



Historical Perspectives For Children

Dear Teachers:

Ben Franklin was truly a Renaissance man whose love of learning, immense curiosity and genuine concern for the public welfare led to his numerous inventions, as well as his involvement in the founding of many institutions in Philadelphia. His inventions included the famous lightning rod, swim fins, bifocals, the Pennsylvanian fire-place (or the Franklin Stove as we know it), a new type of odometer and a library chair which turned into a stepping stool. He was a driving force behind the founding of Philadelphia's first lending library, the first hospital, the first fire department, the first fire insurance company, as well as a school which grew to be the University of Pennsylvania. He was also a tireless advocate for the colonies' concerns becoming, at the age of 70, a revolutionary and eventually signing both the Declaration of Independence and the Constitution.

Through dramatizing Ben's life, we will encourage students' curiosity and urge them to ask, as Ben often did, "I wonder if . . ." -- a question which may lead students to make their own discoveries or create their own inventions. Ben will also introduce students to the simple wonder of static electricity and the basic scientific process. Finally, they will learn about the political conflict of the time which led to the founding of our nation, the Revolutionary War, and the election of our first president, George Washington. Ben's story will both delight and inspire your students, and he will leave them with the question, "What good can I do today?"

Ben Franklin's 300th birthday was celebrated in 2006. He is the first founding father to reach 300. You can find information about this celebration, including curriculum suggestions and complete lesson plans for all grade levels, on www.benfranklin300.org.

We look forward to presenting [BEN FRANKLIN: Statesman and Inventor](#). We know you and your students will enjoy the inspiring story of this most fascinating fellow!

--Joan Schaeffer
President

Note: While our electrostatic machine may look a bit modern, it is operated upon the same principle as Ben's original electrostatic machine, and it is all manual. There are no reliable electrostatic machines available today which look the same as Ben's.

TIMELINE

- 1706 Born on January 17 to Josiah Franklin and Abiah Folger in Boston, Massachusetts. He was the 15th of 17 children and their 10th, and last, son. He is the youngest son of the youngest son of the youngest son for five generations.
- 1716 Attends elementary school for two years, the total of his formal education.
- 1718 Becomes an apprentice to his brother, James, in his print shop.
- 1722 “Silence Dogood” essays (14 total) published anonymously in New England *Courant*.
- 1723 Runs away to Philadelphia; finds work with printer Samuel Keimer.
- 1724 Sails to England to study the latest innovations in printing; works as a printer.
- 1726 Returns to Philadelphia and sets up a printing shop with a partner.
- 1727 Founds the Junto, a club to further the education and business success of ambitious young men.
- 1728 Sets himself up in the printing business with partner Hugh Meridith.
- 1729 Begins publishing *The Pennsylvania Gazette*, which becomes the most popular newspaper in America.
- 1730 Settles down with Deborah Reed. Becomes sole owner of the *Gazette*.
- 1731 Establishes the first circulating library with the help of his friends in the *Junto*.
- 1732 Publishes first edition of Poor Richard’s Almanack. This continues to be published for 25 years.
- 1736- Founds the Union Fire Company; appointed postmaster of Philadelphia; appointed clerk of the
1737 Pennsylvania General Assembly.
- 1742- 1742- Invents the Pennsylvanian fire-place (as he called it); proposes the development of the
1743 1744 University of Pennsylvania.
- 1748 Elected to the Philadelphia Common Council; retires from printing and turns over his shop to his foreman.
- 1751 Founds the Pennsylvania Hospital with friends in the Junto; elected to the Pennsylvania Assembly; publishes first edition of Experiments and Observations on Electricity.
- 1752 Conducts his kite experiment with his son William; establishes first American fire insurance company; invents the lightning conductor (lightning rod).
- 1753 Presented with the Copley Medal by the Royal Society of London in recognition of his work with electricity; receives honorary degrees from Harvard and Yale.
- 1754 Colonies reject his Albany Union Confederation Plan, a plan to unite the American colonies for purposes of defense.

- 1755- Organizes and commands a citizens' army to defend the region against the French and their Native
1756 American allies.
- 1757- Sails to London as representative of the Pennsylvania Assembly and serves as a colonial agent for all
1775 but two years. Tries but fails to prevent the revolution in the colonies.
- 1762- Returns to America; loses race for the Pennsylvania Assembly; returns to London as colonial agent and
1764 works for repeal of the Stamp Act.
- 1762 Describes the armonica in a letter to a friend. The invention proves to be a popular fad.
- 1766 Testifies on the Stamp Act before the House of Commons.
- 1769 Elected president of the American Philosophical Society; becomes colonial agent for New Jersey and
Pennsylvania.
- 1771 Amends and publishes Autobiography.
- 1774 Intolerable Acts (tax acts) passed by Parliament.
- 1775 Returns to America; elected to Continental Congress; submits the Articles of Confederation.
- 1776 Assists Thomas Jefferson in writing the Declaration of Independence; signs Declaration; sails to France
to negotiate an alliance.
- 1778 Negotiates and signs the Treaty of Alliance and the Treaty of Amity and Commerce with France; France
declares war on Britain.
- 1782 Negotiates treaty with Great Britain; signs the Treaty of Versailles.
- 1784 Invents bifocal glasses, commenting that they help him "hear" better because he could now see both
the food on his plate and the mouths of others at the table who are speaking French.
- 1785 Returns to Philadelphia; appointed delegate to the Constitutional Convention.
- 1787 Attends the Constitutional Convention and makes important contributions; signs the Constitution of the
United States.
- 1789 Finishes the last section of his autobiography; submits memorial to the U.S. Congress to ban slavery.
- 1790 Dies in Philadelphia on April 17 at the age of 84; buried in the Christ Church burial ground.

BOOKLIST

There are many excellent books about Ben Franklin. Following is a list of some for both primary and intermediate grade levels:

PRIMARY GRADES

<u>Benjamin Franklin</u>	Philip Abraham
<u>Benjamin Franklin</u>	Lucia Raatma
<u>Benjamin Franklin: Lives and Times Series</u>	Jennifer Gillis
<u>Ben Franklin and the Magic Squares (Step into Reading, Step 4)</u>	Frank Murphy
<u>Benjamin Franklin: Inventor and Patriot</u>	Carin T. Ford
<u>The Revolutionary War: A True Book</u>	Brendan January
<u>Democracy's Signature: Benjamin Franklin and the Declaration of Independence</u>	Danny Fingeroth_

INTERMEDIATE GRADES

<u>Ben Franklin's Almanac: Being a True Account of the Good Gentleman's Life</u>	Candace Fleming
<u>What's the Big Idea, Ben Franklin?</u>	Jean Fritz
<u>How Ben Franklin Stole the Lightning</u>	Rosalyn Schanzer
<u>Benjamin Franklin: Let Freedom Ring</u>	Susan Gregson
<u>Benjamin Franklin: American Statesman, Scientist and Writer</u>	Bruce/Becky Durost Fish
<u>Benjamin Franklin</u>	Peter and Connie Roop
<u>Benjamin Franklin: World Leaders Past and Present</u>	Chris Looby
<u>Benjamin Franklin: A New American</u>	Milton Meltzer
<u>Ben Franklin's Autobiography</u>	Ben Franklin

COLONIAL LIFE

<u>Life in the Thirteen Colonies</u>	Deborah DeFord
<u>Colonial Home Life</u>	John Warner

Boys and Girls of Colonial Days

Carolyn Bailey

Historic Communities

Bobbie Kalman

ELECTRICITY

The Science of Electricity

Steve Parker

Understanding Electricity (with easy-to-make projects)

Gary Gibson

What is Electricity? (Rookie Series)

Lisa Trumbauer

Experiments With Electricity

Salvatore Tocci

The History of Electricity

Robert Snedden

Electricity and Magnetism Science Fair Projects

Robert Gardner

Science Experiments: Electricity

John Farndon

Make It Work! Electricity

Alexandra Parsons

WEB SOURCES

Franklin's 300th Birthday – www.benfranklin300.org

Franklin Court: Franklin's Life – www.nps.gov/inde/Franklin_Court/Pages/franklinprinter.html

Franklin Court: Kids' Corner – www.nps/inde/Franklin_Court/Pages/kids.html

Ben's Guide – <http://bensguide.gpo.gov/benfranklin/>

Benjamin Franklin: Glimpses of the Man – <http://sln.fi.edu/franklin>

Benjamin Franklin – www.pbs.org/benfranklin/

The Electric Ben Franklin – www.ushistory.org/franklin

An Enlightened American – <http://library.thinkquest.org/22254>

The Revolutionary War – <http://library.thinkquest.org/10966>

Colonial Hall: Biographies of the Founding Fathers – www.colonialhall.com/index.asp

Early America – www.earlyamerica.com/earlyamerica/index.html

GLOSSARY OF TERMS

Apprentice - A person who learns a trade by working for someone else.

Founding Father - One of the group of men who helped the colonies become one country.

Colony – An area of land governed by a distant country.

Patriot – A person who believed the American colonies should be free of British rule.

Congress – Group of men and women who make the laws for the United States.

Constitution – The document which explains how the government works and defines the rights people have in the United States.

Declaration of Independence – The historic document in which the American colonies state their independence from England.

Experiment – To test or prove something.

Government – The group of people who rule a country.

Revolutionary War – The war from 1775-1783 in which the American colonies fought for freedom from England.

Right – Something all people deserve to have, such as the right to sit where one wants to on a bus, the right to eat in any restaurant, and other basic freedoms defined in the Constitution, such as the freedom of speech.

Electrical charge – Created when electrons are transferred from one object to another. Rubbing two objects together creates a “charge.” Static electricity is a form of a charge.

The terms below relate to Ben’s work with electricity, though we do not go into this much detail in the program:

Atom - The smallest piece of an element which still has the same properties as the element.

Conductor – Material through which electricity can easily pass.

Insulator – Material which is a poor conductor of electricity.

Neutron – A particle contained in the nucleus of an atom; it has no electrical charge.

Electron – A particle contained in an atom; it has a negative electrical charge.

Nucleus – The positively charged center of an atom, made up of protons and electrons.

Proton – A particle contained in the nucleus of an atom; it has a positive electrical charge.

INTERESTING TIDBITS

Inventions

He invented the lightning rod, bifocal eyeglasses, the flexible catheter, a chair which turns into a step ladder, a clothes pressing machine, a grasping pole to take down books from a high shelf, various lab equipment, the glass harmonica or the “armonica” as he called it (the first musical instrument to be invented by an American)*, various clocks, swim fins (he was posthumously inducted into the International Swimming Hall of Fame) and the Pennsylvanian fire-place (as he called it). He made improvements to the printing press and designed a different type of odometer. He also invented a contraption whereby he had a cord at the head of his bed which connected to a bolt on the door. When he was ready to go to sleep, he pulled the cord to lock the door. Ben never patented any of his inventions, saying “We should be glad on an opportunity to serve others by any invention of ours, and this we should do freely and generously.”

*The armonica was an instrument consisting of bell-shaped glasses in graduated sizes lying one inside another along an iron rod which pierced their center and supported them above a tray. A foot pedal turned the glasses on the rod. Wet fingers applied to the spinning rims of the glasses produced beautiful tones. Mozart composed music for the armonica, and this plays at the end of our program.

Interests

In addition to the armonica, he played the harp, guitar and violin. He demonstrated the way dark or light colored clothing increased or diminished how hot the wearer felt. He studied the weather, observed the patterns of storms and helped chart the Gulf Stream in greater detail. He was the first to test the use of oil to quiet troubled waters. He investigated population changes, which led to the new science of demography. (He forecast with great accuracy that the American population would shoot up enormously by a doubling of numbers every generation.) He suggested Daylight Savings Time. He was the first to use cartoons and a question/answer format in journalism. He figured out how to put Indian languages into print, even though tribes had no written language. He advocated the idea of punishing aggressor nations through the organization of a United Nations. In the study of electricity, he invented the concepts of and coined the terms positive and negative charge. (He did not “invent” electricity as many assume. His kite experiment was to determine whether the clouds in a storm were electrified. Once he realized they were, he invented the lightning rod to bring this electrification to the ground and thus solved the problem of lightning causing so many fires.) Under Ben’s direction, his grandson, Benjamin Franklin Bache, published some books for children. Ben read them to little girls and boys and realized this improved their progress in reading. He helped organized the first fire department in Philadelphia and started the first fire insurance company, which is still in existence today in Philadelphia. He helped organize the first lending library. He started an academy which grew to be the University of Pennsylvania. He worked with Dr. Thomas Bond and proposed matching grants to start the first hospital in Philadelphia.

Ben’s work with electricity greatly advanced the understanding of nature and behavior of electricity, but almost a century passed before Edison discovered that one could pass electricity through a very thin section of wire, causing it to heat up and even glow.

Founding Documents

Thomas Jefferson wrote the original Declaration of Independence, and the “committee of five” suggested changes and revisions. Ben is credited with the words “We hold these truths to be self-evident,” a change from the original, “We hold these truths to be sacred and undeniable.”

Poor Richard's Almanack (Written as Ben wrote them):

- *They that give up essential liberty to obtain a little temporary safety deserve neither liberty nor safety.
- *The greatest talkers are the least doers.
- *Words may show a man's wit, but his actions his doings.
- *Diligence is the mother of good luck.
- *Let all things have their places; let each part of your business have its time.
- *A nation, to keep respect of other states, must keep its own self-respect at home.
- *One way of being content with a situation is comparing it with a worse one.
- *Little strokes fell great oaks.
- *He that can compose himself is wiser than he that composes books.
- *After crosses and losses, men grow humbler and wiser.
- *Imitate Jesus and Socrates.
- *A penny saved is a penny earned.
- *Early to bed and early to rise makes a man healthy, wealthy and wise.
- *Resolve to perform what you ought; perform without fail what you ought.
- *A man who is good at making an excuse is seldom good at anything else.
- *Hunger never saw bad bread.
- *An apple a day keeps the doctor away.
- *He does not possess wealth; it possesses him.
- *God helps them that help themselves.
- *Haste makes waste.
- *Happiness in this world depends on internals not externals.
- *Glass, china and reputation are easily cracked and never well mended.
- *The noblest question in the world: What good may I do in it? (We end our program with this question.)

THE THIRTEEN VIRTUES BEN DEEMED DESIRABLE (As Ben wrote them in his autobiography)

1. TEMPERANCE. Eat not to Dulness. Drink not to Elevation.
2. SILENCE. Speak not but what may benefit others or your self. Avoid trifling Conversation.
3. ORDER. Let all your Things have their Places. let each Part of your Business have its Time.
4. RESOLUTION. Resolve to perform what you ought. Perform without fail what you resolve.
5. FRUGALITY. Make no Expence but to do good to otehers or yourself: i.e. Waste nothing.
6. INDUSTRY. Lose no Time. – Be always employ'd in something useful. – Cut off all unnecessary Actions.
7. SINCERITY. Use no hurtful Deceit. Think innocently and justly; and, if you speak; speak accordingly.
8. JUSTICE. Wrong none, by doing Injuries or omitting the Benefits that are your Duty.
9. MODERATON. Avoid Extreems. Forbear resenting Injuries so much as you think they deserve.
10. CLEANLINESS. Tolerate no Uncleaness in Body, Cloaths or Habitation.
11. TRANQUILITY. Be not disturbed at Trifles, or at Accidents common or unavoidable.
12. CHASTITY. Rarely use Venery but for Health or Offspring; Neer to Dulness, Weakness, or the Injury of your own or another's Peace or Reputation.
13. HUMILITY. Imitate Jesus and Socrates.

A FEW NOTES ABOUT STATIC ELECTRICITY

Technically, static electricity is defined as the imbalance in the amount of positive and negative charges in the surface of an object. Objects can be electrified or “charged” by rubbing. The result is that objects may be attracted to each other or may even cause a spark to jump from one object to the other. Common examples of static electricity in action are static cling, flyaway hair and the sparks which can occur when you touch something. The kind of electrification or strength of the “charge” is dependent upon which types of objects are rubbed together. Following are a few experiments you can do in the classroom to demonstrate “charge.” Please note that if there is high humidity in the room, the experiments will not work as well.

Get a golf tube from a golf bag. You can also use PVC piping. When you rub this with some fur (rabbit fur works well), it becomes quite charged and can attract various objects. In the show, Ben attracts tissue paper, ping pong balls which are sprayed with a metallic spray (try attracting them with and without the spray), yarn, rope (preferably hemp), Christmas ornaments and a piece of masking tape. Following are a few additional experiments you can try:

1. Get a clear, clean plastic liter bottle with a cap, colored tissue paper, packing popcorn and cloth scraps (wool is best). Cut or tear tissue and popcorn into small pieces. Put some bits in the bottle, and close the cap. Rub cloth over bottles and observe. Explain that the bits in the bottles are now “charged” and have static electricity. Experiment and observe the differences when rubbing slowly and quickly. Substitute paper/popcorn bits with salt, sugar or pepper, and record the differences.
2. Tie a string to the end of each of two balloons. Have one student rub one balloon with a woolen cloth and another student rub the second balloon with a paper towel. Bring the two balloons together, and see what happens.
3. Rub a balloon with a paper towel or woolen cloth, and see if it sticks to a wall. Repeat and hold it above a friend’s head. Observe what happens.
4. Rub a balloon on a piece of wool, and hold it over plastic foam pellets. Observe what happens. Watch the pellets for three to five minutes, and note the changes which occur.
5. Take two strips of clear plastic tape, each about 6” long. Fold a short length at the end of both strips to make a tab you can grasp. Place the sticky side of one strip on the non-sticky side of the other strip. Next, hold the strips by their tabs, and pull them apart. What happens when you slowly bring the two strips near one another? Are the charges the same or different? (Objects with the same charge repel one another; objects with different charges attract.)

The Scientific Method:

Start with and state the purpose of the experiment.

Formulate a hypothesis or an educated guess of what you think will happen.

Go through the procedure.

Develop a data chart on which your observations are recorded.

Record what actually happened or the result.

Conclude whether your hypothesis was correct or incorrect.

In Ben’s famous kite experiment, he proved that clouds were electrified during a storm. When lightning hit the metal pole which was connected to his kite, it caused the hairs on the kite string to stand on end, and when he touched the key connected to the string, he saw a spark.

TRIBOELECTRIC SERIES

Triboelectricity is the physics of charge generated through friction. In the table below, rubbing any material from the top of the list with any material from the bottom of the list will create a relatively strong charge. The farther apart the materials are in the list, the greater the charge will be. For example, rubbing rabbit's fur on a golf tube (as Ben does during the show) creates a pretty strong negative charge on the tube. It will attract such items as paper, yarn, twine and other materials. This is a fun and simple activity to do in the classroom.

Positive charge

human hands
leather
rabbit's fur
glass
human hair
mica
nylon
wool
lead
cat's fur
silk
aluminum
paper (small positive charge)
cotton (no charge)
wood (small negative charge)
lucite
sealing wax
acrylic
amber
polystyrene
polyethylene
rubber balloon
resins
hard rubber
nickel, copper
brass, silver
gold, platinum
sulfur
acetate, rayon
celluloid (synthetic rubber)
polyester
styrofoam
orlon
saran wrap
polyurethane
polyethylene (like scotch tape)
polypropylene
vinyl (PVC pipe or golf tube)
silicon
teflon
silicone rubber
Negative charge