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Phone: 205, 453-0034, 453-0035

THE SKYLAB STUDENT PROJECT

In 1971, the NASA, in an effort to involve the general public in the Skylab program, conceived the Skylab Student Project. The primary aim of the project is to stimulate national interest in science and technology in general and in particular the nation's space programs.

To insure that this country have available an adequate scientific and technical manpower pool for the future, the logical source seemed to be our young people. Therefore, it was NASA's decision to direct the Skylab Student Project to those young people who have indicated an interest in science and technology and to foster that interest through direct participation in an ongoing program emphasizing as wide a spectrum of science and technology as possible. Skylab, with its many diverse experiments, provided the ideal opportunity for such participation.

The National Science Teachers Association (NSTA) provided an existing, closely associated contact with all students, grades 9 through 12, in United States sponsored schools. For this reason, the NSTA was asked to sponsor, organize, and administer a national competition for high school students.

The competition called for individual students (or groups of students) to develop meaningful experiments to be flown on Skylab. To facilitate the organizing and administering of the program, the NSTA chose to divide the participating students into 12 geographical regions with a regional chairman appointed to receive all proposals for his region. The regional chairmen then appointed a committee of eminent scientists, engineers, and science educators to evaluate each proposal. Some 80,000 applications for proposals were requested by teachers, 3,409 proposals were submitted and approximately 300 regional winners selected. Each participant received a Certificate of Merit.

The 300 winning regional proposals were transmitted to the NSTA ^{Wahner} ~~headquarters~~ where they were further screened. In March 1972, ^{295 not selected -} 25 national winners were announced and assigned science advisers at the Marshall Space Flight Center, the Center selected by NASA to be responsible for the Student Project.

Working closely with their advisors, the students prepared an evaluation of their experiments in terms of compatibility with the Skylab program and its necessary constraints. These evaluations were presented at a preliminary design review at the Marshall Center. The review board, made up of NASA officials from the Marshall Center, Johnson Space Center, Kennedy Space Center, and NASA Headquarters,

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examined the presentations carefully and determined that 19 of the
25 experiments proposed fell within mission capabilities and could
be flown on Skylab. The remaining six students were associated with
NASA scientists in corollary research.

An intensive development effort followed, directed toward reducing
the proposed student experiments to practical, space qualified
hardware. It was determined that 11 of the proposed student experiments
would require additional hardware development, while eight of the
student experiments could be satisfied using data from existing
experiments of Skylab principal investigators. The results of this effort
were presented in a critical design review at the Marshall Center in
July 1972. At this time, each student discussed efforts made in
furthering the development of his or her experiment. Programmatic
aspects, hardware details, mission requirements and other elements
were considered and a final go-ahead with the project was given.

For those experiments that required hardware development,
an acceptance review was held at the Marshall Center in January 1973.
Test results were received and the hardware was declared flight-
worthy. The hardware was then delivered to the Kennedy Space
Center for installation in the Skylab.

The 25 student experimenters range in age from 14-18 years.
Their mean age is 15.8 years (female 15.4, male 15.9). Five of the
students are females.

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could get talent quickly if student or parent out of town

Student Experiments to be Flown on Skylab

1. DANIEL C. BOCHSLER, age 16, Route 2, Box 75, Silverton, Oregon, 97381. "Possible Confirmation of Objects within Mercury's Orbit." Silverton Union High School, Mr. John P. Daily, teacher/sponsor.

Experiment: ED-22, This experiment will attempt to identify a planetary body which may orbit the Sun at a distance approximately 0.1 the distance from Earth to the Sun (Mercury's orbit is 0.3 to 0.4 the distance to Earth's orbit). The experiment is to be performed by examining about 30,000 Skylab solar telescope photographs.

2. VINCENT W. CONVERSE, age 19, 1704 Roosevelt Road, Rockford, Illinois, 61111. "Zero Gravity Mass Measurement." Harlem High School, Miss Mary J. Trumbauer, teacher/sponsor.

Experiment: ED-74, This experiment complements the existing Skylab specimen mass and body mass measurement devices. The equipment consists of a simple leaf spring anchored at one end with a mass at the other end which is to be measured. The experiment operates on the same principle as the baseline Skylab mass measurement devices and can therefore be used as an excellent demonstration of these.

3. TROY A. CRITES, age 16, 736 Wynwood Drive, Kent, Washington, 98031. "Space Observation and Prediction of Volcanic Eruptions." Kent Junior High, Mr. Richard C. Putnam, teacher/sponsor.

Experiment: ED-12, The aim of this experiment is to analyze infrared surveys of known volcanoes obtained by baseline Skylab Earth

resources experiment equipment. The data will be compared to ground-based data to determine whether remote sensing can detect increased thermal radiation which may precede an imminent eruption.

4. W. BRIAN DUNLAP, age 16, 6695 Abbot Avenue, Youngstown, Ohio, 44515. "Liquid Motion in Zero Gravity." Austintown Fitch High School, Mr. Paul J. Pallante, teacher/sponsor.

Experiment: ED-78, The aim of this experiment is to observe the motion of a gas bubble surrounded by a fluid when excited by a simple mechanical system of calibrated driving force of simple frequency.

5. JOHN C. HAMILTON, age 17, 12 Honu Street, Aiea, Hawaii, 96701. "Spectrography of Selected Quasars." Aiea High School, Mr. James A. Fuchigami, teacher/sponsor.

Experiment: ED-23, In this experiment, selected photographs obtained by the ultraviolet stellar astronomy equipment will be analyzed. Photographs of target areas in which quasars have been identified will be studied to obtain spectral data in the ultraviolet regions to augment existing data in the radio and visible ranges.

6. ALISON HOPFIELD, age 15, 183 Hartley Avenue, Princeton, New Jersey, 08540. "Photography of Libration Clouds." Princeton Day School, Mr. Norman Sperling, director, Duncan Planetarium.

Experiment: ED-21, This experiment will use the Skylab solar telescope cameras to obtain information on two regions in the Moon's orbit. At two points in the orbit of the Moon, ahead of and following the Moon in its path, a condition of gravitational equilibrium is conducive to the collection of space particles. When each of these regions comes within sight of the Skylab solar telescopes the brightness polarization of the reflected light will be measured.

7. KATHY L. JACKSON, age 17, 18718 Capetown Drive, Houston, Texas, 77058. "A Measure of Motor Sensory Performance During Prolonged Inflight Zero "G"." Clear Creek High School, Mrs. Mary K. Kimzey, teacher/sponsor.

Experiment: ED-41, This experiment uses a standard eye-hand coordination test apparatus to measure changes in motor sensory skill of crew members.

8. ROGER G. JOHNSTON, age 19, 1833 Draper Drive, St. Paul, Minnesota, 55113. "Capillary Action Studies in a State of Free Fall." Alexander Ramsey High School, Mr. Theodore E. Molitor, teacher/sponsor.

Experiment: ED-72, The aim of this experiment is to determine if the zero gravity environment induces changes in the characteristics of capillary and wicking action from the familiar Earth-Gravity characteristics.

9. JEANNE L. LEVENTHAL, age 17, 1511 Arch Street, Berkeley, California, 94708. "X-Ray Emission from the Planet Jupiter." Berkeley High School, Mr. Harry E. Choulett, teacher/sponsor.

Experiment: ED-25, The aim of this experiment is to detect X-rays emitting from Jupiter. The X-ray emission detected by Skylab will be compared with solar activity and Jupiter's radio emission to derive more information on the mechanisms of that great planet.

10. TODD A. MEISTER, age 17, 33-04 93 Street, Jackson Heights, New York, 11372. "In Vitro Immunology." Bronx High School of Science, Mr. Vincent G. Galasso, teacher/sponsor.

Experiment: ED-32, This experiment is directed toward determining the effects of zero gravity on antigenic changes in surface membranes.

11. JUDITH S. MILES, age 17, 3 Dewey Road, Lexington, Massachusetts, 02173. "Web Formation in Zero Gravity." Lexington High School, Mr. J. Michael Conley, teacher/sponsor.

Experiment: ED-52, This experiment will observe the web building process and the detailed structure of the web of the common cross spider (*areneus diadematus*) in a normal environment and in a Skylab environment. Analysis of experiment results will be similar to analysis of similar experiments, without the Skylab environment, performed by the Research Division of the North Carolina Department of Mental Health, Raleigh, North Carolina.

12. CHERYL A. PELTZ, age 16, 7117 S. Windermere, Littleton, Colorado, 80120. "Cytoplasmic Streaming in Zero Gravity." Arapahoe High School, Mr. Gordon B. Scheels, teacher/sponsor.

Experiment: ED-63, The aim of this experiment is to perform microscopic observation of leaf cells of elodea plants in zero gravity to determine if there is any difference between the intracellular cytoplasm compared with cytoplasmic motion of similar leaf cells on Earth.

13. TERRY C. QUIST, age 18, 3818 Longridge Drive, San Antonio, Texas, 78228. "Earth Orbital Neutron Analysis." Thomas Jefferson High School, Mr. Michael Stewart, teacher/sponsor.

Experiment: ED-76, In this experiment, detectors inside Skylab record impacts of high energy neutrons. The detectors mounted on the inboard face of water tanks, will be able to discriminate between neutrons in four energy spectra. The neutrons, which have been moderated by their passage through the water in the tanks, impact the detectors and produce fission particles which in turn interact with a plastic material. Chemical treatment of the interaction reveals readily identifiable tracks.

14. JOE W. REIHS, age 18, 12824 Wallis Street, Baton Rouge, Louisiana, 70815. "X-Ray Content in Association with Stellar Spectral Classes." Tara High School, Mrs. Helen W. Boyd, teacher/sponsor.

Experiment: ED-24, The primary aim of this experiment is to make observations of celestial regions in X-ray wavelengths in an attempt to relate X-ray emissions to other spectral characteristics of stars observed. In addition, observations of the Sun in X-ray and other spectral regions will be studied to reevaluate the Sun and its relation to other stellar classes.

15. DONALD W. SCHLACK, age 17, 9217 Appleby Street, Downey, California, 90240. "Phototropic Orientation of an Embryo Plant in Zero Gravity." Downey High School. Miss Jean C. Beaton, teacher/sponsor.

16. JOEL G. WORDEKEMPER, age 14, 810 East Sherman Street, West Point, Nebraska, 68788. "Plant Growth in Zero Gravity." Central Catholic High School, Mrs. Lois M. Schaaf, teacher/sponsor.

Experiment: ED-61/62, These two experiments have been combined into a single joint experiment whose objectives are:

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1. To determine the difference in root and stem growth and orientation of radish seeds in specimens grown in zero gravity and on Earth under similar environmental conditions. 2. To determine whether light can be used as a substitute for gravity in causing the roots and stems of radish seeds to grow in the appropriate direction in zero gravity, and to determine the minimum light level required.

17. NEAL W. SHANNON, age 18, 2849 Foster Ridge Road, Atlanta, Georgia, 30345. "A Search for Pulsars in Ultraviolet Wavelengths." Fernbank Science Center, Dr. Paul H. Knappenberger, teacher/sponsor.

Experiment: ED-26, Objective of this experiment is to make ultraviolet observations of selected celestial regions in an attempt to relate ultraviolet emissions with known radio-emitting pulsars and with the pulsar in the Crab Nebula which is known to emit invisible light and radio spectra.

18. ROBERT L. STAEHLE, age 18, Huntington Hills-North, Rochester, New York, 14622. "Behavior of Bacteria and Bacterial Spores in the Skylab Space Environment." Harley School. Mr. Alan H. Soanes, teacher/sponsor.

Experiment: Ed-31, In this experiment colonies of various species of bacteria will be studied in the Skylab zero gravity environment to determine if this environment induces variations in survival, growth and mutations of the spores which are different from those observed in identical colonies on Earth.

19. JOE B. ZMOLEK, age 19, 1914 Hazel Street, Oshkosh, Wisconsin, 54901. "Earth's Absorption of Radiant Heat." Lourdes High School, Mr. William L. Behring, teacher/sponsor.

Experiment: ED-11, Objective of this experiment is to derive information on the attenuation of heat energy in Earth's atmosphere. Measurements are to be made simultaneously at the Earth's surface and at Skylab altitude to determine differences in radiant heat levels.

Student Experiments Requiring Other Affiliation

1. KEITH L. STEIN, age 15, 2167 Regent Court South, Westbury, New York. "Micro Organisms in Varying Gravity." W. Trespar Clarke High School, Dennis Unger, teacher/sponsor.

Experiment: ED-33, The objective of this experiment was to subject numerous different species of bacteria to a complex regime of varying levels of gravitational forces. The varying "G" levels were to be achieved by mounting the specimens at different radii on a centrifuge. Restraints precluded performing this experiment on Skylab. Since previously planned microbiology Detailed Test Objectives includes some of the data Keith is interested in, he will be associated with Dr. Ferguson, Johnson Space Center, the principal coordinating scientist for this investigation.

2. KENT M. BRANDT, age 16, 11380 Grand Oak Drive, Grand Blanc, Michigan. "Chick Embryology." Grand Blanc Senior High School, Mr. Charles E. Martell III, teacher/sponsor.

Experiment: ED-51, This experiment proposed launching a number of fertile chicken eggs, incubating the eggs in orbit and observing the development of the embryo. Incubation periods would vary so that returned eggs would reflect changes in maturity and in development as a result of weightlessness. Excessive weight and hardware complexity precluded development in allotted time. Kent indicated an interest in biorythms and was associated with Circadian Rhythm-Pocket Mice S071,

under the direction of Dr. John Lindberg, principal investigator.

3. KEITH McGEE, age 18, 122 Sunflower Street, Garland, Texas. "Colloidal State." South Garland High School, Mrs. Ann B. Patterson, teacher/sponsor.

Experiment: ED-71, The objective of this experiment was to investigate the effect of a zero gravity environment on the colloidal state of matter as opposed to the known characteristic of this state in a one-G environment. Hardware complexity and the inability to obtain a stable platform on Skylab forced this experiment to be eliminated. Keith has been associated with Dr. Robert Snyder, Marshall Space Flight Center, who was involved in the Apollo 14 and 17 electrophoresis demonstrations and who is currently continuing his investigations in this area.

4. KIRK M. SHERHART, age 19, 2144 Earlmont Road, Berkley, Michigan. "Powder Flow." Berkley High School, Mrs. Helen Politzer, teacher-sponsor.

Experiment: ED-73, The objective of this experiment was to study the parameters involved in achieving the flow of powdered or granulated materials as opposed to liquids. Studies revealed that development problems existed that precluded production of hardware within the allowable time. Kirk has been affiliated with the NASA researchers on materials flow in a zero gravity environment.

5. GREGORY A. MERKEL, age 18, Wilbraham and Monson Academy, Springfield, Massachusetts. "Brownian Motion." Wilbraham and Monson Academy, Mr. Solon S. Economou, teacher-sponsor.

Experiment: ED-75, The objective of this experiment was to investigate the effect of zero gravity on the Brownian progression of a solute through its solvent. This experiment requires a highly stable platform and Skylab is not capable of providing the degree of stability. Greg indicated a strong interest in astronomy and was associated with Dr. Karl Henize, University of Texas, principal investigator for S019, Ultraviolet Stellar Astronomy.

6. JAMES E. HEALY, age 18, 84 S. Gillette Avenue, Bayport, New York. "Universal Gravity Constant." St. Anthony's High School, Dr. Paul Mottl, teacher-sponsor.

Experiment: ED-77, The objective of this experiment was to be the determination of the universal gravitation constant in a null-G environment. A modified Cavendish balance was proposed to fly in an attempt to measure the constant. Unfortunately, the random forces induced on the masses of the balance by Skylab disturbances exceeded the mass attraction forces on the Cavendish balance. Jim indicated an interest in the T013 -- Crew Vehicle Disturbance experiment. He and the principal investigator, Mr. Bruce Conway, (have developed a meaningful association.) *duhny*