

Spirit of St. Louis

In 1927, Charles A. Lindbergh flew the Spirit of St. Louis solo and nonstop from New York to Paris in 33 hours, 33 minutes.

The small airplane had the following measurements:

- ✓ Wingspan: 46 feet
- ✓ Height: 9 feet x 10 inches
- ✓ Length: 27 feet
- ✓ Gross Weight: 5,135 lbs.

The Spirit of St. Louis was made of wood, steel tubing and fabric and was powered by a 220 - horsepower Wright Whirlwind J-5-C engine. It is on display at the National Air and Space Museum (NASM), Smithsonian Institution, Washington, D.C.

To honor the Spirit of St. Louis and the wonderful world of air and flight, here are some activities to try out:

Properties of Air Activities

1. To prove that air is a real substance:
 - a. Blow up a paper bag and burst it.
 - b. Blow into a Ziploc plastic bag and seal it.
 - c. Push an inverted glass with dry paper in the bottom into a pan of water.
2. To test for air resistance do the following experiments. Time each drop.
 - a. Drop a sheet of paper from a ladder.
 - b. Roll or crumple a second sheet of paper and drop it from the same height.
 - c. Cut a third sheet of paper in half lengthwise; lap the cut edge over to form a wide cone; and drop it.
 - d. Make a paper ice cream cone by rolling a fourth sheet of paper and taping the outer edge. Drop it from the experimental spot.
 - e. Discuss the results and generalizations that can be made.
3. Demonstrate the “braking action” of air. Drag a spring type clothespin through the air (or water), then attach a ketchup bottle cap and repeat. Notice the additional drag.
4. Identify the layers of air and some characteristics of each.
5. Explain the difference between the terms air and atmosphere.

6. Make a circle graph showing the composition of air.
7. Explain similarities of characteristics between air and water such as weight, mass, pressure, density, etc.
8. Draw a picture of an airfoil. Use lines to demonstrate the stream of air moving over and under the airfoil.
9. Discuss the reasons for designing streamlined cars, trains and airplanes.
10. Construct mobiles of inflated balloons. Observe changes in the balloons after one day. Discuss reasons for the changes.
11. Fill bio-degradable balloons with helium (available at a welder's supply store). Attach a postcard with your name and address requesting that the finder return the card. Discuss why and when you must release them. Release the balloons on a windy day.
12. Blow soap bubbles. Discuss what they are; why they break, etc.
13. Examine and manipulate a bicycle pump or perfume atomizer. Feel the air stream as the plunger is pushed.

Principles of Flight Activities

1. Discuss weight.
2. Drop the balls of different size and weight, at the same time and observe that both strike the floor simultaneously.
3. Discuss gravitational differences on the earth and the moon.
4. Compute and compare the weight of objects on the earth and the moon.
5. List some objects that temporarily defy gravity: birds, kites, blowing leaves, gliders, airplanes, rockets, etc.
6. Draw the shape of an airfoil with lines indicating the airstream over and under it. Label areas of low pressure and high pressure. Ask: How does air lift kites, leaves, etc.?
7. Identify Lift as the force that opposes gravity.

8. Identify Drag as the force that opposes lift.
9. Recall the action of wind against the hand when it was put outside the window of a moving automobile. What caused the drag against the hand?
10. Demonstrate Newton's Laws.
 - a. First Law: Show that a small model car needs to be pushed to start it moving and that it will keep moving until something stops it (air, friction or another object).
 - b. Second Law: Push a small model car with varying amounts of force to show that speed of movement is related to thrust. Relate the other examples of thrust; tossing a baseball, pedaling a bicycle, "shooting" a marble, etc.
 - c. Third Law: Demonstrate action and reaction by inflating a balloon and suddenly releasing it. Discuss its actions.
11. Make paper airplanes and fly them. Discuss the action of the four forces: gravity, lift, thrust and drag.
12. Draw an airplane. Use arrows to show where lift, gravity, thrust and drag occur.

Listening, Speaking, and Viewing Activities

1. Interview someone in the field of aviation. Determine appropriate questions to ask to gain the information needed.
2. Relate personal experiences with airplanes.
3. Research skywriting. List some problems involved such as winds or clouds.
4. Invite a CB operator to your class and have the CB demonstrated for you.
5. Build a class crystal radio from a commercial kit or from "scratch". A radio show or reference books will help you.
6. Check the newspapers for radio and television programs about aviation.
7. Participate in a panel discussion on such topics as:
 - a. "The History of Aviation"
 - b. "Recent Developments in Rockets"
 - c. "Effects of Aviation on My Community"

8. Pretend you are the air traffic controller and make a tape of control tower to plane conversations.
9. Identify why oral communication is important at an airport.
10. Practice the correct way to request an airline reservation.