

# TABLE OF CONTENTS

	INTRODUCTION . . . . .	vii
1	PLANE TESSELLATIONS . . . . .	1
	Types of Tessellations . . . . .	3
	The Mathematics of Tessellations . . . . .	12
	Summary . . . . .	18
2	TRANSFORMATIONS AND SYMMETRY . . . . .	19
	Translations . . . . .	21
	Rotations . . . . .	22
	Reflections . . . . .	23
	Plane Symmetry . . . . .	24
	Summary . . . . .	36
3	ALTERING BY TRANSLATION . . . . .	37
	Altering Parallelograms by Translation . . . . .	39
	Altering Hexagons by Translation . . . . .	54
	Summary . . . . .	59
4	ALTERING BY ROTATION . . . . .	61
	Altering Polygons by Rotation of Sides . . . . .	63
	Altering Polygons by Rotation of Half-Sides . . . . .	83
	Altering Polygons by Rotation of Sides and Half-Sides . . . . .	95
	Summary . . . . .	101
5	ALTERING BY REFLECTION AND ROTATION . . . . .	103
	Altering Triangles by Reflection . . . . .	105
	Altering Triangles by Reflection and Rotation . . . . .	107
	Altering Rhombi by Reflection and Rotation . . . . .	115
	Altering Hexagons by Reflection and Rotation . . . . .	116
	Summary . . . . .	117
	SUMMARY OF CHAPTERS ONE THROUGH FIVE . . . . .	118
6	ANALYZING ESCHER'S TESSELLATIONS . . . . .	121
7	USING IMAGINATION AND SPECIAL TECHNIQUES . . . . .	135
	Using Imagination . . . . .	137
	Using Special Techniques . . . . .	140
8	WORKSHEETS FOR DEVELOPING TECHNIQUES . . . . .	151
	Practicing Drawing Translations, Reflections, and Rotations . . . . .	153
	Creating Tessellations by Translation . . . . .	159
	Creating Tessellations by Rotation . . . . .	161
	Creating Tessellations by Reflection and Rotation . . . . .	166
9	SELECTED GRIDS . . . . .	171
	BIBLIOGRAPHY . . . . .	189
	APPENDIX: ESCHER'S LIFE AND ART . . . . .	191