
Contents

Preface	ix
Acknowledgments	xiii
About the Authors	xv
1. An Introduction to Formative Assessment	
Classroom Techniques (FACTs)	1
What Does a Formative Assessment–Centered Classroom Look Like?	1
Why Use FACTs?	3
How Does Research Support the Use of FACTs?	6
Classroom Environments That Support Formative Assessment	8
Connecting Teaching and Learning	10
Making the Shift to a Formative Assessment–Centered Classroom	11
2. Integrating FACTs With Instruction and Learning	15
Integrating Assessment and Instruction	15
Assessment That Promotes Thinking and Learning	16
Linking Assessment, Instruction, and Learning: The Mathematics Assessment, Instruction, and Learning Cycle (MAIL Cycle)	18
Stages in the MAIL Cycle	20
Engagement and Readiness	20
Eliciting Prior Knowledge	20
Exploration and Discovery	23
Concept and Skill Development	24
Concept and Procedure Transfer	24

Self-Assessment and Reflection	24
Selecting and Using FACTs to Strengthen the Link Between Assessment, Instruction, and Learning	25
3. Considerations for Selecting, Implementing, and Using Data From FACTs	28
Selecting FACTs	28
Selecting FACTs to Match Learning Goals	28
FACTs and the Common Core Standards for Mathematics	30
Selecting FACTs to Match Teaching Goals	32
The Critical Importance of Classroom Context in Selecting FACTs	34
Planning to Use and Implement FACTs	35
Starting Off With Small Steps	37
Maintaining and Extending Implementation	37
Using Data From the FACTs	40
4. Get the FACTs! 75 Mathematics Formative Assessment Classroom Techniques (FACTs)	48
#1. A & D Statements	52
#2. Agreement Circles	54
#3. Always, Sometimes, or Never True	57
#4. Card Sorts	59
#5. CCC: Collaborative Clued Corrections	63
#6. Comments-Only Marking	66
#7. Commit and Toss	68
#8. Concept Attainment Cards	71
#9. Concept Card Mapping	74
#10. Concept Cartoons	77
#11. Create the Problem	80
#12. Every Graph Tells a Story	82
#13. Example, Nonexample	85
#14. Fact-First Questioning	87
#15. Feedback to Feed-Forward	89
#16. Fist to Five	92
#17. Four Corners	94
#18. Frayer Model	96
#19. Friendly Talk Probes	99
#20. Give Me Five	101
#21. Hot Seat Questioning	103
#22. Human Scatter Graph	104
#23. Is It Fair?	107

#24. I Used to Think . . . But Now I Know . . .	109
#25. Justified List	111
#26. Justified True-or-False Statements	113
#27. K-W-L Variations	116
#28. Learning Goals Inventory (LGI)	119
#29. Look Back	121
#30. Matching Cards	123
#31. Mathematician's Ideas Comparison	125
#32. More A–More B Probes	130
#33. Muddiest Point	132
#34. No-Hands Questioning	134
#35. Odd One Out	137
#36. Opposing Views Probes	139
#37. Overgeneralization Probes	141
#38. Partner Speaks	143
#39. Pass the Problem	145
#40. P-E-O Probes (Predict, Explain, Observe)	147
#41. Peer-to-Peer Focused Feedback	150
#42. A Picture Tells a Thousand Words	153
#43. POMS: Point of Most Significance	155
#44. Popsicle Stick Questioning	156
#45. PVF: Paired Verbal Fluency	158
#46. Question Generating	161
#47. Response Cards	163
#48. Same A–Same B Probes	165
#49. Sequencing Cards	167
#50. Sticky Bars	168
#51. Strategy Harvest	171
#52. Strategy Probe	174
#53. Student Evaluation of Learning Gains	176
#54. Student Interviews	179
#55. Terminology Inventory Probe (TIP)	181
#56. Ten-Two	183
#57. Thinking Log	185
#58. Think-Alouds	187
#59. Think–Pair–Share	189
#60. Thought Experiments	191
#61. Three-Minute Pause	192
#62. 3-2-1	194
#63. Thumbs Up, Thumbs Down	196
#64. Traffic Light Cards	198
#65. Traffic Light Cups	200

#66. Traffic Light Dots	202
#67. Two-Minute Paper	204
#68. Two or Three Before Me	205
#69. Two Stars and a Wish	207
#70. Two Thirds Testing	209
#71. Volleyball, Not Ping-Pong!	211
#72. Wait Time Variations	212
#73. What Are You Doing and Why?	216
#74. Whiteboarding	218
#75. Word Sort	221
Appendix: Annotated Resources for Mathematics Formative Assessment	223
References	228
Index	232