



Contents

Contributors	10
Foreword	11
Introduction	<i>Teaching and Learning with The Growing Classroom</i>.....13
How to Use This Book	17
Dedication	18

GETTING STARTED

Spotlight	<i>Green Acres Elementary School, Santa Cruz, CA</i>.....20
Getting Started	<i>Creating a School Garden as a Living Laboratory</i>.....21



LET'S WORK TOGETHER: PROBLEM SOLVING AND COMMUNICATION

Spotlight	<i>Bayview Elementary School, Santa Cruz, CA</i>.....34
Unit Introduction.....	<i>Let's Work Together</i> .....35
Song	<i>Singing to the Moon</i> .....36
Can You Hear Me Now?.....	<i>Concentration and listening skills</i> .....37
I Just Love Applause.....	<i>Communication skills</i> .....38
Lighthouse	<i>Communication and cooperation skills</i> .....39
Tell It Like It Is	<i>One-way and two-way communication</i>.....41
Count Off.....	<i>Problem-solving and cooperation skills</i> .....43
The Connected Circle.....	<i>Cooperation and group problem solving</i> .....44
Knots	<i>Cooperation and group problem solving</i> .....45
Skis.....	<i>Cooperation and group problem solving</i> .....46
Sinking Ship.....	<i>Communication and problem solving</i> .....47
Who Am I?.....	<i>Communication and cooperation through problem solving</i> .....49



WE ARE ALL SCIENTISTS: AWARENESS AND DISCOVERY

Spotlight	<i>Growing to Green, Franklin Park Conservatory and Botanical Garden, Columbus, OH</i>.....52
Unit Introduction.....	<i>We Are All Scientists</i> .....53
Song	<i>Take the Time to Wonder</i> .....54
Sharp Eyes	<i>Observation skills</i>.....55
Candid Camera	<i>Visual awareness</i>.....56
The Unnature Trail	<i>Observation skills</i>.....57
Hear, Hear	<i>Sense of hearing</i>.....59
Big Ears	<i>Sense of hearing</i>.....60
Only the Nose Knows.....	<i>Sense of smell</i> .....62
Everyone Needs a Rock	<i>Sensory awareness skills</i> .....64
Six of One, Half Dozen of the Other	<i>All five senses</i> .....66



See No Evil, Hear No Evil	All five senses	68
Mystery Powders	Sensory and problem-solving skills	69
Little Munchkins	Observation and recording skills	71
Burma Shave Hike	Awareness and observation skills	73
On Location	Applying observation and mapping skills	75

THE LIVING EARTH: SOIL

Spotlight	Ladd Lane Elementary School, Hollister, CA	78
Unit Introduction	The Living Earth	79
Song	Dirt Made My Lunch	80
Space Travelers	Exploration of soil ingredients	81
Sensual Soil	Soil exploration and creative writing	83
The Nitty-Gritty	Exploration of quality and composition of garden soil	85
Living in the Soil	Creating a healthy soil	87
Tools and Us	Proper tool use and care	89
To Dig or Not to Dig: That Is		
the Question	Compaction and plant growth	91
Dig Me and Dig Me Again	Soil preparation technique	93
Soil Doctors	Soil testing for major plant nutrients	96
What Good is Compost?	Compost garden experiment	98
The Matchmaker	Nitrogen-fixing cover crops	100
A Warm Place to Grow	Mulching to protect plants from frost	103
Splash	Rain and soil erosion	106
A Day at the Races	Erosion of different planting patterns	108

GROWING

Spotlight	Rock Creek Community Garden, Auburn, CA	112
Unit Introduction	Growing	113
Song	Roots, Stems, Leaves	115
Bioburgers	The importance of air, water, soil, and sun to life	116
Seedy Character	Classification skills and seed anatomy	118
Let's Get to the Root of This	Root growth and function	120
ZIP Code Seeds	Seed ordering	122
Adapt-a-Seed	Seed dispersal mechanisms	124
Seed Power	Water absorption in seeds	125
It's Getting Stuffy in Here	Depth of seed planting	126
Lotus Seeds	A story about seed longevity	128
Growing, Growing, Gone	Seed/plant development	129
Glass Seed Sandwich	Root growth	131
Run, Root, Run	Root growth behavior	133
Let's Get a Handle on This	How plants climb	134
Which Way Did It Grow?	Effects of gravity on plants	136
Sugar Factories	Photosynthesis; plant production of food	138
Sipping Through a Straw	Water absorption by plants	140
Plant Sweat	Transpiration	141
Magical Mystery Tour	CO ₂ utilization by plants	143



Plants Need Light Too.....	Plants' need for light.....	145
Plant Food Magic	How plants make food	147
Star Food.....	Effects of light on plant growth.....	149
Room to Live.....	Effects of crowding on plant growth.....	151
Seed to Earth, Seed to Earth, Do You Read Me?	Effects of different soil types on seedling growth.....	153
Stem, Root, Leaf, or Fruit?	Classification of produce by the parts we eat	155



LIVING LABORATORY: OUTDOOR GARDENING

Spotlight	The Kindergarten Initiative, Philadelphia, PA	158
Unit Introduction.....	Living Laboratory.....	159
Song	Sun, Soil, Water, and Air	160
It's as Simple as One, Two, Three... Four	The necessities of life: air, water, sun, soil.....	161
So What? Sow Seeds!	Soil mixing and seed sowing	162
Inch by Inch, Row by Row	Planning and mapping garden beds	165
Transplanting, or Let's Move 'Em Out!	Technique for planting seedlings.....	168
Water We Doing?	The effects of watering on plant growth	170
What's in a Name?	Observing different varieties of the same crop.....	173
Weeding, Writing, and Arithmetic	Observing weeded and nonweeded sections of garden	175



CYCLES AND CHANGES

Spotlight	Growing a Children's Garden, Life Lab Garden Classroom, Santa Cruz, CA	178
Unit Introduction.....	Cycles and Changes	179
Song	Water Cycle Boogie.....	180
The Power of the Circle	Identifying cycles in nature	181
The Seasons of a Tree.....	Observing seasonal changes.....	183
The Cycle Hunt	Study of seasons.....	185
Me and the Seasons.....	Seasonal differences.....	187
Collector's Corner	Categorizing seasons and creating a season display	189
Roundabout.....	Water cycle.....	191
Dr. Jekyll and Mr. Hyde.....	Observing how substances change.....	193
We're Just Babies in the Woods.....	Demonstrating the short time humans have been on earth.....	195
You Look Different from the Last Time I Saw You	Observing decomposition and nutrient cycling of different foods	197
Bring in the Clean-Up Crew	Observing rates of decay.....	199
Compost Bags	The idea of biodegradable and nonbiodegradable	200
Let's Make a Compost Cake	Making compost	202
The Cycle of Recycle	Personal recycling habits survey.....	204
A Human Paper Factory	Making recycled paper	206
Mother Earth.....	Native American writings	208





INTERDEPENDENCE

Spotlight	<i>Las Cañadas Huatusco, Veracruz, México</i>	212
Unit Introduction.....	<i>Interdependence</i>	213
Song	<i>Give Plants a Chance</i>	214
Eat the Earth	<i>The earth's finite resources</i>	215
I Eat the Sun	<i>Concept of a food chain</i>	216
The Hungry Bear.....	<i>Concept of a food pyramid</i>	218
You Are What You Eat	<i>Interdependence of a food web</i>	220
Lunch Bag Ecology, Part One	<i>Our interdependence with plants and animals</i>	222
Lunch Bag Ecology, Part Two	<i>The food supply system</i>	223
DDT Chew	<i>Role-play of bioaccumulation through a food chain</i>	225
The Day They Parachuted		
Cats into Borneo.....	<i>Ecosystemic interdependency and the impact of change</i>	227

GARDEN ECOLOGY

Spotlight	<i>Watsonville Charter School of the Arts, Watsonville, CA</i>	230
Unit Introduction.....	<i>Garden Ecology</i>	231
Song	<i>Ecology</i>	232
Flower Power, Part One.....	<i>Flower part identification</i>	233
Flower Power, Part Two	<i>Relationships between pollinators and flowers</i>	235
Magic Spots.....	<i>Observing habitats</i>	238
Garden Puzzle.....	<i>Demonstrating companion planting by role-playing</i>	240
Companion Planting	<i>Companion planting garden experiment</i>	243
Plant Architects	<i>Designing plants and observing their impact in</i> <i>an imaginary garden</i>	245
I Need My Space	<i>The effect of seed density on weeds</i>	247
Natural Defense.....	<i>The effects of "plant solutions" on crops</i>	249
Under the Big Top.....	<i>Observing interactions in the garden</i>	251

GARDEN CREATURES

Spotlight	<i>St. John the Baptist School, El Cerrito, CA</i>	254
Unit Introduction.....	<i>Garden Creatures</i>	255
Song	<i>No Bones Within</i>	256
Earth, Planet of the Insects	<i>Effects of insects on earth</i>	257
Insect Anatomy, or Make		
No Bones About It!	<i>Identifying insect parts</i>	259
The Butterfly Flutter By	<i>Observing insect life cycles</i>	261
Who Lives Here?.....	<i>Observing and collecting of insects</i>	264
Buggy Diner.....	<i>Feeding preferences of insects</i>	267
Ladybug, Ladybug, Fly		
Away Home.....	<i>Observing beneficial garden insects</i>	269
Slimy Characters on Trial.....	<i>Identifying pest and pest damage</i>	271
My Friend Tummy-Foot.....	<i>Snail anatomy and behavior</i>	273
Following the Thread	<i>Observing garden spiders</i>	277
The Great and Powerful		
Worm.....	<i>Observing worms as soil tillers and decomposers</i>	279

WEATHER AND CLIMATE

Spotlight	Pacific Elementary School, Davenport, CA	282
Unit Introduction.....	Weather and Climate.....	283
Song	Solar Energy Shout.....	284
Degrees Count	Reading a thermometer	285
Temperature Hunt	Using a thermometer	287
The Station Creation	Making a weather station.....	289
Keeping Track	Collecting and recording weather information.....	291
The Great Weather Exchange	Exchanging weather information with another school	294
Feeling Hot, Hot, Hot	Heat retention and loss in different substances	296
A Ravishing Radish Party.....	Growing plants in different microclimates	299
Catch the Sun	Constructing a mini solar collector	303
A Shoebox of Sunshine	Constructing a miniature greenhouse	305
What's the Angle?	Modeling earth's revolution around the sun	308
A Journey to Different Lands	Researching regional and world climates	310

FOOD CHOICES

Spotlight	Cherryland Community Garden, Hayward Nutritional Learning Community Project, Hayward, CA.....	314
Unit Introduction.....	Food Choices	315
Keep Me Running	How our bodies use food.....	316
I Eat My Peas with Honey	Individual food choice survey	318
Straight from the Source	The sources of foods	320
Processed or Not?	Nutritional value of unprocessed versus processed foods	322
Mrs. Price's Bread	Bread recipe.....	324
When I Was Little.....	Eating habits through generations	325
The Roots of Food.....	Social influences on food choices	327
Hear Us, Hear Us	Graphing of food preferences.....	329
On Your Mark, Get Set, Breakfast!	The importance of a healthy breakfast.....	330
Campaign for Better Breakfast....	Reinforcing the importance of eating breakfast.....	332
Secrets of the Pyramid.....	The basic food groups	334
Searching for Sugar, Salt, and Fat	Effects of sugar, salt, and fat	336
Dear Diary	Analysis of food we eat.....	338
Food Planners.....	Reinforcing the importance of a balanced diet	339

NUTRIENTS

Spotlight	GrowingGreat, Manhattan Beach, CA	342
Unit Introduction.....	Nutrients	343
Invisible Gold.....	Introducing the idea of food nutrients.....	344
The Cat's in the Carbohydrates...	Testing foods for complex carbohydrates.....	346
The Sugar is in the Cat Who is in the Carbohydrates	Testing foods for simple carbohydrates: sugars	348
Fat Cats	Testing foods for fat.....	350
Burn Out	Exploring how our bodies produce energy	352



Water You Made Of?	<i>Introducing water as a nutrient</i>	354
The Body's Helping Hands	<i>Introducing the body's need for vitamins and minerals.....</i>	356
Patient Proteins to Grow On.....	<i>Testing foods for proteins</i>	359
Nutrition Charades.....	<i>Reinforcing the need for nutrients</i>	361



FOOD SYSTEMS AND CONSUMERISM

Case Study.....	<i>Hayward Nutritional Learning Community Project, Markham and Muir Elementary, Hayward, CA</i>	364
Unit Introduction.....	<i>Food Systems and Consumerism</i>	365
Supermarket Snoop	<i>Supermarket field trip survey.....</i>	366
What's Really in the Box?	<i>Reading and understanding packaged labels</i>	368
The \$1,000,000 Orange.....	<i>Why processed food costs more.....</i>	370
This Little Lettuce Went to Market	<i>Steps from farmer to market.....</i>	372
The New Improved Madison Avenue Diet.....	<i>Effects of advertising</i>	374
Try It, You'll Like It!	<i>Influence of advertising.....</i>	375
Buy Me! Buy Me!	<i>Influences on personal selection of food choices</i>	377
Feast or Famine	<i>Developing awareness of hunger in the world.....</i>	378
Market Garden: Grow and Sell Time.....	<i>Setting up a market garden.....</i>	380

APPENDIX

BLACKLINE MASTERS

The Scientific Method: Guess, Test, and Tell.....	385
Pattern Sheet .....From Tell It Like It Is	386
Riddles .....From “Who Am I?”	387
Clay, Silt, Sand Chart .....From The Nitty-Gritty	388
Seed Ordering Chart .....From ZIP Code Seeds.....	389
Nutrient Cycle .....From The Power of the Circle.....	390
Oxygen Cycle.....From The Power of the Circle.....	391
Water Cycle .....From The Power of the Circle.....	392
Wheel, Part 1 .....From Me and the Seasons	393
Wheel, Part 2 .....From Me and the Seasons	394
Self-Survey .....From The Cycle of Recycle.....	395
Self-Survey Results.....From The Cycle of Recycle	396
A Very Short History of Trash...From The Cycle of Recycle	397
Insect Anatomy .....From Insect Anatomy, or Make No Bones About It!	398
Minimum-Maximum	
Thermometer .....From The Station Creation.....	399
Wind Vane .....From The Station Creation.....	400
Wind Speed: Sensing the Wind...From The Station Creation.....	401
Measuring Humidity .....From The Station Creation.....	402
Barometer .....From The Station Creation.....	403
Rain Gauge.....From The Station Creation.....	404



Markers	<i>From Keeping Track</i>	405
Weather Symbols Key #1	<i>From Keeping Track</i>	406
Weather Symbols Key #2	<i>From Keeping Track</i>	407
Comparison Graph	<i>From The Great Weather Exchange</i>	408
Energy Movement	<i>From A Shoebox of Sunshine</i>	409
Climate Zone Map.....	<i>From A Journey to Different Lands</i>	410
Research Questions	<i>From A Journey to Different Lands</i>	411
Energy Poster.....	<i>From Keep Me Running</i>	412
Growth Poster	<i>From Keep Me Running</i>	413
Keeping Healthy Poster	<i>From Keep Me Running</i>	414
Fortitude Cards.....	<i>From Searching for Sugar, Salt, and Fat</i>	415
Daily Meal Planning Guide	<i>From Food Planners</i>	427
Nutrient Chart .....	.....	428
What You Bought Chart.....	<i>From Buy Me! Buy Me!</i>	429

GARDENING “HOW TO”

Seed Starting and Transplanting.....	.....	430
Make Your Own Paper Pots .....	.....	433
Vegetable Planting Guide .....	.....	434
Vegetable Planting and Harvesting Tips .....	.....	436
Year-Round Garden and Planning Tasks .....	.....	439
Companion Planting Guides.....	.....	440
Watering Tips .....	.....	442
Steps for Preparing In-Ground Garden Beds.....	.....	443
Composting .....	.....	444
Let Worms Make Your Compost .....	.....	446
Tips for Creating a Healthy Garden Ecosystem .....	.....	448

BUILDING PLANS

Building a Coldframe for Your Garden .....	.....	450
Plans for a Planter Box .....	.....	452
Plans for a Seed-Sowing Flat .....	.....	453
Making and Using Root View Boxes.....	.....	454
Making a Worm Box.....	.....	456
Insect Collecting Net .....	.....	457
Ski-Making .....	.....	458

SCOPE AND SEQUENCE		459
---------------------------------	-------	-----

ENGLISH/SPANISH VOCABULARY LIST		463
--	-------	-----

