Table of Contents, Volume I

	Page
Introduction and Preface	1
On-line Support and Services	2
ORIENTATION FOR USING BFSU	3
Orientation 1. The Essence of Science	3
Orientation 2. Answers to Frequently Asked Questions	4
Orientation 3. Teaching According to How Students Learn	9
Orientation 4. Guiding Students to Think	17
Orientation 5. Baloney Detection Kit	22
Orientation 6. Overview of BFSU Learning Progressions	28
Orientation 7. Using BFSU Lessons to Full Advantage	33
Orientation 8. Following the Flowchart	37
FLOWCHART OF LEARNING PROGRESSIONS	
Learning Progressions A "Nature of Matter" and B "Life Science"	38
Learning Progressions C, "Physical Science, Engineering and Technology" and D, "Earth and Space Science"	39
LEARNING PROGRESSION "A": NATURE OF MATTER	41
Lesson A/B-1. Organizing Things into Categories	43
Lesson A-2. Solids, Liquids, and Gases and Change with Temperature	50
Lesson A-3. Air Is a Substance and the Concept of the Atmosphere	58
Lesson A-4. Matter I: Its Particulate Nature	65
Lesson A-5. Distinguishing Materials	75
Lesson A-5A. Magnets and Magnetic Fields	82
Lesson A-6. Matter II: Air Pressure, Vacuums, and the Earth's Atmosphere	91
Lesson A-7. Air: A Mixture of Gases (Mixtures and Chemical Reactions)	100
Lesson A-8. Matter III: Evaporation and Condensation; The Basis of the Water Cycle	110
Lesson A-9. Matter IV: Dissolving, Solutions, and Crystallization	118
Lesson A-10, Rocks, Minerals, Crystals, Dirt, and Soil	127

LEARNING PROGRESSION "B": LIFE SCIENCE	139
Lesson B-2. Distinguishing Living or Biological, Natural Earth, and Human-Made Things	141
Lesson B-3. The Plant and Animal Kingdoms: Distinguishing between Plants and Animals	154
Lesson B-4. Life Cycles	166
Lesson B-4A. Identification of Living Things and Why Plants and Animals Live Where They Do	180
Lesson B-4B. What Is a Species?	190
Lesson B-5. Concepts of Adaptations, Food Chains, and Energy Flow	200
Lesson B-5A. Adaptations and Survival	210
Lesson B-6. How Animals Move I: The Skeleton and Muscle System	220
Lesson B-7. How Animals Move II: Different Body Designs; Major Animal Phyla	227
Lesson B-8. How Animals Move III: Coordinating Body Movements; The Nervous System	235
Lesson B-9. How Animals Move IV: Energy to Run the Body (Fundamentals of Anatomy and Physiology)	243
Lesson B-10. Plant Science I: Basic Plant Structure and Reproduction	255
Lesson B-11. Plant Science II: Germination, Seedling Growth, and Responses	266
Lesson B-12. Plants, Soil, Water, and Erosion	275
LEARNING PROGRESSION "C": PHYSICAL SCIENCE, ENGINEERING AND TECHNOLOGY	285
Lesson C-1. Concepts of Energy I: Making Things Go	287
Lesson C-2. Sound, Vibrations, and Energy	299
Lesson C-3. Concepts of Energy II: Kinetic and Potential Energy and the Flow of Energy	311
Lesson C-3A. Energy and Force	322
Lesson C-4. Concepts of Energy III: Distinguishing Between Matter and Energy	333
Lesson C-5. Inertia	339
Lesson C-6. Friction	349

Lesson C-7. Push Pushes Back	360
LEARNING PROGRESSION "D": EARTH AND SPACE SCIENCE	367
Lesson D-1. Gravity I: The Earth's Gravity; Horizontal and Vertical	369
Lesson D-2. Day and Night and the Earth's Rotation	378
Lesson D-3. Reading and Drawing Maps	385
Lesson D-3A. North, East, South, and West	392
Lesson D-4. Land Forms and Major Biomes of the Earth	401
Lesson D-5. Time and the Earth's Turning	411
Lesson D-6. Seasonal Changes and the Earth's Orbit	419
Lesson D-7. Gravity II: Rate of Fall; Weightlessness in Space and Distinction between Mass and Weight	429
Lesson D-8. Rocks and Fossils	440
Lesson E-1. Resources: Developing an Overview	453
Appendix 1. Combining Reading and Writing with Science	461
Appendix 2. Organizing and Conducting Small Group Discussion	465
Appendix 3. Suggested Letter to Parents/Caregivers Asking for Their Help	467
Appendix 4. Observing Nature: The Starting Point for All Science (Dos and Don'ts Regarding Outings and Collecting)	469
Appendix 5. Correspondence between BFSU, Framework, and NGSS	476
Matrix I. NGS Standards and BFSU Lessons That Apply to Each	480
Matrix II. BFSU Lessons and the NGS Standard(s) Supported by Each	485
Acknowledgements	491