Appendix I

Frequency Distributions of Observation Protocol Indicators

Table I–1
Ratings of Key Indicators – Design:
Extent to which Lesson Design
Includes Each of the Following

	Percent of Lessons				
	1	2	3	4	5
	Not at all				To a great extent
The resources available in this lesson contributed to accomplishing the purposes of the instruction	4	18	32	36	11
The design of the lesson reflected careful planning and organization	6	20	29	34	11
The instructional strategies and activities used in this lesson reflected attention to students' experience, preparedness, prior knowledge, and/or learning styles	12	27	29	23	9
The design of the lesson encouraged a collaborative approach to learning among the students	29	23	21	20	7
The design of the lesson incorporated tasks, roles, and interactions consistent with investigative mathematics/science	25	25	24	20	6
The instructional strategies and activities reflected attention to issues of access, equity, and diversity for students (e.g., cooperative learning, language-appropriate strategies/materials)	17	22	33	23	5
Adequate time and structure were provided for 'sense making'	24	37	22	13	5
Adequate time and structure were provided for wrap-up	38	27	21	9	5

Table I–2
Ratings of Key Indicators – Implementation:
Extent to which Lesson Implementation
Includes Each of the Following

	Percent of Lessons				
	1	2	3	4	5
	Not at all				To a great extent
The teacher appeared confident in his/her ability to teach mathematics/science	4	12	20	38	25
The teacher's classroom management style/strategies enhanced the quality of the lesson	17	21	28	20	14
The pace of the lesson was appropriate for the developmental levels/needs of the students and the purposes of the lesson	19	30	28	17	7
The teacher was able to 'read' the students' level of understanding and adjusted instruction accordingly	27	28	25	13	6
The instructional strategies were consistent with investigative mathematics/science	29	28	22	15	5
The teacher's questioning strategies were likely to enhance the development of student conceptual understanding/problem solving (e.g., emphasized higher order questions, appropriately used 'wait time', identified prior conceptions and misconceptions)	39	27	18	10	5

Table I–3
Ratings of Key Indicators – Content:
Extent to which the Mathematics/Science Content of Lessons
Reflects Each of the Following

	Percent of Lessons				
	1	2	3	4	5
	Not at all				To a great extent
Teacher-provided content information was accurate	4	12	28	29	27
The mathematics/science content was significant and worthwhile	2	9	22	42	25
The teacher displayed an understanding of mathematics/science concepts (e.g., in his/her dialogue with students)	6	18	33	26	17
The mathematics/science content was appropriate for the developmental needs of the students in this class	4	14	33	34	14
Appropriate connections were made to other areas of mathematics/science, to other disciplines, and/or to real-world contexts	19	21	30	19	11
Elements of mathematical/science abstraction (e.g., symbolic representations, theory building) were included when it was important to do so	11	24	28	30	6
Students were intellectually engaged with important ideas relevant to the focus of the lesson	20	35	25	14	6
Mathematics/science was portrayed as a dynamic body of knowledge continually enriched by conjecture, investigation analysis, and/or proof/justification	36	25	21	13	5
The degree of 'sense-making' of mathematics/science content within this lesson was appropriate for the developmental levels/needs of the students and the purposes of the lesson	30	36	18	12	4

Table I–4
Ratings of Key Indicators – Classroom Culture:
Extent to which Classroom Culture
Includes Each of the Following

	Percent of Lessons				
	1	2	3	4	5
	Not at all				To a great extent
Active participation of all was encouraged and valued	13	16	24	32	15
There was a climate of respect for students' ideas, questions, and contributions	10	17	28	32	13
Interactions reflected collaborative working relationships between teacher and students	17	25	22	25	12
Interactions reflected collegial working relationships among students (e.g., students worked together, talked with each other about the lesson)	25	23	23	19	10
The climate of the lesson encouraged students to generate ideas, questions, conjectures, and/or propositions	32	26	20	15	8
Intellectual rigor, constructive criticism, and the challenging of ideas was evident	38	31	18	8	6

Table I–5
Ratings of Key Indicators: Synthesis Ratings

	Percent of Lessons				
	1	**2**	**3**	**4**	**5**
	Not at all reflective of best practices/ national standards				**Extremely reflective of best practices/ national standards**
Design	18	33	34	11	4
Implementation	25	35	24	11	5
Mathematics/Science Content	12	39	30	17	3
Classroom Culture	19	28	31	16	6

Table I–6
Ratings of Key Indicators: Overall Ratings of the Lesson

	Percent of Lessons				
	1	**2**	**3**	**4**	**5**
	Negative effect		**Mixed or neutral effect**		**Positive effect**
Students' understanding of important mathematics/science concepts	4	12	50	26	8
Students' understanding of mathematics/science as a dynamic body of knowledge generated and enriched by investigation	10	20	45	16	8
Students' interest in and/or appreciation for the discipline	11	16	41	25	7
Students' self-confidence in doing mathematics/science	5	15	50	23	7
Students' ability to apply or generalize skills and concepts to other areas of mathematics/science, other disciplines, and/or real-life situations	5	10	58	22	5
Students' capacity to carry out their own inquiries	5	16	55	21	3