer society we live in are endless, but particularly notable examples are the Chia Pet, the Pet Rock and the Giga Pet. These inventions are comical in many sense, especially knowing these products have made millions of dollars and serve little useful purpose, although they are entertaining. The innovators of these products had the freedom to be very creative in their inventions.

Who Gets To Invent?

> "No one is useless in this world who lightens the burdens of another."
>
> Charles Dickens 6

All inventors must be creative in some ways. To create something new is to have a vision not previously held by someone else (or previously brought to fruition). Regardless of the product they create and regardless of their background, all inventors face some level of struggle to create. It is a rare inventor who dreams up his/her idea and has it in their hands the next day. The majority of inventors have been able to find a niche to create and sell their product because the majority of recognized American inventors were white males. There were many people from diverse backgrounds who had great vision, although so few have been able to have their ideas realized by society. It is important to learn about all the great thinkers from the past and present.

A great influence on American commerce was Eli Whitney. Whitney was a Yale graduate working as a tutor when the opportunity to invent was passed his way. In 1792, Whitney came up with a device able to separate cotton from cotton seeds rapidly. Whitney's invention was extremely important to what occurred in the United States; he enabled the cotton industry to develop even more rapidly. The Cotton Belt expanded greatly, from two states to the area of South Virginia to east Texas. This expansion also allowed the proliferation of the slave industry, and a setback for the abolitionists of the early 1800s. 7

Often seen as a prime inventor of American technology, Thomas Edison had a generous opportunity to create; creating was his livelihood. However as a child, he was described as an idiot who did not finish his school work. Edison's mother taught him at home and as a child, he experimented, discovering new ideas and causing minor accidents, leading to some of his most important discoveries. Edison set fire to a train, losing his first job, at the age of twelve. At fifteen, he managed a telegraph office and then invented the transmitter and the automatic telegraph. He also invented the record player, the phonograph, the typewriter and motion pictures. Edison created over 1,000 inventions. He is well known for the 1878 invention of the first practical light bulb by using a carbonized thread of cotton. It originally only burned for 40 hours. It is important to note that in 1879, Joseph Wilson Swan, an African-American, invented an electric lamp. He helped Edison keep the light bulb lit. This fact is often left from books on inventors, or even on American history, although Swan's name may be included. 8

African-Americans had fewer opportunities than whites, but despite the challenges African-American faced, they created significant inventions. Many African-American inventions were deleted from the history books and a few historians have worked to give the credit to these inventors. Some of the most difficult inventions to find the creators of were those created during antebellum times. An example of a slave inventor was a slave know only as Ned. Ned created a cotton scraper. His owner, Oscar J.E. Stuart attempted to get Ned's innovation patented under Ned's name, a very unusual proposal for a slave owner. Stuart's request was

denied. Stuart later marketed Ned's invention and eventually Stuart left Mississippi. What happened to Ned is unknown. There are many slaves who invented that are recorded in various sources, and many more slaves who had no way to share their ideas or to protect them from being taken by their white owners. 9

Benjamin Banneker was an African-American innovator who had many opportunities to share his ideas, although he did not escape discrimination. Born in 1731, Banneker grew up on a farm and was able to attend the local school, the only black student in an "all" boy school. His teacher saw his strengths, especially in the areas of mathematics. Banneker received a gift of a pocket watch from a traveling salesman. Banneker spent endless hours tinkering with his gift and built the first wooden clock of its kind in the United States by 1753. Banneker correctly predicted a solar eclipse, surprising two leading astronomers of the time. Banneker began an almanac in 1792 and his almanac became part of every household for the next ten years. Unlike Franklin's almanac, all the work in Banneker's almanacs were his own predictions and calculations.

Banneker recognized the privileges he had been granted as a successful African-American in a racist society. Banneker saw the contradictions presented in American society, particularly in the Declaration of Independence. Banneker wrote Thomas Jefferson expressing himself and pointing out Jefferson's hypocrisy in being the creator of "all men are created equal" and being a slave holder. Banneker wrote,

> Sir, how pitiable it is to reflect that although you were so fully convinced of the benevolence of the Father of Mankind and of his equal and impartial distribution of these rights and privileges which he hath conferred upon them, that you should at the same time counteract his mercies in detaining by fraud and violence so numerous a part of my brethren under groaning captivity and cruel oppression, that you should at the same time be found guilty of that most criminal act which you professedly detested in others with respect to yourselves. 10

Jefferson responded to Banneker stating that he, too, wished to change the unfortunate circumstances of the country. Banneker and Jefferson began a long correspondence. Despite Banneker's continued contributions to the United States and his involvement in politics, Banneker has never received official recognition in the United States; England and France both have Benjamin Banneker recorded in their official records.

Almost a hundred years later, Garrett Augustus Morgan created a very important product: the gas mask. In 1912, his gas mask was simply made to protect the head and allow the wearer to breath. Morgan founded the National Safety Device Company and encouraged blacks to buy shares in his company. Despite his request, Morgan had no African-American buyers and his company became an almost all-white company. In 1916, Morgan and his brother helped saved trapped men from a smoke-filled tunnel. Morgan's heroism gained him recognition necessary to sell the gas mask. Orders rolled in quickly, but Morgan needed to employ a white man to sell his product in the south. The orders stopped as suddenly as they began when it was discovered Morgan was black. However, the advent of World War I made it essential for Morgan's invention to be taken seriously. It was used in an updated version by thousands of soldiers. Morgan also created the traffic signal in 1923. Instead of facing more discrimination, Morgan sold the traffic signal to General Electric for four thousand dollars. Subsequently, whites profited from this invention, so crucial to every industrial city and town.11

Modern day African-American innovators create many different products, including many medicines. However, the opportunities for African-American inventors remains limited, limited by the challenge presented by a society still not free of racism. Often, the avenues to be able to create are not made known to African-Americans. When African-American do become interested in becoming an inventor, many doors are closed to them. An example of someone who dealt with the many challenges created by prejudice is Percy Julian. Born in 1899, Julian made his way to DePauw University through hard work and persistence. Julian was a top chemistry student and looked forward to attending graduate school. He was refused admission because of his

race at all the top universities. Julian went on to teach at a historically black school until finally gaining admission to Harvard in 1922. Years later he won the opportunity to study for his Ph.D. and to do the research he desired. Dr. Julian created many different inventions, including a smothering agent from soybean that was used to put out gasoline and oil fires in WWII. Julian was known for not giving up despite the odds he faced. 12

Although Julian succeeded in overcoming many barriers, many African-Americans and other minority groups in the United States still do not have access to monetary resources to develop products. Nor do they have access to the research and development of large corporations. Consequently, many great ideas still do not even make it off the chopping block because of the challenges facing African-Americans and other minority groups.

Lesson 2: Biographies has students use research to learn about American inventors. Crucial to this lesson is holding class discussion addressing the differences in the kinds of struggles faced by inventors, as well as the influence their invention had on changing people's lives.

## Who Benefits from Innovation?

As previously stated, technology does not always get passed from one society to another. Instead, many nations are deliberately left out of developments to benefit the people who hold the power. A clear example of this is war technology. Since the beginning of the birth of the United States, the manufacturing of weapons has been an issue, especially when this country could no longer get weapons from Great Britain. As weapons have become more advanced, who has access to them has become a ever greater issue. The "need" for weapons has often initiated inventors to create in ways otherwise left untouched, particularly due to the profit of inventing the right weapon. The government greatly rewards inventors of weapons. The inventor of the mousetrap is remembered because he also invented a machine gun (Hiram S. Maxim). It is no coincidence that the use of interchangeable parts first appeared in the manufacturing of rifles, and began the "American system" of mass production of materials. 13 Furthermore, it is the invention of the atomic bomb that allowed a different kind of war to be fought.

The creation of the bomb quickly altered the ways in which wars could be fought and the United States showed the power of atomic bombs in 1945, when it bombed Hiroshima and Nagasaki bringing World War II to its end. The United States demonstrated its power swiftly in this situation. There is clear distinction between who benefited from this invention and who has not. Despite the fact that the United States holds nuclear warfare, it has not prevented other countries from gaining access to it nor does it make this country invincible.

Children's literature illustrates the negative impacts of war on humanity. The fiction book, The Bomb by Theodore Taylor shows how the atomic bomb affected people, particularly the people living in the Bikini Atoll. The Bikini Atoll in the Pacific is the place where atomic bomb testing was performed. Each chapter of this book begins with a factual quote showing the development of the atomic bomb. Class discussion should include the many different perspectives given in this book: those of the Japanese, the natives on Bikini Atoll and the Americans. This book is an excellent resource to use with fifth and sixth graders in order to learn about the effects of war technology.

The example of the nuclear bomb is given to demonstrate how easily an invention can be seen as both harmful and helpful. The lesson from the Styrofoam box illustrates that the simplicity of an invention does not render it harmless. It is possible to argue the pros and cons of any invention. However, war inventions are

especially important to discuss because they obviously cause harm. Lesson 3: The Gadget War by Karen Duffey uses a fiction story to illustrate how war inventions negatively impact people. The Gadget War begins with Kelly Sparks being the star of her class because she can invent all sorts of interesting gadgets and says she is the Gadget Wiz. Then, a new student enters the classroom and become the Real Gadget Wiz. Kelly and the new student, Albert Einstein Jones began a serious competition of inventions that are ways of playing jokes on each other, but the jokes turn into a way of seeking revenge on each other for the previous incident. The children call these new gadgets War Gadgets and they are very different than the previous gadgets Kelly created. This simple children's book carefully shows how a creation can be harmless if used in the wrong way.

Even though technological advancements have been important in the modern world, it is also vital to recognize that some inventions have not been created for the advancement of humanity. Advancements made in technology only for the purpose of war are not beneficial to people, although many societies use the power the war products hold to advance. This is important message to teach children so that they understand the differences in the innovations in their world. While conveying this message, it is also important to give children an understanding of why inventing is exciting. Inventing has always been used as a way to solve problems. In The Gadget War, Kelly has three steps to inventing: "Identify the problem. Identify what you need to solve the problem. Invent it !!!." Students can brainstorm alternative ways for Kelly and Albert to solve their problems. For older students, they can think about ways countries could have come to a consensus on issues without using war technology.

## Conclusion

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> "There is one idea stronger than all the armies in the world, and that is an idea whose time has come."
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> Victor Hugo 14

Students will come to their own understanding of inventors and inventions as they begin to learn throughout the unit. Giving the children the opportunity to take the information they learn and use it to create their own inventions is the key to the success of this unit. Children are naturally curious individuals. Although some students may need extra motivation to learn, this unit provides children with an opportunity to explore new ideas. When given the opportunities to explore the world around them, students have endless queries into their world. As they become more comfortable discussing and finding answers to their questions, students need avenues to see their solutions come real. The ability to make, build, create those solutions become real comes through inventing.

As students research inventors and begin to learn about the obstacles inventors have faced, students will recognize that inventors have overcome the challenges in their life. Young children have the desire to find answers to problems around them and to improve upon objects already in existence. This unit allows students ways to arrive at those answers. Ending this unit with a final project is very important and allows students to express their independent thinking. Students need the opportunity to create their own innovation. Displaying and sharing their invention will give their work further importance- whether in the classroom or in the school building.

Today's students are tomorrow's inventors. The ability to create in school gives children the chance to see the

importance of new ideas and especially their ideas. Any student may be the person who creates the cure for AIDS or the newest toy rage. The unit may also give students a lifelong hobby that gives them pleasure throughout their life. Inventors changed and created the world we live in today and students will continue to invent the world of tomorrow.

## Lesson 1: Timelines and Inventions

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Objective:

1. Students will learn about timelines and when and how inventions were created throughout history.
2. Students will create personal timelines with the important inventions/ innovations in their lives (Example: I was one and I was in diapers. Important invention: Pampers. I was nine and in fourth grade. Important invention: Virtual/ Giga Pet).
3. Students will create a wooden three-dimensional timeline with different inventions made of wooden parts along the timeline. (This activity is to take place at the Eli Whitney Museum).

Time Line:

This lesson will take three to four weeks. It is to be integrated throughout the school day.

Materials:

Timeline of the United States/ world history with corresponding inventions dates, pre made or purchased.
Construction paper, pencil, crayons, tape.

Procedure:

1. Students will read and discuss a new event(s) on the timeline daily. The class will talk about the importance of the inventions and how they changed people's lives.
2. Students will create their personal timelines. They will use small squares of construction paper

to represent each year or major event in their life. The students should brainstorm events that are important to put on their timelines.

3. The students will make wooden three-dimensional timelines. The inventions will be made out of wooden pieces. Key to the success of this activity is having different inventions posted with the date they were invented (example: 1793- cotton gin).

Closure:

Students will discuss how inventions have changed over the years and write an essay on the changes in inventions.

Suggestions:

1. Use the nonfiction book Tools and Gadgets. This book shows how early American settlers used tools, such as a hand-operated dentist's drill and bed warmers. Discuss how modern day are used and why the improvement on the old model was created.
2. Have students think about a tool or gadget they use daily in their homes. Have students make an addition to a tool or gadget by writing about it or drawing their idea. Students should explain why they chose the tool to improve and why they thought the improvement was necessary.

## Lesson 2: Biographies

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Objectives:

1. Students will research the life of an American inventor through children's literature and write their own biography of that inventor.
2. Students will present their research to the class orally.
3. Students will listen to and take notes on their classmates' research.

Time Frame:

This lesson will take 3 to 4 weeks. It should be noted that some class time should be given to

allow children to do research and find the necessary information (two to three 45 minute periods). The majority of written work should be done at home. This assignment is the book report for the month, whenever you assign the lesson.

Materials:

Bibliographies of American inventors (see bibliography for suggested titles).
Worksheet with guide for research (attached).
Paper, pencils.

Procedure:

1. Students will choose what American inventor they will research after having some time to look at different people's biographies.
2. Students will take notes on their research independently or with a partner, using the worksheet as the guide for information.
3. Students will write their biography at home. They will have a date for a first draft to help those students who need assistance with spelling, grammar and punctuation, as well as letting students know what information is missing.
4. Students will present their biographies to the class over a two week period, listening to each other and taking notes.

Closure:

1. Students will have a quiz with general information on the inventors (this information should be in the majority of the students' notes).

2. Students will write about and share their ideas about the importance of these inventors and their inventions.

Suggestions:

A diverse range of biographies must be available to the students. This lesson is a wonderful way to integrate the diversity of origins of inventions. It is important to discuss the differences in the kinds of struggles faced by different people in the United States. The opportunity to educate children on the obstacles minority groups and women have faced is crucial, and to make connections to changes over time. Inventors are incredible role models for children.

Students should be guided in choosing of biographies. There should not be six presentations on Thomas Edison. However, it may be advantageous to have children pair up on inventors so they can share factual information they find when doing their research.

## Questions to Answer for Inventors' Biographies

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First Paragraph should include:

1. The full name of the inventor.
2. When and where the inventor was born. (When they died, if no longer alive)
3. Describe the inventor's childhood (parents, siblings, and interesting stories).

Second Paragraph should include:

1. Describe the inventor's education.
2. Write how the inventor became interested in inventing and creating things.

Third paragraph should include:

1. Describe what the inventor created.
2. Write about how he/she made their inventions.
3. Describe what obstacles he/she had to overcome to create their inventions.

Fourth Paragraph should include:

1. Describe why his/her inventions are important.
2. What was the inventor's most important contribution? Why is the invention important?
3. Who are their inventions important to or helpful to?
4. Is this invention important to people other than Americans? Why or why not? Give some examples.

Fifth Paragraph should include:

1. Write what you have learned from this inventor.
2. What lesson(s) could other people learn from this inventor.

## Lesson 3: Literature, The Gadget War

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Objective:

1. Students will read, discuss and write about the book, The Gadget War.
2. Students will discuss the positive and negative aspects of inventions.

Time Frame:

This lesson will take 3 to 4 weeks. This lesson can be overlapped with lesson 1. This lesson is an integrated lesson that can take place during traditional reading instruction time. This lesson is primarily whole class or small group activities.

Materials:

The Gadget War, Betsy Duffey (74 pages)
Questions for reading comprehension and class discussions.

Procedure:

1. Students will read The Gadget War. The class will read the first chapter together. The class will discuss the characteristics of the main character, as well as the real inventors mentioned in the story.
2. The class will continue to read in small groups (three to four students) taking turns with the reading. Students will discuss questions together in their groups with the teacher rotating through the room. They will write their answers to questions independently.
3. The class will continue to read in groups, as a whole group. It is also important to discuss the real inventors in the story.
4. Students will brainstorm inventions they feel are helpful to people and those inventions they

feel are harmful.
5. Students will write about how inventions can be helpful and harmful.

Closure:

Children will share their ideas, thoughts about harmful vs. helpful inventions.

Culminating Activity:

Children will draw their own gadget on large construction paper. They need to label the gadget's parts. (if materials are available, they can build their gadget). Children will share their gadget and how it is helpful to people.

In order to build their own innovations, students need background information on what they are interested in learning about. This information can be integrated into the school day as the science curriculum. There are different kits created to teach students how to build their own machines, such as Electric Circuits (put out by STC- Science and Technology for Children), Motion and Design (STC) and Magnetism and Electricity and Magnetism (put out by FOSS- Full Option Science System). Having this hands-on experience will provide students with the motivation and experience to create their own inventions.

In order for students to create their inventions, the time must be built into the day. Children should be encouraged to collaborate on their work either in small groups or with a partner. Children need to go through steps to prepare themselves to make their creation. There are some suggested guidelines attached to this lesson. Students should share their plans with each other and gather suggestions from each other before they begin. As they are building and creating, students should keep a science journal about the process of making their own invention. When their inventions are complete, the students should have a way to display their projects. This inventions can be displayed in the classroom, entered into science fairs or even entered into invention contests for young people.

Suggestions:

The Gadget War is appropriate for children in second through fourth grade. For older children, using the fiction book The Bomb by Theodore Taylor is recommended. This book will allow for the same discussions about the negative and positive aspects of inventions, but within a real historical situation. The same procedure can be followed for this lesson with The Bomb, using teacher-made questions for reading comprehension and class discussion for the story.

**The Gadget War**

**by Betsy Duffey**

Something's Up and Hate at First Sight (pages 1 - 14)

Answer all questions in complete sentences.

1. What does Kelly Sparks love to do? Why?

2. Describe the gadgets Kelly creates.

3. The teacher, Ms. Haycock asks the students to write about what they want to be when they grow up. Why is she disappointed in their answers?

4. What job do you want to have when you grow up? Why?

On a separate piece of paper, draw yourself at work at your future job.

5. Describe Kelly's poster and her job.

6. Who comes in the door with the principal?

Describe this new character.

7. What trick does the new student play on Kelly?

8. The last paper put on the bulletin board of class jobs says "Pull" on it. What does it say when pulled? What does Kelly think?

Invent It!!!, Whoops, and Gadget Grounded (pages 14 -33)

Answer all questions in complete sentences.

1. What are some good inventions to Kelly?

2. List 5 more inventions you think are good for you or other people. Explain why they are good inventions.

3. What are some inventions that Kelly says she could live without?

4. List 5 inventions that you think are harmful. Explain why you think they are harmful inventions.

5. What are the three steps to inventing?

1.
2.
3.

6. What is Kelly's problem?

7. Hoes does she plan to solve the problem?

8. How was the Frisbee invented? In what city was it invented?

9. Why does Kelly think Ruth Wakefield is important? Do you agree with her? Why or why not?

10. Describe how Kelly makes her catapult and how she tests it.

11. When Kelly mom discovers what Kelly has done, what does her mom do? How does Kelly feel about her punishment?

Gotcha!!, The Real Gadget Wiz, and The Real Gadget Wiz (pages 34 - 50)

Answer all questions in complete sentences.

1. What happens to Kelly at the start of her school day? Do you think Albert is being fair to her? Why or why not?

2. How does the class realize what happened to Kelly? What do they think happened?

3. Describe what Kelly finds in Albert's desk.

4. What happens to Albert during the spelling quiz?

5. How does Albert get back at Kelly for her trick?

6. What does Kelly have on her list?

7. What do you think of her new gadgets? What is the difference between the gadgets she creates before she met Albert and those she makes afterwards? How are the War Gadgets similar to the gadgets Kelly said she could live without?

This answer should be a complete paragraph.

Whoosh!! Squooooooosh!! and The Mystery Person (pages 51 - 62)

Answer all questions in complete sentences.

1. How does Kelly get back at Albert for making her smell bad?

2. What do you think about Kelly and Albert getting revenge on each other? Is their fighting with these gadgets going to solve their problems? Why or why not?

3. What advice would you give Albert and Kelly to solve their problems?

4. Who does Kelly hit with her latest gadget?

5. Who takes the blame for Kelly?

6. Why do you think Kelly goes to the principal's office at the end of The Mystery Person?

Dum Dum Dee-Dum and Peace (pages 63 - 74)

Answer all questions in complete sentences.

1. What does Kelly learn about her principal?

2. Why does Kelly confess to her “crime”?

3. What happens in the last chapter? Write a one paragraph summary of the events in the chapter.

4. What did Kelly and Albert learn about war gadgets in the end?

5. What do you think will happen to Kelly and Albert the rest of the school year?

Guideline for Inventing

1. Our group’s invention is
2. The purpose of our invention is
3. This invention will be helpful/ important to other people because
4. What special features will your invention have to attract consumers?
. 5. If your invention is an improvement on a previous invention, in what way is it better? If your invention is a new product, in what way is it unique?

6. Materials needed for our invention are:

7. What do you think it will cost to produce your invention?

If you are going to sell your product, how much will you sell it for?

8. Steps to putting together our invention are

9. Our invention will look like (sketch below)

Footnotes

1. Bell, Janet Cheatham, the Soul of Success, Inspiring Quotations for Entrepreneurs, John Wiley & Sons, Inc., New York, 1997, p.35 2. Wilkinson, Philip and Jacqueline Dineen, The Early Inventors, Ideas That Changed the World, Chelsea House Publishers, New York, 1991

3. Bell, Janet Cheatham, the Soul of Success, Inspiring Quotations for Entrepreneurs, John Wiley & Sons, Inc., New York, 1997, p. 117

4. Petroski, Henry, The Evolution of Useful Things, How Everyday Things- From Forks and Pins to Paper Clips and Zippers- Came To Be As They Are, Alfred Knopf, New York, 1993, p.220-225 5. Settle, Robert B., and Pamela L. Alreck, Why They Buy, American Consumers Inside and Out, John Wiley & Sons, New York, 1986, p. 24-25 6. Suid, Murray, How To Be An Inventor, Monday Morning Books, Inc., Palo Alto, 1993, p.71 7. Jeffries, Michael, and Gary A. Lewis, Inventors and Inventions, Smithmark Publishers, New York, 1992, p.4 8. Mitchell, Barbara, The Wizard of Sound, a Story about Thomas Edison, Carolrhoda Books Inc., Minneapolis, 1991 9. Brodie, James Micheal, Created Equal, The Lives and Ideas of Black American Innovators, Quill, William Morrow, New York, 1993, p. 23-24 10. Pinkney, Andrea Davis, Dear Benjamin Banneker, Harcourt Brace & Company, Orlando, 1994, p. 19 11. haskins, jim, outward dream, Black Inventors and Their Inventions, Walker and Company, New York, 1991, p. 73-75 12. Brodie, James Michael, Created Equal, The Lives and Ideas of Black American Innovators, Quill, William Morrow, New

York, 1993, p. 153-162

13. Platt, Richard, Smithsonian Visual Timeline of Inventions, Dorling Kindersley, London, 1994, p.31

14. Suid, Murray, How To Be An Inventor, Monday Morning Books, Inc., Palo Alto, 1993, p. 39

## Bibliography for Teachers

Bell, Janet Cheatham, *The Soul of Success, Inspiring Quotations for Entrepreneurs* , John Wiley & Sons, Inc., New York, 1997 Brodie, James Michael, *Created Equal, The Lives and Ideas of Black American Innovators* , Quill, William Morrow, New York, 1993 Brown, Kenneth A., *Inventors at Work, Interviews with 16 notable American inventors* , Tempus Books of Microsoft Press, London, 1988, 388 pages Burt, McKinley, Jr., *Black Inventors of America* , National Book Company, Oregon, 1989, 149 pages Cardwell, Donald, *The Norton History of Technology* , W.W. Norton and Company, New York, 1995, 565 pages A detailed look at technology over the ages, some good background to innovation and the inventors who caused change. Davies, Eryl, *Pockets Inventions, Pockets Full of Knowledge* , Dorling Kindersley, London, 1995, 160 pages. Excellent mini book on inventions, including a timeline of inventions. Flatow, Ira, *They All Laughed... From Light Bulbs to Lasers: The Fascinating Stories Behind the Great Inventions That Have Changed Our Lives* , HarperCollins, New York, 1992 Gardner, Robert, *Experiments With Inventions* , Franklin Watts, New York, 1990 Haskins, Jim, *Outward Dreams , Black Inventors and Their Inventions,* Walker and Company, New York, 1991 Holt, Rackham, *George Washington Carver, An American Biography* , Doubleday & Company, Inc., New York, 1963, 360 pages Ingpen, Robert, and Philip Wilkinson, *Ideas That Changed the World, The Greatest Discoveries and Inventions of Human History* , Windows 95, Windows 3.1, 1996 (ages 6 and up). Excellent information hidden in the different chapters of this CD-ROM. The visual effects are also very informative. Jeffries, Michael, and Gary A. Lewis, *Inventors and Inventions, Smithmark* Publishers, New York, 1992, 64 pages. This book shows interesting inventions created by American inventors. However, the book only recounts the inventions of white Americans. Jones, Charlotte Foltz, *Mistakes That Worked* , Doubleday, New York, 1991, 82 pages. This book looks at inventions with an eye for those appealing to young people, such as Coca Colas and Potato Chips, and describing their origin. Includes how nursery rhymes, like “Ring Around the Rosey” came to be. Macaulay, David, *The Way Things Work,* Houghton Mifflin Company, Boston, 1988, 384 pages A wonderful resource with detailed pictures and explanations; appealing to older children and adults. Messadie, Gerald, *Great Inventions Throughout History,* Chambers, Edinburgh, 1988, 237 pages. A look at inventions throughout history ranging from fertilizer to the submarine. Originally a French publication. Rummel, Jack, Robert *Oppenheimer, Dark Prince, Makers of Modern Science* , Facts on File, New York, 1992, 140 pages Petroski, Henry, *The Evolution of Useful Things, How Everyday Things-From Forks and Pins to Paper Clips And Zippers- Came to Be as They Are* , Alfred A. Knopf, New York, 1993, 287 pages. A personal favorite. A step by step look at how simple items have developed that is approached by Petroski in new light often not cast on the minute changes that affect us in large ways. Platt, Richard, *Inventions explained, A Beginner’s Guide to Technological Breakthroughs* , Henry Holt and Company, New York, 69 pages. Very informative book with sections on early inventions to modern inventions. Platt, Richard, *Smithsonian Visual Timeline of Inventions* , Dorling Kindersley, London, 1994. Excellent resource for a timeline beginning in 600,000 BC, ending in 1990. Settle, Robert B., and Pamela L. Alreck, *Why They Buy, American Consumers Inside and Out* , John Wiley & Sons, New York, 1986, 351 pages. An interesting look at why we buy the things we do and what marketing does to influence the consumer. Suid, Murray, *How To Be An Inventor* , Monday Morning Books, Inc., Palo Alto, 1993 Wood, Richard, *Great Inventions* , Time Life Books, Weldon Owen Production, Sydney, 1995, 64 pages. This book covers many different kinds of inventions, including those used in everyday life, transportation, and war. This book has a timeline of inventions on the right hand-side of each page. Yankee Magazine, *The Inventive Yankee, From rockets to roller skates, 200 years of Yankee inventors and inventions* , Yankee Books, New Hampshire, 1989.

## Bibliography for Students

Altman, Susan, *Extraordinary Black Americans From Colonial to Contemporary Times* , Children's Press, Chicago, 1989, 240 pages. This book includes brief biographies of African American inventors, including Benjamin Banneker, George Washington Carver, Lewis Howard Latimer, Jan Ernst Matzeliger, Garrett A. Morgan, Norbert Rillieux, Lewis Temple, Madame C.J. Walker, Granville T. Woods, and Elijah McCoy. Bundles, A'Lelia Perry, *Madame CJ Walker, Entrepreneur* , Chelsea House Publishers, New York, 1991, 111 pages. Well-written children's biography with excellent historical background to Sarah Breedlove's life. Caney, Steven, *Invention Book* , Workman Publishing Company Inc., New York, 1985, 207 pages Chang, Heid, *Elaine and the Flying Frog,* Crown Publishers, Random House Inc., 1988. Fiction story of girl who invents new ways to solve problems.

Davidson, Margaret, Louis *Braille: the Boy Who Invented Books for the Blind* , Scholastic Inc., New York, 1976 (with Banners Inventions Etc., Scholastic unit) Biography of Louise Braille that illustrates the challenges he faced and how he overcame them.

Drew, David, *Alone in the Desert: The Science of Survival, The Cat on the chimney: Solving Problems with technology, Toy Designer: Technology and Energy, What should I used?: The technology of simple machines* , Rigby Realization Technology, Rigby Heinemann, Illinois, 1992 This series of books put published by Rigby are excellent classroom resources because they have excellent science information and come as a Big Book and four small books for classroom use.

Duffey, Betsy, *The Gadget War* , Penguin Books, New York, 1991, 74 pages (see Lesson 3)

Endacott, Geoff, *Discovery and Inventions* , Viking Penguin, New York, 1991 Fleisher, Paul, and Patricia A. Keeler, Looking Inside: Machines and Constructions, Atheneum Publishers, Macmillan Publishing Company, 1990. (with Banners Inventions Etc., Scholastic unit). Nonfiction book that looks inside of machines, like the escalator and door locks. Gardner, Robert, *Science Projects About Electricity and Magnets* , Enslow Publishers, New Jersey, 1994, 128 pages. Hands-on experiments geared for science projects or fairs. Excellent motivation for children who want to create their own inventions. Greene, Carol, *George Washington Carver, Scientist and Teacher* , Children's Press, Chicago, 1992, 46 pages. Easy to read and informative biography. Guthridge, Sue, *Thomas A. Edison, Young Inventor,* Aladdin Books, New York, 1947, 192 pages. Chapter book of American inventor of over 1,100 inventions, including the phonograph. Haber, Louis, *Black Pioneers of Science and Invention* , Harcourt Brace and Company, Orlando, 1970, 264 pages Hammontree, Marie, *Albert Einstein, Young Thinker* , Aladdin Paperbacks, New York, 1961. Detailed chapter book on the scientist's life. Jackson, Garnet, Nelson, *Benjamin Banneker, Scientist Elijah McCoy, Inventor Garrett Morgan, Inventor* , Modern Curriculum Press, 1993. These three short, but well-written books are for early readers (26-27 pages). Jeffrey, Laura, *American Inventors of the 20th Century* , Enslow Publishers, New Jersey, 1996. Includes 10 inventors whose names may be unknown, but whose inventions are well known, such as the television, VCR, microchips lasers and the super soaker water gun and more. Kalman, Bobbie, *Historic Communities: Tools and Gadgets* , Crabtree Publishing Company, 1992 (with Banners Inventions, Etc., Scholastic unit). Nonfiction book that depicts early inventions. Great book to open up discussion of the differences in the ways children lived in Colonial Times and present time. Karnes, Frances A., and Suzanne M. Bean, *Girls and Young Women Inventing, Twenty True Stories About Inventors plus How You Can Be One Yourself,* Free Spirit Publishing, Minneapolis, 1995, 168 pages. Wonderful book to inspire young children to become inventors! Lepseky, Ibi, *Albert Einstein* , Barrons, Hong Kong, 1982. Easy reader picture book. McKissack, Patricia and Fred, *Madame C.J. Walker, Self-Made Millionaire* , Enslow Publishers Inc., New Jersey, 1992, 32 pages. Easy reader biography. Mitchell, Barbara, *The Wizard of Sound, A Story about Thomas Edison* , Carolrhoda Books Inc., Minneapolis, 1991 Moore, Eva, *The Story of George Washington Carver* , Scholastic Inc., New York, 1971 Pinkney, Andrea Davis, *Dear Benjamin Banneker,* Harcourt Brace & Company, Orlando, 1994. Excellent children's book with detailed illustrations. This story includes excerpts from Banneker's letter to Jefferson. Santrey, Lawrence, *Young Albert Einstein* , Troll Associates, 1990. Excellent facts on his early childhood and early years. Stanley, Diane, *Leonardo da Vinci* ., Morrow Publishers, New York, 1996. Biography of the many talented man's life, this book shows

students the many different accomplishments.

Swanson, Gloria M., *Margaret V. Ott, I've Got an Idea!, the Story of Frederick McKinley Jones* , Runestone Press, Minneapolis, 1994. Biography of African-American engineer and inventor. Clear depiction of discrimination he faced.

Taylor, Theodore, *The Bomb* , Avon Books, New York, 1995 (see Lesson 3) Toby, Marlene, *Madame C.J. Walker, Pioneer and Business Women* , Children's Press, New York, 1995. Biography of the creator of black hair products and the first black female millionaire. Towle, Wendy, *The Real McCoy, the Life of and African-American Inventor* , Scholastic Inc., New York, 1993. Picture book with good historical information. Turvey, Peter, *Timelines Inventions, Inventors & Ingenious Ideas* , Franklin Watts, New York, 1992, 48 pages. West, David, *53 ½ Things That Changed The World And Some That Didn't Work* , Millbrook Press, Brookfield, Connecticut, 1992, 62 pages Williams, Jay, *Raymond Abrashkin, Danny Dunn and the Homework Machine,* McGraw-Hill, 1958. Fiction story of Danny who invents a homework machine to take care of his homework problems and what happens when his mom and teacher find out. Interesting to look at the differences in the computers of the 1950's and present day technology. (with Banners Inventions Etc., Scholastic unit) Wilkinson, Philip and Jacqueline Dineen, *The Early Inventors, Ideas That Changed the World* , Chelsea House Publishers, New York, 1991 Wulffson, Don L., *The Kid Who Invented the Popsicle and Other Surprising Stories About Inventions* , Cobblehill Books, Dutton, New York, 1997, 114 pages.