



Table of Contents

Development Team	ii
License Agreement	iii
Installing and Running The Layered Earth	v
Section 1: Welcome	1
Teacher Binder at a Glance	3
The Lesson Plans	4
Unit Overview	6
Lesson Overview	8
Lesson Plan Structure	9
The Student Lessons in EarthGuide	10
Welcome Screen	10
Student Lessons Screen	11
At the Unit Level	12
At the Lesson Level	13
At the Lesson Screen Level	14
Section 2: Correlations to Learning Standards	15
Section 3: Lesson Plans	37
Unit A The Atmosphere	
A1 Atmospheric Composition	39
A2 Layers of the Atmosphere	45
A3 The Ozone Layer	51
A4 Atmospheric Pressure	57
Unit B Earth's Energy Balance	
B1 Methods of Heat Transfer	63
B2 The Reason for the Seasons	69
B3 The Greenhouse Effect	75
B4 The Earth's Energy Balance	81
Unit C Atmospheric Circulation	
C1 Global Wind Patterns	87
C2 The Jet Stream	93
C3 Global Winds and Ocean Currents	97
Unit D Weather	
D1 The Water Cycle	101
D2 Weather Patterns – Pressure Systems	107
D3 Forecasting the Weather	113
D4 Extreme Weather: Hurricanes and Tornadoes	117
Unit E Climate	
E1 Climate vs. Weather	123
E2 Factors Affecting Climate	127
E3 World Climate Zones	133





The Layered Earth: Table of Contents

Unit F Climate Change

F1 Paleoclimates – Climates of the Past 139

F2 Recent Climate Change I – The Last Ice Age and Sea Level Changes 145

F3 Recent Climate Change II – Past Climates on Earth 149

F4 Natural Causes of Climate Change I – Solar Output 155

F5 Natural Causes of Climate Change II – Milankovitch Cycles 161

F6 Natural Causes of Climate Change III – Aerosols in the Atmosphere 169

F7 Natural Causes of Climate Change IV – Plate Tectonics 175

F8 Short-Term Climate Change I – El Niño / La Niña 181

F9 Short-Term Climate Change II – The North Atlantic Oscillation 187

F10 Short-Term Climate Change III – Other Climate Cycles 193

Unit G Human Activities and Climate Change

G1 Evidence of Climate Change I – Global Surface Temperatures 199

G2 Evidence of Climate Change II – Carbon Dioxide Concentration 205

G3 Evidence of Climate Change III – Arctic Sea Ice 211

G4 Evidence of Climate Change IV – Sea Levels 217

G5 Evidence of Climate Change V – Land Ice 223

G6 Climate Change and the Future I – Changes in Sea Levels 229

G7 Climate Change and the Future II – Changes in Temperature 235

G8 Climate Change and the Future III – Other Significant Effects 241

Section 4: Assessment Tools 247

Section 5: Glossary of Terms 275

