

Opportunities for Young Inventors

"Genius is one percent inspiration and ninety-nine percent perspiration."

Thomas Edison

"I invent nothing. I rediscover."

Auguste Rodin

"Before he can create, man must have a deep awareness of the world around him—he must be able to really see, hear, feel, touch, and move."

Harold A. Rothbart

"Discovery consists of seeing what everybody has seen and thinking what nobody has thought."

Albert von Szent-Gyorgyi

"The only difference between a stumbling block and a stepping stone is the way you approach it."

American Proverb

"It is by being conversant with the inventions of others that we learn to invent; as by reading the thoughts of others, we learn to think."

Sir Joshua Reynolds

"Inventiveness is historically one of the strongest driving forces in human affairs. If students can comprehend invention, they can better understand the past and the present and predict the future more reliably."

B. Edward Shlesinger, Jr.

"Imagination is more important than knowledge."

Albert Einstein

INVENT ON

Inventions are everywhere! Take a minute to look around and count the various inventions that influence your daily routine. From telephones and televisions to automobiles and computers, inventions have transformed every aspect of human life.

Since inventions play such a vital role in our lives, it is important to help children better understand the past, present and future impact of these marvelous innovations and their inventors. As the technology of the 21st century evolves and new technology develops, children will need advanced skills and tools to deal with new situations, responsibilities and roles. In order to help tomorrow's leaders effectively handle a more complex and technical world, it is crucial for teachers to help them learn how to solve diverse problems, make accurate decisions, think creatively, and communicate and share significant ideas.

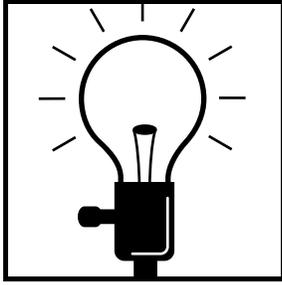
By teaching the inventing process, teachers can encourage the growth of creativity, critical thinking, and problem-solving abilities. Interdisciplinary by nature, students have an opportunity to solve real-world problems in a way that is fun and frequently enhances their self-image. Inventions offer a curriculum opportunity where everyone can succeed!

Since inventions play such a vital role in our lives, it is important to help students understand the past, present, and future impact of the many marvelous innovations along with the personal histories of their inventors. As the technology of the twenty-first century evolves, children will need advanced skills and tools to deal with new situations, responsibilities, and roles. In order to help tomorrow's leaders effectively handle a more complex and technical world, it is critical for teachers to provide opportunities for students to solve diverse problems, make accurate decisions, think creatively, and communicate to share significant ideas. These ideas might just provide the springboard to produce new technologies that might make the world a better place for all people.

This invention guide provides a comprehensive listing of K-12 invention resources including fiction and nonfiction books, kits, activity books, teacher materials, videos, CD-ROMs, student contests, organizations and associations, and Internet sites. In addition, this resource also contains a collection of discussion questions and student activities designed to develop inventive and creative thinking skills. We hope this publication will help students learn more about a wide variety of inventions and inventors, as well as find exciting ways to turn their own creative ideas into successful inventions for the future. The ideas can be used to challenge students to create, produce, and invent new ideas and technologies to make the world a better place.

"Everything that can be invented has been invented."

Charles H. Duell, Commissioner, U.S. Office of Patentes, 1899



Invention Questions

This list of questions is designed to develop students' critical and creative thinking skills, as well as increase their knowledge about invention. Students can discuss these questions in small or large groups or use them as springboards for more advanced research projects.

Who was the greatest inventor of all time? Explain why this individual deserves this distinction.

How have inventions changed the course of history?

How do inventions and events influence each other?

How has nature influenced the development of new inventions? Describe some inventions that were inspired by a natural object or event.

What invention would you miss the most if it disappeared?

How would the world be different if electricity was never invented?

How have inventions such as the fax machine, modem, computer, laser printer, and scanner revolutionized the work place? Describe the advantages and disadvantages of each machine.

If you could get rid of one invention, what would it be? Why would you eliminate this invention?

Describe and compare the inventing styles of Thomas Edison, Leonardo Da Vinci, Buckminster Fuller, George Washington Carver, Alexander Graham Bell, and Eli Whitney. What characteristics do these inventors have in common?

If you could interview any inventor from the past or present, who would it be? Why? What questions would you ask him/her? What invention(s) would you like to discuss?

How did the invention of the automobile change the economy, work force, family life, entertainment, and courtship practices?

What invention annoys you the most? Why? Do others agree with this opinion? How would you change this invention to make it more acceptable?

How have the following inventions changed in the past twenty years: television, airplane, watch, iron, radio, battery, and stove? How do you think these inventions will change in the future?

What are the advantages and disadvantages of working as an inventor for a large company?

What forces drive invention? Discuss which forces have the most influence over the invention process.

What traits do most inventors have in common? What other professions share these traits?

How have inventions such as the food processor, blender, and microwave transformed food preparation in the kitchen?

Describe how inventions mirror the civilizations from which they were created.

What period in history has created the most inventions? Why?

Who were the most creative/inventive people in the history of civilization?

What countries have produced the most inventions? Are these countries still actively involved in the invention process? What countries continue to produce inventions at a staggering rate? What countries are at the leading edge of technology?

Discuss the hurdles women have had to overcome to invent and receive patents.

Describe the reasons why people invent.

What inventions will become obsolete by the year 2050? Why?

What is invention? What is discovery? Describe the differences between both terms and discuss how one affects the other.

Do the times make the inventor or does the inventor make the times?

How do the accomplishments of American inventors compare to their European counterparts?

How does human technology affect the environment? How does this technology disturb the ecological balance of oceans, rain forests, and other natural habitats? How can humans protect these places?

How do people react to new inventions? Describe how people first reacted to electricity, automobiles, televisions, telephones, and other major inventions. If you were alive when these inventions were introduced to society, how would you have reacted to them? Why?

What inventions caused the most commotion/excitement in the 1950's, 1960's, 1970's, 1980's, 1990's? Describe how these inventions are viewed today. Do they still cause excitement?

What inventions are both harmful and helpful to humans? Describe the inventions that have been most detrimental and/or beneficial to human life.

How do inventions affect our daily lives?



ACTIVITIES

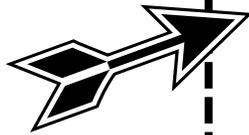
Rube Goldberg Devices

Rube Goldberg is a cartoonist who drew complex contraptions for simple tasks. His cartoons featured Professor Lucifer Gorgonzola Butts, an outlandish inventor. One of his inventions was an automatic stamp licker that consisted of a small robot who tipped over a bottle of ants onto a sheet of postage stamps that was upside down on the table next to a hungry anteater that hadn't eaten for three days.

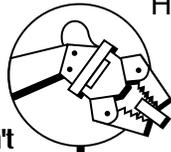
Invite students to create their own Rube Goldberg device out of the following items:



- Candle
- Clock
- Faucet
- Frying Pan
- Iron
- Monkey
- Rope
- Tea Kettle
- Trampoline
- Wheel



Create A Contraption



Have students use different gadgets, animals, and objects to design an outrageous Rube Goldberg-style contraption...

- Automatic Pet Feeder
- Bathtub Cleaner
- Burglar Alarm
- Crevice Cleaner
- Dog Walker
- Door Opener
- Electric Duster
- Leaf Remover
- Pizza Making Machine

Have students create a new invention by combining two or more items from the following list.

- Bicycle
- Broom
- Bucket
- Camera
- Chair
- Envelope
- Fan
- Flashlight
- Jacket
- Parachute
- Ruler
- Shoe
- Spoon
- Television
- Toaster
- Violin
- Watch
- Zipper

Inventor's Notebook

During the invention process, it is very important to keep an inventor's notebook. This notebook should act as an ongoing log/diary of a person's inventive thinking. This notebook should include the following information:

Actions	Materials	Results
Background Information	Observations	Scale Drawings
Brainstorm Lists	Plans	Sketches
Data	Problems	Solutions
Diagrams	Procedures	Special Events
Experiments	Progress Reports	Successes
Failures	Resources	
Graphs		
Ideas		

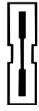
Notebook Tips

- Use a spiral, bound or stitched notebook.
- Number each page consecutively.
- Don't leave space between entries.
- Date and sign each entry.
- Record notes and sketches in ink.
- Have a witness sign and date the notebook once a week.

"Yankee Ingenuity"

Regardless of what part of the country you live in, your state has probably given birth to many inventors and their unique innovations. Check out the story that appeared in the Hartford Courant (October 21, 1990, Section D) of Anita Dembiczak of Sun Hill Industries who holds the patent for the giant pumpkin leaf bags people fill each fall to decorate their lawns. Have students research to create inventor profiles using the "Inventor Research Guide" for suggestions. Use this research information to write interview questions that you might ask this inventor if they were still alive. Arrange a live interview with a partner. Pretend to be the famous inventor by dressing up and sharing the information you learned through your research.

See if any of the inventors who are living in your state or region would be willing to grant an interview and share the story of their own particular invention process. This could be a terrific Type I presentation!



A c t i v i t i e s

Guess-A-Gadget

Bring in various kitchen gadgets and see if students can guess what they are and how they work.

- Apple Corer
- Baster
- Cheese Grater
- Egg Slicer
- Egg Separator
- Garlic Press
- Grapefruit Sectioner
- Juice Squeezer
- Meat Mallet
- Melon Scoop
- Nut Cracker
- Pastry Blender
- Scraper
- Skewer
- Spaghetti Tongs
- Steamer Basket
- Tea Ball
- Whisk

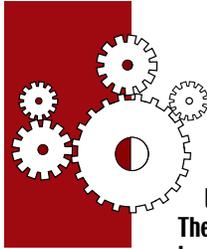
Extension: Bring in antique kitchen gadgets from the early to mid 1900's. Invite students to brainstorm possible names and uses for each item.

Extension: Ask students to think of other uses for common kitchen utensils such as a spatula, fork, knife, spoon, measuring cup, pizza cutter, strainer, and peeler.

Extension: Invite students to create a new kitchen gadget that will perform one of the following tasks: insert melted butter into a freshly baked loaf of bread, remove seeds from a citrus fruit, apply melted chocolate to homebaked goods, squeeze tea bags, pick pickles from a jar, or remove chicken skin.

Extension: Have students create an all-purpose kitchen utensil that can do five or more different tasks.

Extension: Invite students to discuss how gadgets have transformed life in the kitchen. Have them describe the differences/similarities between food preparation in the 1890's and 1990's.



Set Up An Inventor's Workshop

All inventors need a place to tinker, build, experiment, and solve problems. An inventor's workshop provides a great place to play with ideas and jumpstart inventive thinking. This workspace should contain plenty of light and a large variety of tools, equipment, materials, and safety supplies. The following list contains a variety of items that can be included in an inventor's workshop.

- | | | |
|------------------|---------------------|----------------|
| Aluminum Foil | Hammer | Sand Paper |
| Balance | Hand Drill | Scale |
| Balloons | Hand Saw | Scissors |
| Baster | Hangers | Screens |
| Batteries | Jars | Screw Drivers |
| Beakers | Jugs | Screws |
| Books | Lamp | Sieve |
| Brads | Magic Markers | Skewers |
| Bulb Holder | Magnets | Spray Bottle |
| Bulbs | Magnifying Glass | Square |
| Buzzer | Masking Tape | Straws |
| Calculator | Measuring Cups | String |
| Caliper | Measuring Spoons | Switches |
| Cardboard | Measuring Tape | T-Square |
| Catalogs | Metal Parts | Tape |
| Circuit Board | Modeling Clay | Tape Rule |
| Clamps | Nails | Telephone Book |
| Clips | Newspaper | Templates |
| Clothespins | Notebook | Thermometer |
| Compass | Nuts and Bolts | Thread Spools |
| Corks | Paper | Timer |
| Craft Knife | Paper Bags | Toothpicks |
| Crocodile Clips | Paper Clips | Tweezers |
| Cutting Mat | Paper Towels | Twist Ties |
| Cups | Paper Tubes | Two-Sided Tape |
| Dowels | Pencils | Vise |
| Duct Tape | Pens | Wire |
| Electric Wire | Pipe Cleaners | Wire Strippers |
| Electrical Motor | Plastic Bags | Wood |
| Electronic Parts | Plastic Bottles | Wood Scraps |
| Erector Set | Plastic Containers | Wrench |
| Eye Dropper | Plastic Tubing | Yard Stick |
| Fasteners | Pliers | Ziploc Bags |
| File | Protractor | |
| First Aid Kit | Pump | |
| Flash Light | Reference Materials | |
| Foam Board | Rope | |
| Funnel | Rubber Bands | |
| Glue | Ruler | |
| Goggles | Safety Glasses | |
| Graph Paper | Safety Pins | |

"Creative intelligence in its various forms and activities is what makes man."
James Harvey Robinson

INVENTOR RESEARCH GUIDE



Inventor's Name

Dates of Birth/Death

Describe the inventor's early life.

Describe the inventor's education and career.

What was the inventor's most important contribution?

What was the process they went through? Make a timeline of the significant developments along the way, from the first "Ah, ha! To, "There, it's done!"

Explain what the invention does. Make a prototype, if possible.



The following list of people made significant contributions to our lives. Some of the inventions make life more entertaining, adventurous, and have dramatically improved human health. Choose an inventor from list below. Research to collect interesting information about the invention process.

Alexander Graham Bell
 Vincent Bendix
 Martha Hunt
 Louis Braille
 Eli Whitney
 Leonardo da Vince
 Elias Howe
 Guglielmo Marconi
 Maria E. Allen
 Samuel Colt
 Melitta Bentz
 George Eastman
 Robert Fulton
 Samuel Morse
 Orville and Wilber Wright
 James Watt
 Benjamin Franklin
 Virginia Apgar
 Mary Davidson Kenner
 Stephine Kwolek
 Henry Bessemer
 George Fuller
 John Ericsson
 Martina Kempf
 H. I. (Harriet) Irwin
 George Westinghouse
 Chester Carlson
 Johannes Gutenberg
 Elijah McCoy
 George Washington Carver
 Henry Ford

Ida Forbes

Galileo

Levi Strauss

Alfred B. Nobel

Rudolph Diesel

Marion Donovan

- A. Write a script and perform a dramatization of how they came to their discovery. Create the setting, costumes, and dialogue that would be appropriate for the time and place. What earlier experiences influenced the inventor's later work? Were there other inventions that preceded this one that the inventor "piggy-backed" on?
- B. Create an "Invention Log" that this famous person might have kept. What were the major experiments or events that led to their achievement?

Inventor

Invention

Howard Aiken

Computer

Alice King Chatham

Helmet used by Chuck Yeager when he broke the sound barrier

Margaret Grimaldi

Space Shuttle Escape Pole

Leo Baekeland

Plastic

Alexander Fleming

Penicillin

Robert Goddard

Rocket

Charles Goodyear

Vulcanization of Rubber

Sarah G. Goode

Folding Bed

Katherine Burr Blodgett

Nonreflecting Glass

Frances Gabe

Self-cleaning House

Peter Hodgson

Silly Putty®

John Pemberton

Coca-Cola®

Wilhelm C. Roentgen

X-ray

Anne Connelly

Fire Escape

Mary Anderson

Windshield Wiper

Spencer Silver

Post-it Notes®

Vladimir Zworykin

Television

- C. Create an editorial cartoon that demonstrates the positive or negative impact the invention might have on people, the environment, or the world in general.
- D. Create a timeline of the significant historical events that occurred ten years before and ten years after one of these inventions.

INVENTOR RESEARCH GUIDE



There are thousands of inventions that have dramatically affected human existence. Using the following timeline as a sample, construct your own 'personal' invention timeline to illustrate the innovations that you feel have had a significant impact on your life and that of your family and friends.

Design an ad that would have appeared to promote the sale of one of the following inventions. Remember to make it historically accurate. How would it have changed people's lives during the time when it was created?

Timeline	Invention
1920's	Television
1826	Photography
1952-1955	Polio Vaccine
1849	Safety Pin
1983	Compact Disc
1902	Air Conditioning
3000 BC	Wheel
1940's	Tape Recorder
1846	Sewing Machine
1876	Telephone
1608	Telescope
1804	Steam Locomotive
1903	Airplane
1100's	Magnetic Compass
1893	Zipper
1,750,000 BC	Flint Tools
1920's	Frozen Food
1793	Cotton Gin
1945	Atomic Bomb
1890's	Motion Picture
100 BC	Paper
1867	Dynamite

Invention List

Shoes
Fork
Television
Mirror
Bicycle
Paper
Vacuum Cleaner
Pencil
Elevator
Skateboard
Yoyo
Eyeglasses
Airplane
Chewing Gum
Telephone
Toothbrush
Telescope
Dishwasher
Wristwatch
Lawn Mower
Canned Food
Video Camera

INVENTOR RESEARCH GUIDE



"What's in a Name"

These pictures come from actual applications for patents. Can you correctly identify what each invention was supposed to do?

- a. One-person movie theater
- b. Foul-weather shelter
- c. Germ-free suit for surgeons



- a. Sunshade for a baby seat
- b. Grapefruit-squirt shield
- c. Pin holder



- a. Swing to provide power for a washing machine
- b. Schoolroom scale
- c. Chair for protrait photographs



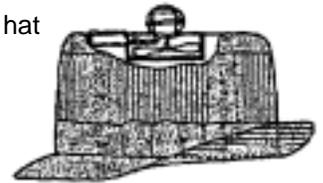
- a. Knitting machine
- b. Needle threader
- c. Btcycle seat to discourage thieves



- a. Mouthpiece to prevent snoring
- b. Whistle for hikers
- c. Device to keep teeth from chattering



- a. Solar-powered, fan-cooled hat
- b. Advertising sign foa a hat store
- c. Boomerang hat



- a. Seats for movie theaters showing Westerns
- b. Barbershop chairs for children
- c. Mechanical horses for teaching riding



INVENTOR RESEARCH GUIDE



Bertolt Brech said: "Intelligence is not to make no mistakes, but quickly to see how to make them good."

Investigate to find out about some of the most interesting inventions that happened by mistake. What were the circumstances that led to the discovery of popular items such as the ones listed below?

Fudge
 Popsicles®
 Ice Cream Cones
 Maple Syrup
 Potato Chips
 Penicillin
 X-Rays
 Frisbee®
 Piggy Banks
 Silly Putty®
 Bricks
 Glass
 Post-it Notes®
 Levi® Jeans
 Velcro®
 Coca-Cola®
 Chocolate Chip Cookies



Invention Detective

Explore the origins of various intriguing inventions. For example, how were earmuffs invented? Did you know that potato chips were an edible accident? Who developed the concept of a 'sandwich?'



Very few products and inventions have names that describe what they do. For example, the word "aspirin" does not give any clue that this product relieves pain. Make a list of ten items whose names fail to tell what function the item serves. Then create a new name. For example, a chair might be renamed as a 'sitdownon.'



Create an "Inventors Wall of Fame." Have students gather facts about an inventor and create a poster display for the exhibit. Include sketches and descriptions of the invention.



Many famous inventors of the past were men. Why? Do women today have equal opportunities to be inventors? Research to find the names of some female inventors in the past and some in the present who have made innovative contributions during your lifetime.

Read biographies of famous female inventors who have made incredible contributions to the invention world from the following websites. Learn about women inventing in traditionally male fields, why women are a minority of patent holders and how that is rapidly changing.

inventors.about.com/cs/womeninventors

kids.patentcafe.com/discover/women.asp

www.inventorsmuseum.com/women.htm

Brainstorming!

Brainstorming is a creative thinking process inventor's use when they attempt to come up with new ideas. Sometimes the ideas really come in a flash, like lightning! Whenever inventors brainstorm, they try to come up with as many ideas as possible, no matter how crazy or of-the-wall they may seem. The idea is to look at something that is familiar and see it in a totally new way!

Get Those Creative Juices Flowing!

Rules: for Brainstorming

1. Produce as many ideas as possible.
2. Hitchhike on other's ideas.
3. Do not criticize ideas.
4. Think of wild and unusual ideas.

THE INVENTION PROCESS

1. **THINK OF A PROBLEM**
Find a problem that needs solving. What do people need to make like simpler and easier?
What make life more fun and entertaining?
2. **BRAINSTORM**
Think of as many solutions as you can. The greater the number, no matter how far out or crazy they may seem, the better the chance that you will come up with something truly creative.
3. **SELECT THE BEST**
Choose the solution that you feel is the best. Establish criteria to help you judge. Which one does the job in the simplest, most creative way? Which is the best solution for the problem?
4. **SKETCH YOUR IDEA**
Make a diagram or illustration of your mental picture.
5. **KEEP AN INVENTOR'S NOTEBOOK**
Keep a log of all of your thoughts, of your insights along the way. Include your diagrams and sketches. Be sure to date everything.
6. **RESEARCH YOUR IDEA**
Check references to be sure that your idea is truly unique. Has anyone else thought of something that might resemble it? Other similar inventions might help you refine your ideas.
7. **CONSTRUCT A MODEL**
Build a model of your invention. The first one is called a "breadboard." It is like a rough draft in writing where you get the basic idea across. As you continue to improve your idea, your final model, the exact model of your invention will be called a "prototype."
8. **TEST YOUR MODEL**
You will need to see if your model actually works. Does it do what it is assigned to do? Is it safe?
Can you improve on the design in any way to make it even better?
9. **PATENT YOUR INVENTION**
You need to fill out the proper forms from the United States Patent Office so that someone else cannot claim that they discovered your invention.
10. **MARKETING YOUR INVENTION**
Now that you have something that is unique, a "one-of-a-kind," how will you advertise it? Who will need your invention? What is the best way to get the word out to those people who will want to know about it and want to use it?

Try an Idea Checklist!

Invite students to use an idea checklist (like SCAMPER) to think of more flexible and original ideas.

Have students use the SCAMPER technique with the following objects:

Eyeglasses, umbrella, safety pin, balloon, tire, mug, belt, slipper, boat, key, candle, spoon, and toothbrush.

Substitute
Combine
Adapt
Modify, Magnify, Minify
Put To Other Uses
Eliminate
Reverse, Rearrange

Fiction Books



Dreamland. (1996). Written by Roni Schotter. Illustrated by Kevin Hawkes. Published by Orchard Books. Hardcover. ISBN: 0-531-09508-8. 40 pages. (Ages 5-8). In this magical story, Theo, a young boy who works in his family's tailor shop, draws a series of dream machines with chutes, slides, ladders, and levers—The Spinning Machine, The Hoist and Spring, and Head in the Clouds. Theo's dream machines eventually come to life as part of an amusement park built by his uncle Gurney, a fellow dreamer who says, "There's more to life than measuring and cutting and keeping to a pattern...There's think and wonder, and best of all, imagine."

The Flying Dragon Room. (1996). Written by Audrey Wood. Illustrated by Mark Teague. Published by Scholastic. Hardcover. ISBN: 0-590-48193-2. 32 pages. (Ages 4-8). In this imaginative tale, Mrs. Jenkins, a housepainter, lends her special box of tools to Patrick and invites him to make whatever he wants. One week later, he takes his parents and Mrs. Jenkins on a magical tour through his newly created world—the Subterranean Room and its small creature garden, the Bubble Room, the Friendly Wild Animal Room, and more. This wonderful story ends with an invitation to visit Mrs. Jenkins Dragon Room, a special place where imaginations soar.

The Gadget War. (1991). Written by Betsy Duffey. Published by Penguin Books. Hardcover. ISBN: 0-670-84152-8. 64 pages. (Ages 8-14). This book introduces youngsters to the negative and positive aspects of competition. In this story Kelley is the undisputed gadget champion of the third grade until Albert Einstein Jones, an alumnus of Young Inventor's Camp, moves into her territory. Soon after Albert makes his presence known, a battle ensues between the two and escalates to an "I can top that" gadget war.

Ask students to brainstorm a list of solutions for the following problems:

Contacting a person on a boat that has no phone
Finding a lost pet in a dense forest
Heating a cup of soup on a hike in the mountains
Keeping a casserole from spilling during the car ride to a party
Keeping a pencil tip from breaking
Preventing dust from collecting on a favorite model airplane

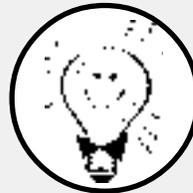
Samuel Todd's Book of Great Inventions. (1991). Written by E.L. Konigsburg. Published by Atheneum Books. Hardcover. ISBN: 0-689-31680-1. 32 pages. (Ages 4-7). This humorous and thought-provoking book takes a look at the world through the eyes of Samuel Todd, a reflective child who thinks about all the inventions that make a difference in his life—from mirrors and Velcro to backpacks and french fries.

Try A Direct Analogy!

A direct analogy is a simple comparison between two objects, ideas or concepts. Invite students to answer the following question:

How is a _____ like a _____?

Have them compare items such as an owl and scientist, elephant and vacuum cleaner, belt and snake, cloud and mushroom, tire and balloon, car and clock, or shoe and cabinet.



Don't Miss These Great Fiction Books!

Ben and Me. (1939). Written by Robert Lawson. Published by Little, Brown and Company. Paperback. ISBN: 0-316-51730-5. 114 pages. (Ages 8-12).

Captain Snap and the Children of Vinegar Lane. (1989). Written by Roni Schotter. Illustrated by Marcia Sewall. Published by Orchard Books. Paperback. ISBN: 0-531-07038-7. 32 pages. (Ages 4-8).

Dear Mr. Henshaw. (1983). Written by Beverly Cleary. Published by William Morrow. Hardcover. ISBN: 0-688-02405-X. 144 pages. (Ages 8-12).

Ruby Mae Has Something to Say. (1992). Written by David Small. Published by Crown. Hardcover. ISBN: 0-517-58248-1. 32 pages. (Ages 4-8).



Nonfiction Books



The Age of Technology: 19th Century American Inventors. (1997). Edited by David C. King. Published by Discovery Enterprises. Paperback. ISBN: 1-878668-64-1. 64 pages. (Ages 11 and up). This intriguing anthology features lab notes, peer criticism, journals, and letters from some of America's greatest inventors including Eli Whitney, Thomas Edison and Benjamin Banneker.

Amazing Pop-up House of Inventions. (2000). Written by Robert Crowther. Published by Candlewick Press. Hardcover. ISBN: 0-763608-10-6. 12 pages. (Ages 4 to 8). In this remarkable, elaborate pop-up book by a master paper engineer, readers learn scads of fun facts about everyday household items, such as CDs, nylon stockings, skateboards, refrigerators, belt buckles, piggy banks, pens, cameras, and sandwiches. Trivia buffs and regular humans alike will gawk in delighted wonder at this interactive, 3-D paper extravaganza, with oven doors you can open, videos you can insert into a VCR, model train sets you can spin around a track, and a shower curtain you can pull back. Discover some incredible, entertaining, and amusing facts about objects you never looked twice at before.

The Children's Atlas of Scientific Discoveries and Inventions: The Earliest Discoveries of Humans and the Flights of Imagination Which Brought About. (1997) Written by Andrew Dunn. Published by Millbrook Press. Paperback. ASIN: 0-761302-41-7. 96 pages. (Ages 9 to 12). Beginning with the discovery of fire, this comprehensive book traces discoveries and inventions right up through history to the future of space travel. In sections entitled "Technology and the Birth of Ideas," "Communications and Travel," "Learning About Life," and "Astronomy and Cosmology," factual information is highlighted with full-color illustrations, photographs, maps, charts, and graphs. The wealth of wonders contained in these pages is sure to inspire ideas in the minds of eager readers and aspiring inventors.

"Nothing is more important than to see the sources of invention, which are, in my opinion, more interesting than the inventions themselves."
Gottfried Wilhelm Leibnitz

DK Pockets: Inventions. (1995). Written by Eryl Davies. Published by DK Publishing. Distributed by Houghton Mifflin. Paperback. ISBN: 1-56458-889-0. 160 pages. (Ages 12 and up). This comprehensive, pocket-sized reference book contains essential facts, charts, lists, and full-color photographs that introduce the reader to the world of inventions and their inventors.

Eyewitness Science: Technology. (1995). Written by Roger Bridgman. Published by DK Publishing. Distributed by Houghton Mifflin. Hardcover. ISBN: 1-56458-883-1. 64 pages. (Ages 8 and up). This colorful resource uses photographs, illustrations and accurate facts to explore the ways technology has transformed everyday life. This fascinating book describes how technology has affected materials (metal, glass, wood, and plastic) and other aspects of daily living (communication, measurement, industry, medicine, and electronics/computers). Another title of interest includes: **Eyewitness Science: Electronics** (ISBN: 1-56458-324-4).

Feminine Ingenuity: How Women Inventors Changed America. (1994). Written by Anne L. Macdonald. Published by Random House. Paperback. ISBN: 0-345-38314-1. 528 pages. (Ages 16 and up). The author uses information obtained from the U.S. Patent Office archives, magazines, fairs and expositions, journals, lectures, and manuscripts to discuss patent-holding women and their contributions to technology, science and engineering.

Theme-Based Magazines

The following magazines contain invention-related information. These magazine back issues were published by Cobblestone Publishing, 7 School Street, Peterborough, NH 03458-1454. 800-821-0115. Price: \$4.50, 10% shipping and handling. 48 pages. (Grades 4-9).

COBBLESTONE

African American Inventors
Thomas Edison
Women Inventors

FACES

Inventions of the World

Nonfiction Books



Girls Think of Everything: Stories of Ingenious Inventions by Women. (2000). Written by Catherine Thimmesh. Published by Houghton Mifflin. Hardcover. ISBN: 0-395937-44-2. 64 pages. (Ages 9 to 12). This very attractive, informative book will find an audience among browsers and report writers alike. Ten women and two girls are given a few pages each. Included are Mary Anderson, who invented the windshield wiper (after she was told it wouldn't work); Ruth Wakefield, who, by throwing chunks of chocolate in her cookie batter, gave Toll House cookies to the world; and young Becky Schroeder, who invented Glo-paper because she wanted to write in the dark. The text is written in a fresh, breezy manner, but it is the artwork that is really outstanding. The endpapers list women inventors, beginning at 3000 B.C., when silk was invented by a Chinese empress. The final section tells girls how to patent their inventions, and an informed bibliography and Web site list will help them do just that.

Great Inventions. (1995). Edited by Richard Wood. Published by Time-Life. ISBN: 0-7835-4766-8. 64 pages. (Ages 8 and up). This visually appealing resource uses colorful photographs, illustrations, labeled diagrams, lively text, interactive questions, timelines, and an illustrated fold-out to show how inventions define the way people work, play, prosper, and communicate. This book takes a close-up look at the origins, functions, inner workings, and impacts of various inventions such as umbrellas, conveyor belts, fax machines, games, weapons, and cars.

Historical Inventions on File. (1994). Written by The Diagram Group. Published by Facts On File. Loose-leaf Bound. ISBN: 0-8160-2911-3. 288 pages. (Ages 9 and up). This volume takes students step-by-step through the development of some of the world's greatest inventions, describes the science and technology behind each invention, presents more than sixty-five hands-on projects, and provides accurate timelines and chronologies. Students will enjoy using this comprehensive resource to learn about the origins and impacts of dozens of inventions such as the refracting telescope, sundial, telegraph, windmill, and loom.

"Inventing is a combination of brains and materials. The more brains you use, the less material you need."
Charles F. Kettering

History and Invention Series: The Clock and How It Changed the World. (1995). Written by Michael Pollard. Published by Facts On File. Hardcover. ISBN: 0-8160-3142-8. 48 pages. (Ages 9 and up). This volume traces the historical development of the clock and describes the impact this invention has had on the world. This book contains well-written text accompanied by full-color illustrations, photographs, and maps.

History and Invention Series: The Light Bulb and How It Changed the World. (1995). Written by Michael Pollard. Published by Facts On File. ISBN: 0-8160-3145-2. 48 pages. (Ages 9 and up). This interesting resource reviews the electric inventions that preceded Thomas Edison's light bulb (battery, telegraph, and telephone) and discusses how electricity has been generated, supplied, and used ever since. This book contains well-written text accompanied by full-color illustrations, photographs, and maps.

History and Invention Series: The Wheel and How It Changed the World. (1995). Written by Ian Locke. Published by Facts On File. Hardcover. ISBN: 0-8160-3143-6. 48 pages. (Ages 9 and up). This book invites youngsters to travel back in time and follow the invention and reinvention of the wheel. From early potter's wheels and medieval torture wheels to 19th century flywheels, students will enjoy learning how past civilizations have adapted and used this prehistoric invention. This book contains well-written text accompanied by full-color illustrations, photographs, and maps.

Ideas That Changed the World Series. (1995). Written by Philip Wilkinson. Illustrated by Robert Ingpen. Published by Chelsea House. Hardcover. 96 pages. (Ages 10 and up). This series uses stunning illustrations and accurate text to document the progress of ideas that transformed the world. From the first stone tools to the most advanced computer technology, these books describe the moment of invention, the key people involved, and how the ideas developed. Titles of interest include:

Art and Technology Through the Ages
(ISBN: 0-7910-2769-4)

The Early Inventions (ISBN: 0-7910-2766-X)

The Industrial Revolution (ISBN: 0-7910-2767-8)

Transportation (ISBN: 0-7910-2768-6)



Nonfiction Books



Imaginative Inventions: The Who, What, Where, When, and Why of Roller Skates, Potato Chips, Marbles, and Pie (and More!). (2001). Written by Charise Mericle Harper. Published by Little, Brown, & Company. Hardcover. ISBN: 0-316347-25-6. 32 pages. (Ages 4 to 8). This edifying volume explains how such everyday things such as gum, skates, and potato chips came to be. The book is pleasantly illustrated with naive portraits of inventors at work, frames spread with a thematic border, and trivia about the subjects. With its crazy-quilt visual patterns, bouncy stanzas and fun facts, this miscellany zigzags between informational and whimsical.

Invention in America. (1995). Written by Russell Bourne. Published by Fulcrum Publishing. Hardcover. ISBN: 1-55591-231-1. 152 pages. (Ages 10 and up). This book uses lively and instructive images from the Library of Congress to introduce readers to American inventions. This insightful resource focuses on the impact technological progress has had on the American culture.

Inventions That Changed Modern Life. (1994). Written by L. Markham. Published by Raintree Steck-Vaughn. Hardcover. ISBN: 0-8114-4930-0. 48 pages. (Ages 9-14). This volume from the *20 Events* series describes twenty inventions that have had a significant impact on the modern world. The author presents detailed information about important inventions such as the steam engine, electric light bulb, sewing machine, telephone, television, and computer. This book also includes colorful photographs, charts, diagrams, a glossary, and a reading list. Other titles of interest from this series include: **Discoveries That Changed Science** (1995) and **Transportation Milestones and Breakthroughs** (1995).

Inventors. (1996). Written by Martin W. Sandler. Published by HarperCollins. Hardcover. ISBN: 0-06-024923-4. 96 pages. (Ages 8 and up). The author uses hundreds of vintage photographs from the archives of the Library of Congress to explore great American inventors. He discusses how these creative individuals have revolutionized life through their world-altering inventions such as the telegraph, television, airplane, skyscraper, and much more.

Mistakes That Worked. (1991). Written by Charlotte F. Jones. Illustrated by John O'Brien. Published by Doubleday. Paperback. ISBN: 0-385-32043-4. 96 pages. (Ages 8-12). Students will enjoy reading this fascinating book about the role serendipity played in the development of such inventions as penicillin, potato chips, trouser cuffs, Silly Putty, Post-It Notes, and the Frisbee.

Nature Got There First: Inventions Inspired by Nature. (1995). Written by Phil Gates. Published by Kingfisher Books. Distributed by Raintree Steck-Vaughn. Hardcover. ISBN: 1-85697-587-8. 80 pages. (Ages 9-13). This exciting resource explores the parallels between natural solutions and man-made inventions. The author uses close-up photographs, illustrations and lively text to describe how nature has inspired various inventions such as jet engines, Velcro, chisels, outerwear, and much more.

The Picture History of Great Inventors. (1994). Written by Gillian Clements. Published by Alfred A. Knopf. Paperback. ISBN: 0-679-84787-1. 80 pages. (Ages 8-12). This illustrated resource presents a decade-by-decade look at the achievements of many of the world's greatest inventors. In addition to facts and anecdotes about individual inventors, this book also provides a pictorial timeline of major events at the bottom of each page.

Possible Dreams: Enthusiasm for Technology in America. (1992). Edited by John L. Wright. Published by Henry Ford Museum & Greenfield Village. Distributed by Independent Publishers Group. Paperback. ISBN: 0-933728-35-2. 128 pages. (Ages 12 and up). This book explores American invention from Benjamin Franklin's legendary kite to nuclear weapons. Colorful photographs and more than 100 period illustrations fill the pages of this useful reference.

"At first people refuse to believe that a strange new thing can be done, then they begin to hope it can be done, then they see it can be done—then it is done and all the world wonders why it was not done centuries ago."

Frances Hodgson Burnett



Nonfiction Books



Smithsonian Visual Timeline of Inventions. (1994). Written by Richard Platt. Published by DK Publishing. Distributed by Houghton Mifflin. Hardcover. ISBN: 1-56458-675-8. 64 pages. (Ages 8 and up). This outstanding reference book charts the entire history of human ingenuity from the first prehistoric tools and weapons created 600,000 years ago to the future of genetic engineering and microelectronics. Featuring more than 400 inventions that changed the world, this resource contains a running chronology of world events and arranges the inventions chronologically (date, name of inventor, country of origin, and a brief description accompanies each entry) and thematically (entries are organized into four categories—counting and communication, daily life and health, agriculture and industry, and travel and conquest). Accurate information, hundreds of photographs and colorful illustrations fill the pages of this fascinating resource. Other titles of interest include: **Visual Timeline of Transportation** written by Anthony Wilson (ISBN: 1-56458-880-7) and **Visual Timeline of the Twentieth Century** written by Simon Adams (ISBN: 0-7894-0997-6).

They All Laughed...From Light Bulbs to Lasers: The Fascinating Stories Behind The Great Inventions That Have Changed Our Lives. (1993). Written by Ira Flatow. Published by HarperCollins. Paperback. ISBN: 0-06-092415-2. 256 pages. (Ages 12 and up). This exciting resource takes a behind-the-scenes look at the development and evolution of various inventions. Students will enjoy reading about how the first commercial fax machine was invented in 1843, how a melted candy bar led to the microwave oven, and the truth about Ben Franklin's famous kite experiments.

Toys! Amazing Stories Behind Some Great Inventions. (2000). Written by Don Wulffson. Published by Henry Holt. Hardcover. ISBN: 0-805061-96-7. 128 pages. Ages (9 to 12). This book contains quirky tales behind more than two dozen novelties, gadgets, and games, from playing cards and wind-up toys to Play-Doh. Some (tops, seesaws) have long histories, some (whoopee cushions) only seem to have been around forever, and some (Trivial Pursuit) are of recent vintage. The generalizations may sometimes shade over into oversimplifications, but the accounts of the origins of super balls, Raggedy Ann, Legos, Twister, Pong and the like will give middle

graders new insight into their parents' misspent youths—and a bibliography and a list of Web sites will give readers who want all the details a head start.

The Usborne Book of Inventors. (1994). Written by Struan Reid and Patricia Fara. Published by EDC. Paperback. ISBN: 0-7460-0705-1. 48 pages. (Ages 8-12). This book uses charts, illustrations, detailed cutaways, diagrams, archival photographs, and informative descriptions to chronicle the successes and failures of some of the world's most famous inventors such as Galileo Galilei, Henry Ford, Johannes Gutenberg, and Thomas Edison.

Visual Timeline of Inventions. (2001). Written by Richard Platt. Published by DK Publishing. Distributed by Houghton Mifflin. Hardcover. ISBN: 1-564586-75-8. 64 pages. (Ages 4 to 8). Clear photographs and drawings set against a bright white background will attract readers to this book. A time line of world events anchors each page, with the remainder of the page divided into four sections: "Counting & Communication"; "Daily Life & Health"; "Agriculture & Industry"; and "Travel & Conquest." This is a fascinating book to browse, leading readers on a sweep through history extending from the discovery of fire and the making of the wheel to the invention of virtual reality.

What's Inside? Great Inventions. (1993). Written by Dorling Kindersley. Published by DK Publishing. Distributed by Houghton Mifflin. Hardcover. ISBN: 1-56458-220-5. 18 pages. (Ages 4-8). This clever introductory text uses clear photographs, cutaway illustrations and brief captions to illustrate the function and inner workings of historical inventions such as the radio, flush toilet and telephone.

Working at Inventing: Thomas A. Edison and the Menlo Park Experience. (1989). Edited by William S. Pretzer. Published by Henry Ford Museum & Greenfield Village. Distributed by Independent Publishers Group. Paperback. ISBN: 0-933728-34-4. 142 pages. (Ages 12 and up). Thomas Edison hand-picked a select group of craftsmen to help him develop the phonograph, electric light bulb, and more at his successful Menlo Park Laboratory. This book recreates this exciting experience through photographs, drawings, reproductions of the inventors' detailed drawings, and manuscript excerpts.



How Things Work



How Things Work. (1996). Written by Ian Graham. Published by Time-Life. Hardcover. ISBN: 0-8094-9249-0. 64 pages. (Ages 8 and up). This dynamic reference uses colorful illustrations, photographs, cutaways, labeled diagrams, and lively text to explain the basic functions and principles behind machines such as fax machines, microwave ovens, windmills, cars, binoculars, and computers. This resource also includes interactive questions, activities, and an illustrated fold-out.

Machines and How They Work. (1991). Written by David Burnie. Published by DK Publishing, Inc. Distributed by Houghton Mifflin. Hardcover. ISBN: 1-879431-15-7. 64 pages. (Ages 8 and up). This book uses detailed, full-color cutaway illustrations to explore the functions and inner workings of different machines such as clocks, steam engines, bulldozers, bicycles, vacuum cleaners, refrigerators, cameras, and submarines.

101 Questions and Answers: How Things Work. (1995). Written by Ian Graham. Published by Facts On File. Hardcover. ISBN: 0-8160-3218-1. 48 pages. (Ages 8 and up). This resource takes a close-up look at the inner workings of various machines and everyday devices. This informative book uses clear explanations and colorful drawings and diagrams to show youngsters how different inventions work.



Videos About The Invention Process and Amazing Inventors

From Dreams to Reality: A Tribute to Minority Inventors. Available from a local Patent and Trademark Depository Library or the Office of Civil Rights, U.S. Patent and Trademark Office, Washington, DC 20231. Price: Free. (Grades 3-12). This award-winning video takes a look at the experiences of minority inventors and shows students that dreams can become reality through hard work and dedication.

Scholastic First Encyclopedia: How Things Work. (1995). Written by Claire Llewellyn. Edited by Scholastic Reference Editors. Published by Scholastic. Hardcover. ISBN: 0-590-47529-0. 96 pages. (Ages 6 and up). This helpful resource explains how everyday items such as guitars, bridges and clocks are made, built and used. This book contains colorful photographs, detailed illustrations, diagrams, and interesting facts.

Stephen Biesty's Incredible Cross-Sections. (1992). Written by Richard Platt. Illustrated by Stephen Biesty. Published by Alfred A. Knopf. Hardcover. ISBN: 0-679-81411-6. 48 pages. (Ages 8 and up). This resource contains a unique collection of cross-sections that explain the inner workings of real machines and buildings from around the world. Youngsters will enjoy looking at Stephen Biesty's incredibly detailed cutaway illustrations of different structures (castle, factory, subway station) and machines (submarine, tank, space shuttle).

The Ultimate Book of Cross-Sections. (1996). Published by DK Publishing, Inc. Distributed by Houghton Mifflin. Hardcover. ISBN: 1-7894-1195-4. 304 pages. (Ages 8 and up). This fascinating book uses informative text and detailed, full-color cutaway illustrations to explore the inner workings of various vehicles and machines such as cars, trains, trucks, tanks, bulldozers, rescue vehicles, record breakers, planes, ships, jets, and spacecraft.

The Way Things Work. (1988). Written by David Macaulay. Published by Houghton Mifflin. Hardcover. ISBN: 0-395-42857-2. 384 pages. (Ages 8 and up). This award-winning reference uses detailed cutaway illustrations, diagrams, and fascinating explanations to describe the inner workings of hundreds of everyday gadgets and machines such as zippers, hang gliders, televisions, musical instruments, and refrigerators. Arranged in four sections (Movement, Harnessing the Elements, Working with Waves, and Electricity & Automation), this comprehensive book demonstrates how machines work and how they are connected to other inventions. This entertaining and informative publication also uses humorous analogies about a woolly mammoth to illustrate the scientific principles behind various inventions.



Biographies



A Picture Book of Benjamin Franklin. (1990). Written by David Adler. Illustrated by John and Alexandra Wallner. Published by Holiday House. Hardcover. ISBN: 0-8234-0792-6. 32 pages. (Ages 4-8).

A Picture Book of Thomas Alva Edison. (1996). Written by David Adler. Illustrated by John and Alexandra Wallner. Published by Holiday House. Hardcover. ISBN: 0-8234-1246-6. 32 pages. (Ages 4-8).

A Pocketful of Goobers: A Story about George Washington Carver. (1986). Written by Barbara Mitchell. Illustrated by Peter E. Hanson. Published by Carolrhoda Books. Paperback. ISBN: 0-87614-474-1. 64 pages. (Ages 8-12).

American Profiles Series: Twentieth Century Inventors. (1991). Written by Nathan Aaseng. Published by Facts On File. Hardcover. ISBN: 0-8160-2485-5. 144 pages. (Ages 10 and up).

American Profiles Series: Women Inventors. (1997). Written by Linda Jacobs Altman. Published by Facts On File. Hardcover. ISBN: 0-8160-3385-4. 128 pages. (Ages 10 and up).

Benjamin Franklin and Electricity. (1995). Written by Steve Parker. Published by Chelsea House. Hardcover. ISBN: 0-7910-3006-7. 32 pages. (Ages 8 and up).

Black Pioneers of Science and Invention. (1970). Written by Louis Haber. Published by Harcourt Brace and Company. Paperback. ISBN: 0-15-208566-1. 192 pages. (Ages 10 and up).

Click! A Story about George Eastman. (1986). Written by Barbara Mitchell. Illustrated by Jan Hosking Smith. Published by Carolrhoda Books. Paperback. ISBN: 0-87614-472-5. 64 pages. (Ages 8-12).

Fine Print: A Story about Johann Gutenberg. (1991). Written by Joann Johansen Burch. Illustrated by Kent Alan Aldrich. Published by Carolrhoda Books. Paperback. ISBN: 0-87614-565-9. 64 pages. (Ages 8-12).

Galileo and the Universe. (1995). Written by Steve Parker. Published by Chelsea House. Hardcover. ISBN: 0-7190-3008-3. 32 pages. (Ages 8 and up).

Great Black Heroes: Five Notable Inventors. (1995). Written by Wade Hudson. Illustrated by Ron Garnett. Published by Scholastic. Paperback. ISBN: 0-590-48033-2. 48 pages. (Ages 7-9).

Great Lives: Invention and Technology. (1991). Written by Milton Lomask. Published by Atheneum Books. Hardcover. ISBN: 0-684-19106-7. 288 pages. (Ages 9-12). This collection contains the profiles of twenty-seven inventors and technologists whose discoveries have radically changed the world. Students will enjoy reading about the ideas and accomplishments of such famous individuals as Thomas Edison, Orville and Wilbur Wright, Enrico Fermi, and Robert Goddard.

Guglielmo Marconi and Radio. (1995). Written by Steve Parker. Published by Chelsea House. Hardcover. ISBN: 0-7910-3009-1. 32 pages. (Ages 8 and up).

Henry Ford: Young Man With Ideas. (1986). Written by Hazel B. Aird and Catherine Ruddiman. Published by Macmillan. Paperback. ISBN: 0-02-041910-4. 192 pages. (Ages 8-12).

The Importance of Benjamin Franklin. (1992). Written by Gail B. Stewart. Published by Lucent Books. Distributed by Greenhaven Press. Hardcover. ISBN: 1-56006-026-3. 112 pages. (Ages 9 and up).

Louis Braille: The Boy Who Invented Books for the Blind. (1991). Written by Margaret Davidson. Illustrated by Janet Compere. Published by Scholastic. Paperback. ISBN: 0-590-44350-X. 80 pages. (Ages 7-10).

Nikola Tesla: A Spark of Genius. (1994). Written by Carol Dommermuth-Costa. Published by Lerner Publications. Hardcover. ISBN: 0-8225-4920-4. 144 pages. (Ages 10 and up).

Outward Dreams: Black Inventors and Their Inventions. (1991). Written by Jim Haskins. Published by Walker and Company. Hardcover. ISBN: 0-8027-6993-4. 128 pages. (Ages 8 and up).



Biographies



Pioneer Plowmaker: A Story about John Deere. (1990). Written by David R. Collins. Illustrated by Steve Michaels. Published by Carolrhoda Books. Hardcover. ISBN: 0-87614-424-5. 64 pages. (Ages 8-12).

Starry Messenger: Galileo Galilei. (1996). Written by Peter Sis. Published by Farrar. Hardcover. ISBN: 0-374-37191-1. 40 pages. (Ages 6 and up).

The Story of Thomas Alva Edison, Inventor: The Wizard of Menlo Park. (1990). Written by Margaret Davidson. Published by Scholastic. Paperback. ISBN: 0-590-42403-3. 64 pages. (Ages 7-10).

Thomas Alva Edison, Great Inventor. (1996). Written by Nancy Levinson. Published by Scholastic. Paperback. ISBN: 0-590-52767-3. 64 pages. (Ages 8-12).

Thomas Alva Edison: The King of Inventors. (1995). Written by David C. King. Published by Discovery Enterprises. Paperback. ISBN: 1-878668-55-2. 88 pages. (Ages 10 and up).

Thomas Edison and Electricity. (1995). Written by Steve Parker. Published by Chelsea House. Hardcover. ISBN: 0-7910-3012-1. 32 pages. (Ages 8 and up).

Thomas Edison: Great American Inventor. (1995). Written by Shelley Bedik. Published by Scholastic. Paperback. ISBN: 0-590-48357-9. 32 pages. (Ages 5-8).

We'll Race You, Henry: A Story about Henry Ford. (1986). Written by Barbara Mitchell. Illustrated by Kathy Haubrich. Published by Carolrhoda Books. Paperback. ISBN: 0-87614-471-7. 64 pages. (Ages 8-12).

The Wizard of Sound: A Story about Thomas Edison. (1991). Written by Barbara Mitchell. Illustrated by Hetty Mitchell. Published by Carolrhoda Books. Paperback. ISBN: 0-87614-563-2. 64 pages. (Ages 8-12).

The Wright Brothers: How They Invented the Airplane. (1991). Written by Russell Freedman. Published by Holiday House. Hardcover. ISBN: 0-8234-0875-2. 144 pages. (Ages 8 and up).

The Wright Brothers and Aviation. (1995). Written by Steve Parker. Published by Chelsea House. Hardcover. ISBN: 0-7910-3013-X. 32 pages. (Ages 8 and up).

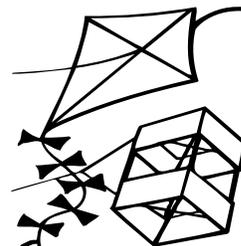


Tips From A Kid Inventor



Graham Beattie, a Grade 5 student from Toronto, Canada who developed a knapsack that electronically checks its contents, has some advice to share with other student inventors:

-  Get an idea. Your idea should be original and you should be able to carry it out.
-  Do careful research on the processes required to make your invention work.
-  Make a complete list of materials you are going to need. Warehouses are great places to buy electronic equipment.
-  After you have planned your invention on paper, make a prototype to see if it really works. There will probably be some problems. Solve them!
-  Remember to keep an inventor's journal and list your ideas, modifications, resources, failures, successes, and all of the steps you took each day. Have an adult sign it at regular intervals. You may want to patent your invention. If you do, your inventor's journal is essential evidence of the originality of your ideas.



Answers for Just for Students

(See Page 27)

Invention Scramblers: Alexander Graham Bell (Telephone), Henry Ford (Automobile), Chester Greenwood (Earmuffs), Whitcomb Judson (Zipper), Eva Landman (Umbrella), Joseph Merlin (Roller Skates), James Naismith (Basketball), Levi Straus (Jeans), Ruth Wakefield (Chocolate Chip Cookies), Eli Whitney (Cotton Gin).

Mystery Inventions: Ivory Soap, Chewing Gum, Frisbee, Velcro, Drinking Straw, Submarine, Air Conditioner, Light Bulb, Sewing Machine.

Who Am I?: Mark Twain, Thomas Edison (1,093 patents), George Washington.



Activity Books and Kits



The Ben Franklin Book of Easy and Incredible Experiments: Activities, Projects, and Science Fun. (1995). Written by Franklin Institute Science Museum Staff. Published by John Wiley and Sons. Paperback. ISBN: 0-471-07638-4. 131 pages. (Ages 8 and up). This hands-on activity book contains experiments and projects that focus on some of Benjamin Franklin's favorite topics—observation and experimentation, meteorology, electricity, sound and music, paper and printing, and lenses and vision. The activities in this exciting resource invite students to build an optical eye shop, make a weather station, create an orchestra, construct a printing press, and much more.

Boston Museum of Science Inventor's Workshop. (1994). Written by Belinda Recio. Published by Running Press. ISBN: 1-56138-459-3. (Ages 8 and up). This entertaining kit includes a 64-page fully-illustrated handbook about inventions and inventive thinking, a working electric motor, and a pack of inventor's materials including a propeller, gears, and much more. Students can use this kit to develop their thinking skills, generate new ideas, learn scientific principles, and invent new devices such as a time-keeping machine, a music maker, and a telescoping machine.

Inventing Stuff. (1995). Written by Ed Sobey. Published by Dale Seymour. Paperback. ISBN: 0-86651-937-8. 64 pages. (Ages 10 and up). This useful resource shows students how to tap their creativity and ingenuity and invent toys, games, and solutions to everyday problems. The author presents a series of challenges that invite students to gather and modify ideas and develop working inventions. In addition to providing interesting student activities, experiments and helpful advice, this book also contains suggestions for teachers and parents who are looking for ways to encourage student involvement in the invention process.

Inventors Workshop. (1981). Written by Alan McCormack. Published by Fearon Teacher Aids. Paperback. ISBN: 0-8224-9783-2. 96 pages. (Ages 8 and up). The author combines elements of mystery, humor, fantasy, and scientific principles to develop twenty-five challenging projects that invite students to create fun-to-make inventions, gadgets and devices. Youngsters will enjoy using easy-to-find materials to construct a bubble-making machine, a toothpaste dispenser, a candle-powered steamboat, and much more.

Lucky Science: Accidental Discoveries from Gravity to Velcro, with Experiments. (1994). Written by Royston Roberts and Jeanie Roberts. Published by John Wiley and Sons. Paperback. ISBN: 0-471-00954-7. 128 pages. (Ages 10-15). This fun, easy-to-follow activity book contains twenty experiments that recreate accidental scientific breakthroughs from history. The authors invite students to roll up their sleeves and relive serendipitous discoveries such as gravity, photography, Velcro, Silly Putty, and Corn Flakes. In addition to simple activities, this resource also includes amusing historical anecdotes and colorful biographical sketches of the lucky people who made these accidental discoveries.

Steven Caney's Invention Book. (1985). Written by Steven Caney. Published by Workman Publishing. Paperback. ISBN: 0-89480-076-0. 208 pages. (Ages 8-14). This book presents a comprehensive introduction to the world of inventing. Young inventors will treasure this fascinating collection of illustrations, diagrams, photographs, charts, activity ideas, advice, facts, and stories. This resource highlights each step of the invention process: getting started, creating an inventor's workshop, keeping a notebook, planning, developing prototypes and product names, applying for patents, and marketing the final product. The author also provides twenty-five intriguing stories about common inventions such as chocolate chip cookies, earmuffs, milk bottles, and zippers.

The Thomas Edison Book of Easy and Incredible Experiments: Activities, Projects, and Science Fun for All Ages. (1988). Written by The Thomas Alva Edison Foundation. Published by John Wiley and Sons. Paperback. ISBN: 0-471-62090-4. 160 pages. (Ages 8 and up). This activity book invites youngsters to conduct scientific experiments and activities based on some of Thomas Edison's favorite topics—chemistry, electricity, magnetism, electrochemistry, physics, energy, and environmental studies. This resource contains illustrations, step-by-step instructions for experiments, and stories and pictures about Thomas Edison. Scientific "tinkering" is definitely encouraged!

**"Invention breeds invention."
Ralph Waldo Emerson**



Teacher Materials



From Indian Corn to Outer Space: Women Invent in America. (1995). Written by Ellen H. Showell and Fred M.B. Amram. Published by Cobblestone Publishing. Paperback. ISBN: 0-942389-10-7. 160 pages. (Grades 4-9). This outstanding book takes a close-up look at the lives and accomplishments of women inventors in America. This resource contains a collection of descriptive summaries, engaging first-person narratives, photographs and illustrations, and interdisciplinary, hands-on classroom activities (projects, discussion questions, puzzles, games, and contests). In addition to learning about famous women inventors, readers also explore the invention process from idea generation to patent acquisition. Extensive appendices include lists of invention programs, contests, books, magazines, videos, kits, camps, great places to visit, and much more.

Invent: A Simulation of Inventors and the Invention Process. (1994). Written by Beth Arner. Published by Interact. (Grades 4-8). Based on the recommendations of Benjamin Bloom (higher level thinking skills) and Howard Gardner (multiple intelligences), this simulation challenges students to develop their problem solving, creativity, communication, and research skills. Activities invite students to research a famous inventor and his/her invention, design their own Rube Goldberg invention, develop an original invention that would help a familiar character in literature, create a personal invention, keep an invention log, conduct a survey, patent and market their own invention, explain the benefits and hazards of their invention, and participate in a Thomas Edison Day (culminating activity that invites students to display their inventions, advertisements, patents, and drawings).

Inventing, Inventions, Inventors: A Teaching Resource Book. (1989). Written by Jerry D. Flack. Published by Teacher Ideas Press. Paperback. ISBN: 0-87287-747-7. 148 pages. (Grades 4-12). This informative resource book provides dozens of exciting ways to integrate the study of invention into the regular curriculum. In addition to a collection of enrichment activities and creative thinking exercises, this volume also includes information about the invention process, descriptions of creative thinking techniques, quotations about inventing, a list of invention contests and programs, and a resource bibliography.

Inventions & Extensions: High-Interest, Creative Thinking Activities. (1991). Written by Doris Spivack and Geri Blond. Published by Incentive Publications. Paperback. ISBN: 0-86530-209-X. 64 pages. (Grades 3-7). This collection of more than thirty units taps into kids' natural curiosity about how things work. Each unit focuses on a famous invention (telephone, dictionary, Braille alphabet, etc.) and its inventor. This unique resource is designed to help teachers promote amazing discoveries in their own classroom.

Inventions, Inventors and You. (1985). Written by Dianne Drazee. Published by Dandy Lion Publications. Paperback. ISBN: 0-931724-35-X. 64 pages. (Grades 3-7). This activity/resource book discusses the characteristics of inventors, describes worthwhile inventions and how these innovations influence our lives, takes a close-up look at creativity and idea development, and provides techniques for promoting inventive and creative thinking skills. This resource contains directed lessons, warm-up questions, learning centers, reproducible worksheets, project ideas, and a reference list.

Inventors: A Source Guide for Self-Directed Units. (1989). Written by Sally J. Patton and Margaret Maletis. Published by Zephyr Press. Paperback. ISBN: 0-913705-35-7. 72 pages. (Grades 2-6). This book examines the lives of Leonardo Da Vinci, Benjamin Franklin, Alexander Graham Bell, Thomas Edison, George Washington Carver, and Orville and Wilbur Wright. The authors include in-depth background information for the teacher, up to 100 reproducible activities, a comprehensive listing of reference materials, and a complete bibliography.

Untrapping Your Inventiveness: Lessons in Creative Thinking and the Inventive Process. (1992). Written by Janet DiSilvestro and Judy Riley. Illustrated by Christina Smith. Published by Creative Learning Press. Paperback. ISBN: 0-93638-61. 192 pages. (Grades 5-12). This creativity unit is designed to motivate and inspire students to develop their creative and inventive thinking skills. Based on the *Enrichment Triad Model* and *Creative Problem Solving*, this collection of activities moves students through the processes and skills needed for creative thinking and inventing. Each lesson contains a list of objectives, Type II skills, materials, warm-ups, activities, questions, debriefing ideas, charts, and forms.

Organizations and Associations

Affiliated Inventors Foundation (AIF)

1405 Potter Drive, #107
Colorado Springs, CO 80909-3516
Fax: (719) 380-1234
Web: www.affiliatedinventors.com

American Intellectual Property Law Association

2001 Jefferson Davis Highway,
Suite 203
Arlington, VA 22202
Phone: (703) 415-0780
Fax: (703) 415-0786

The American Society of Inventors, Inc. (ASI)

P.O. Box 58426
Philadelphia, PA 19102
Phone: (215) 546-6601
Web: www.americaninventor.org

Bruce Sawyer Inventor Center

606 Healdsburg Avenue
Santa Rosa, CA 95401
Phone: (707) 524-1773
E-mail: sbic@ap.net
Web: www.santarosa.edu/sbic

Innovation Institute

901 South National Avenue
Springfield, MO 65804
Phone: (417) 836-5671
Web: www.innovation.institute.com

Intellectual Property Owners (IPO)

1255 Twenty-Third Street NW,
Suite 200
Washington, DC 20037
Phone: (202) 466-2396
Fax: (202) 466-2893
Web: www.ipo.org

Inventors Assistance League International (IMI)

National Inventors Foundation (NIF)

403 South Central Avenue
Glendale, CA 91204
Phone: (818) 246-6548
Toll Free: (877) 433-2246
Web: inventions.org

Inventure Place

National Inventors Hall of Fame
221 South Broadway Street
Akron, OH 44308
Phone: (330) 762-4463
Fax: (330) 762-6313

National Congress of Inventor Organizations (NCIO)

P.O. Box 93669
Los Angeles, CA 90093-6690
Toll Free: (888) 695-4450
Fax: (213) 947-1079
Web: www.inventionconvention.com

National Inventive Thinking Association (NITA)

P.O. Box 836202
Richardson, TX 75083
Phone: (972) 448-2847
Web: www.blarg.net/~building/ofc-nita.html

This association promotes inventive and creative thinking through education and the networking of community and national resources. They provide information and ideas through a newsletter, a network of schools, and an annual conference (National Creative and Inventive Thinking Skills Conference and Workshops). For membership information contact the above address.

United Inventors Association of the United States

P.O. Box 23447
Rochester, NY 14692-3447
Phone: (716) 264-1778
Fax: (301) 963-7403
Web: www.sgn.com/invent/extra/uia_01.html

United States Copyright Office

Library of Congress
101 Independence Avenue SE
Washington, DC 20559-6000
Information Line: (202) 707-3000
Forms Hotline: (202) 707-9100
Web: www.loc.gov/copyright

United States Patent and Trademark Office

U.S. Department of Commerce
Crystal Park 3, Suite 441
Washington, DC 20231
General Info. Line: (800) 786-9199
Phone: (703) 308-HELP
Web: www.ucpto.gov

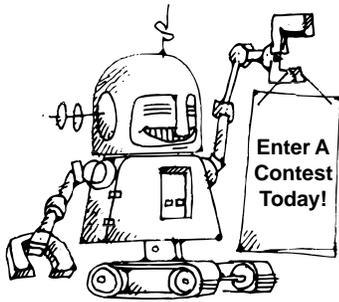
General Information Services Division
Crystal Plaza 3, Room 2C02,
Washington, DC 20231



Project XL

Office of Public Affairs
U.S. Patent and Trademark Office
Washington, DC 20231
Phone: (703) 305-8341
Web: www.uspto.gov

Project XL, an outreach program of the U.S. Patent and Trademark Office, is designed to encourage the development of inventive thinking and problem solving skills through national and regional workshops, teaching materials and kits, and programs offered in partnership with the National Inventive Thinking Association and other private and public organizations. They offer free copies of the following publications: **Inventive Thinking Curriculum Project**, **Black Innovators: Inspiring a New Generation**, and **Inventive Thinking Resources Directory**.



Invention

CONTESTS



Duracell/NSTA Scholarship Competition

This contest challenges students to design and build an original working device that is powered by Duracell batteries. The invention must be portable, self-contained and able to operate independent of supplementary equipment. Students are asked to submit a typed, double-spaced description of the device (no longer than two pages), a photograph, a wiring diagram, and an official entry form.

Grade Levels: 7-12 (individuals or pairs).

Prizes: Prizes include U.S. savings bonds, certificates, computers, publications, and Duracell gifts, over \$100,000 in prizes!

Contact: National Science Teachers Association (NSTA), 1840 Wilson Boulevard, Arlington, VA 22201-3000. Phone: (703) 243-7100, Fax: (301) 942-2777, E-mail: mharris@deans.umd.edu



Young Inventors Awards Program

The Craftsman/NSTA Young Inventors Awards Program challenges students to use creativity and imagination along with science, technology, and mechanical ability to invent or modify a tool. This competition began in 1996.

Grade Levels: 2-8 (individual).

Prizes: The two national winners (one from grades 2-5 and one from grades 6-8) will each receive a \$10,000 U.S. EE Savings Bond. The 10 national finalists (five from each grade category) will each receive a \$5,000 U.S. Series EE Savings bond. The 12 second-place regional winners (six from each grade category) will each receive a \$500 U.S. Series EE Savings Bond. The 12 third-place regional winners (six from each grade category) will each receive a \$250 U.S. Series EE Savings Bond.

Contact: www.nsta.org/programs/craftsman



Young Game Inventors Contest

Students under the age of thirteen are invited to create an original board game, including complete rules and game board.

Grade Levels: K-8.

Prizes: Prizes include a \$10,000 savings bond, certificates, seals of achievement, games, toys, magazine subscriptions, and the grand-prize winner receives an all expense-paid trip to San Francisco, a chance to have his/her game manufactured by University Games, a shopping spree, and much more.

Contact: University Games. Phone: (415) 503-1600, Ext. 736, E-mail: lynette@ugames.com

"Creativity is so delicate a flower that praise tends to make it bloom, while discouragement often nips it in the bud. Any of us will put out more and better ideas if our efforts are appreciated."

Alex F. Osborn



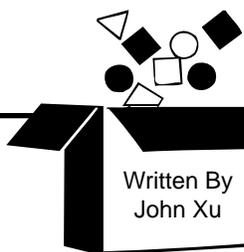
Young Inventors Program

This national recognition program invites students to create original inventions based on one or more of the following categories: Health, Business/Office, Household/Food, Agriculture, New Technology, Leisure Time/Entertainment, Transportation/Travel, and Environment. Each contest entry should include the title of the invention, a typewritten description that explains how it works and the source of the idea, and drawings, photographs or videotapes of the invention. National finalists will be asked to submit models.

Grade Levels: 7-12.

Prizes: Prizes include certificates of participation and achievement. The national winner will be recognized at the National Creative and Inventive Thinking Skills Conference.

Contact: National Inventive Thinking Association, P.O. Box 836202, Richardson, TX 75083 or Project XL, Office of Public Affairs, U.S. Patent and Trademark Office, Washington, DC 20231.



Spotlight on Type III Enrichment

The History of Making *The Wizard*™

Our teacher explained that a Type III Enrichment Project should be related to a subject in which you have a great interest, it should be something you enjoy doing, it requires research, and it involves something you create on your own. The teacher gave our class a handout sheet and explained the ten steps of a Type III Project. She also showed us a variety of Type III projects and Management Plans that other students had done.

I thought about my interest areas. The first ones that I thought of were music and cars. I planned to invent a better violin shoulder rest or something that helped prevent an accident when a driver falls asleep or loses consciousness while driving. I studied inventors and inventions. I read many books from my class collection and public libraries about invention and inventors.

On March 29, 1996 while my dad and I were picking up a Steven Caney book about inventions from the public library, a thief broke into our car and stole my violin. After that happened, I decided to invent a security system for valuables so that this would never happen to me again. I borrowed books from the library about electricity and electronics and studied them for about two weeks.

My first solution was to make a circuit that had a wire connected to the pocket of your pants. To steal the object, the thief would have to cut the wire. If he did, the circuit inside would cause the buzzer to start buzzing. I realized that the wired security system wouldn't be convenient because you would have to be connected to your valuable object all the time. I decided a wireless control would be better.

The only type of wireless control I knew about was radio control, which I learned from my toy radio controlled car. I noticed that the car would not move when I did not press a button. But when I did press the button, the transmitter sent a radio signal to the receiver. The signal made the car go forward. But when I was far away from the race car, it would not move. That was because the signal from the transmitter couldn't get to the receiver. I got the idea that I could just replace the car motor with an alarm so that when the transmitter sent a radio signal to the receiver, it would keep the alarm off. But when a thief steals an object with the receiver inside and takes it a certain distance from the transmitter, the radio signal from the transmitter can't get to the receiver and the alarm will sound.

I purchased a battery holder, a switch, and a buzzer. From a toy radio controlled car, I took a receiver and a transmitter, changed the circuit, and added the buzzer and battery holder. My prototype was finished!

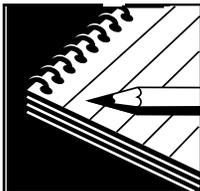
I typed up information about the ideas, features, technology, and instructions on how to use my invention which I named *The Wizard*™. Then I thought of disguising *The Wizard*™ as something that people would bring along on vacation, such as a toothpaste box or a soap box, so that thieves would not be able to recognize the security device once it becomes popular.

I created a display board for our Type III Fair. In our classroom we had a very successful Type III Fair. We each brought in our projects and displayed them at an Open House for parents, other classes, and visitors.

Since then, I have been thinking of ways to further improve *The Wizard*™. For example, I am planning to make it smaller and make it use less battery power.

John Xu was a nine year-old fourth grader in a full-time gifted program at Palmerston Avenue Public School in Toronto, Canada when he invented *The Wizard*™ during the spring term of 1996.

NOTES FROM THE TEACHER



Before beginning Type III projects each student completed an in-depth study of an eminent person in an area of personal interest to the student. Particular attention was paid to the talent development of the individual and characteristics which led to his/her achievements. Children, like John, who were interested in invention, learned from their biographical investigations that inventors "tinkered" as children, learned to deal with failures in a positive way, showed perseverance and task commitment, and worked very hard over a long period of time. An understanding of these common traits seemed to provide emotional support for the inventors in class who encountered difficulties in the development of their Type III projects. The students worked on their Type III projects in class each Friday afternoon for 12 to 14 weeks. This provided a good chunk of working time with few interruptions and other distractions. An inventors' corner was set up in the classroom with resource materials. During Type III work time, the inventors frequently offered each other support and advice.

Joanne Elmer is a teacher in Toronto, Canada and is a graduate of the Teaching For Talent Development program at the University of Connecticut. In her five years as a teacher in a pull-out gifted program for Grade 7 and 8 students and as a teacher in a full-time Grade 4, 5, 6 gifted program, she has had extensive experience in facilitating the development of Type III Enrichment Projects.

EYES ON TECHNOLOGY



InventorLabs Transportation.

Published by MacMillan Publishing. Price: \$19.99. Platform: Mac OS, Windows 95 / 98 / Me. Media: CD-ROM. ASIN: B00004UB6M.

InventorLabs invites you to enter the world of three great inventors who gave wings—and wheels—to all mankind. Meet the Wright brothers and help them build their revolutionary flying machine. Visit the turn-of-the-century workshop of Gottlieb Daimler, and explore his groundbreaking 1901 Mercedes automobile. Then tour George Stephenson's cottage, where you will reinvent the world's first practical steam locomotive. Science springs to life in a fascinating, hands-on celebration of man in motion.

You'll be transported to another world to wander through each workroom, to open drawers, examine tools, and explore real drawings, patents, and notebooks. Meet the extraordinary men who invented the future. Probe the innermost workings of their remarkable vehicles. Then test your wits by conducting dozens of experiments, each with many unique outcomes. Like the great inventors, you will learn from your failures as much as your accomplishments.

Return of the Incredible Machine: Contraptions.

Published by Sierra Attractions. Price: \$9.99. Platform: Mac OS, Windows 95 / 98 / Me. Media: CD-ROM. ASIN: B00004Y2LI.

Return of the Incredible Machine: Contraptions gives players a goal, such as knocking a blimp out of the air or blowing up a brick wall so a ball can escape. Players must build a functional machine that meets the goal, using a basket of wacky machine parts. Switches, levers, fire, wind, and electricity—not to mention good, old-fashioned gravity—are the engines you use to power your contraptions. Place them within mechanisms, flip them, shrink or grow them to fit—anything you can think of, as long as it achieves the contraption's specified task.

Widget Workshop. Published by Maxis. Phone: (800) 925-2669. Price: \$34.95. Platform: Macintosh and Windows. Media: CD-ROM. (Ages 8 and up). This virtual inventor's workshop invites youngsters to create unique contraptions with dozens of parts and pieces including pendulums, light switches, sound transformers, cannons, human and animal hearts, and much more. In addition to constructing gadgets and wacky inventions, learners can also solve widget puzzles, conduct experiments, play interactive games, and explore various principles of math and science.

Check Out These Great Resources!

Superintendent of Documents
U.S. Government Printing Office
P.O. Box 371954
Pittsburgh, PA 15250-7954
Phone: (202) 512-1800
Fax: (202) 512-2250

The *Superintendent of Documents* prints various publications related to patents and trademarks. Some titles include: **Basic Facts about Registering a Trademark** (\$3.25), **General Information Concerning Patents** (\$4.75), **Official Gazette of the United States Patent and Trademark Office—Patents** (Annual Subscription—\$1465.00; weekly journal), and **Official Gazette of the United States Patent and Trademark Office—Trademarks** (Annual Subscription—\$1015.00; weekly journal).

A Look At Women Inventors

Inventive Women Poster Set.

Published by the National Women's History Project, 7738 Bell Road, Windsor, CA 95492. (707) 838-6000. Order Number: 4905. (Ages 10 and up). This collection of full-color, multicultural posters honors eleven women inventors and their patented inventions.

Invite students to invent a new...

Dessert for people who like chocolate and strawberries

Mode of transportation

Olympic event or outdoor game

Piece of equipment to revolutionize a sport

Shoes or sneakers

Toothpaste or mouthwash flavor



Invention Web Sites

The following web sites will assist students in finding out more about the mothers and fathers of invention who used their intelligence in creative, productive ways to make this world a better place. Students can actually see many the inventions by touring the Invention Museum websites.

"BUILD-IT-YOURSELF" TOY LABORATORY

<http://northshore.shore.net/~biy>

This site helps students from ages 8 - 16 become constructive designers, inventors, and builders of future inventions. Students can download Top Secret toy plans, buy tools, parts, and supplies, join the Build-It-Yourself Hot Shot Inventors Crew, and demonstrate their toy inventions. Students learn to design, invent, and build whimsical remote control and programmable toys mostly from recycled materials used in conjunction with Lego parts, K'nex, Radio Shack, and the local hardware store.

FRANKLIN PIERCE LAW CENTER

<http://www.fplc.edu>

This scholarly community is dedicated to addressing the creation, maintenance, protection, and transfer of intellectual property assets in today's global economy. Because of the global information explosion created by the Internet, issues of whether and how to protect creativity and innovation in the arts and technology are increasingly important. Opportunities to register for courses, seminars, and special events are provided.

THE INTERNET INVENTION STORE

www.inventing.com

Details about the FlossPro, the Krumstick, the Recycle Cycle and a device that launches rubber bands from a laser pointer are all available at this handy site. Who knows what these crazy ideas may make you think of!

INVENTING A NEW KIND OF PENCIL

www.noogenesis.com/inventing/pencil/pencil_page.html

This site helps teachers take students through the steps of inventing a better pencil. The invention process takes students back and forth from two distinct thinking states; creative/non-judgemental and critical/judgemental. Exercise your students' critical thinking abilities by having them examine and brainstorm ways to improve this essential tool.

INVENTION CONVENTION

http://kafka.uvic.ca/~monterey/hyperzone/hzone_what.html

This site demonstrates the sixth grade project of Steven Toleikis', who challenged his students to invent some way to turn written research reports into a HyperCard project they call, The HyperZone. This is a student-created

InfoBank on the Web that has a Kid Tours Home page where they are looking for all ideas, BIG or small to help create a larger "kid-made" InfoBank. There is a student article on the invention of Braille and "Mystery Impossible," an interactive portion where students work as detectives to find "fact-clues," solve riddles and puzzles, and investigate strange mysteries. It is an example of what students could invent on the Worldwide Web.

INVENTION DIMENSION

<http://web.mit.edu/invent>

The Invention Dimension offers a wide array of information, from the Inventor's Handbook to the Inventor of the Week Archives. Maintained by the Massachusetts Institute of Technology (MIT), it has an invention 'Trivia Challenge', a new book on American inventors, Inventing Modern America, and a variety of contest and awards.

INVENTNET: THE INVENTORS NETWORK

<http://www.inventnet.com/index.html>

This site offers step-by-step advice of what to do if you have an IDEA. There is an illustration of the inventing-patenting process along with the InventNET Forum. Students can read the on-going discussions, search the discussion archives, ask questions, and share experiences with other inventors. Students learn how to protect themselves against dishonest Invention Submission and Marketing companies.

INVENTORS DIGEST

<http://www.inventorsdigest.com>

This site is designed for anyone who has ever said, "I've got a great idea...now what do I do?" It is also THE spot for anyone who is searching for the Next HOT product. The magazine site and the accompanying links lead students to the wonderful world of invention.

INVENTOR SOLUTIONS

www.ideasa-z.com

This site has free information about getting your invention on television. The concept of "inventigation," combining consumer needs and industrial needs to create a new product with a commitment to a code of moral or artistic values is explained.

INVENTORS MUSEUM

www.inventorsmuseum.com

This site has links that cover a wide range of inventors and their inventions. Thomas Edison is the featured inventor, along with African-American Colonial inventors. Check out the medical inventions, along with the monthly-featured inventor.



Invention Web Sites

LEGO DACTA

www.stemnet.nf.ca/CITE/dacta.htm

This site contains student activity sheets and Teacher's Guides for technology programs using Lego Dacta. The activities relate to building simple machines by connecting gears and pulleys. Directions for keeping an inventor's log are provided along with investigations that encourage students to document their findings as they move into the design area of technology.

NATIONAL AIR AND SPACE MUSEUM

www.nasm.edu

The Smithsonian Institution's National Air and Space Museum (NASM) maintains the largest collection of historic air and spacecraft in the world. It is a major center for research into the history, science, and technology of aviation and space flight.

NATIONAL INVENTORS HALL OF FAME and INVENTURE PLACE

www.invent.org

Part museum and part laboratory, The Inventure Place is designed to encourage curiosity and creativity. Contents include a National Inventors Hall of Fame that has an alphabetical list of inventors with links to biographical information. It has descriptions of programs, activities, competitions, and links to other invention sites on the Internet. It also links student inventors with hands-on museums in American and around the world. The Inventors Museum offers a virtual museum to student inventors of the future.

NIKOLA TESLA

www.nickf.com/tesla.htm

Croatian-born Nikola Tesla was an inventor whose ideas, such as alternating electrical current, rivaed, and in some cases, excelled, those of his contemporary, Thomas Edison. His patents number about 700 and include some for radio transmission that predate those of Marconi. Tesla has been referred to as "the greatest inventor ever forgotten."

PATENT-O-PEDIA KIDS INVENTION REFERENCE RESOURCE

kids.patentcafe.com/patent-o-pedia/index.asp

kids.patentcafe.com/patent-o-pedia/museum

kids.pattentcafe.com/inveentioneers/index/asp

This site provides guidance for students who wish to pursue the patent process through the use of an invention journal, patent search, and invention evaluation. For \$29.95 students can join the "Inventioneer Club," where they receive specialized suggestions with their own invention from "Ask Dr. Ed." The site has a list of 'Try This! Projects' for those kids who need a jump-start and an Inventioneers Invention Competition with \$5000 in prize

monies for those with different motivational needs! Check out the kid's museum of ingenious patents. Experiment with individual or team in-class inventing activities. The site even supports an "Invent for Peace" initiative.

SMITHSONIAN MUSEUM

www.si.edu/lemelson/dig.links.html

The Lemelson Center is a place to explore the exciting world of invention. Students, teachers, inventors, and history buffs, alike, will find things they can use here. A special feature is a spotlight on famous American inventors such as Eli Whitney and Ben Franklin along with African-Americans who made their mark in the invention world. The Center for Invention at the Smithsonian has lots of links to Invention Museums all over the world. Lasers and electromobiles, lunar learning, phantom fingers and robot ants are just a few of the intriguing inventions on this site about innovation. Meet the "Lady Edison's," the female inventors of the 20th century like Beulah Henry. She invented an umbrella design that was showcased by Lord and Taylor and earned her \$50,000. Beulah earned her first patent in 1912 at the age of 25 for an ice cream freezer.

UNITED STATES COPYRIGHT OFFICE

<http://www.loc.gov/copyright>

"It is the principle of American law that an author of a work may reap the fruits of his or her intellectual creativity for a limited period of time."

This site provides students with national and international copyright laws that govern and protect intellectual products such as books and plays. A history and overview of the patent process are provided. Students may also search copyright records and secure forms that they may need to protect their own invented products. There is also a section entitled "Frequently Asked Question."

WACKY PATENT OF THE MONTH

colitz.com/site/wacky.htm

The "Tailless monoplane With Longitudinal Side Wings," designed by Philadelphian Edward F. Wagner in 1936 is just the type of invention that would make Rube Goldberg proud. It joins a parade of wacky patents, including the pat-on-the-back apparatus, the self-waiting table, and the nose shaper designed by patent attorney, Michael J. Colitz Jr.

Travel Back in Time



Mechanical inventions, or technology, make our lives today very different than those of our ancestors. Imagine life without television, cars, computers or telephones. Our grandparents sometimes remind us of what this was like. Now imagine life without books to read or electricity. It would not be possible to predict weather, like hurricanes, from satellites. Step further back in time and think about what it would be like without the tools to make cotton clothing. Now, imagine living in the very early history of humankind. How would you build a shelter; how would you get food and cook?

These questions were asked by humans during the Stone Age. As they began to find solutions to these problems, they created technology. Humans began making tools out of stone and then later developed more elaborate things, like bows and arrows. They also learned how to bake the earth with fire to make pottery that could hold food and be used for grinding.

Over the next few thousands of years, people discovered how to take metals, like Iron and Bronze, from the earth. This discovery was very important because they were the strongest

Stone Tools
1 million years ago

Pottery
12,000 years ago

Wheel
3500 B.C.

Ships
600 B.C.

Windmill
Mechanical Clocks
Magnetic Compass
1280

Submarine
Telescope
Microscope
1590

Typewriter
1867
Photography
1879
Telephone
1918
Gasoline Car
SONAR
Computer
Satellite
T.V.
Record Player
Airplane
Man on the Moon
Today

materials humans had at the time. It was during this time that people also began to farm land for food instead of hunting and gathering.

In the periods of time that followed, humans discovered power. They harnessed the energy of wind, water and horses to save their own strength. It was also during this time that soap was invented, an important invention that allowed people to avoid infection and smell better!

In the 1400s, the printing press was invented, an instrument that radically improved communication. Because of the press, people could exchange ideas without ever meeting each other. Transportation also improved, allowing people to see more of the world. Then came the cotton gin and the typewriter; then the telephone, electricity and the car. In just the past twenty years, inventors have given us the personal computer, the FAX machine and the CD player. As you can tell, humanity is creating technology faster and faster these days, making our lives more and more different from early humans.

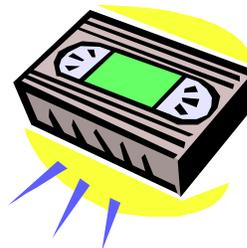
What do you think is the most important invention? Why?

Bermuda Biological Station for Research

Videotapes & Teacher Training Guides

Two outstanding invention resources for teachers from PBS's Scientific American Frontiers series:

- Inventing the Future (show 701—October 23, 1996)
- Robots Alive! (show 705—April 9, 1997)



For further information contact:
Scientific American Frontiers
105 Terry Drive, Suite 120
Newtown, PA 18940-3425
Phone: 800-315-5010
E-mail: saf@pbs.org
Web: www.pbs.org/saf

Have a problem?



Got an idea?



Invent a solution!



ITM — Idea to Market

Do you have an idea for a product that the world just can't live without? Come to ITM.

ITM is a non-profit organization designed to help people with innovative ideas through the invention process. Take a little time and see how we can help you bring your ideas from your mind to the marketplace. ITM members hold a storehouse of experience they willingly share with newcomers. They include:

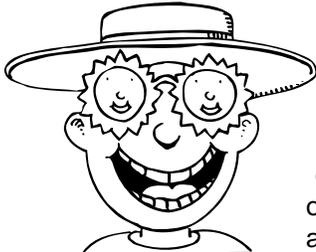
- Building a prototype
- Patents and trademark
- Manufacturing your product
- Marketing your product
- Packaging your product
- Distribution of your product
- Writing a business plan
- Copyrights/royalties, licensing
- Trade shows
- Import/Export
- Writing press releases
- Media exposure
- Investors
- And much much more

Address: ITM, P.O. Box 12248, Santa Rosa, CA 95406

Phone: 800-486-3210

Website: www.ideatomarket.org

Read About Kid Inventors!



Be An Inventor. (1987). Written by Barbara Taylor. Published by Harcourt Brace and Company, 525 B Street, Suite 1900, San Diego, CA 92101. Price: \$11.95. Hardcover. ISBN: 0-15-205950-4. 80 pages. (Ages 8-12). This resource introduces children to the exciting world of inventing and provides practical tips for generating and developing ideas, obtaining a patent, and selling and marketing an invention. The author also presents stories about children inventors, describes characteristics that inventors have in common, discusses the development of unusual inventions such as earmuffs and chewing gum, and provides activities, exercises, questions, diagrams, photographs, illustrations, a listing of inventors' associations and shows, and a suggested reading list.

Brainstorm! The Stories of Twenty American Kid Inventors. (1995). Written by Tom Tucker. Illustrated by Richard Loehle. Published by Farrar, Straus & Giroux, 19 Union Square West, New York, NY 10003. Price: \$15.00. Hardcover. ISBN: 0-374-30944-2. 144 pages. (Ages 10-14). This book contains inspirational stories about twenty young American inventors such as Chester Greenwood (creator of earmuffs), Ralph Samuelson (originator of water-skiing), Vanessa Hess (inventor of colored car wax), and Jerrald Spencer (creator of an electronic gizmo for toys). In addition to these remarkable stories, this resource also includes step-by-step advice for young inventors who are interested in turning their own great ideas into inventions of the future.

Girls & Young Women Inventing: Twenty True Stories About Inventors, Plus How You Can Be One Yourself. (1995). Written by Frances Karnes and Suzanne M. Bean. Published by Free Spirit Publishing, 400 First Avenue North, Suite 616, Minneapolis, MN 55401. Price: \$12.95. Paperback. ISBN: 0-915793-89-X. 168 pages. (Ages 11 and up). This inspirational collection of stories focuses on the lives of twenty young female inventors and their inventions. These fascinating first-person accounts describe how each inventor came up with her idea, who helped her, what problems she faced, and how she solved her problems. This remarkable book also contains information about the invention process, tips for keeping an inventor's notebook, facts about female inventors in history, quotations about inventing and creativity, information about inventor associations and organizations, and a list of books for further reading.

Mystery Inventions

Accidental Floater _____

Flavored Chicle _____

Empty Pie Pan Offspring _____

Man-Made Sticky Burrs _____

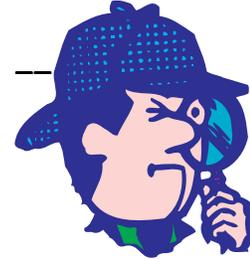
A Sipper's Delight _____

Underwater Diver _____

Cool Contraption _____

Bright Illuminator _____

Electric Stitcher _____



Invention Scramblers

Match the inventor to his/her invention.

Inventors

xredaenla haamrg lble
rnhey dfro
strehec odwnoegre
cmbtwohi donjus
vea dnmnala
seojhp lrnime
smjae ntihsiam
vlie sratus
tuhr fwekaldie
lei ytnwehi

Inventions

llrero stksae
cltohocae phci okosiec
perpzi
sjane
ttnoco ngi
leptehnoe
lombeiauot
rfmfeusa
blaksblaet
lbrlamue



Who Am I?

What famous American author received a patent in 1871 for pants suspenders?

Who was the first inductee into America's National Inventor's Hall of Fame and holds the world record for number of U.S. patents?

Who signed the first U.S. patent bill into law?

See page 17 for answers.