National Aeronautics and
Space Administration

Educational Product	
Educators	Grades K-8

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Exploring the Extreme

High Performance Learning Activities in Mathematics, Science and Technology

Exploring the Extreme–High Performance Learning Activities in Mathematics, Science and Technology is available in electronic format through NASA Spacelink–one of the Agency's electronic resources specifically developed for use by the educational community.

This guide and other NASA education products may be accessed at the following address:
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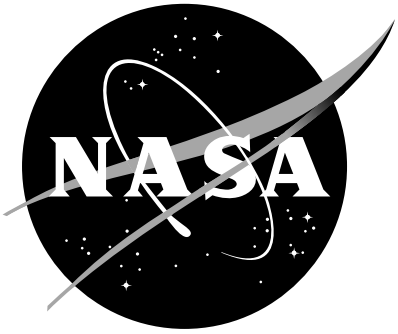
Exploring the Extreme

High Performance Learning Activities in Science, Mathematics and Technology Education



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This publication was developed for the National Aeronautics and Space Administration (Dryden Flight Research Center) by ***PAT*** (**P**reservation of **A**erospace **T**echnology) Projects, Inc., with the assistance of teachers from the Antelope Valley in North Los Angeles County and Kern County of California.

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How To Use This Guide

Controlled flight by humans was attempted early in the last millenium but only mastered for heavier-than-air vehicles in the last century. Tremendous progress was achieved in the twentieth century in aircraft performance and mission capability through research in flight controls, aircraft stability, and propulsion. Modern technology was applied to aeronautics in the last century as aggressively as in other fields, such as medicine, communications, and geosciences. So many advances have been made, that today the demands of performance and maneuverability for many advanced aircraft designs require extensive use of computers to aid the pilot in controlling flight.

With some simple inexpensive materials, you can mount an exciting and productive unit for children that incorporates science, mathematics, and technology education. The many activities contained in this teaching guide emphasize hands-on involvement, prediction, data collection and interpretation, teamwork, and problem solving. The guide also contains background information about aeronautical research that can help students learn how airplanes fly.

Following the background sections are a series of activities that demonstrate the basic science of aeronautics while offering challenging tasks in design. Each activity employs basic and inexpensive materials. In each activity you will find construction diagrams, material and tools lists, and instructions. A brief background section within each activity elaborates on the concepts covered and points back to the introductory material in this guide. Also included is information about where the activity applies to science and mathematics standards, assessment ideas, and extensions.

Because many of the activities and demonstrations apply to more than one subject area, a matrix chart identifies

opportunities for extended learning experiences. The chart indicates these subject areas by activity title. In addition, many of the student activities encourage student problem-solving and cooperative learning. The length of time involved for each activity varies according to its degree of difficulty and the development level of the students.

Finally, the guide concludes with a glossary of terms, suggested reading list, NASA educational resources including electronic resources, and an evaluation questionnaire. We would appreciate your assistance in improving this guide in future editions by completing the questionnaire and making suggestions for changes and additions.

A Note on Measurement

In developing this guide, metric units of measurement were employed. In a number of instances, English units are used or shown along with metric units because of the standard practices in the aviation community, such as altimeters displaying feet instead of meters.