

Contents

Program Staff	ix
Acknowledgments	xi
Foreword	xii
Introduction	1
What Is Teaching Science with TOYS?	1
Becoming Involved with the TOYS Project	1
What Are TOYS Teacher Resource Modules?	2
How Is This Resource Module Organized?	2
Annotated List of Energy Activities	6
Safety	10
Pedagogical Strategies	11
The Learning Cycle	11
Initiating a New Topic of Investigation	12
Work, Kinetic Energy, and Potential Energy	14
Gravitational Potential Energy	15
Other Forms of Energy, Energy Transformations, and Energy Conservation	17
Conclusion and Assessment	19
References	20
Content Review	23
Conservation of Energy	23
Energy of Motion	25
Energy That Is Stored	26
Work: A Way to Transfer Energy	30
Other Forms of Energy	31
The Energy Crisis	35
References for Further Content Review	35
Activities	37
What Makes It Go?	37
The Toy That Returns	51
How Much Energy?	59
Exploring Energy with an Explorer Gun	65
Pop Can Speedster	77
Ladybug, Ladybug, Roll Away	85
Rubber Band Airplane	99

Slingshot Physics	113
The Catapult Gun	127
Loop-the-Loop Challenge	137
Homemade Roller Coaster	151
Bounceability	163
The Energy Transformation Game	173
Drop 'n' Popper	187
Apply Your Energy Knowledge	197
Doc Shock	207
Make Your Own Motor	215
Chemical Energy Transformations	227
Simple Machines with LEGO	237
Get It in Gear with a LEGO Vehicle	245
Squish 'em, Squash 'em, Squoosh 'em	253
Appendices	263
Activities Indexed by Science Topics	263
National Science Education Standards Matrix	268