

### Basic Rocket Stability Rockets For Schools

Rocket and air-breathing propulsion systems are the foundation on which planning for future aerospace systems rests. A Review of United States Air Force and Department of Defense Aerospace Propulsion Needs assesses the existing technical base in these areas and examines the future Air Force capabilities the base will be expected to warfighter capabilities not yet fully defined could be met by current science and technology development plans.

Contains 69 innovative home and classroom rocketry projects designed specifically with science fair competitions in mind.

This book teaches the reader to build rockets--powered by compressed air, water, and solid propellant--with the maximum possible fun, safety, and educational experience. Make: Rockets is for all the science geeks who look at the moon and try to figure out where Neil Armstrong walked, watch in awe as rockets lift off, and want to fly th readers will start out making rockets made from stuff lying around the house, and then move on up to air-, water-, and solid propellant-powered rockets. Most of the rockets in the book can be built from parts in the Estes Designer Special kit.

NASA technical note

How Rockets Fly Teacher’s Edition: Math & Science Learning Standards Applied to Rocket Design Grades 4-6

Technical Abstract Bulletin

The Rocket Book

Rocket Propulsion Elements

A Guide to Building and Launching Model Rockets for Teachers and Students of the Space Age

You'll launch excitement in the classroom with these fascinating facts and motivational activities based on rocketry. Blast Off! provides everything you need to create a thematic unit on rocketry - background information, explanations of scientific principles of rocket flight, scientific experiments for students, language activities, even a school assembly based on the science of rocketry. With a variety of projects that are easy to implement and will appeal to students, this book offers educators a complete teaching package. Grades 4-8.

The book follows a unified approach to present the basic principles of rocket propulsion in concise and lucid form. This textbook comprises of ten chapters ranging from brief introduction and elements of rocket propulsion, aerothermodynamics to solid, liquid and hybrid propellant rocket engines with chapter on electrical propulsion. Worked out examples are also provided at the end of chapter for understanding uncertainty analysis. This book is designed and developed as an introductory text on the fundamental aspects of rocket propulsion for both undergraduate and graduate students. It is also aimed towards practicing engineers in the field of space engineering. This comprehensive guide also provides adequate problems for audience to understand intricate aspects of rocket propulsion enabling them to design and develop rocket engines for peaceful purposes.

This book contains selected papers prepared for the NATO Advanced Study Institute on "Unsteady Combustion", which was held in Praia da Granja, Portugal, 6-17 September 1993. Approximately 100 delegates from 14 countries attended. The Institute was the most recent in a series beginning with "Instrumentation for Combustion and Flow in Engines", held in Vimeiro, Portugal 1987 and followed by "Combusting Flow Diagnostics" conducted in Montechoro, Portugal in 1990. Together, these three Institutes have covered a wide range of experimental and theoretical topics arising in the research and development of combustion systems with particular emphasis on gas-turbine combustors and internal combustion engines. The emphasis has evolved roughly from instrumentation and experimental techniques to the mixture of experiment, theory and computational work covered in the present volume. As the title of this book implies, the chief aim of this Institute was to provide a broad sampling of problems arising with time-dependent behaviour in combustors. In fact, of course, that intention encompasses practically all possibilities, for "steady" combustion hardly exists if one looks sufficiently closely at the processes in a combustion chamber. The point really is that, apart from the excellent paper by Bahr (Chapter 10) discussing the technology of combustors for aircraft gas turbines, little attention is directed to matters of steady performance. The volume is divided into three parts devoted to the subjects of combustion-induced oscillations: combustion in internal combustion engines; and experimental techniques and modelling.

Blast Off!

Introduction to Rocket Technology

Down-to-Earth Rocket Science

Make: Rockets

Transition of the Naval Ordnance Test Station from Rocket Station to Research, Development, Test, and Evaluation Center, 1948-58

The Rocket into Planetary Space

***How Rockets Fly, Teacher’s Edition, illustrates through rocket design how technical books are written, and how mathematical expressions come to be, with a systematic seven step approach to problem solving. How Rockets Fly is a series of colorfully illustrated interactive labs intended for grades 4-6 aimed at helping children learn and apply problem solving techniques for math and science in a way that is both powerful and fun for children. How Rockets Fly illustrates through rocket design how technical books are written, and how mathematical expressions come to be. How Rockets Fly incorporates many of the Learning Standards taught for proficiency testing and applies these standards to rocket design with a systematic approach to problem solving. Upon completion of the labs, the students will predict the stability of a rocket and certify it for flight. Then they will test their theoretical skills with empirical data as they watch their own rockets fly! Many of the Math and Science Learning Standards taught for proficiency testing can be found in How Rockets Fly and applied to rocket design, flight, and descent. The Teacher’s Edition is a companion book to the Student’s Edition and includes an expanded appendix including: Application of the equation of a line from the coursework, rocket stability certificate, rocket cutout templates, detailed simulation guide (includes derivations, spreadsheet example, and graphs), and additional graph paper. About the Author: Jon Wilson received his degrees in Electrical Engineering from Purdue and Mechanical Design from Ivy Tech. Jon spent his career as an engineering and analytics consultant for NASA, commercial and military aviation and a variety of other industries. Jon was a long time Adjunct Instructor at both Ivy Tech and Cincinnati State in the Engineering and Technology Departments.Jon is a Private Pilot, a member of the National Association of Rocketry and is certified for High Powered Rocketry flights. He also holds a Technician Class FCC amateur radio license. Contact Jon at aes2jwilson@fuse.com.***

***Model Rocket Design and ConstructionHow to Create and Build Unique and Exciting Model Rockets That Work!ROCKETRYInvestigate the Science and Technology of Rockets and BallisticsNomad Press***

***Introduction to Rocket Technology focuses on the dynamics, technologies, aerodynamics, ballistics, theory of servomechanisms, principles of navigation instruments, and electronics involved in rocket technology. The publication first takes a look at the basic relationships in the theory of reactive motion; types of jet propelled aircraft and their basic construction; and types of reaction motors and their construction. Discussions focus on air breathing motors, anti-aircraft rockets, long range bombardment rockets, surface to surface, short range bombardment missiles, thrust of a rocket motor, and operating efficiency of a rocket motor. The text then examines rocket motor fuels and processes in the combustion chamber of a rocket motor. The manuscript ponders on the flow of combustion products through the nozzle of a rocket motor and forces and moments acting on the rocket in flight. Topics include stabilizing and damping moments, steering forces, aerodynamic forces, properties of supersonic nozzle, gas flow in a supersonic nozzle, cooling of liquid rocket motors, and basic laws of gas flow. The book then elaborates on rocket flight trajectory, basic principles of stabilization and steering, and ground equipment and launching devices. The publication is a valuable source of information for engineers and researchers interested in rocket technology.***

***Encyclopedic Dictionary of Pyrotechnics***

***Student’s Edition Math and Science Learning Standards Applied to Rocket Design Grades 4-6***

***The Rocket Files: 2nd Edition: A Comprehensive Guide to Rocketry***

***How to Create and Build Unique and Exciting Model Rockets that Work!***

***Unsteady Combustion***

***How to Create and Build Unique and Exciting Model Rockets That Work!***

Anyone can recycle a plastic bottle by tossing it into a bin, but it takes a bit of skill to propel it into that bin from 500 feet away. Skill, and a copy of Soda-Pop Rockets. Author and engineer Paul Jarvis has designed 20 different easy-to-launch rockets that can be built from discarded plastic drink bottles. After learning how to construct and fly a basic model, readers will find out new ways to modify and improve their designs, including built-on fins, nosecones, and parachutes that enable a rocket to float safely back to earth. More complex designs include two-, three-, and five-bottle rockets, gliding rockets, long-tail rockets, cluster rockets, whistling rockets, ring-finned rockets, and a jumbo version made from a five-gallon water-cooler tank. Clear, step-by-step instructions with full-color illustrations accompany each project, including how to build a launch pad, along with photographs of the author firing his creations into the sky. For those determined to find an educational benefit to their tinkering, these rockets are a clear demonstration of Newton’s Third Law. Soda-bottle rockets can even be used as science fair projects by budding engineers. You don't have to be a rocket scientist to build them, but who knows what career path you'll take after you do?

For all being interested in astronautics, this translation of Hermann Oberth’s classic work is a truly historic event. Readers will be impressed with this extraordinary pioneer and his incredible achievement. In a relatively short work of 1923, Hermann Oberth laid down the mathematical laws governing rocketry and spaceflight, and he offered practical design considerations based on those laws.

A fully updated new edition of the bible of model rocketry and the official handbook of the National Association of Rocketry G. Harry Stine was one of the founders of model rocketry and one of its most accomplished and respected figures. His Handbook of Model Rocketry has long been recognized as the most authoritative and reliable resource in the field. Now fully updated and expanded by Harry’s son Bill Stine, who inherited his father’s passion for model rockets, the new Seventh Edition includes the many changes in the hobby that have occurred since the last edition was published, such as new types of rockets, motors, and electronic payloads, plus computer software and Internet resources. This new edition also includes new photos and a new chapter on high-power rocketry. G. Harry Stine, founder and one-time president of the National Association of Rocketry, started the world’s first model rocket company, whose kits are now in the Smithsonian. Bill Stine, also a model rocket expert, is the founder and president of Quest Aerospace Inc.

Rocket and Spacecraft Propulsion

Rockets

(and Related Subjects)

How Rockets Fly

Handbook of Model Rocketry

NASA EP.

Plans, diagrams, schematics, and lists of parts and tools for model rocket projects.

A user’s manual for our everyday world! "Whether a curious layperson, a trained physicist, or a beginning physics student, most everyone will find this book an interesting and enlightening read and will go away comforted in that the world is not so strange and inexplicable after all." —From the Foreword by Carl Wieman, Nobel Laureate in Physics 2001, and CASE/Carnegie US University Professor of the Year 2004 If you didn’t know better, you might think the world was filled with magic—from the household appliances that make our lives easier to the CDs and DVDs that fill our world with sounds and images. Even a simple light bulb can seem mysterious when you stop to think about it. Now in How Everything Works, Louis Bloomfield explains the physics behind the ordinary objects and natural phenomena all around us, and unravels the mysteries of how things work. Inside, you’ll find easy-to-understand answers to scores of fascinating questions, including: How do microwave ovens cook food, and why does metal sometimes cause sparks in a microwave? How does an iPod use numbers to represent music? How do CDs and DVDs use light to convey information, and why are they so colorful? How can a CT or MRI image show a cross-sectional view of a person without actually entering the body? Why do golf balls have dimples? How does a pitcher make a curveball curve and knuckleball jitter about in an erratic manner? Why is the sun red at sunrise and sunset? How does a fluorescent lamp produce visible light? You don’t need a science or engineering background to understand How Everything Works, all you need is an active curiosity about the extraordinary world all around you.

Completely revised and updated version of the The Rocket Files by Joseph Jimmerson. This book is crucial for those starting out in rocketry as well as those making the transition into high-power and experimental rocketry. While continually drawing a link between hobby rockets and space launch vehicles, this book covers every aspect from propulsion and rocket design to payload sciences and ground support equipment. Twelve chapters chock full of over 200 images, advanced equations, detailed procedures, and expert advice from a rocket specialist guide prospective rocket scientists.

Rocketry for Elementary and Middle School Students

Knowledge and Interaction

Static Stability and Separation Characteristics of a Two-stage Rocket Configuration at Mach Numbers from 1.57 to 4.50

Annual Report - National Advisory Committee for Aeronautics

Subsonic, Transonic, and Supersonic Speeds

Fundamentals of Rocket Propulsion

***Easy PVC Rockets is a book on how to make your own model rocket engines at home with easy techniques and readily available materials. Using only stump remover, powdered sugar, kitty litter, and some PVC pipe you can create a whole array of rocket engine designs ranging from small bottle rockets to large F class engines. Also in the book are homemade methods to creating your own model rockets, launch stands, and electrical ignition systems also from readily available materials.***

***The Classic Guide by the "Father of Model Rocketry" Now Completely Revised and up to Date... This new edition of the model rocketeer’s "bible" shows you how to safely build, launch, track, and recover model rockets—and have fun doing it. Whether you’re a beginner or a veteran model rocketeer, the Handbook of Model Rocketry, the official manual of the National Association of Rocketry (NAR), will become your well-used reference book. G. Harry Stine has been a model rocketeer since 1957 when he founded the NAR and started the first model rocket company. Stine’s Handbook, after satisfying rocket enthusiasts for nearly three decades, remains the definitive resource. Recent technological progress has had a major effect on the model rocket hobby and sport. This revised and updated edition covers such new technology as: revised computer programs that use improved versions of Basic composite propellant model rocket motors recently approved reloadable model rocket motors building and flying large model rockets radio-controlled boost gliders and rocket gliders solid-state, microchip, computer-readable modules used to measure temperature, pressure, acceleration, and airspeed Magnificent Mavericks tells the story of the creative military/civilian team who worked at the Naval Ordnance Test Station and its Pasadena Annex from 1948 to 1958. Projects developed there include Sidewinder, the world’s first successful heat-homing guided missile; Polaris, for which NOTS provided conceptual studies as well as major T&E programs; the 6.5-Inch Antitank Aircraft Rocket (Ram), developed and delivered in a month to meet urgent needs in Korea; the 2.75-Inch Folding-Fin Aircraft Rocket (Mighty Mouse) introduced in Korea and used in every conflict since then; and many other products developed at NOTS to meet the needs of the fleet. Also addressed are propellant technology and other significant innovations in applied research. Improvements to the station’s unexcelled facilities R&D laboratories and T&E tracks and ranges are described, as is the community of China Lake, which played an important role in employee morale and productivity.***

***69 Simple Science Fair Projects with Model Rockets***

***Scientific and Technical Aerospace Reports***

***Wind-tunnel Investigation of a Number of Total-pressure Tubes at High Angles of Attack***

***Investigate the Science and Technology of Rockets and Ballistics***

***A Synthetic Agenda for the Learning Sciences***

***Rockets : an educator’s guide with activities in science, mathematics, and technology.***

***Kerbal Space Program (KSP) is a critically acclaimed, bestselling space flight simulator game. It’s making waves everywhere from mainstream media to the actual space flight industry, but it has a bit of a learning curve. In this book, five KSP nerds—including an astrophysicist—teach you everything you need to know to get a nation of tiny green people into space. KSP is incredibly realistic. When running your space program, you’ll have to consider delta-V budgets, orbital mechanics, Hohmann transfers, and more. This book is perfect for video game players, simulation game players, Minecrafters, and amateur astronomers. Design, launch, and fly interplanetary rockets Capture an asteroid and fly it into a parking orbit Travel to distant planets and plant a flag Build a moon rover, and jump off a crater ridge Rescue a crew-mate trapped in deep space***

***How Rockets Fly, Students' Edition, is a series of colorfully illustrated interactive labs intended for children, grades 4–6 aimed at helping children learn, and apply powerful problem solving techniques.How Rockets Fly illustrates though rocket design how technical books are written, and how mathematical expressions come to be, with a systematic seven step approach to problem solving.Many of the Math and Science Learning Standards taught for proficiency testing can be found in How Rockets Fly and applied to rocket design, flight, and***

descent. Upon completion of the labs, the students will: Predict the stability of a rocket  
Certify a rocket for flight  
Test their theoretical skills with empirical data as they watch their own rockets fly!  
The Students' Edition is a companion book to the Teachers Edition and includes an appendix including: Rocket Cutout Templates  
Additional graph paper

**Rocketry: Investigate the Science and Technology of Rockets and Ballistics** introduces students to the fascinating world of rocketry and ballistics. Readers discover the history of rocket development, from the earliest fire arrows in China to modern-day space shuttles, as well as the main concepts of rocketry, including how rockets are launched, move through the atmosphere, and return to earth safely. Exploring the science behind rocket flight, kids learn how the forces of thrust, gravity, lift, and drag interact to determine a rocket's path, then imagine new uses and technologies in rocketry that are being developed today and for the future. Combining hands-on activities with physics, chemistry, and mathematics, Rocketry brings fun to learning about the world of rocket science. Entertaining illustrations and fascinating sidebars illuminate the topic, while Words to Know highlighted and defined within the text reinforce new vocabulary. Projects include building a pneumatic blast rocket and launcher, testing a rocket recovery system, and designing a rocket model of the future. Additional materials include a glossary, and a list of current reference works, websites, and Internet resources. This title meets Common Core State Standards for literacy in science and technology; Guided Reading Levels and Lexile measurements indicate grade level and text complexity.

#### ROCKETRY

*An Educator's Guide with Activities in Science, Mathematics, and Technology*

*Magnificent Mavericks*

*Annual Report of the National Advisory Committee for Aeronautics*

*Aerospace Bibliography*

*Easy PVC Rockets*

Includes the Committee's Reports no. 1-1058, reprinted in v. 1-37.

Decades of research in the cognitive and learning sciences have led to a growing recognition of the incredibly multi-faceted nature of human knowing and learning. Up to now, this multifaceted nature has been visible mostly in distinct and often competing communities of researchers. From a purely scientific perspective, "siloes" science—where different traditions refuse to speak with one another, or merely ignore one another—is unacceptable. This ambitious volume attempts to kick-start a serious, new line of work that merges, or properly articulates, different traditions with their divergent historical, theoretical, and methodological commitments that, nonetheless, both focus on the highly detailed analysis of processes of knowing and learning as they unfold in interactional contexts in real time. Knowledge and Interaction puts two traditions in dialogue with one another: Knowledge Analysis (KA), which draws on intellectual roots in developmental psychology and cognitive modeling and focuses on the nature and form of individual knowledge systems, and Interaction Analysis (IA), which has been prominent in approaches that seek to understand and explain learning as a sequence of real-time moves by individuals as they interact with interlocutors, learning environments, and the world around them. The volume's four-part organization opens up space for both substantive contributions on areas of conceptual and empirical work as well as opportunities for reflection, integration, and coordination.

The revised edition of this practical, hands-on book discusses the launch vehicles in use today throughout the world, and includes the latest details on advanced systems being developed, such as electric and nuclear propulsion. The author covers the fundamentals, from the basic principles of rocket propulsion and vehicle dynamics through the theory and practice of liquid and solid propellant motors, to new and future developments. He provides a serious exposition of the principles and practice of rocket propulsion, from the point of view of the user who is not an engineering specialist.

50 Model Rocket Projects for the Evil Genius

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

An Introduction to the Engineering of Rockets

The Kerbal Player's Guide

Model Rocket Design and Construction

Aeronautics