

NASA AT 50

1961: Flexible Wing Design Used for Hang Gliders

Teacher's Guide



Grade Level: 6–12 **Curriculum Focus:** Science, Social Studies **Running Time:** 4 minutes

Introduction

NASA at 50 acquaints students with key innovations and milestones in chemistry, physics, engineering, and space exploration from NASA's fifty-year history. Each clip serves as a gateway for extended lessons in science and history, promoting critical thinking and inquiry as essential components of scientific literacy.

Program Description

Introduces Francis Rogallo, a NASA engineer whose design for the flexible wing became the basis for modern hang gliding. The program details how Rogallo designed the flexible wing for the Gemini and Apollo space programs. Although NASA did not ultimately use the design, the flexible wing's low cost and simple construction allowed flying to become a recreational sport.

Learning Objectives

After viewing the program and participating in discussion, students will be able to:

- Explain how a flexible wing works;
 - Describe how hang gliding has become a recreational sport;
 - Identify why NASA was interested in the flexible wing design.
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Classroom Connections

Describe the flexible wing. How is it different from a parachute?

How did NASA intend to use the flexible wing?

Where was most of the inventing for the flexible wing done? What materials were used?

How did this invention change aviation?

Classroom Activities

Although NASA tested the use of a flexible wing to land spacecraft capsules, NASA ultimately continued to use parachutes. Students should compare and contrast the structure and uses of parachutes versus flexible wings. Students should use a graphic organizer for this assignment.

Target Vocabulary*

aerodynamics - a branch of dynamics that deals with the motion of air and other gaseous fluids and with the forces acting on bodies in motion relative to such fluids

aviation - the operation of heavier-than-air aircraft

drag - something that retards motion, action, or advancement

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Academic Standards

National Science Teachers Association

The National Science Teachers Association (NSTA) has developed national standards to provide guidelines for teaching science. To view the standards online, go to

<http://www.nsta.org/publications/nse.aspx>.

This guide addresses the following standards:

- Science and Technology
- Earth and Space Science
- People, Places, and Environments
- Science in Personal and Social Perspectives
- History and Nature of Science

National Council for the Social Studies

The National Council for the Social Studies (NCSS) has developed national standards to provide guidelines for teaching social studies. To view the standards online, go to

<http://www.socialstudies.org/standards/strands/>.

This guide addresses the following standards:

- Time, Continuity, and Change
- People, Places, and Environments
- Science, Technology, and Society
- Individuals, Groups, and Institutions