



THEATRE IV
Classroom
Connections

For teachers and students grades K - 5

Ben Franklin and His Kite

A Theatre IV Production

Teacher Resources



In the Classroom

Ben Franklin and His Kite is presented in support of Virginia Standards of Learning in Science: K.1, 1.1, 2.1, 2.6, 3.1, 3.11, 4.1, 4.3, 5.1, and in English: K.1, K.5, K.6, K.8, 1.1, 1.5, 1.6, 1.10, 1.11, 2.7, 2.8, 3.4, 3.5, 3.6, 4.4, 4.5, 5.5, 5.6.

Activities provided support curriculum in grades K-5



At the Library

Ben and Me : a new and astonishing life of Benjamin Franklin, as written by his good mouse Amos, by Robert Lawson. Boston: Little, Brown, 1939.

What's the Big Idea, Ben Franklin? by Jean Fritz. New York: Coward, McCann & Geoghegan, 1976.

Look in the *J500's* at the library for more books about electricity.



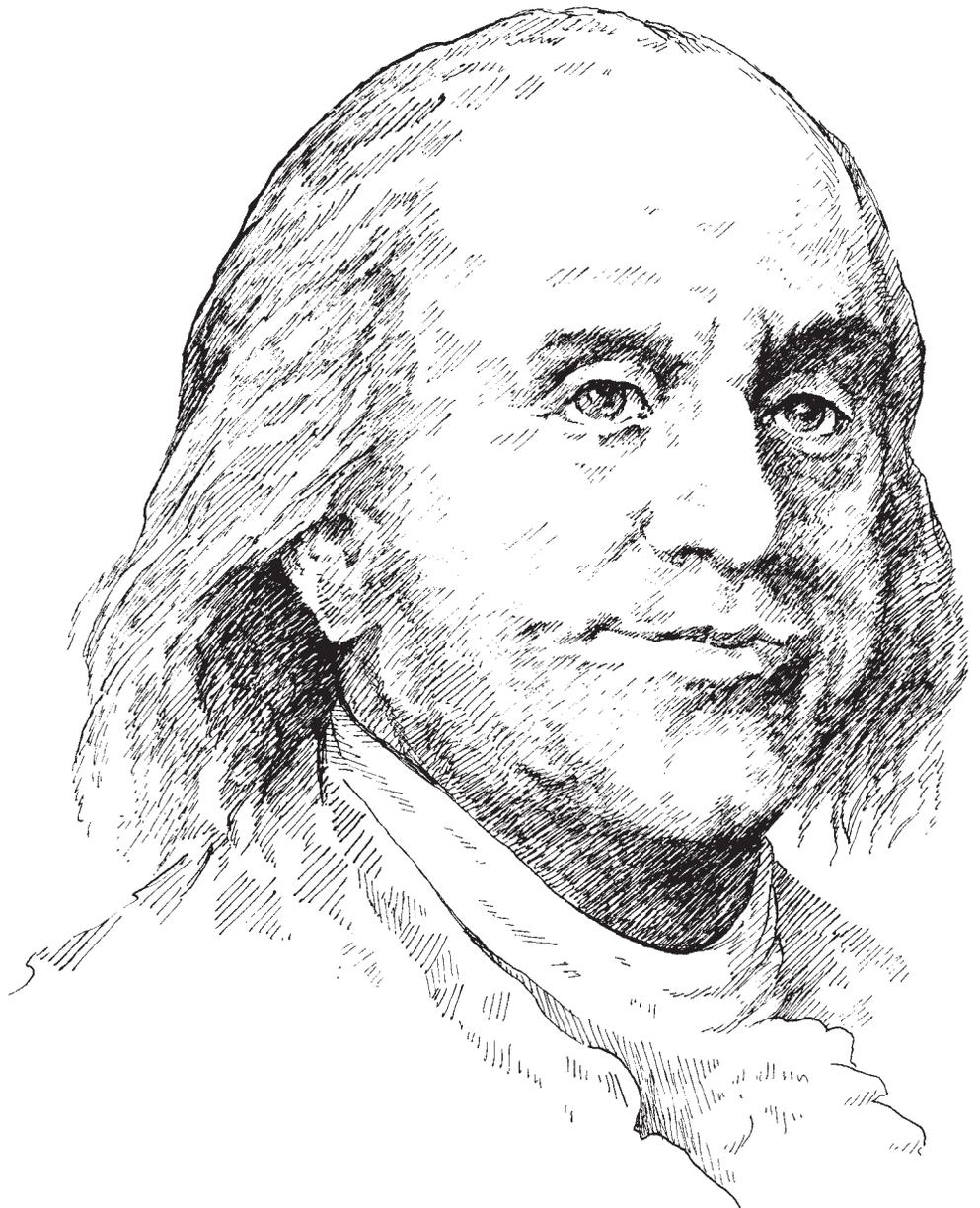
On the Web

www.TheatreIV.org/sidekicks.html

www.smv.org/pubs/

www.ushistory.org/franklin

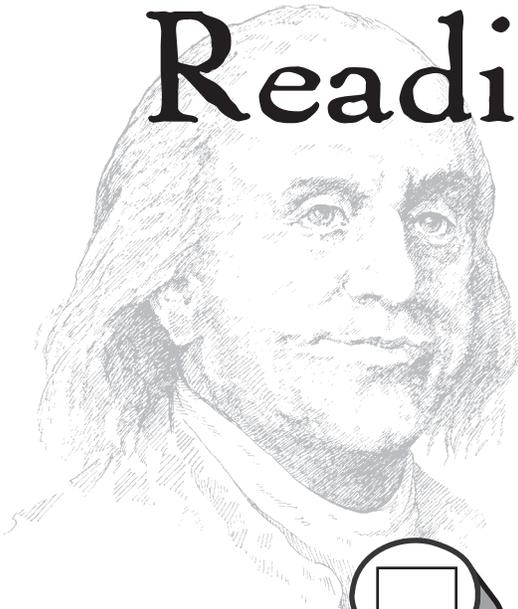
Activities provided are aligned with the Virginia Standards of Learning. Information for teachers and parents, including links to other great web sites.



Ben Franklin is known as a statesman, writer, publisher, inventor, and scientist. One might argue that any of his many achievements helped make our world and our nation what it is today. However, in June of 1752, Ben Franklin "shocked" the world with his discovery that lightning held electricity - and thus rendered scientists "thunder-struck!" We still see evidence of his "shocking" discoveries every time we turn on a light, boot up the computer, or turn on the microwave. *Ben Franklin and His Kite* is a play about this incredible character who changed our world forever.

Reading Resources

Ben Franklin's Life - Puzzle Pieces



Have you ever heard the phrase "A penny saved is a penny earned?" If so, you already know something about Ben Franklin. In 1733, Ben began publishing *Poor Richard's Almanack*. **Almanacs** are usually printed each year, and give weather reports, recipes, and **predictions**. In his *Almanack*, Franklin **coined** many phrases for which he has become famous.

Have you ever wondered who had the (brilliant) idea to start a fire company? In 1736, Ben Franklin organized Philadelphia's Union Fire Company, the first in the city. The famous saying, "An ounce of prevention is worth a pound of cure," was actually Ben's fire-fighting advice.

Franklin began concentrating on the study of electricity in the early 1750's. His work, especially his kite experiment, that verified the nature of electricity and lightning, made Franklin famous.

In 1743, Ben Franklin invented the Franklin stove which warmed houses very well. Franklin also invented bifocal glasses, swim fins, and the glass armonica, a musical instrument. Ben Franklin retired from the printing business in 1749. At this time, he began working on scientific experiments and inventions.

Did you know that Franklin was a **statesman** too? As a member of the Second Continental Congress, Franklin helped draft the Declaration of Independence. In 1776 Franklin signed the Declaration. Later, he became an **ambassador** to France.

Using Resources-

Piecing Together Ben's Life

1. Read the paragraphs about Ben's many careers and talents. Then, use dates and other information in the paragraphs to put them in **chronological**, or time, order. Number the puzzle pieces.

2. It could be said that Franklin "wore many hats." What do you think was his most important contribution to our world today? Why?

3. "An ounce of prevention is worth a pound of cure" is a famous Ben Franklin quote. What did it mean in Philadelphia in the 1730's? What would it mean today if your dentist told you that?

4. Ben Franklin was a man of many interests. If he walked into your classroom today, what would you tell him? What would you ask him?

Easy Activity

Create an illustrated timeline of Ben's life. Use four different dates, and draw pictures of Ben working on different projects during these times in his life.

Challenge Activity

Write a friendly letter to Ben Franklin about what we know about electricity in the 21st century. Include definitions of important words and examples of how we use electricity in our daily lives.

Think about it

Use the information in the reading and your previous knowledge to match the definition with the correct word.

- | | |
|------------|--|
| statesman | <input type="checkbox"/> To invent a new word, or a new way to use a word. |
| ambassador | <input type="checkbox"/> What one believes will happen. |
| coin(ed) | <input type="checkbox"/> A yearly publication that includes weather forecasts. |
| almanac | <input type="checkbox"/> A country's representative in another country. |
| prediction | <input type="checkbox"/> A man who is a leader in national affairs. |

Take it One Step Further

Go to www.ushistory.org/franklin and click on the timeline. What do you think the three most important events of Franklin's life were?

Great Sparks of Lightning!

Did you know that static electricity and lightning are related? Both are sparks of electricity created by the attraction of unlike **charges**.

Everything in the world is made up of tiny particles, and these particles carry either a positive or negative "**charge**" or **energy**. **Protons** are particles with positive charges, and **electrons** are particles with negative charges. Most of the time, the positive and negative charges are balanced; however, static electricity is caused by a buildup of negative charges in a substance.

The following experiments will help you understand more about how those protons and electrons cause both static electricity and lightning.



Key Information

Particles in storm clouds pick up positive or negative charges, like when shoes scuff a rug. Usually, positively charged particles rise to the top of the cloud, and negatively charged particles collect at the bottom of the cloud.

When the power of attraction between the unlike charges gets too great, the particles discharge energy, completing a path for electricity to travel through the air. We call this flow of electricity, lightning.

By the way, lightning can strike the same place twice.

Charge Up A Balloon!

You'll need: a balloon, a piece of silk, nylon, or wool, a wall.

Do this: Rub the inflated balloon with the fabric for 30 seconds. Place the balloon against the wall.

What happens? _____

Do you know why? When the balloon is rubbed, it gets covered with lots of negative charges. They are attracted by the positive charges in the wall. That's why it sticks there!

Light Up Your Mouth

You'll need:

Wintergreen Lifesavers,
a dark room, a mirror.

Do this:

In a dark room, break up a Wintergreen Lifesaver with your teeth. Look in the mirror. What do you see?

Do you know why?

You should see sparks! Electric sparks come from other sources too! Squeezing together the atoms in candy causes these.



Think about it

Based on the information provided, which of these men experimented with electricity first? last? Put their discoveries in order.

1. _____
2. _____
3. _____

What characteristics do you think these three scientists shared?

What character traits would be helpful to an inventor?

If you could ask these men one question, what would it be?

Challenge Activity

Think of a new invention that would make life easier for someone in your family. Design it on grid paper, label its parts, and give it a name.

Take it One Step Further

Want to learn about electromagnets? Visit www.howstuffworks.com/electromagnet.htm to find out more! Includes experiments to try!

Who is he?

Franklin, Faraday, and Edison



This scientist suspected that lightning was nature's electricity. He used a key and a kite to prove that lightning is really a stream of electrified air. His famous kite experiment in June of 1752 led him to develop many of the terms that we still use today including: conductor, condenser, charge, discharge, uncharged, negative, minus, plus, electric shock, and electrician.

He knew that lightning was dangerous. So he figured out a way to protect people, buildings, and ships from it, - the lightning rod.

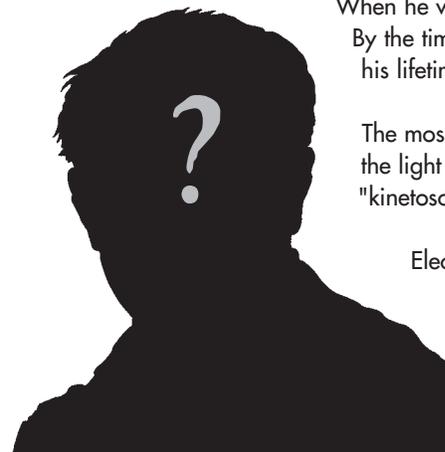
Who is he?



This scientist studied the nature of electricity. Born on September 22, 1791, this English physicist and chemist is best remembered for his understanding of electromagnetism. Once he discovered that electricity could be made by moving a magnet inside a wire coil, he was able to build the first electric motor. He later built the first generator and transformer. He introduced several words that we still use today to discuss electricity: ion, electrode, cathode, and anode.

To honor his accomplishments, a unit of electricity was named after him. The "farad" measures capacitance, an amount of electrical charge.

Who is he?



When he was born, society didn't take electricity seriously. By the time he died, entire cities were lit by electricity. In his lifetime, he patented 1,093 inventions.

The most famous was an incandescent light bulb. Besides the light bulb, he developed the phonograph and the "kinescope," a small box for viewing moving films.

Electric lights in the U.S. were dimmed for one minute on October 21, 1931, a few days after his death.

Who is he?

Conductor or Insulator?



Think about it

Why are electrical wires covered in plastic?



Definitions

conductor:

Any material through which electricity flows freely.

insulator:

Any material that blocks the flow of electricity.



Challenge Activity

With the permission of your teacher, test other materials in your classroom to determine whether they are conductors or insulators. What patterns do you see in your findings?



Take it One Step Further

Go to Famous Historic Kite Flights at <http://www.total.net/~kite/famous.html#60> and discover what Ben Franklin did to his kite to make it conduct electricity!

Problem

How can we determine what materials conduct electricity, and what materials are insulators?

Materials Needed

small (flashlight) light bulb, approx. 10 in. of insulated wire (stripped at both ends), one "D" cell battery, tape, items to test (paper clip, pencil, thumb tack, chalk, cardboard).

Hypothesis

Which of the test items do you think will allow electricity to flow freely (conductors)? Which do you think will block the flow of electricity (insulators)?

Procedures

1. Tape one of the stripped ends of the wire to the bottom of your "D" cell.
2. Wrap the other stripped end of the wire around the base of your light bulb, and tape it in place.
3. When you place the bottom of the light bulb on top of your battery, it should light up.
4. Test each item by placing it between the top of your battery and the bottom of your light bulb. If the bulb lights, the item conducts electricity. If the bulb does not light, the item is an insulator. Record your findings below.

Material	Prediction	Findings



Benjamin Franklin's Life



Challenge Activity

Benjamin Franklin was a printer, and the author of many famous quotes that give advice about life. Read the following "name poem," made up using Benjamin's quotes. Then write your own name poem. Include advice you would give others about different things in life.

A Quotable Poem

Be always ashamed to catch thyself idle.

Early to bed and early to rise makes a man healthy, wealthy, and wise.

Nothing but money is sweeter than honey.

If **J**ack's in love, he's no judge of Jill's beauty.

An empty bag cannot stand upright.

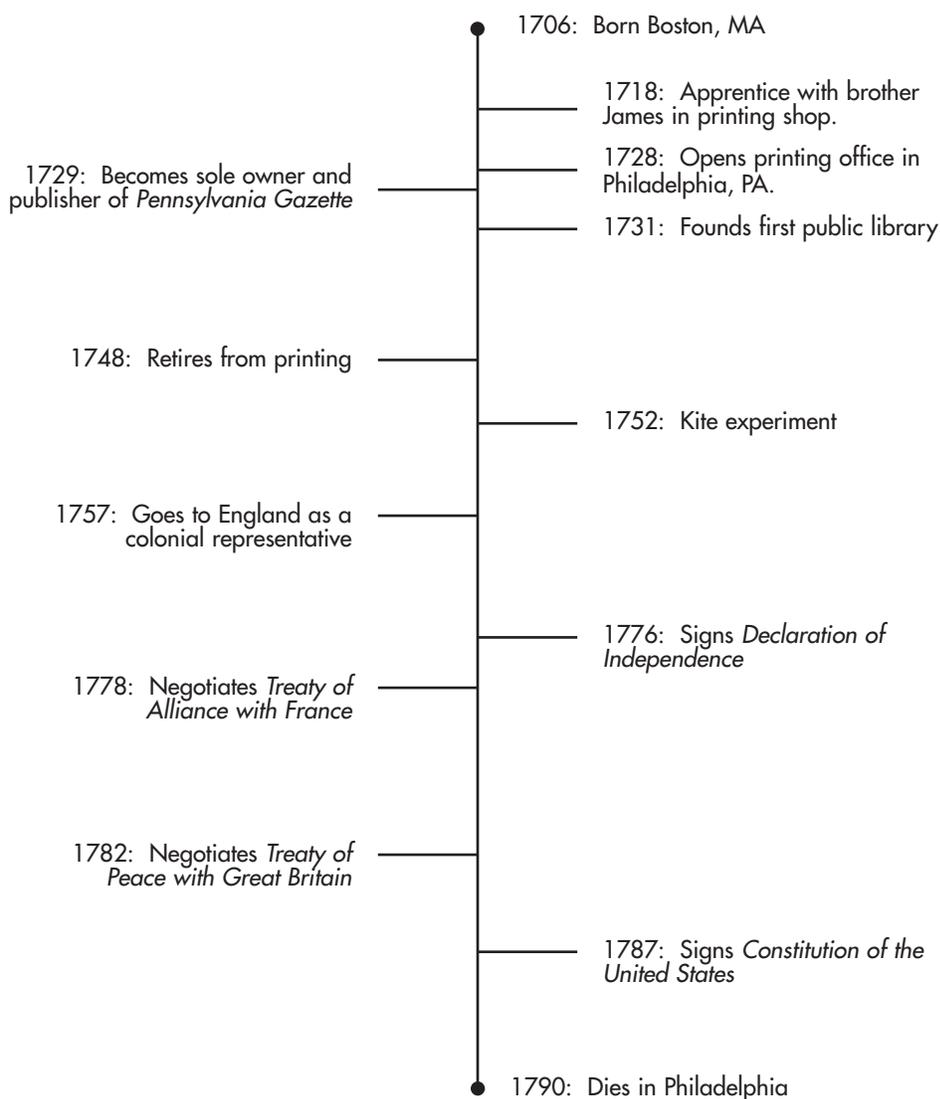
Muses love the morning.

If you'd have a servant that you like, serve your self.

Necessity never made a good bargain.

Choose one of Ben's quotes, and explain what it means.

Ben's Life- A Timeline





THEATRE IV

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Theatre IV Presents...

Ben Franklin and His Kite

written by Scott Wichmann

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This **Classroom Connections** study guide is the result of a partnership between Theatre IV and the Science Museum of Virginia's Carpenter Science Theatre Company. To learn more about electricity, go to www.smv.org/pubs and click on *Physical Science SOLutions*.

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More Teacher Resources...

Additional Core Curriculum Activities

History and Social Science

Gr.
K

Ask students to match Franklin's jobs with their descriptions. Franklin was a printer (a person who makes newspapers), a statesman (a person in charge of running the government), and an inventor (a person who creates new things that make our lives easier).

Gr.
1

Describe how Benjamin Franklin helped our country by being an inventor and a statesman.

Gr.
2

Make a list of ways that Benjamin Franklin was a good citizen. Make a list of the ways we can be good citizens today.

Gr.
3

Using a world map or globe, trace the route Benjamin Franklin traveled from Pennsylvania to France when he worked as Ambassador to France.

Gr.
4

Benjamin Franklin and Thomas Jefferson worked closely together on the Declaration of Independence. Compare the contributions of these two important statesmen.

Gr.
5

Describe why it was dangerous to be a revolutionary in colonial America. What did Franklin mean when he said, "We must all hang together, or assuredly we shall all hang separately." ?



SCIENCE MUSEUM OF VIRGINIA