

Science Experiment Manual

by Aurora Lipper
Supercharged Science



www.SuperchargedScience.com

© 2008 Supercharged Science

Reproduction Rights

No part of this book may be reproduced or duplicated without the expressed written consent of the author.

© 2008 Supercharged Science

www.SuperchargedScience.com

Special Note:

All experiments you do are at your own risk. You are responsible for yourself and your own safety, as well as those around you.

If you are not sure about an experiment, don't do it!

...or get help from an experienced adult – someone with a successful track record of doing whatever it is you want to do.

To Al, who got me my first telescope and gave it to me completely unassembled and hidden in various household appliances.

Without you, this book would have never been discovered and written.

Thank you with the deepest part of my heart for continuing to light the next few steps along my path.

~A.

Table of Contents

Chapter 1 Air Pressure Experiments	11
Experiment 1. 1: Soda Can Trick	11
Experiment 1.2: Fountain Bottle	12
Experiment 1.3: Squished Balloon	12
Experiment 1.4: Sneaky Bottles	13
Experiment 1.5: Streaming Water.....	13
Experiment 1.6: Magic Water Glass Trick	14
Experiment 1.7: Air Takes Space	14
Experiment 1.8: Ping Pong Funnel	15
Experiment 1.9: Balsa Flyer	15
Experiment 1.10: Ring Thing.....	16
Experiment 1.11: Helicopters	16
Experiment 1.12: Best Stunt Flyer	17
Experiment 1.13: How to 'Tweak' your Flyers	17
Experiment 1.14: Nakamura Lock.....	17
Experiment 1.15: Streak	18
Experiment 1.16: Hanglider	18
Experiment 1.17: Butterfly Cups.....	18
Bonus Experiments!.....	19
Plumber Magic	19
Magic Egg Trick.....	19
Squished Soda Can.....	19
The Million Dollar Bet	20
Flying Papers	20
Kissing Balloons	20
Hot Air Balloons	20
Parachutes	20
Free Form Machines.....	21
Aerodynamics Worksheet	22

Chapter 2 Kite Experiments	24
Experiment 2.1: Bat Kite	24
Experiment 2.2: Tetrahedral Kite	25
Experiment 2.3: Diamond Kite	26
Experiment 2.4: Dragon Kite	27
Experiment 2.5: Sled Kite	27
Bonus Experiment!	28
Rotor Kite	28
Kite Dynamics Worksheet	29
Chapter 3 Rocketry Projects	31
Experiment 3.1: Paper Blow-Gun Rockets	31
Experiment 3.2: Water Rockets	32
Experiment 3.3: Seltzer Rockets	33
Experiment 3.4: Slingshot Rockets	34
Bonus Experiments!	35
Puff Rockets	35
Micro Paper Rockets	35
Multi-Staging Balloon Rockets	35
Rocketry Worksheet	36
Chapter 4 Shock Science Experiments	37
Experiment 4.1: Static Electricity Fun	37
Experiment 4.2: Basic Electric Circuits	39
Experiment 4.3: Switches	40
Experiment 4.4: Switches & Motors	41
Experiment 4.5: Trip Wire Burglar Alarm	42
Experiment 4.6: Pressure Sensor Burglar Alarm	43
Experiment 4.7: Homemade DC Motor	44
Experiment 4.8: Relays & Telegraphs	46
Experiment 4.9: Racecar, Propeller, and Jigglebot Robot Projects	48
Bonus Experiments!	50
Charged Ping Pong Ball	50

Science Experiment Manual

Electroscopes.....	50
Dark Room Fun.....	50
Quick and Easy Buzzer.....	50
Spit Sensors.....	50
Nerve Testers.....	51
Electricity Worksheet.....	52
Chapter 5 'Simple Machines' Experiments.....	54
Experiment 5.1: Exponential Friction.....	55
Experiment 5.2: Easy Tug-of-War with Three People.....	56
Experiment 5.3: Return Pulley System.....	56
Experiment 5.4: Block & Tackle.....	57
Experiment 5.5: Fast Catapult.....	58
Experiment 5.6: Marble Vortex.....	59
Bonus Experiments!.....	59
Second Class Levers.....	59
Third Class Levers.....	59
First Class Lever.....	60
Wedge.....	60
Simple Catapult.....	60
Simple Gears.....	60
Belts and Pulleys.....	60
Wheels and Bearings.....	60
Ball Bearings.....	60
Simple Homemade Pulleys.....	61
Slingshot Block.....	61
Inclined Plane.....	61
Simple Balance.....	61
'Simple Machines' Worksheet.....	62
Chapter 6 Sonic Vibrations Experiments.....	63
Experiment 6.1: Homemade Hornets.....	63
Experiment 6.2: Harmonicas.....	64
Experiment 6.3: Bobby Pin Strummer.....	65

Science Experiment Manual

Experiment 6.4: String Test	65
Experiment 6.5: Styro-Phone	66
Bonus Experiments!	66
Poppers	66
Mystery Pitch	67
Phonograph	67
Easy Guitars	67
Sonic Rulers	67
Sneaky Clocks	67
Sonic Eggs	67
Sonic Vibrations Worksheet	68
Chapter 7 Laser Experiments	69
Experiment 7.1: Simple Laser Experiments	70
Experiment 7.2: Laser Maze.....	70
Experiment 7.3: Laser Light Show	71
Experiment 7.4: Advanced Laser Light Show	72
Bonus Experiments!	73
Plastic Bottle Beam.....	73
Light Bulbs and Lasers	73
Lenses.....	73
Filters.....	73
Laser Worksheet	74
Chemical Information Sheet	75
Chapter 8 Slime Science Experiments	79
Experiment 8.1: Bouncy Putty Slime	79
Experiment 8.2: Starch Slime	80
Experiment 8.3: Sewer Sneeze Slime	81
Experiment 8.4: Corny Slime	82
Experiment 8.5: Water Jelly Crystal Slime.....	82
Experiment 8.6: Mucus Slime.....	83
Slime Science Worksheet.....	85

Chapter 9 Chemistry Wizard Experiments.....	86
Experiment 9.1: Chemistry Wizard.....	87
Chemistry Wizard Worksheet	91
Chapter 10 Water Purification Experiments.....	92
Experiment 10.1: Swamp Muck Science.....	92
Water Purification Worksheet	94
BONUS! Chapter 11 Crystal Experiments	95
Geodes	95
Gemstones	96
String Crystals	96
Rock Candy	96
Salt Stalactites.....	96
BONUS! Chapter 12 Light Wave Experiments.....	97
Mixing Colors	97
Spectrometer.....	97
Pinhole Camera.....	98
Kaleidoscopes	98
Telescopes and Microscopes.....	98
Homemade Diffraction	98
Spinning Colors.....	99
Water Prism	99
Polarization	99
BONUS! Chapter 13 Volcano Experiments.....	100
Standard Volcano Dough	100
Earthy Volcano Dough.....	100
Soda Volcanoes.....	100
Air Pressure Sulfur Volcanoes.....	100
BONUS! Chapter 14 Roller Coaster Physics	102
Roller Coaster Physics	103
Bucket Splash	104
Ping Pong Curves	104
Cork Accelerometer	104

Science Experiment Manual

Roller Coaster Maneuvers	105
Loops	105
Camel-Backs	105
Jump Track	105
Pretzel	105
Troubleshooting	106
BONUS! Chapter 15 Thermodynamics	107
BONUS! Chapter 16 Bubble Experiments	110
Best Bubble Solution.....	110
Zillions of Tiny Bubbles	111
Trumpet Bubbles	111
Bubble Castles	111
Stretch and Squish!	111
Light Show	111
Weird Shapes	111
Polygon Shapes.....	111
Gigantic Bubbles	111
Really, Really, Really Big Bubbles	112
Kid-In-A-Bubble	112
An Interview with a Successful Science Teacher	113