

Module/Section	Page Number
Module 1 : The Basics	
Introduction	1
Atoms and Molecules	1
Experiment 1.1: Atoms and Molecules	1
Measurements and Units	8
The Metric System	8
Manipulating Units	10
Converting Between Units	12
Experiment 1.2: Cubits and Fingers	16
Concentration	18
Experiment 1.3: Concentration	18
Module 2 : Air	
Introduction	27
The Air and Humidity	27
Experiment 2.1: Evaporation and Temperature	28
The Composition of Air	30
Experiment 2.2: Oxygen and Fire	31
Carbon Dioxide in the Air	33
Experiment 2.3: Carbon Dioxide and the Greenhouse Effect	35
Global Warming	38
Ozone	43
Air Pollution	45
Module 3: The Atmosphere	
Introduction	57
Atmospheric Pressure	57
Experiment 3.1: Air Pressure	58
The Layers of Earth's Atmosphere	61
The Homosphere	63
What is Temperature?	67
Experiment 3.2: Seeing the Effect of Changing Temperature	67
The Temperature Gradient in the Homosphere	70
The "Hole" in the Ozone Layer	71
The Heterosphere	75
Module 4: The Wonder of Water	
Introduction	81
The Composition of Water	81
Experiment 4.1: The Chemical Composition of Water	81
Chemical Formulas	85
Water's Polarity	86
Experiment 4.2: Water's Polarity	86
Water as a Solvent	90
Experiment 4.3: Water as a Solvent	91
Hydrogen Bonding in Water	93
Experiment 4.4: Comparing Solid Water to Solid Butter	95
Water's Cohesion	97
Experiment 4.5: Water's Cohesion	97
Hard and Soft Water	99
Module 5 : The Hydrosphere	
Introduction	105
The Parts of the Hydrosphere and the Hydrologic Cycle	107
Experiment 5.1: Evaporation, Condensation, and Precipitation	110

The Ocean	114
Glaciers and Icebergs	16
Experiment 5.2: Ice and Salt	17
Groundwater and Soil Moisture	120
Surface Water	122
Atmospheric Moisture	123
Experiment 5.3: Cloud Formation	123
Water Pollution	126
Module 6 : Earth and the Lithosphere	
Introduction	131
The Lithosphere	132
The Mantle	133
Experiment 6.1: How Sound Travels Through Different Substances	133
The Earth's Core	137
Experiment 6.2: Making an Electromagnet	139
Plate Tectonics	143
Experiment 6.3: A Model of Plate Tectonics	144
Earthquakes	147
Mountains and Volcanoes	50
Module 7: Factors That Affect Earth's Weather	
Introduction	157
Factors That Influence Weather	57
Clouds	157
Experiment 7.1: A Long-Term Weather Experiment	161
Earth's Thermal Energy	162
Latitude and Longitude	66
Uneven Thermal Energy Distribution	167
Air Masses	173
Module 8: Weather and Its Prediction	
Introduction	183
Precipitation	183
Thunderstorms	185
Experiment 8.1: Make Your Own Lightning	88
Tornadoes and Hurricanes	191
Weather Maps and Weather Prediction	195
Interpreting the Results of Experiment 7.1	99
Experiment 8.2: Turning Experiment 7.1 Into a Weather Prediction Tool	200
Module 9: An Introduction to the Physics of Motion	
Introduction	205
Mechanics - The Study of Motion	205
Speed: How Quickly Motion Occurs	207
Velocity: Speed and Direction	9
Experiment 9.1: The Importance of Direction	10
Acceleration: The Change in Velocity	14
The Acceleration Due to Gravity	20
Experiment 9.2: The Acceleration Due to Gravity is Independent	221
Experiment 9.3: Measuring Height With a Stopwatch	224
Module 10: Newton's Laws	
Introduction	233
Sir Isaac Newton	33
Newton's First Law of Motion	234
Experiment 10.1: Two Inertia Experiments	235

Experiment 10.2: A Test to See How Well You Understand Friction	238
Friction	241
Experiment 10.3: Friction	241
Newton's Second Law of Motion	44
Newton's Third Law of Motion	251
Experiment 10.4: Newton's Third Law	251
Module 11: The Forces in Creation - Part 1	
Introduction	261
The Four Fundamental Forces of Creation	261
The Gravitational Force	262
Force and Circular Motion	265
Experiment 11.1: Force and Circular Motion	265
The Gravitational Force at Work in Our Solar System	269
Comets	274
What Causes the Gravitational Force?	77
Experiment 11.2: The "Bent Space" Theory of Gravity	77
Experiment 11.3: The Graviton Theory of Gravity	280
A Brief History of Our View of the Solar System	81
Module 12: The Forces in Creation - Part 2	
Introduction	289
James Clerk Maxwell	89
The Electromagnetic Force	90
Experiment 12.1: Electrical Attraction and Repulsion	290
Photons and the Electromagnetic Force	93
How Objects Become Electrically Charged	295
Experiment 12.2: Making and Using an Electroscope	295
Electrical Circuits	300
Resistance	303
Experiment 12.3: Current and Resistance	304
Switches and Circuits	306
Series and Parallel Circuits	7
Magnetism	308
Permanent Magnets	309
Module 13: The Forces in Creation - Part 3	
Introduction	317
The Structure of the Atom	317
The Periodic Chart of the Elements	323
The Strong Nuclear Force	328
Radioactivity	30
The Dangers of Radioactivity	333
The Rate of Radioactive Decay	335
Radioactive Dating	337
Module 14: Waves and Sound	
Introduction	45
Waves	45
Sound Waves	348
Experiment 14.1: The Medium Through Which Sound Waves Travel	349
The Speed of Sound	51
Experiment 14.2: The Speed of Sound	351
The Speed of Sound in Other Substances	55
Sound Wavelength and Frequency	358
Experiment 14.3: Wavelength and Sound	358

The Doppler Effect	361
Experiment 14.4: The Doppler Effect	361
The Volume of Sound	363
Experiment 14.5: The Amplitude of a Sound Wave	363
Uses of Sound Waves	366
Module 15: Light	
Introduction	373
The Dual Nature of Light	373
Wavelength and Frequency of Light	377
Experiment 15.1: Seeing Different Wavelengths of Light	377
Reflection	381
Experiment 15.2: The Law of Reflection	381
Refraction	384
Experiment 15.3: Refraction of Light	385
Experiment 15.4: The "Magical" Quarter	388
Lenses	391
The Human Eye	393
How We Perceive Color	395
Experiment 15.5: How the Eye Detects Color	396
Adding and Subtracting Colors	397
Module 16: An Introduction to Astrophysics	
Introduction	405
The Sun	405
Nuclear Energy	409
Classifying The Stars in the Universe	12
Variable Stars	417
Measuring the Distance to Stars	419
Galaxies	422
An Expanding Universe	23
Summing It All Up	427