

Hiller Aviation Museum Exhibit Safari

Dream of Flight

Explorations in Aviation

ANSWER KEY

1. Both the 1903 Wright Flyer and the 1869 Marriott Avitor had 1 engine and 2 propellers.

An airplane driven by a single propeller is more difficult to control because of turning forces from the propeller. The Wrights and Marriott recognized this and devised mechanisms to turn two propellers with a single engine. The propellers turned in opposite directions, negating the turning tendency. Later light airplanes had stronger control surfaces and could fly safely with a single propeller.

2. Name three aircraft in the Museum that have pusher propellers.

The 1903 Wright Flyer, the Vin Fiz, Black Diamond, Curtiss Pusher, Little Looper, Buhl autogiro, Stearman-Hammond Y, and Rutan Defiant. Pusher propellers were popular in early aviation but in a rough landing the engine could come loose and crash forward into the pilot. By 1915 most propeller-driven aircraft had changed to tractor propellers that pull the airplane through the air.

3. Was the Avitor considered to be an airplane, or an airship?

An airplane. Although its structure included a hydrogen-filled envelope that partially offset its weight, the Avitor still weighed about 15 pounds when ready for flight. Additional lift had to be generated by the wings for the Avitor to fly.

4. What powered the Avitor?

A steam engine. Marriott, like other aviation pioneers of his time, was hobbled by lack of a lightweight, powerful engine. It was not until gasoline powered internal combustion engines came into use at the turn of the 20th century that sustained, powered flight with people aboard became a possibility.

5. The Black Diamond Airplane, Eugene Ely's airplane and Lincoln Beachey's Little Looper are all examples of what kind of airplane?

All are variants on the Curtiss Pusher. Glenn Curtiss' design was popular in the early history of aviation. Unlike Wright aircraft such as the 1903 Flyer or the Vin Fiz, Curtiss Pushers had a single propeller and used ailerons for roll control instead of wing warping. Nearly all aircraft today continue to use ailerons for roll control.

6. What is the biggest difference between the Curtiss biplanes flown by Lincoln Beachey and Eugene Ely?

Beachey's Little Looper has no forward stabilizer. At the time, most aircraft had stabilizers in front of and behind the wings. At an early flying meet Beachey had a rough landing and damaged the Little Looper's forward stabilizer. The impatient Beachey simply removed the stabilizer and returned to the air. The rear stabilizer proved to be sufficient for his aircraft, and the reduction in weight and drag boosted performance. Within a short time the single stabilizer design had been adopted for most aircraft.

7. What makes the autogiro different from a helicopter?

The Buhl Autogiro represents the transition from airplane design to helicopter design. The autogiro still employed a propeller, wings and control surfaces as an airplane, and the rotorblades were not powered as in a helicopter.

8. What is unusual about the rotor systems for the XH-44 and UH-4 helicopters compared to most helicopters today?

Both of these early helicopters had twin counter-rotating main rotors and no tail rotor. The turning motion of the single large rotor on a helicopter gives it a turning tendency. Stanley Hiller believed the solution to this problem was to use a single engine to turn two rotors in opposite directions. This worked, but helicopters with one large rotor and a smaller tail rotor able to compensate for the turning effects ultimately proved more efficient. Note that only a model of the XH-44 is on display, as the original is currently at the Smithsonian.

9. Why does the 1928 Travelair plane say "Pepsi"? What would you write in the sky?

The 1928 Travelair "Pepsi Plane" was a record breaker, in 1929 Louise McPhetridge Thaden flew in this aircraft for 22 hours setting a new record for endurance. Later, this same aircraft was flown by Suzanne Asbury-Oliver, one of the nation's only professional female skywriters. The "Pepsi" logo is because this aircraft was used to skywrite advertisements for Pepsi-Cola.

10. What was the longest flight of the Grumman Albatross?

A flight around the world. The Museum's Albatross, N44RD, participated in an around-the-world flight 1997. The flight recreated the last mission of famed aviation pioneer Amelia Earhart, who disappeared over the Pacific Ocean near remote Howland Island in 1937. The Albatross, flown by local aviator Reid Dennis, and the Lockheed Electra flown by Linda Finch, which it accompanied, successfully completed the circumnavigation of the world by landing at Oakland International Airport, the same field Earhart departed from and intended to return to in 1937.