

Contents

Foreword	vii
Preface and Acknowledgments	xi
Introduction.....	1
CHAPTER 1	
Laying the Groundwork: Setting Goals and Selecting Tasks	7
Identifying Instructional Goals.....	7
Assessing Tasks by Category and by Cognitive Demand.....	10
Experimentation Tasks	11
Data Representation, Analysis, and Interpretation Tasks.....	13
Explanation Tasks	13
The Teacher's Role.....	16
Modifying Tasks	17
Maintaining Cognitive Demand during Task Enactment	18
CHAPTER 2	
Introducing the Five Practices Model: Contrasting the Practices of Two Teachers.....	23
Successful or Superficial? Discussion in Kelly Davis's Classroom	24
Growing Fast Plants: The Case of Kelly Davis.....	24
Analyzing the Case of Kelly Davis	25
The Five Practices Model.....	28
Anticipating.....	28
Monitoring.....	29
Selecting.....	31
Sequencing	31
Connecting.....	32
Investigating the Five Practices in Action.....	32
Growing Wisconsin Fast Plants: The Case of Nathan Gates.....	33
Analyzing the Case of Nathan Gates.....	40
Evidence of the Five Practices.....	40
Relating the Practices to Learning Opportunities	42
The Science Practices in the Case of Nathan Gates	43
Conclusion	43

CHAPTER 3

Getting Started: Anticipating and Monitoring Students' Work	45
Anticipating	45
Matter and Molecules: The Case of Kendra Nichols (Part 1—Anticipating)	46
Analysis of Anticipating in the Case of Kendra Nichols	51
Key Features That Must Be Present	52
Challenges and Misconceptions	52
Responding to Students' Work	52
Monitoring.....	53
Matter and Molecules: The Case of Kendra Nichols (Part 2—Monitoring)	54
Analysis of Monitoring in the Case of Kendra Nichols.....	60
Conclusion	61

CHAPTER 4

Making Decisions about the Discussion: Selecting, Sequencing, and Connecting	63
Selecting and Sequencing	63
Matter and Molecules: The Case of Kendra Nichols (Part 3—Selecting and Sequencing) ...	66
Analysis of Selecting and Sequencing in the Case of Kendra Nichols.....	71
Connecting	72
Matter and Molecules: The Case of Kendra Nichols (Part 4—Connecting).....	74
Analysis of Connecting in the Case of Kendra Nichols	80
Analysis of the Science Practices in the Case of Kendra Nichols	83
Conclusion	83

CHAPTER 5

Encouraging and Guiding Student Thinking	85
Kinds of Classroom Talk.....	85
Use of Focused Talk While Monitoring Small-Group Work.....	88
Making Student Thinking Visible	88
Guiding Student Thinking in Productive Directions.....	90
Directing Students' Attention to What Matters	91
Use of Focused Talk during Whole-Class Discussions	93
Making Student Thinking Visible	94
Guiding Student Thinking in Productive Directions.....	95
Directing Students' Attention to What Matters	96
Conclusion	98

CHAPTER 6

Positioning Five Practices Discussions within Instructional Design	99
The Learning Cycle	100
Five Practices Discussions and the Learning Cycle.....	101
Teachers as Instructional Designers.....	108
Conclusion	111

CHAPTER 7

Beginning Secondary Science Teachers Use the Model: Lessons Learned.....	113
Contexts for Working with Beginning Teachers: Foundation-Supported and University-Based	113
Lessons Learned	114
Lesson One.....	114
Lesson Two.....	116
Lesson Three.....	117
Lesson Four	119
Lesson Five	124
Lesson Six.....	125
Conclusion	126
References	127