

SUGGESTED TEACHING STRATEGIES

1. Trace the origins of the Gregorian calendar.
2. Discuss the Egyptians contributions in the evolution of the calendar.
3. Trace the origins for the names of the months.
4. Trace the origins for the days of the week.
5. Discuss how life would be different if we stayed with a ten (10) month calendar.
6. Create a sundial to track the passage of time during the days, seeing how the length of the shadow corresponds to the hour of daylight.
7. Using a world map, determine what you might be doing in different time zones.
8. Compare the Hindu-Arabic Number System to the Roman Numeral System.
9. Discuss how your life would be different if we did not have standard units of measurement.
10. Trace the origins of coins.
11. Develop a standard of money for the world. Determine the value of different nations' current money for the switch-over.

CONCEPTS AND TERMS TO LISTEN AND WATCH FOR

CALENDAR	MONTH
GREGORIAN CALENDAR	SIDEREAL DAY
WEEK	SUNRISE
YEAR	DAY
SUNSET	LEAP YEAR
SIDEREAL CLOCK	TIME
MERIDIAN	INT'L DATE LINE
DIGIT	TIME ZONE
CALCULATE	PRIME MERIDIAN
STANDARD MEASURES	METRIC SYSTEM
ANTE MERIDIEM	METER
HINDU-ARABIC SYSTEM	POST MERIDIEM
MASS	ROMAN SYSTEM
DAYLIGHT SAVING TIME	LENGTH
COINS	CAPACITY

QUESTIONS FOR THOUGHT, DISCUSSION AND FURTHER STUDY

1. Whose calendar is our calendar based on?
2. Who were the first people to utilize the concept of a year?
3. Why do we have a leap year? When does it occur?
4. How many months were originally in a calendar? What were they?
5. What is the idea behind the creation of a week?
6. Where do our names for the days of the week come from?
7. How do scientists determine a day?
8. What is the exact length of a sidereal day?
9. In which direction does the sun rise? In which direction does the sun set?
10. How does a sundial work?
11. What does Ante Meridiem mean?
12. What does Post Meridiem mean?
15. Where is the International Date Line?
16. What are the four (4) time zones in the United States?
17. Why was Daylight Saving Time first created?
18. Why does Daylight Saving Time not affect farmers?
19. Does place value make the Hindu-Arabic system of numbers easier to follow than the Roman system.
20. Why was the National Bureau of Standards established in 1901?
21. The Metric System is based on units of 10. What do each of the prefixes mean?
22. What are the origins of the dollar?
23. What are the origins of the dime?
24. What are the origins of the cent?
25. How did the nickel get its name?
27. What is the barter system, and how does it work?

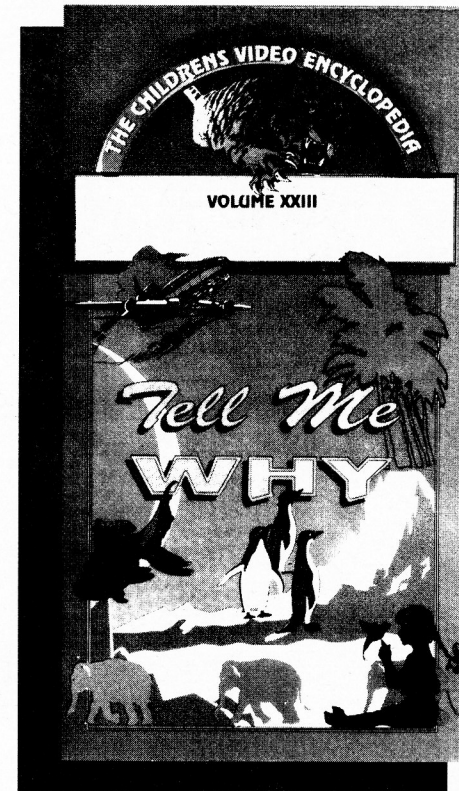
CAREER OPPORTUNITIES

ASTRONOMER	ECONOMIST
TECHNICIAN	HISTORIAN
STATISTICIAN	MINER
MATHEMATICIAN	PRINTER
BUILDER	MAP MAKER
NAVIGATOR	CLOCK MAKER

G L O S S A R Y

1. ANTE MERIDIEM (A.M.)-Before noon; the time between midnight and the following noon
2. APRIL-The fourth month of the year having 30 days
3. ARITHMETIC-Computation with figures
4. AUGUST-Eighth month of the year containing 31 days
5. AXIS-Line about which something turns
6. BARTER-Trade by exchange
7. CALCULATE-Compute or estimate by mathematics
8. CALENDAR-List of days, weeks, and months of the year
9. CENT-1/100 of a dollar; penny
10. CENTIMETER-Unit of measure, equal to 1/100 meter (.3937 inch)
11. CENTRAL STANDARD TIME-One of the four (4) standard times in the U.S. corresponding to the mean local time of the 90th Meridian West of Greenwich, England... Six (6) hours behind Greenwich time and one (1) hour behind Eastern standard time
12. CIRCLE-Closed curve of uniform distance from its center
13. COIN-Piece of metal issued as money
14. COUNT-To name, one by one, by units or groups to reach a total
15. DAY-Period of time between the rising and setting of the sun
16. DAYLIGHT-The beginning of the day
17. DAYLIGHT SAVINGS TIME-The method of saving or making use of daylight, by setting the clock ahead, usually one (1) hour of standard time
18. DECEMBER-The twelfth and last month of the year having 31 days, in which the sun enters the Tropic of Capricorn and makes the Winter Solstice
19. DIGIT-Any arabic numeral, as 0, 1, 2, etc.
20. DIME-Coin worth ten (10) cents
21. DOLLAR-Monetary unit equal to 100 cents
22. EASTERN STANDARD TIME-One of the four (4) standard times in the U.S. corresponding to the Mean local time of the 75th Meridian west of Greenwich, England... Five (5) hours behind Greenwich time
23. ELECTRUM-Natural composition of 75% gold and 25% silver from which primitive coins were made
24. FEBRUARY-Second month of the year introduced into the Roman calendar by number having 28 days in regular years and 29 days in Leap Year
25. FOOT/FEET-Unit of length equal to 12 inches
26. FRIDAY-Sixth day of the week
27. GRAM-Metric unit of weight equal to about 1/28th of an ounces
28. GREENWICH TIME-Mean solar time of the Meridian of Greenwich, England, used as the basis for standard time throughout most of the world
29. GREGORIAN CALENDAR-Uses birth of Christ as point from which to count backward and forward
30. HEBREW CALENDAR-Calendar used by the Jews in calculating Jewish history, hours, etc. based on the lunar month and reckoned from 3761 B.C., the traditional of creation
31. HINDU-ARABIC SYSTEM-The figures 1,2,3,4,5,6,7,8,9, and 0 (Zero)
32. HORIZON-Apparent boundary between earth and sky
33. HOUR-Period of sixty minutes
34. JANUARY-First month of the year having 31 days and named for the two-faced God Janus
35. JULIAN CALENDAR-Calendar as regulated by Julius Caesar, giving every fourth year 366 days, the other years having 365 days each
36. JULY-Seventh month of the year having 31 days during which the sun enters the sign Leo
37. JUNE-sixth month of the year having 30 days in which the sun enters the sign of Cancer
38. LEAP YEAR-A year of 366 days occurring every fourth year, the additional day given to February
39. LITER-Metric unit of capacity equal to 1.0567 U.S. liquid quarts or 9.06 dry quarts
40. MARCH-Third month of the year having 31 days and takes its name from the God Mars
41. MATHEMATICS-Science that deals with number, quantity and form
42. MAY-Fifth month of the year having 31 days
43. MEASUREMENT-The amount, quantity, or extent ascertained by measuring; capacity, size, area, contents, bulk; a dimension
44. MERIDIAN-Circle on earth's surface passing through the poles
45. METER-Unit of length in the Metric system equal to 39.37 inches
46. METRIC SYSTEM-Decimal system of weights and measurements in which the gram, the meter, and the liter are the basic units of weight, length and capacity, respectively.
47. MONDAY-Second day of the week
48. MONEY-Pieces of metal or certificates issued as medium of exchange
49. MONTH-Any of twelve parts of the calendar year
50. MOUNTAIN STANDARD TIME-One of the four (4) standard times in the U.S. corresponding to the mean local time of the 105th Meridian west of Greenwich, England... seven (7) hours behind Greenwich time and 2 hours behind Eastern Standard time
51. NICKEL-Five cent coin
52. NIGHT-Period between sunset and sunrise
53. NOON-12:00 in daytime
54. NOVEMBER-Eleventh month of the year containing 30 days
55. NUMBER-To total the number of persons or things in, to count
56. OCTOBER-Tenth month of the year containing 31 days
57. PACE-Variable lineal measure about 30 inches
58. PACIFIC STANDARD TIME-One of the four (4) standard times in the U.S. corresponding to the mean local time of the 120th Meridian west of Greenwich, England... eight (8) hours behind Greenwich time and 3 hours behind Eastern Standard time
59. POST MERIDIEM (P.M.)-After noon; the time between noon and the following midnight
60. PRIME MERIDIAN-The Meridian taken as a starting point from which to reckon longitude; it passes through Greenwich, England
61. RECTANGLE-Parallelogram with four right angles
62. ROMAN NUMERAL-System of numbers using letters as symbols: I=1, V=5, X=10, C=100, D=500, M=1000
63. SATURDAY-Seventh day of the week
64. SEPTEMBER-Ninth month of the year having 30 days
65. SIDEREAL CLOCK-Time as reckoned by sidereal days, or as measured by the daily motion of the stars
66. STANDARD MEASUREMENT-Something established by the government for use as a rule or basis of comparison in measuring or judging capacity, quantity, content, extent, value, etc. as standards of weight and measure are fixed by the government
67. SUNDAY-First day of the week
68. SUNRISE-Ascent of the sun above the horizon
69. SUNSET-Descent of the sun below the horizon
70. TALLY-Anything used to record for an account
71. THURSDAY-Fifth day of the week
72. TIME-Period between two events or during which something exists, happens, or acts
73. TIME ZONE-15° wide in longitude
74. TUESDAY-Third day of the week
75. WEDNESDAY-Fourth day of the week
76. WEEK-Period of seven (7) days, especially one beginning with Sunday and ending with Saturday
77. YEAR-Period of 365 or 366 days
78. ZERO-Symbol (0) indicating nonquantity

Tell Me WHY TEACHER'S GUIDE



VOLUME XXIII TIME, MONEY, AND MEASUREMENT

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	

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 1-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 pressure of fluid.
67. TURBOJET-jet engine that compresses air by turbine.
68. TURBOPROP-a turbojet engine whose turbine 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 of 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

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