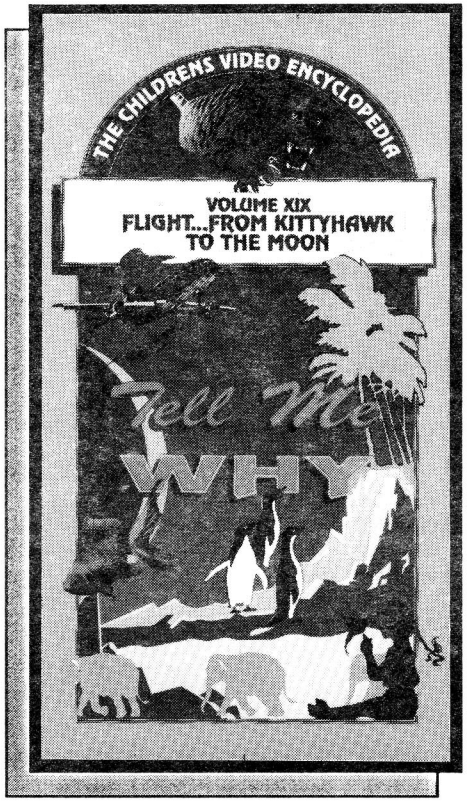
GLOSSARY

1. AERONAUTICS-science of flight in aircraft.
2. AIRBORNE-carried by air.
3. AIRPLANE-powered heavier-than-air craft with wings.
4. ALTITUDE-height.
5. APOGEE-remotest point of satellite orbit.
6. ARCHEMEDES-greek who discovered how and why objects floated in water in 200 B.C.
7. ASTRONAUT-traveler outside earth's atmosphere.
8. ATMOSPHERE-air surrounding earth.
9. BALLISTIC MISSILE-guided missile completing its trajectory in free fall.
10. BIPLANE-an airplane with two main planes, typically one above the other.
11. BUOYANCY-tendency to float.
12. COMBUSTIBLE-inflammable.
13. COMBUSTION-burning.
14. CURRENT-water, air, etc. moving in one direction.
15. ELLIPTICAL-oblong.
16. ENVISION-to imagine (something not yet in existence).
17. EVOLUTION-gradual development.
18. EXHAUST-used gases from engine.
19. FASCINATE-attract irresistibly.
20. FLIGHT-act or power of flying.
21. FLOAT-rest or move on in liquid, air, etc.
22. FLY-move or direct through air.
23. GLIDE-move smoothly and gradually.
24. GLIDER-motorless heavier-than-air aircraft.
25. GRAVITY-force attracting bodies to the earth's center.
26. HELICOPTER-heavier-than-air craft lifted a by horizontal propeller.
27. HELIUM-light, gaseous element.
28. HORIZONTAL-at right angles to vertical.
29. HOVER-stay fluttering or suspended in air.
30. INERTIA-without inherent power to move, resist, or act.
31. JET-plane operated by jet propulsion.
32. KITTY HAWK, N.C.-place where Orville and Wilbur Wright flew the first successful motorized airplane on December 17, 1903.
33. LAW OF FALLING BODIES-Galileo; if object fell someplace where there was no air, the object would fall faster and faster the longer it fell.
34. LIFT-upward pull resulting from the force of the air against an airfoil passing through it.
35. LUNAR-of or according to the moon.
36. MANEUVER-planned movement.
37. MODULE-self-contained element of spacecraft.
38. NASA-National Aeronautics and Space Administration.
39. NAVIGATION-passing over or through water or air.
40. ORBIT-path of planet, satellite, etc. around another body.
41. PAYLOAD-contents to be carried.
42. PERIGEE-point nearest earth in orbit of heavenly body.
43. PILOT-operator of aircraft or ship.
44. PREDESTINE-determine beforehand.
45. PROPEL-drive forward.
46. PROPELLER-screwlike propelling device.
47. PROPULSION-pressing onward by force, as wind or steam.
48. PTEROSAURS-first vertebrate able to fly.
49. RAMJET-jet engine in which the air is continuously compressed by being rammed into the open front end.
50. RECONNAISSANCE-search area, especially for military information.
51. RESISTANCE-opposition to.
52. ROCKET-tube propelled by discharge of gases from it.
53. SATELLITE-body that revolves round planet.
54. SHAFT-revolving bar in engine.
55. SOAR-fly upward.
56. SOLAR-of the sun
57. SPACECRAFT-vehicle for traveling in outer space.
58. SPAR-a structural member of an airplane wing, running the length of the wing and supporting the ribs.
59. SPUTNIK I-first man-made satellite launched by Russia October, 1957.
60. STALL-loss of air speed necessary for control.
61. STRUT-rigid supporting frame work.
62. TECHNIQUE-skilled method.
63. TELECOMMUNICATION-communication by radio, telephone, telegraph, and television.
65. TRANSCEND-go or be beyond.
66. TURBINE-motor producing torque by pres sure of fluid.
67. TURBOJET-jet engine that compresses air by turbine.
68. TURBOPROP-a turbojet engine whose tur - bine shaft, through reduction gears, drives a propeller that develops most of the thrust, with some of the thrust usually being added by a jet of the turbine exhaust gases.
69. VERTEBRATE-animal with spinal column.
70. VERTOL-any number o tilt-wing convertiplanes whose blades can be positioned horizontally or vertically; cross between a helicopter and an airplane.
71. VORTEX-whirling movement or mass.
72. WEATHER-state of atmosphere as to moisture, temperature, etc.

Tell Me WHY

TEACHER'S GUIDE



VOLUME XIX
FLIGHT...FROM KITTYHAWK TO THE MOON

SUGGESTED TEACHING STRATEGIES

1. Research how birds fly. Compare it to how planes fly.
2. Determine how Galileo's "Law of Falling Bodies" had a major impact on the designs of all modes of flight.
3. Discuss how air currents affect flight.
4. Research December 17, 1903, in Kitty Hawk, North Carolina. Re-enact man's first successful flight.
5. Perform experiments with propulsion, comparing propellers, ramjets and turbojets.
6. Discuss how weather conditions, such as visibility, humidity, temperature, wind shear, etc..., effect planes in flight. Relate them to cautions in take-off and landing.
7. Trace the beginnings of rockets, making a correlation between their uses in war and space.
8. Trace the history of the Apollo Space Program from Alan Shepard Jr.'s first flight in the Mercury mission to the last flight of the Apollo mission.
9. Determine how the principles of flight exemplified in Kitty Hawk, North Carolina have led to the success of the Space Shuttle Program.
10. Trace the failures of the Space program, and what has been learned from each.

CONCEPTS AND TERMS TO LISTEN AND WATCH FOR:

ALTITUDE	PROPULSION
CURRENT	SATELLITE
HOVER	TURBOPROP
LIFT	COMBUSTION
SOAR	GRAVITY
TURBOJET	LAW OF FALLING BODIES
ATMOSPHERE	RAMJET
GLIDE	SPUTNIK I
INERTIA	WINGSPAN

QUESTIONS FOR THOUGHT, DISCUSSION AND FURTHER STUDY

1. How does a bird fly?
2. List the four (4) ways in which an object can fly. Define each.
3. What is the difference between heavier-than-air flight and lighter-than-air flight? Which category do most flying objects fall in?
4. Who were the first people to have a successful flight? For how long did they fly?
5. How does an airplane get its lift to get off the ground?
6. How does atmospheric pressure effect flight?
7. How does jet propulsion work?
8. What are ramjets?
9. What are turbojets?
10. What are turboprops?
11. What is a vertol?
12. How fast has the X-15 been clocked to go?
13. Who was the first man in space?
14. How does a rocket work?
15. What are artificial satellites used for?
16. How does gravity effect things in space?
17. What makes the Space Shuttle Program unique from all previous space programs?

CAREER OPPORTUNITIES

ASTRONAUT	BIOLOGIST
COMMERCIAL PILOT	AIRLINE ANALYST
TEST PILOT	PHYSICIST
MATHEMATICIAN	SATELLITE ANALYST
TRAVEL AGENT	ELECTRICAL ENGINEER
AEROSPACE ENGINEER	HISTORIAN
FLIGHT ATTENDANT	COMPUTER ENGINEER
MECHANICAL ENGINEER	