



100 Things to Teach Kids About the 100th Anniversary of Powered Flight – 2003

Happy 100 Years of Flight!!! The items below have been compiled for your use and enjoyment by the Educational Outreach Office at Wright-Patterson AFB. The information was compiled from a variety of sources and we have made an honest attempt to insure its accuracy and completeness. Thanks go to Jan Ferguson at the WPAFB Environmental Management Office, Dr. Henry Narducci, WPAFB Base Historian, and Jan Hart, Education Specialist, Dayton Aviation Heritage National Historic Park for their review and assistance with this project.

1	What famous brothers made the first powered flight?	Wilbur and Orville Wright
2	Where were the Wright Brothers from?	The Wright Brothers lived and invented the airplane in Dayton, Ohio
3	When did the first flight take place?	12/17/1903, 10:35 am
4	Where did the first flight take place?	At a place known as Kill Devil Hills near Kitty Hawk, North Carolina
5	Who made the first powered flight?	Orville Wright
6	How did they decide who got to fly first?	They flipped a coin.
7	Why did they go to North Carolina to try their flying machine?	They wrote to what would be considered the US Weather Bureau to get a list of windy places and Kitty Hawk was one of them. It was also a sandy, open beach area. They decided that good steady winds and sand for soft landings was a good place to start.
8	How far did the first flight go?	The first flight covered about 120 feet.
9	How long was the aircraft in the air?	12 seconds. It was more like a roller-coaster ride than a flight.
10	What was used to "launch" the airplane?	A 60' launching rail, an engine, propellers and a good wind.
11	How many other flights were there that day?	Three. The second and third flights went about 175 feet and the fourth and final flight went a total of 852 feet in 59 seconds.
12	What was the name of the plane?	The Wright Flyer
13	What happened to that original plane?	It landed kind of rough and broke the front rudder frame. Then, while the Brothers discussed their success, a gust of wind caught the craft, turned it over and demolished it. Parts were stored in crates at the Wright Cycle Co. in Dayton, OH
14	Where is the original Wright Flyer today?	Massachusetts Institute of Technology took the original parts (about 45% remained), and fabricated what parts were needed to rebuild the plane. It was enshrined at the Smithsonian Institution in 1948.
15	How did the press react to the first flight?	They basically ignored it. Brother Lorin Wright took the information to an Associated Press reporter at the Dayton Journal. The reporter didn't think four short flights was "newsworthy" so they didn't even run it. This was ironic because the Wright Brothers specifically told the telegraph operator in Kitty Hawk NOT to tell the press so they could break the news in their hometown of Dayton, OH.
16	Why did the Wright Brothers choose Dec 17th to make their first flight?	Actually, they hadn't planned it that way. They started on December 14th, with Wilbur as the pilot, but the plane crashed and needed to be repaired. It wasn't until December 17th that got it repaired and was ready to try again, this time with Orville attempting the flight. Also, by that time, they had already been at camp for a long time and the winter weather was getting worse, not better.
17	What was Wilbur and Orville Wright's middle name?	None of the Wright children had middle names!!
18	What were the names of the Wright Brothers Parents?	Milton Wright and Susan Catherine Koerner Wright.
19	What was the occupation of the Wright Brothers' Father?	Bishop of the Church of the United Brethren in Christ. He was also in charge of printing work for the church for many years.

20	What was the occupation of The Wright Brothers' Mother?	Susan Wright stayed home with her children, but she had attended Hartsville College in Indiana, where she excelled in literature and science and was at the top of her class in mathematics which was highly unusual for the time! As the daughter of a carriage maker she was also skilled with tools and had a mechanical aptitude that she shared with her children. She built sleds, made toys and fixed household appliances.
21	What did they fly before they flew the powered airplane?	Gliders and Kites. They tested many concepts with kites and gliders before attempting powered flight. Their 1899 Glider is considered to be the "grandfather" of the Wright Flyer used at Kitty Hawk.
22	How many bicycle shops did the Wright Brothers have in Dayton Ohio?	According to the National Park Service - five. Only two remain today. One was carefully moved, along with the Wright family home, to Greenfield Village in Dearborn, MI, in 1936 by Henry Ford. The other is now part of the Dayton Aviation Heritage National Historic Park, 22 South Williams St. in Dayton, OH.
23	Henry Ford did move something else when he relocated the Wright Cycle Shop and Wright family home to Greenfield Village. What was it?	He also moved the dirt below the buildings and placed it in the ground in Dearborn because he wanted complete authenticity, including the soil where the Wrights walked.
24	The Wright Brothers had two important inventions related to the bicycle. What were they?	One was a self-oiling hub in which they sealed the bearings with felt washers and created a reservoir for oil inside the hub which took much less maintenance. The other was a bicycle pedal that they reversed the threading on so that wouldn't come unscrewed when riding.
25	What did the Wright Brothers use their last bicycle shop for besides bicycles?	They used it to fund and work on their glider/airplane experiments.
26	How many Wright Brothers were there?	There were actually four Wright Brothers. Reuchlin was born in 1861, Lorin in 1862, Wilbur in 1867, and Orville in 1871.
27	How many other Wright Children?	Sister Katharine was born in 1874. There was also a set of twins, Otis and Ida who died shortly after their birth in 1870.
28	Which of the Wright Brothers was involved in Boy Scouts?	Orville was involved in the promotion of Scouting and was on the local Boy Scout Council. He was advisor for the Aviation Merit badge!
29	Where did the Wright Brothers go to college?	They didn't. In fact, neither ever received a high school diploma. Wilbur completed his senior year in Indiana, but the family moved to Ohio before commencement and he never applied to get his diploma. (NOTE: By special arrangements, the Richmond IN Board of Education presented Wilbur's diploma to his 98 year-old niece Ivonette Wright Miller in 1994...110 years after he graduated.) Orville started a printing business when he was 15 and was running a weekly newspaper by his junior year. His grades were mediocre (except in science) and he had lost interest in school, so he didn't go back for his senior year. Both, however, received 15 honorary graduate and post-graduate college degrees between them.
30	Did Orville Wright have a pilot's license?	Trick Question...No...Nobody Ever Flew Before!!
31	What occupations did the Wright Brothers do before they became famous for inventing the powered airplane?	They had a small printing business, printing small newspapers, handbills and other small jobs. In 1896, during the bicycle craze, they became bicycle manufacturers and repairmen. Their company produced three models - the "Van Cleve", the "St. Clair" and the "Wright Special".
32	Where was Wilbur Wright born?	Near Richmond, Indiana, 1867
33	Where was Orville Wright born?	In Dayton, Ohio, 1871
34	Who was the first passenger to be carried in a Wright airplane?	Charles Furnas, of Dayton, OH and a Wright mechanic, got the first "ride" while assisting the Wright Brothers at Kitty Hawk in 1908.

35	Who made the engine used by the Wright Brothers?	Charles E. (Charlie) Taylor, a machinist from the Wright Brothers bicycle shop constructed a lightweight, four-cylinder engine that produced 12 horsepower to power the counter rotating propellers of the "pusher" type.
36	Who took the famous photograph of the Wright Brothers at Kitty Hawk?	John Daniels shot the famous photo, using Orville Wrights camera which he had set up on a tripod and aimed in the general direction he hoped the airplane would pass. Mr Daniels was part of the Kill Devil Life Saving Crew. The camera is on display at Carillon Historical Park in Dayton, OH.
37	Where did the Wright Brothers, in their own words, "really learn how to fly"?	Huffman Prairie, Dayton, OH. It was there where they learned to bank, turn, do circles, figure 8's and land using their 1904 and 1905 Flyer.
38	What was the longest flight on Huffman Prairie	Their longest flight at Huffman Prairie lasted for 39 minutes, went 24 miles at 38 MPH making 29 circles of the Prairie.
39	What ended the longest flight at Huffman Prairie?	They ran out of gasoline.
40	How is the world different today because of the Wright Brothers?	A Good Essay Question!!
41	What was the "toy" that is credited for interesting the Wright Brothers in Flight	It was a toy helicopter, modeled after the Pe'naud Helicopter, that was given to Wilbur (11) and Orville (7) by their father. It was had counter rotating propellers and actually flew. They were also fascinated by kites.
42	Who bought the first of the Wright Brothers commercially produced airplanes?	They wrote a contract to conduct tests with the U.S. Army in 1908. The tests were successful and the Army bought one of their planes. The 1909 Military Flyer was the first military airplane in the world.
43	What were some of the first foreign countries where the Wright Brothers flew their airplanes?	France, Germany, Italy. The French were particularly fond of the Wright Brothers and their "flying machine".
44	Who was the first American serviceman killed in an airplane crash?	Lt T.E. Selfridge died during the last test flight for the Army at Fort Myer, Virginia, in 1908 when a propeller broke. Orville Wright suffered a broken leg in the same accident.
45	When and where was the first Flight School established?	Winters in Ohio were not good for flying, so the Wrights set up a school in Montgomery, AL in 1910 in an area that later became Maxwell AFB. The Wright School Of Aviation was established on Huffman Prairie, Dayton, OH, later in 1910 on land that is now part of Wright-Patterson AFB. Some students were trained to be Wright Co. exhibition flyers.
46	How did the Honey Locust Tree help the Wright Brothers solve a problem they were having with lateral movement of the airplane?	At Huffman Prairie Flying Field, the Brothers often used a large Honey Locust Tree to practice circling around. On one occasion, Orville found himself headed straight for the tree, loaded with thorns. He quickly lowered the elevator in an attempt to force the plane to the ground. Instead, with the nose tipped down, the plane promptly responded to the lateral control and Orville finished the flight with several thorns driven into the wing. The problem had not been a design flaw, but rather, an error in handling it.
47	After the Kitty Hawk flight, the Wright Brothers became very secretive about their work. Why?	They were afraid others would steal their ideas and wanted to secure a patent for their invention. In fact, in 1905, they quit flying and turned their attention to securing a patent. Patents were received from Britain, France and Belgium in 1904, but the United States did not grant them a patent until 1906.
48	What did the Wright Brothers use to build their first printing press?	An old, damaged tombstone and buggy parts.
49	What are the three necessary elements of a flying machine according to Wilbur Wright?	Wings to provide lift, a power source for propulsion and a system of control.

50	What are the three axes of motion that needed to be controlled in order to fly?	Pitch, roll and yaw
51	What is Pitch?	Pitch is the up and down movement of an airplane. Elevators on the horizontal stabilizer (tail) control the pitch of an airplane which prevents an up and down motion of the nose.
52	What is Yaw?	Yaw, which is the side-to-side movement of an airplane. It is controlled by the rudder in the vertical stabilize (tail) of the airplane which keeps the nose of the plane from swinging from side-to-side.
53	What is Roll?	Roll is rotation around the longitudinal axis that goes down the center of the fuselage of the airplane. Ailerons on the back edge of the wing control the rotation of the body of the airplane
54	What was different about the horizontal stabilizer on the Wright Flyer?	The horizontal stabilizer was placed in front of the wings. Such a configuration is called a "Canard" after the French word for "duck".
55	What object gave Wilbur Wright the idea of how to control wing warping?	He was playing with a bicycle inner tube box in the bicycle shop when he noticed that by twisting the empty box, the sides changed position.
56	What mechanism was used to "launch" the Wright Brothers airplanes at Huffman Prairie Flying Field?	Because Huffman Prairie Flying Field did not have the wind that Kitty Hawk had to create enough "lift" to get the plane to take off, the Wright Brothers used a derrick and drop weight catapult to launch the plane. A weight, attached to the plane by a series of pulleys, was hoisted to the top of 20 foot tower. The plane was set atop a two-wheeled carriage on a track. . When the weight was dropped, it pulled the airplane down the track, allowing it to gain enough speed to lift off the ground.
57	Why did early pilots wear goggles?	General Hap Arnold explained why in his autobiography. "The first goggles were worn by Army airmen came as a result of a bug's hitting me in the eye as I was landing my plane...it left one of its transparent wings sticking in my eyeball. The pain was terrific; blinded by tears, I could scarcely see to make my landing...After that, we wore goggles."
58	How and when did Wilbur Wright die?	Wilbur died of typhoid fever in May 1912. He was 45 years old.
59	How and when did Orville Wright die?	Orville died in January 1948 of a heart attack at 76 years of age.
60	Why did the Wright Brothers use a wind tunnel?	They used it to test small model wings, using a "balance" and see what the best shape would be for the wings. It also let them calculate the size of the wing that would be required to lift them into the air, how their propellers would perform and the amount of power their engine would have to produce.
61	What were the wind tunnel and balances made of that helped do tests in the wind tunnel?	They were not precise scientific equipment. The wind tunnel was an old pine box with a blower and the balances were made of old, worn hacksaw blades and discarded bicycle spokes.
62	Who were some of the scientists that the Wright Brothers studied for additional information?	One was Otto Lilienthal, a glider pilot who crashed and died during one of his flights. Another was Octave Chanute, a highly respected civil engineer, an aeronautical visionary and a prolific correspondent with many experimenters in the aviation field. They also studied information from Samuel Pierpont Langley.
63	Why were their wind tunnel experiments important?	It was the first time that anyone had measured the lift and drag produced by various wing shapes with sufficient accuracy for them to be of any use in an aircraft design. Earlier inventors had conducted experiments with wing shapes but they had not really understood the dynamics of a wing in flight. Only the Wright Brothers tested their theories with an aircraft in flight.
64	Why are the Wright Brothers considered to be the first Aeronautical Engineers?	They combined the partial achievements of their predecessors with their own insights, adding a critical methodology that proceeded logically from one step to the next, anticipating problems and constantly critiquing results. By doing so, they were able to explain, repeat and improve on what they were doing.

65	What were the family "nicknames" for the Wright Brothers?	In the Wright Family, Wilbur was often referred to as "Ullam" and Orville was called "Bubs". "Wil" and "Orv" were also used.
66	Orville Wright was a lifelong board member on the National Advisory Council on Aeronautics (NACA) which later became what federal agency?	NASA - The National Air and Space Administration.
67	Who invented the wind tunnel?	It was invented by Francis Wenham and John Browning in 1871 in England, who used it to study wing camber and aspect ratio. The 1901 Wright wind tunnel was the second or third one used in America. Activity - build wind tunnel out of science fair show boards and 20" square fan.
68	What is the relationship of the axes (pitch, yaw and roll) to the center of gravity?	All of the axes must go through the center of gravity of the airplane as the center of gravity is the balance point of the airplane. All the weight of the airplane is considered to be at that one point. (Note: You can make a simple illustration of this using drinking straws.)
69	What are the four forces that act on an airplane?	Lift, Thrust, Drag and Weight
70	What is Lift?	Lift comes from air moving over the wings. The air under the wings pushes up more than the air on top of the wing pushes down. The pressure that is pushing the airplane up creates a force called lift in the upwards direction.
71	What is Thrust?	Thrust, caused by the airplane's engines, is the force that moves the airplane forward. If the plane did not move forward, the air would stop moving over and under the wings, the wings could not create lift and the plane would start falling back towards the ground.
72	What is Drag?	Drag is the force that tries to slow down a moving object. Airplanes are made to be aerodynamic or streamlined to reduce the amount of drag they feel. Drag is caused by friction and is the force that opposes thrust.
73	What are two ways to reduce drag on an airplane?	(1) make sure the surface is structurally smooth (aerodynamic) and (2) keep the airplane very clean.
74	What is weight?	Weight is a force caused by gravity. An airplanes weight also pulls downward on it - directly opposite to the lift force that is pulling the airplane up. For level flight, lift and weight must balance each other out.
75	What is gravity?	Gravity is the force that causes objects to fall to earth.
76	What is a simple experiment you can do to demonstrate Jet Propulsion?	A good example of Newton's Law (For every action there is an equal and opposite reaction) can be done with balloons. Blow up the balloon and let it go! See NASA aer.o.nau.tics worksheet,
77	How about a hidden message puzzle?	See Word Search - 100 Years of Flight
78	How did the Wright Brothers turn their Wright Flyer besides using the rudder?	They warped the wing. See White Wing's Glider Kit
79	Which of the four forces of flight is demonstrated with Bernoulli's principle?	Lift. See Activity with straw, plastic wine glasses and ping-pong ball.
80	Why did the Wright Brothers often fly kites?	It helped them to understand more about lift. Kite exercise - Kimono Kites. Paper, Skewers, and tissue tail
81	The Wright Brothers enjoyed sleds in the snow when they were children in Dayton, OH. What kind of sleds did they use when they were older?	They used kite sleds. NASA Connect "Wright Math" program can help students experiment with sled kites to determine the ratio of surface area and lift.
82	Wright Brothers Chronology. Can you put the events in their proper order?	Activity Sheet
83	Two wrongs don't make a right, but two Wrights made an...	Airplane!!
84	What is an easy way to remember which Wright is which?	Wilbur was bald-headed and Orville had a moustache.

85	How much did it cost the Wright Brothers to build their first Wright Flyer?	Approximately \$1000
86	What does "aeronautics" mean?	It means the science of flight. It comes from the French "aer" (air) and Latin "nauticus" (sailing).
87	How does a propeller create thrust?	Propeller blades are shaped like wings - flat side to the back, curved side to the front. Changes in air pressure over this airfoil create thrust.
88	What is Bernoulli's Principle (Law)?	Moving air has lesser pressure than air that is not moving.
89	How are boats like airplanes?	The same balance of forces that affects a boat affects an airplane. See NASA aer.o.nau.tics worksheet, #2
90	What is a simple experiment you can do to demonstrate air pressure?	See NASA aer.o.nau.tics worksheet, #3
91	What is an airfoil?	It is a shape that is rounded in front, tapered in back like a bird wing. See NASA aer.o.nat.tics worksheet #6
92	Why is the airfoil shape important?	See Bernoulli's Principle
93	Draw a diagram on how an airplane flies.	See NASA aer.o.nau.tics worksheet, #1
94	Who was Icarus?	Icarus was a mythological creature who attached feathers to his arms so he could fly, but he flew too close to the sun and the wings melted.
95	Name ways that weather affects flight.	Snow, Wind
96	Who made the first flight across the United States?	C.P. Rodgers flew across the US in the Vin Fiz in 1911. It took him 49 days to make the trip...with only 3 days, 10 hours and 14 minutes of it actually in the air. The difference in time was due to bad weather, crashes, many repairs and injuries along the way.
97	What was Vin Fiz?	It was a grape flavored soft drink, popular in the early 1900's. The Vin Fiz company sponsored Rodger's flight as a publicity stunt.
98	Name some of the bicycle parts used on Wright airplanes	Oversized bicycle chains and sprockets to turn propellers, regular and oversized bicycle tubular steel for propeller shaft supports, double bicycle sprockets on back of engine turned propeller chains, bike chains for wing warping and elevator control, wheels, ball bearings
99	Orville Wright had a favorite pet. What was it?	A St. Bernard named "Scipio" that he and Katherine found in the baggage compartment of a train. Orville built a fence outside of his laboratory so he could take the dog to work with him. A photo of Scipio was found in Orville's wallet when he died.
100	The list can go on and on...what do you have to do now?	Create your own #100 question...and add on!!