AN ANCILLARY TEACHERS GUIDE FROM PATRICK GARNER'S HISTORY'S ALIVE!

THE WRIGHT BROTHERS (& SISTER!) AIRPLANE CO.

TEACHER'S GUIDE

Thank you very much for inviting me in to perform for your students. I formed HISTORY'S ALIVE! In an attempt to present history in an exciting, interesting venue where your children don't merely learn history but learn <u>from</u> history. It's my hope that they will leave the assembly program with life and learning tools they can use that very day. And the fact that those "life lessons" propelled these ordinary people into the pages of history shows that they do indeed work!

With THE WRIGHT BROTHERS (& SISTER!), we learn how three people solved the riddle of the ages—-man-powered flight. And they did so with tools you teach your kids. Their efforts fall under several banners: logic, problem-solving, The Scientific Method, cause-and-effect, etc. I mention the Scientific Method in the show, but please use whatever you're currently introducing in your classroom.

The most important themes I try to introduce to your charges are:

- Use all your available sources for information
- Use everything you know
- Look for solutions everywhere
- Define your problem before trying to solve it
- And, of course, think outside the box!

VOLUNTEERS NEEDED!

<u>IF THIS IS THE ONLY PART OF THE TEACHERS GUIDE YOU READ… READ THIS!!!</u>

During the course of the show I will be using two of your students to portray Orville and Katherine Wright. I need your help in selecting them! Would you please confab with your fellow teachers and select a boy and a girl from your students. General guidelines: Pick kids who will take part but not take over. Good natured kids. (Please don't give me your class clowns. As a reformed class clown, I know how difficult we can be.)

<u>Orville</u>—A slightly built boy from your lower grades. (He'll sit on a folding table that easily holds my weight but why take chances?)
<u>Katherine</u>—A good reader from your upper grades.

Tell the two volunteers they'll be acting as my assistants in the show. There will be absolutely nothing embarrassing for them to do. Nor will any jokes be directed at them. And if they could come to the performance space about ten minute early, I tell them what we're going to do.

THANK YOU VERY MUCH. HOPE YOU ENJOY THE SHOW!

MEET THE WRIGHT FAMILY

Wilbur, Orville & Katherine, along with their father Milton, were a very close-knit family. Milton was a bishop of the United Brethren Church. The love of learning the parents instilled in them taught them how to research, discuss and attack problems. The family library carried many tomes that contradicted Milton's own teachings but he thought all sides of an argument should be explored.

Wilbur was the go-getter of the family. Taciturn and studious, he was destined for college when Mother Susan's slow death to consumption, a serious athletic accident and the nursing of Orville through a bout of typhoid fever, made college all but impossible.

Orville was the out-going practical joker. He skipped college in order to join Wilbur in his new printing business. First brother to fly.

Katherine, the forgotten Wright, was the only child who attended college. She had a promising teaching career in motion when she returned home to help her brothers run their business and home during the invention of the airplane.

THE WRIGHT BUSINESS

You and your students may know that the Wrights ran a bicycle shop before inventing the airplane. But that wasn't their first business. They started as printers but were unable to purchase an expensive printing press. Instead they found a broken press and, using the mechanical aptitude their mother had taught them, repaired it. Business flourished. Among their many projects was *The Dayton Tattler* for Dayton's African-American community. It was written by Paul Laurence Dunbar (see "Dayton, Ohio").

The Wrights left printing to subordinates while they joined America's latest fad, bicycling. At first they sold bicycles. Then, again using their mechanical skills, began manufacturing. Their work on bicycles gave them unique insights to mechanics and motion.

The Wrights pursued manufacturing airplanes until Wilbur's untimely death in 1912. Shortly after his death, Orville accumulated all existing Wright Brothers stock, settled all out-standing lawsuits and sold everything to their biggest competitor, Glenn Curtis. Orville and Katherine had a falling out when she married late in her life. There was rumored to be a secret pact between the three Wrights to never marry. They made a death-bed reconciliation when she passed in 1929 Orville enjoyed a retirement of tinkering and celebrity to the ripe age of 77. He passed in 1948 while tinkering with a doorbell.

In the space of just over four years, the Wright Brother solved a problem that had been vexing man for thousands of years—man-powered flight. Their approach to the problem was very methodical. They researched all available data on previous experiments. They used all of the resources at their disposal. They used their own experiences. And when problems arose they attacked them using the Scientific Method.

THE SCIENTIFIC METHOD

1. State the Problem
2. Research
3. Hypothesis
4. Test & Experiment
5. Record Data
6. Check Hypothesis
7. Conclusions
8. Repeat if needed

PRECURSORS & RIVALS TO THE WRIGHTS

Here are a few scientists who explored man-powered flight before the Wrights. There's plenty of information on them on the web.

Leonardo DaVinci—conceived the "ornithopter." Completely impractical to fly a man but a wind-up flying machine still manufactured today.

Alphonse Penaud—one of the first theorists on flight. Designed the Wright Bat flying toy that Orville credited as the inspiration of their interest in flight.

Otto Lilienthal—glider inventor and developer of wing shape vs. lift formula. His death in a crash spurred the Wrights on. Dying words: "Sacrifices must be made."

Octave Chanute—Contemporary and sponsor. Proposed bi-wing as most stable type of glider.

Samuel Pierpont Langley—president of Smithsonian Institute. Major competition. Got government funding for steam-powered aerodrome which crashes twice just before Wright success. Associates claimed he was first flyer for over forty years.

Glenn Curtis—Huge innovator immediately after Wrights. Major manufacturing competitor. Developer of ailerons which replace wing-warping.

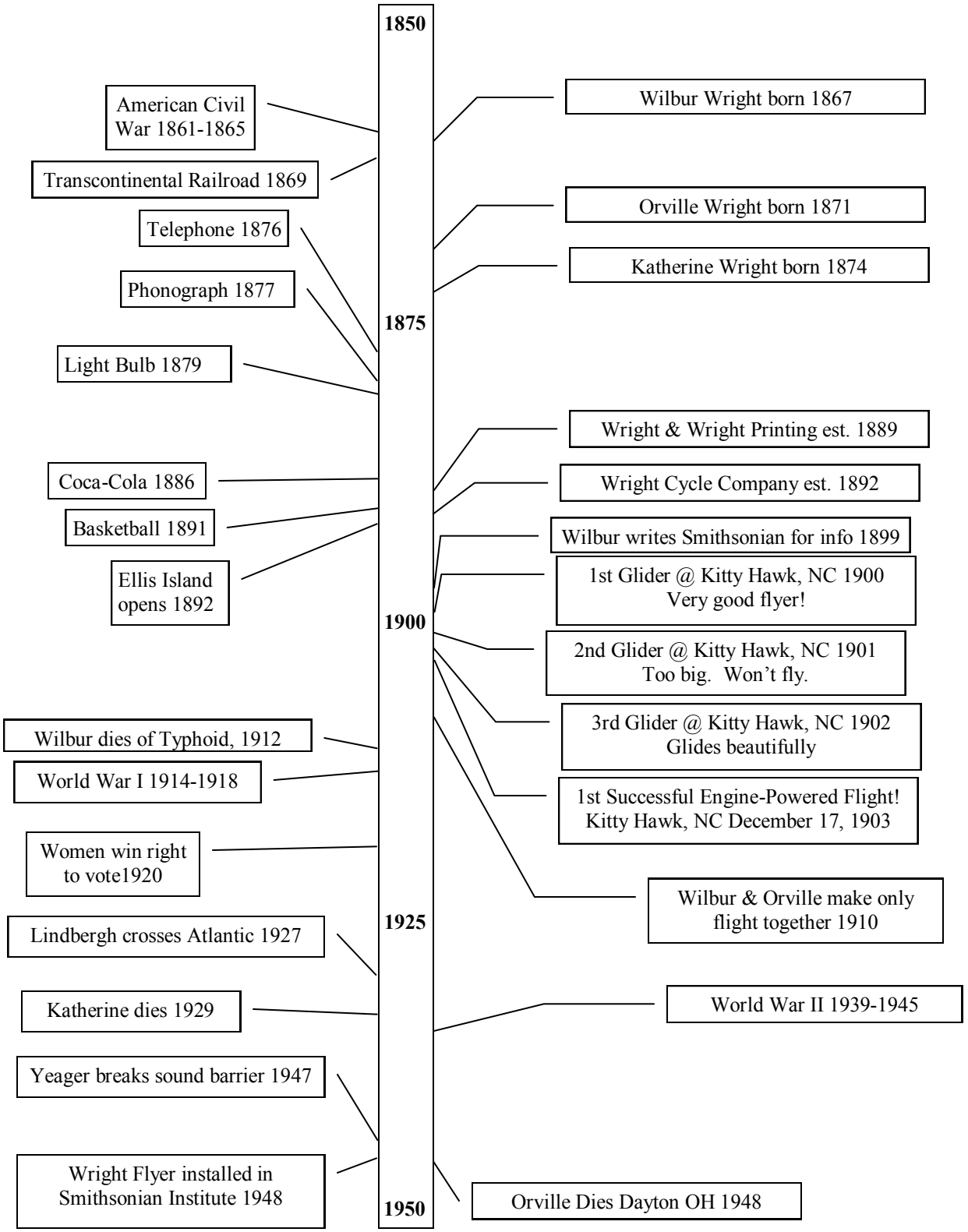
DAYTON, OHIO

Dayton, Ohio was quite an important town around the turn of the last century. The Wright Brothers (& Sister!) may be their most famous citizens but by no means the only ones.

Paul Laurence Dunbar was in the same high school class as Orville Wright. The Wright printing business helped Dunbar produce a newspaper for African-Americans. Although that paper soon folded, Dunbar soon achieved international fame as a poet. His first collection was published by the Wrights. He was the most published African-American author in the world until the 1950s.

The International Cash Register Company was head-quartered in Dayton. Their cash registers, adding machines, etc. made them the IBM of the early 1900s!

THE WRIGHT BROTHERS (& SISTER!): TIMELINE



Neil Armstrong steps onto surface of moon with piece of Wright Flyer wing-covering fabric in spacesuit 1969

SUMMARY OF THE SUMMERS AT KITTYHAWK

1900—The Wrights test their theory of wing-warping by flying their glider as a large kite. Only after verifying their theory and proving the gliders air-worthiness did they attempt to pilot the vehicle, always tethered to the ground.

1901—Thinking "bigger is better" they increase the size of their glider and are surprised when it will not fly with any measurable control.. This second glider crashes repeatedly. Tempting fate they unsuccessfully try a manned flight. During the winter and spring they test Lillienthal Formula for wing lift and discover its errors.

1902—With their new understanding of wing lift, they construct a new glider which flies beautifully. They make many manned glides, breaking record after record. All they need is an engine. No automaker will reply to the requests for a light engine to power their airplane. They make their own.

1903—After many delays caused by weather, the Wrights assemble their airplane named "The Flyer." They had manufactured their own engine, propellers and drive shafts. The drive shafts prove to be trouble, warping and cracking. Orville returns to Dayton. He returns with new shafts. After a failed attempt by Wilbur on Monday December 14 (they never worked on Sunday), Orville makes the first successful engine-powered flight on Thursday December 17, 1903. It lasted just twelve seconds and covered 120 feet!

RESOURCES

Children's Books on Wright Brothers

THE WRIGHT BROTHERS FOR KIDS by Mary Kay Carson
AIRBORNE by Mary Collins
FIRST TO FLY by Peter Busby

Adult books on Wright Brothers

THE BISHOP'S BOYS by Tom D. Crouch

Really Cool Web Sites with more information and demonstrations:

www.fiddlersgreen.net/AC/aircraft/Wright-Glider/glider.php
(Free paper model of Wright Glider!)
www.first-to-fly.com
www.nasm.si.edu/wrightbrothers (Air & Space Museum)
Www.amazingpapersirplanes.com