



TABLE OF CONTENTS

HOW THIS MANUAL CAN BE USED	1
INTRODUCTION	4
GEOMETRY	5
Introduction	5
Lines and Angles	17
Background Information	17
Activity 1: Investigating Relationships Between Two Lines: Intersecting, Perpendicular, and Oblique Lines	22
Activity 2: Naming Five Types of Angles	25
Activity 3: Measuring Angles with a Protractor	27
Activity 4: Drawing Angles with a Protractor	30
Activity 5: Adding and Subtracting Angles	32
Activity 6: Naming Relationships Between Two Angles	34
Activity 7: Naming the Angles Formed by Two Straight Lines Cut by a Transversal	38
Triangles	42
Background Information	42
Activity 1: Identifying the Parts of a Triangle	45
Activity 2: Classifying Triangles by Their Sides	47
Activity 3: Classifying Triangles by Their Angles	49
Activity 4: Adding Up the Interior Angles of a Triangle	51
Quadrilaterals	54
Background Information	54
Activity 1: Identifying the Quadrilaterals	56
Many-Sided Polygons	59
Background Information	59
Activity 1: Identifying Many-Sided Polygons	61
Activity 2: Adding Up the Interior Angles of Polygons	64
The Circle	67
Background Information	67

Activity 1: Drawing the Parts of a Circle	70
Activity 2: Measuring Parts of a Circle	74
Activity 3: Relating Parts of a Circle: Lines and Circumference, Lines and Radius	76
Activity 4: Relating Parts of a Circle: Two Circumferences	79
Geometric Solid Shapes	83
Background Information	83
Activity 1: Identifying Geometric Solid Shapes	88
Activity 2: Identifying the Parts of a Geometric Solid Shape	91
Activity 3: Investigating Heights and Cross-Sections	93
Line Symmetry	96
Background Information	96
Activity 1: Creating and Identifying Lines of Symmetry	97
Constructing Geometric Figures: Lines and Angles	99
Background Information	99
Activity 1: Constructing a Congruent Line Segment	100
Activity 2: Bisecting a Line Segment	102
Activity 3: Constructing Perpendicular Lines	104
Activity 4: Constructing Parallel Lines	107
Activity 5: Bisecting an Angle	109
Constructing Geometric Figures: Circles, Ellipses, and Squares	110
Background Information	110
Activity 1: Exploring Circles as Geometric Figures	111
Activity 2: Constructing an Ellipse	113
Activity 3: Constructing a Square	115
Constructing the Regular Polyhedra	117
Background Information	117
Activity 1: Finding Out About the Five Regular Polyhedra	119
Activity 2: Constructing a Cube	121
Activity 3: Constructing a Regular Tetrahedron	122
Activity 4: Constructing a Regular Octahedron, Regular Dodecahedron, and Regular Icosahedron	124
Introduction to Similar, Congruent, and Equivalent Figures	126
Background Information	126
Activity 1: Recognizing Similar and Non-Similar Figures	128
Activity 2: Recognizing and Making Congruent Figures	131
Activity 3: Recognizing and Making Equivalent Figures	133

Calculating Areas of Polygons and Circles	136
Background Information	136
Activity 1: Studying Equivalent Figures	144
Activity 2: Calculating the Area of a Rectangle	156
Activity 3: Calculating the Area of a Square	160
Activity 4: Calculating the Area of a Parallelogram	162
Activity 5: Calculating the Area of an Acute Triangle	166
Activity 6: Calculating the Area of a Right Triangle	174
Activity 7: Calculating the Area of an Obtuse Triangle	180
Activity 8: Calculating the Area of a Trapezoid	188
Activity 9: Calculating the Area of a Regular Pentagon	191
Activity 10: Calculating the Area of a Regular Decagon	196
Activity 11: Calculating the Area of Any Regular Polygon	202
Activity 12: Calculating the Area of an Irregular Polygon	205
Activity 13: Considering the Circle as a Regular Polygon with an Infinite Number of Sides	208
Activity 14: Calculating the Area of a Circle by Considering the Circle as a Rectangular Arrangement of Sectors	212
Calculating Volumes of Geometric Solids	216
Background Information	216
Activity 1: Using Cubes to Measure Volume	220
Activity 2: Calculating the Volume of Any Rectangular Prism or Cube	225
Activity 3: Working with Equivalent Volumes	228
Activity 4: Calculating the Volume of a Pyramid	230
Activity 5: Calculating the Volume of a Cylinder	234
Activity 6: Calculating the Volume of a Cone	237
Activity 7: Calculating the Volume of a Sphere	240
Activity 8: Understanding Equivalency and Calculating Volume of Solid Prisms with Varying Bases	244
Calculating Lateral and Total Area of Solids	248
Background Information	248
Activity 1: Lateral and Total Area of a Rectangular-Based Prism	249
Activity 2: Lateral and Total Area of a Triangular-Based Prism	252
Activity 3: Lateral and Total Area of a Cylinder	255
Activity 4: Lateral and Total Area of a Square-Based Pyramid	258
Activity 5: Lateral and Total Area of a Cone	261

Pythagorean Theorem	264
Background Information	264
Activity 1: Recognizing the Isosceles Right Triangle	
Case of the Pythagorean Theorem	266
Activity 2: Recognizing the 3:4:5 Right Triangle Case of the Pythagorean Theorem	269
Activity 3: Exploring the Pythagorean Theorem Using Equivalent Parallelograms	272
Activity 4: Illustrating Euclid's Theorem Using Equivalent Parallelograms	275
RESOURCES	280