# ROCKETS

## A Teacher's Guide with Activities In Science, Mathematics, and Technology



**National Aeronautics and Space Administration** 

Office of Human Resources and Education Education Division Washington, DC



Education Working Group NASA Johnson Space Center Houston, Texas

This publication is in the Public Domain and is not protected by copyright. Permission is not required for duplication.

EG-108 February 1996

# Acknowledgments

This publication was developed for the National Aeronautics and Space Administration with the assistance of hundreds of teachers in the Texas Region IV area and educators of the Aerospace Education Services Program, Oklahoma State University.

Writers:

### Deborah A. Shearer

**Gregory L. Vogt, Ed.D.** Teaching From Space Program NASA Johnson Space Center Houston, TX

Editor:

#### Carla B. Rosenberg

Teaching From Space Program NASA Headquarters Washington, DC

Special Thanks to:

#### **Timothy J. Wickenheiser**

Chief, Advanced Mission Analysis Branch NASA Lewis Research Center

#### Gordon W. Eskridge

Aerospace Education Specialist Oklahoma State University

# **Table of Contents**

How To Use This Guide1
Activity Format3
Brief History of Rockets5
Rocket Principles13
Practical Rocketry18
Activities
Activity Matrix26Pop Can Hero Engine29Rocket Car353-2-1 Pop!43Antacid Tablet Race47Paper Rockets51Newton Car57Balloon Staging63Rocket Transportation66Altitude Tracking69Bottle Rocket Launcher67Bottle Rocket81Project X-3585Additional Extensions104
Glossary 105
NASA Educational Materials 106
Suggested Reading 106
Electronic Resources for Educators 107
NASA Educational Resources108
NASA Teacher Resource Center Network 109
Evaluation Reply Card Insert