“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

“Imagination is more important than knowledge.”
Albert Einstein

Opportunities for Young Inventors

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, produced, 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?
"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!

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

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

"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 Vinci
Elias Howe
Gugliemo Marconi
Maria E. Allen
Samuel Colt
Melitta Bentz
George Eastman
Robert Fulton
Samuel Morse
Orville and Wilbur 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?

<table>
<thead>
<tr>
<th>Inventor</th>
<th>Invention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Howard Aiken</td>
<td>Computer</td>
</tr>
<tr>
<td>Alice King Chatham</td>
<td>Helmet used by Chuck Yeager when he broke the sound barrier</td>
</tr>
<tr>
<td>Margaret Grimaldi</td>
<td>Space Shuttle Escape Pole</td>
</tr>
<tr>
<td>Leo Baekeland</td>
<td>Plastic</td>
</tr>
<tr>
<td>Alexander Fleming</td>
<td>Penicillin</td>
</tr>
<tr>
<td>Robert Goddard</td>
<td>Rocket</td>
</tr>
<tr>
<td>Charles Goodyear</td>
<td>Vulcanization of Rubber</td>
</tr>
<tr>
<td>Sarah G. Goode</td>
<td>Folding Bed</td>
</tr>
<tr>
<td>Katherine Burr Blodgett</td>
<td>Nonreflecting Glass</td>
</tr>
<tr>
<td>Frances Gabe</td>
<td>Self-cleaning House</td>
</tr>
<tr>
<td>Peter Hodgson</td>
<td>Silly Putty®</td>
</tr>
<tr>
<td>John Pemberton</td>
<td>Coca-Cola®</td>
</tr>
<tr>
<td>Wilhelm C. Roentgen</td>
<td>X-ray</td>
</tr>
<tr>
<td>Anne Connelly</td>
<td>Fire Escape</td>
</tr>
<tr>
<td>Mary Anderson</td>
<td>Windshield Wiper</td>
</tr>
<tr>
<td>Spencer Silver</td>
<td>Post-it Notes®</td>
</tr>
<tr>
<td>Vladimir Zworykin</td>
<td>Television</td>
</tr>
</tbody>
</table>

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.
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.

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

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?

**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
"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. Knitting machine
b. Needle threader
c. Bicycle 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 for a hat store
c. Boomerang hat

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

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

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 is a creative thinking process inventors 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 off-the-wall they may seem. The idea is to look at something that is familiar and see it in a totally new way!

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 a 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?

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.

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.

**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!**


---

**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
"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
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 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)


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.


"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
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 (whooppee 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.


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.


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


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 Strauss (Jeans), Ruth Wakefield (Chocolate Chip Cookies), Eli Whitney (Cotton Gin).


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


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.


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.


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


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.iipo.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.uspto.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.
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.
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.

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 eachother 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.

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 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
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://afka.uvic.ca/~monterey/hyperzone/hzone_whatis.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 "inventigration," 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.
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, rivaled, 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.patentcafe.com/invenzioneers/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 "Invenzioneer 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 Invenzioneers 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.
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 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?

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.idealmarket.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.


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
rmhey dfro
strehec odunnoegre
cmbtwohi donjus
vea dnmnala
seojhp lnime
smjae nthsiam
vlie sratus
tuhr fuekalde
lei ytnwehi

Inventions

llrero stklsaec
clthoacae phci okosiec
perpzi

ttnoco ngi
leptehnoe
lomboiaut
rfmfeusa
blaksblael
lbriamue

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.