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ABSTRACT

The New York Collaborative for Excellence in Teacher Preparation (NYCETP) is a multicampus project designed to produce well-qualified teachers of science and mathematics. As part of the formative evaluation of the NYCETP, evaluators have designed activities that support faculty development and intercampus faculty collaboration. The pilot study of the lesson plan review form for education mathematics methods courses was one of these activities. Although small numbers of faculty and student lesson plans were involved in the pilot study, the study provides data related to the two main purposes of the pilot study: to determine if review forms could be used by faculty and whether sample lesson plans met the goals of the NYCETP. The report includes a description of procedures, summary of findings, case study examples of lesson plans and ratings, conclusions, and implications. Ratings for 2 sets of 10 lesson plans each are analyzed, each set rated by 2 faculty raters. For one set, rater agreement was 85%, and for the second, 56%. Rater disagreement was a function of adequacy of lesson plans and different use of rating categories. Disagreement could be reduced with rater training and, in some cases, improved lesson plans. Four appendixes contain some supporting information, a glossary, and tables for 20 lesson plans. (Author/SLD)

REPORT ON THE PILOT STUDY: LESSON PLAN REVIEW FORM FOR STUDENT LESSON PLANS IN MATHEMATICS

New York Collaborative for Excellence in Teacher Preparation

Spring 2000

Center for Advanced Study in Education
The Graduate School and University Center
of the City University of New York

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Abstract

The New York Collaborative for Excellence in Teacher Preparation (NYCETP) is a multi-campus project designed to produce well-qualified teachers of science and mathematics. As part of the formative evaluation of the NYCETP, CASE evaluators have designed activities that support faculty development and intercampus faculty collaboration. The pilot study of the lesson plan review form for education mathematics methods courses was one of these activities. Although small numbers of faculty and student lesson plans were involved in the pilot study, the study provides data related to the two main purposes of the pilot study: to determine if review forms could be used by faculty, and if sample lesson plans met the goals of the NYCETP. The report includes a description of procedures, summary of findings, case study examples of lesson plans and ratings, conclusions and implications. Ratings for two sets of 10 lesson plans each are analyzed, each set rated by two faculty raters. For one set rater agreement was 85%, and for the second 56%. Rater disagreement was a function of adequacy of lesson plans and different use of rating categories. Disagreement could be reduced with rater training and, in some cases, improved lesson plans.

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I. Introduction and Procedures

Introduction

The New York Collaborative for Excellence in Teacher in Teacher Preparation (NYCETP) is a project involving five campuses of the City University of New York (CUNY) and New York University (NYU). The internal formative evaluation is carried out by the Center for Advanced Study in Education (CASE) of the Graduate Center of CUNY. During the first year of the project CASE focused on typical formative evaluation activities. These included: documentation and formative feedback on collaborative workshops and conferences, on-going consultation on collaborative goals, and implementation of particular activities such as the workshops. In succeeding years the focus of the evaluation has changed, as described below.

The goal of the Collaborative was stated as to produce "well-qualified teachers of science and mathematics for New York City schools and to increase the number of individuals who enter and successfully complete teacher preparation requirements in science and mathematics." The Collaborative efforts to meet this main objective were presented in six clusters of activities: (1) Rethinking college instruction—Methodology and structures; (2) Developing new courses and programs; (3) Developing new curriculum materials; (4) Providing student supports and career development; (5) Recruiting promising students into teaching; and (6) Developing exemplary field sites for students.

In late spring of the first year the evaluators reviewed collaborative goals and activities, and decided to focus the evaluation activities on two key NYCETP project goals: (1) faculty development; and (2) intra and intercampus collaboration in developing courses and curriculum materials. We developed and carried out procedures for NYCETP faculty to conduct cross-campus case studies of courses being revised and/or developed by other NYCETP faculty participants (Tittle, Pape, & Flugman, 2000). Particular emphasis was given to involving faculty in both liberal arts and sciences and education in each case study. As part of the case study evaluation project, the case study process was formalized to some degree, involving an outline for

the case study and a peer review form (Pape & Tittle, 1998) designed to evaluate the case-studied courses, as well as other courses revised by faculty in the collaborative. The peer review form (Self-Study Guidelines) included check lists and ratings on whether course documents/curriculum met the collaborative student-centered instructional goals, course content goals, course/materials minimum expectations, and evidence of effectiveness of goals in mathematics and/or science, including student attitudes or other outcomes. A glossary of terms accompanied the Guidelines.

The present evaluation report describes a pilot study carried out in the fifth year of the NYCETP. In this evaluation pilot study, the peer review form was adapted and modified for reviews of student lesson plans. There were two main purposes of the pilot study: (1) to determine if the peer review forms developed for the case studies could be adapted and used by faculty; and (2) to determine if a sample of the lesson plans developed in classes in mathematics and science education met the goals of the NYCETP, that is, the new standards in science and mathematics proposed by the National Council of Teachers of Mathematics (1998) and the National Research Council (1996).

This lesson plan pilot study continues the formative evaluation orientation. The peer review process in the original case studies was used to achieve the Collaborative goals of cross-campus collaboration, cross discipline study, and faculty development linked to the instructional process. The case studies dealt with science and mathematics courses that were content-focused. This pilot study focuses on how education students are taught methods and on how their lesson plans are evaluated using NCTM and National Science Standards. Professors were asked to collect student lesson plans and were then asked to rate lesson plans from methods classes of other faculty. The following sections describe (1) the procedures followed, (2) summary tables and findings for two sets of lesson plans rated by two faculty each, (3) a mini-case study describing four of these lessons, and (4) conclusions drawn from the pilot study of ratings of student lesson plans.

Procedures

The pilot study was described to the project directors (campus principal investigators, PIs) on the six campuses of the NYCETP. A memo was sent to campus PIs on October 13, 1999. This memo asked PIs to provide names of faculty members who teach elementary education methodology courses in science and math and who agreed to be contacted for participation in a cross-campus project involving peer review of lesson plans. The PIs were asked to give faculty members copies of this memo, which also outlined the projected study in terms of its goals and the steps participants would follow. Additionally, the memo stated that participants would be paid $200 for their services, and guaranteed that the project report would not identify any participating faculty or students. (See Appendix A).

Through the assistance of the campus PIs, a list of eight faculty members was compiled, including four in math and four in science. As a first step, faculty were asked to select a sample lesson plan, and rate another faculty's student lesson plan, and to evaluate/comment on the review form itself. The purpose of this first step was to evaluate the form itself. By November 1999, five participating faculty members had sent in a sample lesson plan written by one of their students. The collected lesson plans were then copied and one lesson plan was sent to each participant, along with an NYCETP lesson plan rating form (the above-mentioned peer review form, modified for use in the initial stages of this project), and a glossary of terms. Five participants read the lesson they received, filled out the rating form, made comments on the lesson, and suggested changes for the rating form. The rating form was modified according to faculty suggestions. The revised form and the glossary of terms are given in Appendices B and C.

In December 1999, five participants collected consent forms from their mathematics or science education methods' students and sent in a randomly selected sample of ten lesson plans from those consenting students (names removed for anonymity). These five sets of plans were copied and one set of ten plans was sent on January 26, 2000 to each of seven participating

faculty members, along with the revised rating forms and the glossary of terms. There was an attempt to provide at least two ratings on all sets of lesson plans. However, not all faculty completed ratings. Therefore the ratings results discussed in the next section are based on only two sets of mathematics lesson plans, for each of which we had two sets of faculty ratings completed by April 2000. These sets of ratings provide the basis for the pilot study findings. The ratings were examined to see the extent of agreement between the two raters, and to determine if there were disagreements on particular items on the rating form. These latter disagreements might indicate that certain items were ill-defined or that it was difficult to determine an element's presence in a lesson plan.

Additionally, four student lesson plans are presented as case studies. The four cases were selected as follows: (1) rater agreement--a lesson plan where the two raters agreed that the lesson was good, (2) rater agreement--a lesson plan that the two raters agreed was poor, (3) rater disagreement-- a lesson where there was disagreement between the two raters as to whether the lesson was good or fair, and (4) rater disagreement--a lesson where one rater gave high ratings while another gave low ones. One case of agreement and one case of disagreement were selected from each set of the mathematics lesson plans.

II. Summary of Findings

The NYCETP Lesson Plan Review form (Appendix B) asks the rater to indicate whether a particular item is included in a lesson plan, 1 = absent, 2 = partially present, 3 = present, and NA = not applicable. These ratings are indicated for items within each of 3 major categories: Student Centered Instructional Goals; Collaborative Content (Course/Materials) Expectations; and Evidence of Effectiveness Goals (Lesson Meets Collaborative Goals Through Assessments and Collaborative Goals for Student Attitudes and Other Outcomes. After rating each individual item in a category, the rater provides an Overall Rating, where 1 = major problems, 2 = minor problems, 3 = good and 4 = excellent. For example, in Student Centered Instructional Goals, the rater is asked to rate presence and absence of : Use of inquiry-based approaches; Opportunities

for hands-on, experiential learning; Focus on deep understanding of major concepts, and so on. (These terms are described in the Glossary given to raters, Appendix C.) After considering seven individual items, the rater can add another item, if desired, and then make the overall category rating, from 4, Excellent to 1, Major Problems. The rating form also contains a section for comments.

Each lesson plan was examined for the discrepancies between raters for individual items within each category, and for the overall agreement on the three major category ratings. These discrepancies were indicated by 0= no difference in rating, 1= one category difference, etc. In some instances these differences could not be examined, and this is indicated by NC, where NC = Not Calculable due to one of two cases:

NC*, one rater gave an NA and one rater gave a number; or

NC**, one rater did not fill in a rating for this item.

Tables 1 and 2 provide examples of ratings on two individual lesson plans, 1-0 in mathematics and 4-5 in mathematics. Each table contains a summary of ratings done by a pair of faculty members on a particular lesson plan. The item number and title from the peer review form is given, as well as the range of difference between the two ratings. A low rating, 0, or even 1, indicates that there was agreement between the raters. An entry of 2 or 3 in the range column indicates little or no agreement on an item's presence in a lesson plan. An entry of NC* or NC** indicates the difference could not be calculated, as described above. There are entries of NC* in both tables. In Table 1, Lesson Plan 1-0, the raters arrived at the same overall ratings for the lesson plan, with few discrepancies within the major categories, as indicated by the ranges of 0, 1, and only one discrepancy of 2. In the second case, Lesson Plan 4-5, there are more differences in the ratings, as shown in the discrepancies (ranges) both in individual items within categories and in the overall ratings. In the overall ratings one rater has consistently rated the lesson plan a 4, Excellent, and the second rater has given ratings of 3 (Good) and 2 (Minor Problems). These ratings are examined in more detail as part of the case studies in III., below.

Table 1. Range of Rater Difference
Lesson Plan No. 1-0

Item # (26)	*Item Title*	*Range: for Plan 1-0*
A1	Inquiry-based	1
A2	Hands-on	0
A3	Deep understanding	0
A4	Problem-solving	1
A5	Collaborative Groups	0
A6	Technology	NC*
A7	Alternative Assessment	NC*
B1	Content central to new standards	2
B2	Content connects to other topics	1
B3	Content connects to oth. disciplines	1
B4	Content connects to oth. lessons	0
B5	Mastery of topic/skills important	1
C1	Conceptual Knowledge	0
C2	Problem-solving (process)	0
C3	Analyzing	NC*
C4	Communicating	0
C5	Tools	0
C6	Knowledge of facts/routines	0
C7	Making Connections	1
C8	Reasoning	NC*
C9	Alt. Assessment	0
D1	Attitudes	0
D2	Interest	1
D3	Habits of Mind	1
D4	Safety	0
D5	Participation	0

Overalls:	Rater 1 (A)	Rater 2 (B)	Range
Student Centered Instructed Goals:	1	1	0
Course/Materials Minimum Expectations	1	1	0
Evidence of Effectiveness Goals	1	1	0

NC
Not Calculable due to one of two cases:
NC* : one rater gave an NA and one rater gave a number
NC** : one rater did not fill in a rating for this item

Table 2. Range of Rater Difference
Lesson Plan No. 4-5

Item # (26)	*Item Title*	*Range for Plan 4-5*
A1	Inquiry-based	0
A2	Hands-on	0
A3	Deep understanding	2
A4	Problem-solving	0
A5	Collaborative Groups	NC**
A6	Technology	0
A7	Alternative Assessment	0
B1	Content central to new standards	1
B2	Content connects to other topics	NC*
B3	Content connects to oth. disciplines	0
B4	Content connects to oth. lessons	0
B5	Mastery of topic/skills important	2
C1	Conceptual Knowledge	2
C2	Problem-solving (process)	1
C3	Analyzing	1
C4	Communicating	0
C5	Tools	NC*
C6	Knowledge of facts/routines	2
C7	Making Connections	1
C8	Reasoning	2
C9	Alt. Assessment	NC*
D1	Attitudes	1
D2	Interest	1
D3	Habits of Mind	1
D4	Safety	0
D5	Participation	0

Overalls:	Rater 1 (C)	Rater 2 (B)	Range
Student Centered Instructed Goals:	4	3	1
Course/Materials Minimum Expectations	4	2	2
Evidence of Effectiveness Goals	4	2	2

NC
Not Calculable due to one of two cases:
NC* : one rater gave an NA and one rater gave a number
NC** : one rater did not fill in a rating for this item

The individual data on each lesson plan are summarized across each set of 10 lesson plans in Tables 3 and 4. These tables show agreement for the two faculty raters for each set, at the level of items within each of the major categories for evaluating the lesson plan. As described above, these individual items are rated for their presence (3), partial presence (2) or absence (1), without any qualification as to their quality. In Table 3, reading down the columns, the range of agreement of the raters for Lesson plan 1-9 is predominantly 2 (18 of 26 possible ratings), indicating that raters did not agree on their ratings for this lesson plan. Possible reasons for this lack of agreement are discussed in III., Case Studies, below. The raters were in more agreement on Lesson plan 1-0, with 21 of 26 items showing perfect or some agreement (rating range of 0 or 1). Again, possible reasons for the agreement are discussed in III.

Tables 3 and 4 can also be scanned to identify the items that tended to have the highest rater agreement and disagreement. The columns headed Perfect Agreement (Range = 0) and Perfect Agreement/Some Agreement (Range 0 or 1) provide this information. Across the ten lesson plans there were items within the major categories that raters could agree upon, using the 0 or 1 range. In both tables, for example, Student Centered Instructional Goals had items with 7 or more of the items agreed upon: A1 Inquiry-based, A2 Hands-on, A3 Deep understanding, A-4 Problem solving, and A5 Collaborative Groups.

Comparing the overall Perfect Agreement/Some Agreement (0 and 1 ranges) for the two sets of lesson plans in Tables 3 and 4 also provide indications that sets of lesson plans will vary in rater agreement. The set of 10 lesson plans included in Table 4 provided the basis for greater agreement between raters than the lesson plans in Table 3. Table 4 shows 85% agreement for raters across all the items in the rating form (222 out of 260 possible Perfect/Some Agreement). Table 3 shows a comparable figure of 56% (146 items with Perfect/Some Agreement) across all of the items in the rating form.

Both tables provide examples that the NA category is used differently by the pairs of raters. NA is intended to indicate that the item is not applicable in the context of the particular

lesson. However, a number of items, e.g., A6 Technology and C5 Tools in both tables, and C3 Analyzing in Table 3, indicate that this NA category needs clarification or deletion.

Table 3. Agreement of Faculty Raters on Individual Categories
Lesson Plan Set No. __1__ (10 lesson plans)

Item # (26)	*Item Title*	*1-0*	*1-1*	*1-2*	*1-3*	*1-4*	*1-5*	*1-6*	*1-7*	*1-8*	*1-9*	*Perfect Agreement (Range=0)*	*Prefect Agreement/ Some Agreement (Range =0 or 1)*
A1	Inquiry-based	1	2	0	0	0	0	2	1	0	2	5	7
A2	Hands-on	0	2	0	0	0	0	0	0	1	2	7	8
A3	Deep understanding	0	1	0	1	2	1	1	0	2	2	3	7
A4	Problem-solving	1	1	0	2	1	0	2	1	1	2	2	7
A5	Collaborative Groups	0	0	0	2	0	0	0	1	2	0	7	8
A6	Technology	NC*	0	NC*	0	NC*	0	NC*	NC*	NC*	0	4	4
A7	Alternative Assessment	NC*	NC*	2	NC*	2	0	0	NC*	2	2	2	2
B1	Content central to new standards	2	2	1	1	1	1	1	0	2	2	1	6
B2	Content connects to other topics	1	2	2	1	1	1	NC*	2	0	2	1	5
B3	Content connects to oth. disciplines	1	0	1	0	2	0	NC*	1	0	2	4	7
B4	Content connects to oth. lessons	0	2	0	0	0	1	NC*	1	2	1	4	7
B5	Mastery of topic/skills important	1	1	1	1	2	1	0	0	2	2	2	7
C1	Conceptual Knowledge	0	1	2	1	2	NC*	1	0	2	2	2	5
C2	Problem-solving (process)	0	1	1	NC*	1	0	2	1	1	2	2	7
C3	Analyzing	NC*	NC*	NC*	0	NC*	NC*	NC*	NC*	2	NC*	1	1
C4	Communicating	0	2	1	1	1	0	NC*	1	2	2	2	6
C5	Tools	0	NC*	2	0	1	0	NC*	NC*	NC*	NC*	3	4
C6	Knowledge of facts/routines	0	1	NC*	1	1	NC*	0	1	2	1	2	7
C7	Making Connections	1	0	0	1	1	0	2	1	1	1	3	9
C8	Reasoning	NC*	1	NC*	1	1	1	NC*	NC*	2	1	0	5
C9	Alt. Assessment	0	NC*	1	NC*	NC*	NC*	0	NC*	NC*	2	2	3
D1	Attitudes	0	2	1	1	2	1	NC*	2	1	2	1	5
D2	Interest	1	NC*	1	NC*	2	1	NC*	1	1	2	0	5

D3	Habits of Mind	1	2	1	NC*	1	0	NC*	1	2	2	1	5
D4	Safety	0	0	0	NC*	NC*	NC*	NC*	0	NC*	2	4	4
D5	Participation	0	2	1	1	2	0	NC*	1	2	2	2	5
TOTALS:								out of 260 cases				67	146

0/1 Ranges 56% of the time

NC*
Not Calculable due to one of two cases:
One rater gave an NA and one rater gave a number, or one rater did not fill in a rating for this item.

Table 4. Agreement of Faculty Raters on Individual Categories
Lesson Plan Set No. __4__ (10 lesson plans)

Item # (26)	*Item Title*	*4-0*	*4-1*	*4-2*	*4-3*	*4-4*	*4-5*	*4-6*	*4-7*	*4-8*	*4-9*	*Perfect Agreement (Range=0)*	*Perfect Agreement/ Some Agreement (Range =0 or 1)*
A1	Inquiry-based	1	0	0	0	1	0	1	0	0	0	7	10
A2	Hands-on	0	1	0	0	0	0	0	0	0	0	9	10
A3	Deep understanding	1	1	1	0	0	2	1	0	0	1	4	9
A4	Problem-solving	0	0	1	0	1	0	1	1	0	NC*	5	9
A5	Collaborative Groups	0	1	2	0	0	NC*	0	0	0	0	7	8
A6	Technology	NC*	NC*	NC*	NC*	NC*	0	NC*	0	NC*	NC*	2	2
A7	Alternative Assessment	1	2	0	0	1	0	0	1	0	1	5	9
B1	Content central to new standards	0	0	1	0	0	1	1	0	0	0	7	10
B2	Content connects to other topics	1	1	1	0	1	NC*	0	NC*	0	2	3	7
B3	Content connects to oth. disciplines	0	1	1	0	1	0	0	1	0	2	5	9
B4	Content connects to oth. lessons	NC*	2	0	0	1	0	0	0	0	2	6	7
B5	Mastery of topic/skills important	2	0	0	0	1	2	1	1	0	0	5	8
C1	Conceptual Knowledge	0	1	0	0	0	2	1	0	0	0	7	9
C2	Problem-solving (process)	0	0	0	0	0	1	1	1	0	0	7	10
C3	Analyzing	0	0	1	0	0	1	1	1	0	0	6	10
C4	Communicating	0	1	0	0	0	0	0	1	NC*	NC*	6	8
C5	Tools	NC*	NC*	NC*	0	NC*	NC*	NC*	0	NC*	NC*	2	2
C6	Knowledge of facts/routines	1	0	0	0	0	2	1	1	0	0	6	9
C7	Making Connections	0	1	0	0	0	1	0	0	0	1	7	10
C8	Reasoning	0	NC*	2	0	0	2	NC*	1	1	1	3	6
C9	Alt. Assessment	NC*	2	0	0	1	NC*	0	NC*	0	0	5	6
D1	Attitudes	NC*	1	1	0	0	1	1	1	0	1	3	9
D2	Interest	NC*	0	1	0	1	1	1	0	0	1	4	9
D3	Habits of Mind	NC*	0	1	0	0	1	1	1	0	NC*	4	8
D4	Safety	NC	1	1	1	1	0	0	1	0	0	4	9

		*											
D5	Participation	NC*	0	1	0	0	0	0	1	0	0	7	9
TOTALS:								out of 260 cases				146	222

0/1 Ranges 85% of the time

NC*
Not Calculable due to one of two cases:
One rater gave an NA and one rater gave a number, or one rater did not fill in a rating for this item

III. Case Studies

Four lesson plans were selected as provide case studies to illustrate aspects of rating lesson plans, in particular aspects of the lesson plans themselves that may lead to lack of agreement for the faculty raters. As mentioned earlier, we selected two lesson plans from our two class sets of lesson plans. The lesson plans were identified on two criteria—high and low rater agreement, and good and poor lesson plans. Table 5 presents the overall ratings for the four case study lesson plans. As shown in the table, Lesson Plan 1-0, The Abacus was given low ratings by both raters (1 = Major Problems), so there was high rater agreement and the lesson plan was judged to have major problems. Lesson Plan 1-9, Less Than/Greater Than Monsters was one which had very different ratings from the two judges, one giving consistently low ratings and the other higher ratings of Good or Minor Problems (2 or 3). The third lesson plan, 4-3 Weights and Force, had high ratings (4 = Excellent) and both raters agreed on 4 for two of the three overall ratings. Lesson Plan 4-5, Math Concepts in Media, had Excellent ratings from one rater, and Good or Minor Problems from the second rater.

Table 5. Overall Ratings for Case Study Lesson Plans

Lesson Plan 1-0 *The Abacus*

Overalls:	Rater 1 (A)	Rater 2 (B)	Range
Student Centered Instructed Goals:	1	1	0
Course/Materials Minimum Expectations	1	1	0
Evidence of Effectiveness Goals	1	1	0

Lesson Plan 1-9 *Less Than/Greater Than Monsters*

Overalls:	Rater 1 (A)	Rater 2 (B)	Range
Student Centered Instructed Goals:	3	1	3
Course/Materials Minimum Expectations	2.5	1	1.5
Evidence of Effectiveness Goals	3	1	2

Lesson Plan 4-3 *Weights and Force*

Overalls:	Rater 1 (C)	Rater 2 (B)	Range
Student Centered Instructed Goals:	3	4	1
Course/Materials Minimum Expectations	4	4	0
Evidence of Effectiveness Goals	4	4	0

Lesson Plan 4-5 *Math Concepts in Media*

Overalls:	Rater 1 (C)	Rater 2 (B)	Range
Student Centered Instructed Goals:	4	3	1
Course/Materials Minimum Expectations	4	2	2
Evidence of Effectiveness Goals	4	2	2

1 = Major Problems 2 = Minor Problems 3 = Good 4 = Excellent

Information is given for each of the four lesson plans on the following pages. These include: a brief summary of the lesson, its length and a summary of the ratings, including any comments made by the reviewers; a Rating Review Sheet for the two reviewers, showing the actual rating for each item and the overall ratings; and the lesson plan itself. Examining the characteristics of the individual lesson plans provides some understanding of why there was rater agreement and/or disagreement. The examination also indicates that some divergence among the raters may be due to differing standards held by faculty raters.

Case A, The Abacus, is a weak lesson plan (No. 1.0) and is not well written. Both raters agreed, giving the lesson plan 1's (Major Problems) on all three overall ratings: Student centered instructional goals, Course/material minimum expectations, and Evidence of effectiveness goals. Although one rater made no comments, the other criticized the age appropriateness and lack of models and demonstrations. Within the categories raters tended to agree, except for Category B, in which there were items on whether content was central to new standards (B1, one rating of 3, Present, and one of 1, Absent) and Mastery of topics/skills important (B5, rated 3, Present, and 2, Partially present). So despite some disagreement that there some aspects of Course/material minimum expectations present or absent, the overall rating on the quality of the lesson plan was a 1, Major Problems. As the summary indicates, the lesson plan learning objectives are very general and lack specificity. Further, there are no descriptions of student activities or assessment plans.

Case B, Less Than/Greater Than Monsters for grade one, provides an example of a lesson plan (No. 1-9) on which the faculty raters differed on the overall quality ratings. One rater gave two 3's (Good) and one 2.5(Minor Problems-Good) and the other rater gave 1's, Major Problems on all three overall quality ratings. The ratings within the major categories are similarly discrepant, with one rater giving almost all 1's (item absent in lesson plan) and the other either 2's or 3's (indicating the item was Partially Present or Present). The lesson plan itself touches on all the major categories of Aim, Objective, Materials, Resources, Activities/Procedures, Assessment and Follow-up. In this case it is difficult to discern the reason for the major and

consistent differences between the faculty raters. On the poor lesson plan the raters were in agreement on the overall ratings for the major quality categories and for most of the items rated. Here, however, the raters were split in their evaluation of overall quality. This finding suggests that faculty raters need training on a wide variety of lesson plans in order to get consensus on using the rating forms. It is not immediately clear from the lesson plan itself why the discrepancy occurred.

Case C, Weights and Force/Putting Mathematics to Work: Science Study for grade three, is an example where the raters (a different pair than for set one, above) agreed that this was an excellent lesson plan. As shown in the Rating Review Sheet for Lesson Plan No. 4-3, the raters were almost unanimous in giving ratings of 3 (Present) on all items within the major categories. The overall quality ratings were 4, Excellent, with one exception, a 3 (Good) from one rater on category A, Student-centered instructional goals. Examination of the lesson plan indicates why there was high rater agreement that this was an Excellent lesson plan. The plan, although only 2 single spaced pages, is comprehensive, integrates mathematics and science, is a hands-on activity incorporating mathematics and science, and is succinct in incorporating all the aspects needed in a lesson plan: Grade level, Subject, Overview, Suggested Time Allowance, Objectives, Resources/Materials/ Before Actions (questions eliciting major concepts/activating prior knowledge), During Actions, After Actions, Evaluation/Assessment, Vocabulary, Extension Lesson/Activity, Interdisciplinary, National Content Standards. In the During and After actions, there are descriptions of what the students and teacher will be doing and their interactions. The evaluation/assessment is clear that there are math portfolios for each student. Overall, an exemplary lesson plan that clearly facilitated rater agreement.

Case D. Mathematical Concepts Found in Films and/or Media for grades 4-6 is an example of a stronger lesson plan (compared to Cases A and B) and an example where raters disagreed to some degree. The overall ratings for the major categories were consistently a 4 (Excellent) from one rater and a 2 (Minor Problems) or 3 (Good) from the other rater for Lesson Plan 4-5. Examination of the lesson plan suggests some of the reasons for the discrepancies. Compared to the lesson plan in Case C, the descriptions are not specific enough to eliminate

ambiguity. For example, item A5 in Student Centered Instructional Goals is Collaborative Groups. The item is rated as 2 (Partially Present) by one rater and omitted as a rating by the second rater. The text of the lesson plan talks about students discussing films and, under the heading of "Collaboration & Communication," students are listing and sharing the lists with class; however, it is not specific whether students discuss in groups or whole class. A similar discrepancy occurs item for C9, Alternative Assessment, and again the text of the lesson plan is not specific enough about assessment for the second rater to make a rating. Overall, for both category B, Course/Materials Minimum (content) Expectations and category D, Evidence of Effectiveness Goals, the plan lacks sufficient detail for the second rater go beyond a rating of 2 (Minor Problems), while the first rater has given 4's (Excellent) to both of these categories overall. In Case D the lesson plan provides some suggestions that its lack of specificity or precision in the text contributes to rater discrepancies. The implications here, again, are the need for practice on a diverse set of lesson plans to try to reach rater consensus on how to rate lesson plans for which the text is ambiguous.

A. Lesson Plan 1-0 *The Abacus (Historical Lesson Plan, Japan)*

Summary

This lesson plan (for age eight years) centers around the Abacus. There is an introduction providing details on the history of the Abacus (where, when, how, and why it was used). There are three general learning objectives, a list of necessary materials, grade level, examples for demonstration, and sources for the lesson plan. (Absent are: specific learning objectives, description of student activities, homework, and assessment plans.)

Length

6 pages, double-spaced.

Ratings

The two raters agreed that this was a poor lesson plan. Both raters gave the lesson plan 1's (Major Problems) on the three overall ratings, indicating exceedingly negative reviews. One rater made no comments, and the other criticized the age appropriateness and lack of models and demonstrations.

Lesson Plan No. 1-0 *The Abacus*

Item # (26)	*Item Title*	*Range: for Plan 1-0*
A1	Inquiry-based	1
A2	Hands-on	0
A3	Deep understanding	0
A4	Problem-solving	1
A5	Collaborative Groups	0
A6	Technology	NC*
A7	Alternative Assessment	NC*
B1	Content central to new standards	2
B2	Content connects to other topics	1
B3	Content connects to oth. disciplines	1
B4	Content connects to oth. lessons	0
B5	Mastery of topic/skills important	1
C1	Conceptual Knowledge	0
C2	Problem-solving (process)	0
C3	Analyzing	NC*
C4	Communicating	0
C5	Tools	0
C6	Knowledge of facts/routines	0
C7	Making Connections	1
C8	Reasoning	NC*
C9	Alt. Assessment	0
D1	Attitudes	0
D2	Interest	1
D3	Habits of Mind	1
D4	Safety	0
D5	Participation	0

Overalls:	Rater 1 (A)	Rater 2 (B)	Range
Student Centered Instructed Goals:	1	1	0
Course/Materials Minimum Expectations	1	1	0
Evidence of Effectiveness Goals	1	1	0

NC
Not Calculable due to one of two cases:

NC* : one rater gave an NA and one rater gave a number
NC** : one rater did not fill in a rating for this item

Math

Prof.
12- 15- 1999

HISTORICAL LESSON PLAN
Japan

Origen of the Abacus

The abacus was invented thousands of years ago. It is not certain who invented it. However, provided a easy way of doing arithmetic without using numerals. The numerals of ancient times were very awkward for doing arithmetic. The trouble was they did not express zero or place value. The Romans, for example, used letters as numerals and they expressed place value by using different letters. The numbers 5, 50, and 500 were written V, L, and D. Without the idea of zero and place, there was no way to make the same numerals stand for more than one number. That means that V could not stand for any other except the numeral 5.

Place Value

The abacus was build with place value incorporated in it. One counter could be made to express 1, 10, or 100, according to its place on the abacus. It was first made by placing pebbles into grooves drawn in soft dirt or sand. Later, the Romans and the Arabs learned to make a portable abacus. It was a flat piece of wood or metal with grooves for counters.

Portable Abacus

The abacus is a very simple calculator that is used for doing

arithmetic. Today it is made of beads, rods, and a frame, and each stands for a place in the decimal system. One rod stands for units, one for 10's one for 100's and so on. The beads are counters. Numbers are added or subtracted by simple moving the beads on the rods.

Arithmetic

The abacus offers an easy way of adding and subtracting. It can also be used for multiplication and division.

The abacus is widely used today in China, Japan, and many other countries. Some people use the abacus as fast as a person using an electronic calculator.

Objectives

To teach the concepts of multiplication and division with the use of the abacus

To prepare children problem solving through ancient as well modern devices.

To provide children with a historical and cultural background that will enrich their knowledge.

Materials

a -Abacus

b- pencil

c- paper

Project for children

For all whole numbers axb=bxa.

3x 17= 3x (10+ 7)= (3x 10)+ (3x 7)

```
17
x 3
--
21    3x 7
30    3x 10
--
51    3x 17
```

17x 23= (7x 3)+ (7x 20)+ (10x 3)+ (10x 20)

```
  23
x 17
--
  21    7x 3
 140    7x 20
  30   10x  3
+200   10x 20
 391   17x 23
```

We can also use the "short" form:

```
  23
x 17
--
 161    7x 23= 7x (3= 20)= (7x 3)+ (7x 20)
+230   10x 23= 10x (3x 20)= (10x 3)+ (10x 20)
 391
```

Reinforcement activity where children use their knowledge of place value and their calculator (abacus) to find products of large numbers.

420 8700

Think, "42 tens x 87 hundreds." Children will use calculator to find 42x 87.

23

Thousands divided by hundreds are tens, so 54000 ÷ 900 is the as (54 ÷ 9)tens, or (54 ÷ 9)x 10.

MODEL

Hundreds	Tens	Ones
1	3	6

$6\overline{)136}$

2 — 2 in the tens place

$6\overline{)136}$

12 — 6 sets with 2 tens

16 — Exchange 1 ten for 10 ones; already had 6 ones

22 — 2 in the ones place

$6\overline{)136}$

12 — 6 sets with 2 tens

16

12 — 6 sets with 2 ones

4 — Cannot distribute

(6x 22)+ 4= 136

Total in original set
A reminder of 4
2 tens and 2 ones in each set
6 sets

24

Theme:	Whole concept
Discipline:	Math
Activity:	Multiplication and division
Aim:	Children will learn to multiply and divide through the abacus.
Age:	8 years
Materials:	Abacus pencil paper
Procedure:	Teacher will discuss what the activity will be. Write multiplications and division, then use the abacus to solve, then Children will make their own problems, and solve them.

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The New Book of Knowledge Volume 1 Pg. 2-3

Mathematics A Good Beginning Troutman & Lichtenberg Chapter

Www. Siam Org/ Web search Htm

26

Summary

This lesson plan for grade one centers around the concept of less than and greater than. The specific learning objective is to have students create arts and crafts monsters and have them use them to demonstrate the concept of less than/greater than. Detailed activities and procedures for the lesson are provided. Also included are explanations of assessment and follow-up, and one math example for demonstration is provided.

Length

One page, single-spaced.

Ratings

One rater gave the lesson plan three 1's (Major Problems) on the overall ratings, and one rater gave two 3's (Goods) and one 2.5 (somewhere in between Minor Problems and Good). The lower rater made no comments, and the higher rater made some suggestions for improvement of teacher explanations.

Item # (26)	*Item Title*	*Range 1-9*
A1	Inquiry-based	2
A2	Hands-on	2
A3	Deep understanding	2
A4	Problem-solving	2
A5	Collaborative Groups	0
A6	Technology	0
A7	Alternative Assessment	2
B1	Content central to new standards	2
B2	Content connects to other topics	2
B3	Content connects to oth. disciplines	2
B4	Content connects to oth. lessons	1
B5	Mastery of topic/skills important	2
C1	Conceptual Knowledge	2
C2	Problem-solving (process)	2
C3	Analyzing	NC*
C4	Communicating	2
C5	Tools	NC*
C6	Knowledge of facts/routines	1
C7	Making Connections	1
C8	Reasoning	1
C9	Alt. Assessment	2
D1	Attitudes	2
D2	Interest	2
D3	Habits of Mind	2
D4	Safety	2
D5	Participation	2

Overalls:	Rater 1 (A)	Rater 2 (B)	Range
Student Centered Instructed Goals:	3	1	3
Course/Materials Minimum Expectations	2.5	1	1.5
Evidence of Effectiveness Goals	3	1	2

NC
Not Calculable due to one of two cases:

NC* : one rater gave an NA and one rater gave a number
NC** : one rater did not fill in a rating for this item

Activity: Less Than/Greater Than MONSTERS
Grade Level: 1st Grade
Time Frame: 45-60 minutes

Aim: To have students make a < > "monster". Students will demonstrate proper use of scissors and glue as well as the proper way to hold crayons, colored pencils, etc.

Objective: Students will use their "monsters" to demonstrate the concept of less than and greater than.

Materials: A < > shape cut out of a sturdy material (manilla folder,etc.) Drawing utensils, colored pencils, crayons, etc.Construction paper, glue.

Resources: The Hungry Thing by Jan Slepian Unknown Binding 1999

Activities/ Procedures:

1.
The teacher will read the story "The Hungry Thing", Students and teacher will discuss how the very hungry thing likes to eat; if he were given the opportunity to eat 3 cookies or 8 cookies, the monster would rather eat the largest number of cookies, 8. The teacher will use his/her monster < > to demonstrate the monster preferring to eat 8 cookies rather than 3.

2.
Students will decorate their own < > monsters using construction paper to make teeth, crayons, colored pencils, etc,to draw features on their < > monsters.

3.
The teacher will pass out a few beans, pieces of pasta, or other manipulatives, to each student. Students will then place 3 items on the left and 8 items on the right and decide which way the "monster" should face. The teacher can direct students to put different numbers of items on their desks and have the students decide which way the "monster" should face.

Assessment: The teacher can observe the students as they decorate their monsters. Are the students holding their pencils correctly? Are they demonstrating proper use of scissors and glue? the teacher can also evaluate the students understanding of less than and greater than by watching the students to see if they face their monsters the correct way.

Follow-up: The teacher should show examples of what the undecorated less than and greater than symbols look like. He/she should show examples of how these symbols are used in math.

3 < 8 3 is less than 8

8 > 3 8 is greater than 3

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C. Lesson Plan 4-3 *Weights and Force/Putting Mathematics to Work: Science Study*

Summary

This lesson plan for grade three focuses on weights and force, as used in scientific contexts. Included is an overview of the lesson plan's components, suggested time allowance for each part of the lesson, specific learning objectives, materials list, a description of the introduction/prior knowledge activation for students, detailed procedures/ activities, evaluation/assessment, a vocabulary list, extension lesson, and explanation of standards that the lesson meets.

Length

2 pages, single-spaced.

Ratings

The two raters agreed that this was a good lesson plan. One rater gave the lesson 4's (Excellent) on the three overall ratings, and the other rater two 4's (Excellent) and one 3 (Good), indicating exceedingly positive reviews. There was a single comment by one rater, which was a suggestion for the inclusion of a student created portfolio.

Item # (26)	*Item Title*	*2-3*
A1	Inquiry-based	0
A2	Hands-on	0
A3	Deep understanding	0
A4	Problem-solving	0
A5	Collaborative Groups	0
A6	Technology	NC*
A7	Alternative Assessment	0
B1	Content central to new standards	0
B2	Content connects to other topics	0
B3	Content connects to oth. disciplines	0
B4	Content connects to oth. lessons	0
B5	Mastery of topic/skills important	0
C1	Conceptual Knowledge	0
C2	Problem-solving (process)	0
C3	Analyzing	0
C4	Communicating	0
C5	Tools	0
C6	Knowledge of facts/routines	0
C7	Making Connections	0
C8	Reasoning	0
C9	Alt. Assessment	0
D1	Attitudes	0
D2	Interest	0
D3	Habits of Mind	0
D4	Safety	1
D5	Participation	0

Overalls:	Rater 1 (C)	Rater 2 (B)	Range
Student Centered Instructed Goals:	3	4	1
Course/Materials Minimum Expectations	4	4	0
Evidence of Effectiveness Goals	4	4	0

NC
Not Calculable due to one of two cases:

NC* : one rater gave an NA and one rater gave a number
NC** : one rater did not fill in a rating for this item

Lesson Plan

Grade 3

Subject Weights and Force/Putting Mathematics to Work: Science Study

Overview Estimate, weigh, record and reflect on the weight of several objects, comparing similarities and differences to create a system of ordering them (at least three different classifications), which will be included in the math portfolio. Students use two different scales; a two-pan scale to experience balance and which is heavier, and a spring scale for weight measurement. They create an ordered way to classify the objects. Using the data collected (estimations, results, written explanations, ordered presentation, teacher and parent comments), students choose two objects from different groups. For homework, they will make-up a story describing each object's weight and characteristics and what might happen if they: 1) dove into a pool, 2) fell onto a hard surface, 3) lived on the moon, or 4) rolled down a hill. This will determine prior knowledge of forces (i.e., gravity, buoyancy, etc.) and will relate weight to real-world environments.

Suggested Time Allowance

10 minutes	Review of the concepts, weight, balance, and scale usage. Give directions for the activity.
25 minutes	Independent/group student participation in activity. Teacher walks the room providing feedback and written comments in the math portfolio.
10 minutes	Reflect on and discus what was found. Explain and demonstrate how some objects bounce, break, etc. Give directions for writing the story for homework.

Objectives

- Use prior knowledge to estimate weight comparisons of two objects at a time, and at least twelve objects total.
- Practice using and reading scales and recording data in an organized way.
- Provide written explanations comparing the estimations with actual results, defending why the estimation was or was not reasonable.
- Create ordered presentation of data, forming three different classifications to group the twelve objects (by weight, shape, texture, etc.).
- Discus results and observations made.
- Write a story comparing and contrasting two objects, their individual properties and how they "act" in real-world situations.

Resources/ Materials Scales-preferably one each per student, or to be shared in groups of three.
Boxes of various objects, such as, marbles, tennis balls, bolts, spoon, etc. There should be at least one box per scale.
Math Portfolios consisting of writing paper, grid paper and folders.

Before Actions Reinforce concepts and discus weight and measurement. How is weight measured? How do we read a scale? What are some ways to record information? What are some ways to classify objects?

During Actions Students choose two objects and record estimations of their weight, which will be heavier or lighter, and a description of their reasoning. They then take measurements, record the results, write an explanation and repeat this process until data for twelve different objects has been collected. Students then create a way to present the data by developing three different ways to group the objects. This may be done using lists, graphs, organizational charts, etc. If sharing materials, students may work in groups or discus the activity while waiting their turn with the scale.

Teacher offers feedback, answers questions and writes comments about each student's work in individual math portfolios.

After Actions Discus observations and different classifications made by students. Answer any remaining questions about the activity, results or concepts. Lead student discussion into what may happen when objects are bounced, dropped, etc., and demonstrate in front of class. Then give homework instructions on how to write the story. Explain what must be included and the approximate page requirement (1-3 pages, for example).

Evaluation/ Assessment Math portfolios will be collected and evaluated. Student has successfully grasped the concepts of weight, measurement and force if their estimations and classification presentations make sense and are appropriate, justified and reasonable. Students should demonstrate an idea of the impact a force has on an object in a real-world environment. Teachers provide a final written comment in the math portfolio explaining the student's level of understanding, progression and what may need reinforcement. Portfolios are taken home for parent review and written comment. There is no letter grade.

Vocabulary Weight, estimate, heavier, lighter, gram, balance, classification, order, force, gravity, buoyancy or bounce, impact

Extension Lesson/Activity A lesson about forces, such as gravity, can be an extended lesson, discussing impact (concave, convex, etc.). An activity that might follow would be to have students drop various objects onto different types of surfaces and explain what happens. These surfaces may include a beanbag chair, floor mat, and "kiddie pool" filled with water.

Interdisciplinary Relating objects to real-world forces incorporates science, while writing explanations and creating a story provides practice in language arts.

National Content Standards Putting mathematics to work enables students to participate in independent investigation, using a contructivist approach. Mathematics as reasoning is achieved with estimations and relative reflections. Communication is practiced through writings and after action discussions, and students develop connections to the real-world as they use collected data and prior knowledge to relate concepts and write a story.

Summary

This lesson plan for grades 4-6 focuses on math that students are exposed to in films and media. Included are objectives, grade level, suggested time allowance, resources, detailed activities and procedures, evaluation/assessment, discussion questions, homework, vocabulary list, and additional extension activities.

Length

Two pages, single-spaced.

Ratings

There was disagreement between the two raters about this lesson. One rater gave 4's (Excellent) on the overall ratings, and the other gave two 2's (Minor Problems) and one 3 (Good), indicating that one rater felt that this lesson was excellent while the other thought it was fair. The higher rater made a couple of suggestions for ideas to include in the lesson, and the lower rater made no comments.

Item # (26)	*Item Title*	*2-5*
A1	Inquiry-based	0
A2	Hands-on	0
A3	Deep understanding	2
A4	Problem-solving	0
A5	Collaborative Groups	NC**
A6	Technology	0
A7	Alternative Assessment	0
B1	Content central to new standards	1
B2	Content connects to other topics	NC*
B3	Content connects to oth. Disciplines	0
B4	Content connects to oth. Lessons	0
B5	Mastery of topic/skills important	2
C1	Conceptual Knowledge	2
C2	Problem-solving (process)	1
C3	Analyzing	1
C4	Communicating	0
C5	Tools	NC*
C6	Knowledge of facts/routines	2
C7	Making Connections	1
C8	Reasoning	2
C9	Alt. Assessment	NC*
D1	Attitudes	1
D2	Interest	1
D3	Habits of Mind	1
D4	Safety	0
D5	Participation	0

Overalls:	Rater 1 (C)	Rater 2 (B)	Range
Student Centered Instructed Goals:	4	3	1
Course/Materials Minimum Expectations	4	2	2
Evidence of Effectiveness Goals	4	2	2

NC
Not Calculable due to one of two cases:

NC* : one rater gave an NA and one rater gave a number
NC** : one rater did not fill in a rating for this item

Prof.
November 16, 1999

"Mathematical Concepts Found in Films and /or Media"

Grade Level: 4 – 6

Overview of the Lesson Plan:

In this lesson, students investigate the role of mathematics in their everyday lives. They then discover, that even with movies they watch mathematics exists on a deeper meaning.

Performance Standards in Mathematics (NYC):

M8 – Putting Mathematics to Work. Understands the general nature and uses of mathematics through projects. Knows how various concepts and principles are used in the arts such as film and disciplines outside the arts (i.e. balance, pattern, shape).

Suggested Time Allowance: 45 minutes

Objectives:

Students will:

1. List and discuss all that they do on a daily basis that involves math, both on obvious and more hidden levels.
2. Watch and discuss "Good Will Hunting", "Rain Man", or other film the students selected that has a math theme. Teachers may also provide a list of films.
3. Relate mathematical concepts from the film to their project and in class.

Resources:

Paper
Pens/pencils
Video tape of "Good Will Hunting" or "Rain Man" or other film selected by students

Activities & Procedures:

- *Collaboration & Communication*

1. Students will list the things that they do that involve math. Students then share their lists with the class as the teacher writes suggestions on the board. Students then add to the class list by brainstorming other daily tasks or chores that involve math.

2. Watch the film they have selected at home and discuss the following questions:

a) "Good Will Hunting" is not a movie about math just because the plot involves a math genius. How does the author/writer support this argument? What stereotypes about mathematicians does he feel are promoted by the movie?
b) In what way does the film relate to mathematical concepts?
c) How does the film incorporate mathematics?
d) What does the writer mean when he says, "math, like beauty, is more than skin-deep"?

Evaluation/Assessment

Students will be evaluated based on participation in classroom discussion and "Mathematical Concepts Found in Film and/or Media" project.

Further Questions for Discussion

What are some examples of stereotypes about mathematicians and people who are interested and good in math?
How do films and television promote these stereotypes?
How does math apply to the profession you want to pursue?
What are some examples of mathematics used in architecture, music, or science?
What is the relevance of mathematics in your daily life?

Homework

Students search for math concepts in books, stories, art pieces, music, films or television shows. Students choose one of these examples and describe in writing the math concept or theory it expresses. Teachers may need to help younger students with creating such comparisons.

Some Vocabulary Used

abstract algebra, continuum, intersect, geometry, symmetry, trajectories

Additional Activities

1. Students interview a person who uses math in his or her occupation (i.e. doctors, nurses, accountants, store cashiers, street vendors). Students should find out specifically how math is used in this occupation and obtain an example of a typical math problem (i.e. how much change do you get when $20 is given to buy groceries...). This information can be posted in the classroom.

2. Study a famous mathematician or mathematical discovery this century and present the information in class.

3. Find articles dealing with mathematics and discuss it with their classmates.

IV. Conclusions and Implications

The two main purposes of the pilot study were to determine: the usefulness of the peer review forms for faculty ratings of lesson plans; and the extent to which these small samples of lesson plans met NYCETP goals. With respect to the first question the pilot study provided evidence that the adapted peer review form was useful, and also that further revisions were needed. In particular, there were several items that were not consistently used by our small sample of mathematics education faculty and indications that rater agreement varied as a function of the degree to which lesson plans were clearly exemplary or inadequate. The lesson plans selected for the case studies helped to clarify possible reasons for rater agreement and disagreement. Lesson plans at either extreme were consistently evaluated by both raters. Lesson plans that were not at the extremes and were lacking in detail presented an ambiguity that led raters to have different interpretations on some items.

With respect to the second question of lesson plans meeting NYCETP goals, there were clearly differences between the two sets of lesson plans from mathematics education classes. We used a stringent criterion—receiving an overall quality rating of good or excellent on any of the three major categories--to answer this question. Set 1 had only two lesson plans that were evaluated by both raters as good (3) or excellent (4) in one of the major categories reflecting NYCETP goals (Appendix E, lesson plan 1-5, D-Evidence of Effectiveness Goals, and lesson plan 1-6, B-Course/ Material Minimum Expectations). Set 4 had six of the 10 lesson plans (4-2, 4-3, 4-5, 4-6, 4-7, and 4-8) that were rated good or excellent in at least one major category (A-Student-Centered Instructional Goals). Of these six lesson plans, two (4-3 and 4-8) were rated good or excellent in all three of the major categories for which overall ratings were given (Lesson plans 4-3 and 4-8). Although this is a small sample, it does suggest that the reviews of lesson plans could be used to examine the extent to which the lesson plans being developed in mathematics education classes were meeting Collaborative goals.

There are also a number of implications to be drawn from these admittedly limited data. Despite the extent of rater agreement described in II., Summary of Findings, these is a wide

range in both the form and substance of lesson plans within these two sets. For a project such as NYCETP which is attempting to support the application of national standards in mathematics and science for teacher education students, student lesson plans provide an opportunity to incorporate a goals and standards-oriented framework for both teacher education faculty and students.

In our pilot study, the faculty of the methods classes use different directions for writing lesson plans. Other methods faculty undoubtedly have their own directions. A review form similar to the one used in the pilot study appears to have usefulness. The use of such forms would also require faculty development and practice in rating (as is done with raters of other text, e.g., essays), in order to have consistent agreement on the rating categories and definitions in the reviews. Also, it is likely that if more detailed review forms were provided to students, the lack of detail and ambiguity in lesson plans would be reduced and rater agreement would increase. Further, standards would be discussed and incorporated into student lesson plans. As shown by one of the Case study lesson plans (Case C., 4-3), clarity, focus and meeting standards do not mean longer lesson plans.

Overall, the pilot study of mathematics education faculty rating student lesson plans does suggest the potential uses for such a process in supporting the incorporation of standards and NYCETP goals in an important component of teacher education programs.

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January 26, 2000

Dear NYCETP Lesson Plan Study Participants,

Thank you for the materials that you have been sending us. This letter is about rating a set of student lesson plans. Enclosed please find sample lesson plans collected by a colleague at another school, along with rating sheets and a glossary of terms. Please rate each plan on a separate rating sheet and write any comments you may have. ENTER the lesson plan number, located on the top right hand corner of each lesson plan, on the rating form.

Please mail the rating sheets (not the lesson plans) back to us in the addressed and stamped envelopes enclosed. Please put this in the mail by February 18th. The mailing address is C. Tittle, Educational Psychology, GSUC, 365 Fifth Avenue, New York, NY, 10016.

When we receive your rating sheets, we will send you a form to complete so that you can receive your $200 stipend for participation in the study.

If you have any questions, especially if you are missing any materials, please contact us. Carol Tittle (212) 817-8288 or Estie Halberstam (718) 263-5542. You can also email: Ctittle@gc.cuny.edu or E.halberstam@worldnet.att.net.

We look forward to receiving your ratings, and thank you for your continued participation!

Carol Tittle

Estie Halberstam

Study plan letter 1262000

APPENDIX B

NYCETP LESSON PLAN REVIEW

This form has been prepared by the New York Collaborative for Excellence in Teacher Preparation. It is intended to structure the review of lesson plan materials. Please fill out everything; if something is irrelevant, circle "Not Applicable." If you are unsure about what is meant by a particular item, (specifically the ones marked by asterisks), refer to the glossary of terms included in the appendix. Please use the "Comments" section to explain ratings and/or comment on the lesson plans.

Reviewer Name/College: _____ Date: _____

Course number and title: _____

1) Rate the individual items in each category: **CIRCLE ONE** 1 2 3 NA

1- Absent 2-Partially present 3- Present NA-Not Applicable

2) After you have rated all items, make an **OVERALL RATING** for the whole category: **CIRCLE ONE** 1 2 3 4

1-Major Problems 2-Minor Problems 3-Good 4-Excellent

***NOTE:** Terms followed by an asterisk are defined in the attached glossary of terms.

A. Meets Collaborative Student Centered Instructional Goals -- CIRCLE to indicate USE OF ANY OF THE FOLLOWING:

1	2	3	NA	Use of inquiry-based approaches*
1	2	3	NA	Opportunities for hands-on, experiential learning*
1	2	3	NA	Focus on deep understanding of major concepts*
1	2	3	NA	Emphasis on problem solving, critical thinking skills*
1	2	3	NA	Use of collaborative learning groups*
1	2	3	NA	Use of technology in effective ways
1	2	3	NA	Incorporation of alternative assessment approaches*
1	2	3	NA	OTHER (describe) _____

Student Centered Instructional Goals: **OVERALL RATING** 1 2 3 4

B. Meets Collaborative Content Expectations -- CIRCLE to indicate USE OF ANY OF THE FOLLOWING:

1	2	3	NA	Content (concepts, process skills, and habits of mind*) is central to new standards and curriculum, including objectives, topics, exercises, details of technology, readings and assignments
1	2	3	NA	Content connects to other topics
1	2	3	NA	Content connects to other disciplines
1	2	3	NA	Content connects to other lessons (previous to or following the lesson being examined)
1	2	3	NA	Mastery of topics and skills is important for students
1	2	3	NA	OTHER (describe) _____

Course/Materials Minimum Expectations: **OVERALL RATING** 1 2 3 4

C. Lesson meets Collaborative Goals – Lesson meets collaborative goals through assessments that incorporate any of the following:

MATHEMATICS &/OR SCIENCES

1 2 3 NA Conceptual knowledge/Understanding concepts
1 2 3 NA Problem solving (e.g., emphasis on processes - Math)
1 2 3 NA Theorizing and analyzing* (Sci)
1 2 3 NA Communicating (i.e., oral &/or written)
1 2 3 NA Using tools (e.g., protractor, calculator, etc.)
1 2 3 NA Knowledge of facts and skills/routine procedures
1 2 3 NA Making Connections (i.e., within subject, across subject, & to every day life -- Math)
1 2 3 NA Reasoning: Conjectures and proof (Math)
1 2 3 NA Alternative assessment methods

D. Lesson meets Collaborative Goals – STUDENT ATTITUDES/OTHER OUTCOMES

1 2 3 NA Attitudes*
1 2 3 NA Increasing interest
1 2 3 NA Habits of mind*
1 2 3 NA Safety*
1 2 3 NA Participation*
1 2 3 NA OTHER (describe) _____

Evidence Of Effectiveness Goals: **OVERALL RATING: 1 2 3 4**

COMMENTS: _____

NYCETP GUIDELINES FOR SELF-STUDY OF COURSE DOCUMENTS/CURRICULUM

GLOSSARY OF TERMS

Source: National Science Education Standards (National Research Council, 1996)

1. **Inquiry-based Approaches:** "Scientific inquiry refers to diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work."

Inquiry: " . . . multifaceted activity that involves making observations; posing questions; examining books and other sources of information to see what is already know; planning investigations; reviewing what is already known in light of experimental evidence; using tools to gather, analyze, and interpret data; proposing answers, explanations, and predictions; and communicating the results."

"Emphasizing active science learning means shifting emphasis away from teachers presenting information and covering science topics. The perceived need to include all the topics, vocabulary, and information in textbooks is in direct conflict with the central goal of having students learn scientific knowledge with understanding." (p. 21)

2. **Experiential Learning:** "Use appropriate tools and techniques to gather , analyze, and interpret data. ... The use of tools and techniques, including mathematics, will be guided by the question asked and the investigations students design."

Abilities necessary to do scientific inquiry:

- "Identify questions that can be answered through scientific investigation."
- "Design and conduct a scientific investigation."
- "Use appropriate tools and techniques to gather, analyze, and interpret data."
- "Develop descriptions, explanations, predictions, and models using evidence."
- "Think critically and logically to make the relationships between evidence and explanations" (p. 145).

3. **Deep Understanding of Major Concepts:** Students should develop " . . . productive and insightful ways of thinking about and integrating a range of basic ideas that explain the natural and designed world."

"As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes:

- systems, order, and organization
- evidence, models, and explanation
- constancy, change, and measurement
- evolution and equilibrium
- form and function" (pp. 115-116).

4. **Critical Thinking:** "Thinking critically and logically to make the relationship between evidence and explanations."

"Thinking critically about evidence includes deciding what evidence should be used and accounting for anomalous data. Specifically, students should be able to review data from a simple

experiment, summarize the data, and form a logical argument about the cause-and-effect relationships in the experiment." (p. 145)

5. **Collaborative Learning Groups:** Students should ". . . engage in problem solving, planning, decision making, and group discussions." (p. 20)

- "Using a collaborative group structure, teachers encourage interdependency among group members, assisting student to work together in small groups so that all participate in sharing data and in developing group reports."
- The teacher's role in these small and larger group interactions is to listen, encourage broad participation, and judge how to guide discussion -- determining ideas to follow, ideas to question, information to provide, and connections to make" (p. 36).

6. **Alternative Assessment Approaches:** "Rather than simply checking whether students have memorized certain items of information, new assessments probe for students understanding, reasoning, and use of that knowledge -- the skills that are developed through inquiry."

- "Besides conventional paper and pencil tests, assessments might include performances, portfolios, interviews, investigative reports, or written essays" (p. 6).
- "Teachers of science engage in ongoing assessment of their teaching and of student learning. In doing this, teachers use multiple methods and systematically gather data about student understanding and ability." (p. 37)

7. **Habits of Mind:** (TIMSS) - "curriculum encourages ways of scientific and mathmatical thinking such as openness, objectivity, tolerance of uncertainty, inventiveness, curiosity" (Robitaille et al., 1993, p. 84).

8. **Active Learning Instructional Strategies:** "Inquiry into authentic questions generated from student experiences is the central strategy for teaching science."

- "Teachers focus predominantly on real phenomena, in classrooms, outdoors, or in laboratory settings, where students are given investigations or guided toward fashioning investigations that are demanding but within their capabilities."
- " . . . teachers can take an inquiry approach as they guide students in acquiring and interpreting information from sources such as libraries, government documents, and computer databases -- or as they gather information from experts from industry, the community, and government."
- "Teachers of science guide and facilitate learning. In doing this, teachers
- Focus and support inquiries while interacting with students.
- Orchestrate discourse among students about scientific ideas.
- Challenge students to accept and share responsibility for their own learning.
- Recognize and respond to student diversity and encourage all students to participate fully in science learning.
- Encourage and model the skills of scientific inquiry, as well as the curiosity, openness to new ideas and data, and skepticism that characterize science." (p. 32)

9. **Desired Student Outcomes:** " What students learn is greatly influenced by how they are taught."
- "The actions of teachers are deeply influenced by their perceptions of science as an enterprise and as a subject to be taught and learned."
- "Student understanding is actively constructed through individual and social processes."
- "Actions of teachers are deeply influenced by their understanding of and relationships with students." (p. 28-9)
- "Select science content and adapt and design curricula to meet the interests, knowledge, understanding, abilities, an experiences of students."
- "Select teaching and assessment strategies that support the development of student understanding and nurture a community of science learners" (p. 30).

10. **Course Content Topics and Teacher Preparation Goals:** "Program Standard A: All elements of the K-12 science program must be consistent with the other National Science Education Standards and with one another and developed within and across grade levels to meet a clearly stated set of goals."
- "In an effective science program, a set of clear goals and expectations for students must be used to guide the design, implementation, and assessment of all elements of the science program."
- "Teaching practices need to be consistent with the goals and curriculum frameworks."
- "Assessment policies and practices should be aligned with the goals, student expectations, and curriculum frameworks" (p. 211).

11. **Theorizing, Analyzing, Investigate:** see the following: Inquiry, deep understanding of major concepts, critical thinking, experiential learning, active learning instructional strategies

12. **Investigating Natural World:** see the following: Inquiry, deep understanding of major concepts, critical thinking, experiential learning, active learning instructional strategies

13. **Attitudes:** "Teachers of science develop communities of science learners that reflect the intellectual rigor of scientific inquiry and the attitudes and social values conducive to science learning. In doing this, teachers
- Display and demand respect for the diverse ideas, skills, and experiences of all students.
- Enable students to have a significant voice in decisions about the content and context of their work and require students to take responsibility for the learning of all members of the community.
- Nurture collaboration among students.
- Structure and facilitate ongoing formal and informal discussion based on a shared understanding of rules of scientific discourse.
- Model and emphasize the skills, attitudes, and value of scientific inquiry." (pp. 45-6)
- "Teachers who are enthusiastic, interested, and who speak of the power and beauty of scientific understanding instill in their students some of those same attitudes." (p. 37)

14. **Safety:** "Ensure a safe working environment."
- "Teachers also teach students how to engage safely in investigations inside and outside the classroom." (p. 44)

15. **Participation:** "Challenge students to accept and share responsibility for their own learning."

- "Although open exploration is useful for students when they encounter new materials and phenomena, teachers need to intervene to focus and challenge the students, or the exploration might not lead to understanding."
- "Premature intervention deprives students of the opportunity to confront problems and find solutions, but intervention that occurs too late risks student frustration. Teachers must also decide when to challenge students to make sense of their experiences: at these points, students should be asked to explain, clarify, and critically examine and assess their work." (p. 36)
- "Orchestrate discourse among students about scientific ideas."
- "Recognize and respond to student diversity and encourage all students to participate fully in science learning."
- "Teachers monitor the participation of all students, carefully determining . . . if all members of a collaborative group are working with materials or if one student is making all the decisions. This monitoring can be particularly important in classes of diverse students, where social issues of status and authority can be a factor." (pp. 36-7)

Appendix D

Rating Review Sheet
Lesson Plan No. 1-0

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	2	1	1.5	1
A2	Hands-on	1	1	1	0
A3	Deep understanding	1	1	1	0
A4	Problem-solving	2	1	1.5	1
A5	Collaborative Groups	1	1	1	0
A6	Technology	1	NA	1/NA	
A7	Alternative Assessment	1	NA	1/NA	
A8	Other	1 (tools)	--	1/--	
A9	**OVERALL: Student-Centered Instruct. Goals**	1	1	1	0
B1	Content central to new standards	3	1	2	2
B2	Content connects to other topics	2	1	1.5	1
B3	Content connects to oth. disciplines	2	3	2.5	1
B4	Content connects to oth. lessons	1	1	1	0
B5	Mastery of topic/skills important	3	2	2.5	1
B6	Other	1 (theme)	--	1/--	
B7	**OVERALL: Course/Material Minimum Expectations**	1	1	1	0
C1	Conceptual Knowledge	1	1	1	0
C2	Problem-solving (process)	1	1	1	0
C3	Analyzing	NA	1	NA/1	
C4	Communicating	1	1	1	0
C5	Tools	2	2	2	0
C6	Knowledge of facts/routines	2	2	2	0
C7	Making Connections	2	3	2.5	1
C8	Reasoning	NA	1	NA/1	
C9	Alt. Assessment	1	1	1	0
D1	Attitudes	1	1	1	0
D2	Interest	2	1	1.5	1
D3	Habits of Mind	2	1	1.5	1
D4	Safety	NA	NA	NA	0
D5	Participation	1	1	1	0
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	1	1	1	0

Rating Review Sheet
Lesson Plan No. ___1-1___

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	1	2	2
A2	Hands-on	3	1	2	2
A3	Deep understanding	2	1	1.5	1
A4	Problem-solving	2	1	1.5	1
A5	Collaborative Groups	3	3	3	0
A6	Technology	NA	NA	NA	0
A7	Alternative Assessment	2	NA	2/NA	
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	1	1	1	0
B1	Content central to new standards	3	1	2	2
B2	Content connects to other topics	3	1	2	2
B3	Content connects to oth. disciplines	3	3	3	0
B4	Content connects to oth. lessons	3	1	2	2
B5	Mastery of topic/skills important	1	2	1.5	1
B6	Other	2	--	2/--	
B7	**OVERALL: Course/Material Minimum Expectations**	2	1	1.5	1
C1	Conceptual Knowledge	2	1	1.5	1
C2	Problem-solving (process)	3	2	2	1
C3	Analyzing	NA	1	NA/1	
C4	Communicating	3	1	2	2
C5	Tools	NA	3	NA/3	
C6	Knowledge of facts/routines	2	3	2.5	1
C7	Making Connections	3	3	3	0
C8	Reasoning	2	1	1.5	1
C9	Alt. Assessment	2	NA	2/NA	
D1	Attitudes	3	1	2	2
D2	Interest	3	NA	3/NA	
D3	Habits of Mind	3	1	2	2
D4	Safety	NA	NA	NA	0
D5	Participation	3	1	2	2
D6	Other	3	--	3/--	
D7	**OVERALL: Evidence of Effectiveness Goals**	3	1	2	2

Rating Review Sheet
Lesson Plan No. 1-2

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	2	2	2	0
A4	Problem-solving	2	2	2	0
A5	Collaborative Groups	3	3	3	0
A6	Technology	1	NA	1/NA	
A7	Alternative Assessment	1	3	2	2
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	2	3	2.5	1
B1	Content central to new standards	3	2	2.5	1
B2	Content connects to other topics	1	3	2	2
B3	Content connects to oth. disciplines	2	3	2.5	1
B4	Content connects to oth. lessons	3	3	3	0
B5	Mastery of topic/skills important	3	2	2.5	1
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	2	3	2.5	1
C1	Conceptual Knowledge	3	1	2	2
C2	Problem-solving (process)	3	2	2.5	1
C3	Analyzing	NA	2	NA/2	
C4	Communicating	3	2	2.5	1
C5	Tools	1	3	2	2
C6	Knowledge of facts/routines	1	NA	1/NA	
C7	Making Connections	3	3	3	0
C8	Reasoning	NA	1	NA/1	
C9	Alt. Assessment	2	3	2.5	1
D1	Attitudes	3	2	2.5	1
D2	Interest	3	2	2.5	1
D3	Habits of Mind	3	2	2.5	1
D4	Safety	NA	NA	NA	0
D5	Participation	3	2	2.5	1
D6	Other	2	--	2/--	
D7	**OVERALL: Evidence of Effectiveness Goals**	2	2	2	0

Rating Review Sheet
Lesson Plan No. ___1-3_____

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	2	2.5	1
A4	Problem-solving	3	1	2	2
A5	Collaborative Groups	3	1	2	2
A6	Technology	NA	NA	NA	0
A7	Alternative Assessment	1	NA	1/NA	
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	3.5	2	2.75	1.5
B1	Content central to new standards	3	2	2.5	1
B2	Content connects to other topics	2	3	2.5	1
B3	Content connects to oth. disciplines	1	1	1	0
B4	Content connects to oth. lessons	1	1	1	0
B5	Mastery of topic/skills important	3	2	2.5	1
B6	Other	2 (vocabulary)	--	2/NA	
B7	**OVERALL: Course/Material Minimum Expectations**	--	2	--/2	
C1	Conceptual Knowledge	3	2	2.5	1
C2	Problem-solving (process)	NA	3	NA/3	
C3	Analyzing	3	3	3	0
C4	Communicating	3	2	2.5	1
C5	Tools	3	3	3	0
C6	Knowledge of facts/routines	1	2	1.5	1
C7	Making Connections	2	1	1.5	1
C8	Reasoning	1	2	1.5	1
C9	Alt. Assessment	3	--	3/--	
D1	Attitudes	3	2	2.5	1
D2	Interest	3	NA	3/NA	
D3	Habits of Mind	NA	2	NA/2	
D4	Safety	3	NA	3/NA	
D5	Participation	3	2	2.5	1
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	--	2	--/2	

Rating Review Sheet
Lesson Plan No. ____1-4____

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	1	2	2
A4	Problem-solving	3	2	2.5	1
A5	Collaborative Groups	3	3	3	0
A6	Technology	1	NA	1/NA	
A7	Alternative Assessment	3	1	2	2
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	3.5	2	2.75	1.5
B1	Content central to new standards	3	2	2.5	1
B2	Content connects to other topics	3	2	2.5	1
B3	Content connects to oth. disciplines	3	1	2	2
B4	Content connects to oth. lessons	1	1	1	0
B5	Mastery of topic/skills important	3	1	2	2
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	3.5	1	2.75	2.5
C1	Conceptual Knowledge	3	1	2	2
C2	Problem-solving (process)	3	2	2.5	1
C3	Analyzing	NA	2	NA/2	
C4	Communicating	3	2	2.5	1
C5	Tools	1	2	1.5	1
C6	Knowledge of facts/routines	2	1	1.5	1
C7	Making Connections	3	2	2.5	1
C8	Reasoning	1	2	1.5	1
C9	Alt. Assessment	3	--	3/--	
D1	Attitudes	3	1	2	2
D2	Interest	3	1	2	2
D3	Habits of Mind	3	2	2.5	1
D4	Safety	3	NA	3/NA	
D5	Participation	3	1	2	2
D6	Other	3	--	3/--	
D7	**OVERALL: Evidence of Effectiveness Goals**	3	1	2	2

Rating Review Sheet
Lesson Plan No. ____1-5____

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	2	2.5	1
A4	Problem-solving	3	3	3	0
A5	Collaborative Groups	3	3	3	0
A6	Technology	NA	NA	NA	0
A7	Alternative Assessment	3	3	3	0
A8	Other	3 (organization)	--	3/--	
A9	**OVERALL: Student-Centered Instruct. Goals**	--	3	--/3	
B1	Content central to new standards	3	2	2.5	1
B2	Content connects to other topics	3	2	2.5	1
B3	Content connects to oth. disciplines	1	1	1	0
B4	Content connects to oth. lessons	2	1	1.5	1
B5	Mastery of topic/skills important	3	2	2.5	1
B6	Other	3 (guided practice)	--	3/--	
B7	**OVERALL: Course/Material Minimum Expectations**	3	2	2.5	1
C1	Conceptual Knowledge	3	--	3/--	
C2	Problem-solving (process)	3	3	3	0
C3	Analyzing	NA	2	NA/2	
C4	Communicating	3	3	3	0
C5	Tools	3	3	3	0
C6	Knowledge of facts/routines	2	--	2/--	
C7	Making Connections	1	1	1	0
C8	Reasoning	3	2	2.5	1
C9	Alt. Assessment	3	--	3/--	
D1	Attitudes	3	2	2.5	1
D2	Interest	3	2	2.5	1
D3	Habits of Mind	3	3	3	0
D4	Safety	NA	3	NA/3	
D5	Participation	3	3	3	0
D6	Other	3 (positive aspects)	--	3/--	
D7	**OVERALL: Evidence of Effectiveness Goals**	4	3	3.5	1

Rating Review Sheet
Lesson Plan No. 1-6

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	1	2	2
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	2	2.5	1
A4	Problem-solving	3	1	2	2
A5	Collaborative Groups	1	1	1	0
A6	Technology	1	NA	1/NA	
A7	Alternative Assessment	3	3	3	0
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	3	2	2.5	1
B1	Content central to new standards	3	2	2.5	1
B2	Content connects to other topics	3	NA	3/NA	
B3	Content connects to oth. disciplines	1	NA	1/NA	
B4	Content connects to oth. lessons	2	NA	2/NA	
B5	Mastery of topic/skills important	3	3	3	0
B6	Other	--	--	--	--
B7	**OVERALL: Course/Material Minimum Expectations**	3	3	3	0
C1	Conceptual Knowledge	3	2	2.5	1
C2	Problem-solving (process)	3	1	2	2
C3	Analyzing	NA	1	NA/1	
C4	Communicating	3	NA	3/NA	
C5	Tools	3	--	3/--	
C6	Knowledge of facts/routines	2	2	2	0
C7	Making Connections	3	1	2	2
C8	Reasoning	NA	1	NA/1	
C9	Alt. Assessment	3	3	3	0
D1	Attitudes	3	--	3/--	
D2	Interest	3	--	3/--	
D3	Habits of Mind	3	--	3/--	
D4	Safety	NA	--	NA/--	
D5	Participation	2	--	2/--	
D6	Other	3 (age appropriate)	--	3/--	
D7	**OVERALL: Evidence of Effectiveness Goals**	4	2	3	2

Rating Review Sheet
Lesson Plan No. ___1-7___

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	2	2.5	1
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	3	3	0
A4	Problem-solving	3	2	2.5	1
A5	Collaborative Groups	1	2	1.5	1
A6	Technology	1	NA	1/NA	
A7	Alternative Assessment	--	--	--	
A8	Other	1 (coop learning)	--	1/--	
A9	**OVERALL: Student-Centered Instruct. Goals**	2.5	2	2.25	.5
B1	Content central to new standards	3	3	3	0
B2	Content connects to other topics	3	1	2	2
B3	Content connects to oth. disciplines	2	1	1.5	1
B4	Content connects to oth. lessons	2	1	1.5	1
B5	Mastery of topic/skills important	3	3	3	0
B6	Other	3 (vocabulary)	--	3/--	
B7	**OVERALL: Course/Material Minimum Expectations**	3	2	2.5	1
C1	Conceptual Knowledge	3	3	3	0
C2	Problem-solving (process)	3	2	2.5	1
C3	Analyzing	NA	2	NA/2	
C4	Communicating	3	2	2.5	1
C5	Tools	3	NA	3/NA	
C6	Knowledge of facts/routines	3	2	2.5	1
C7	Making Connections	2	1	1.5	1
C8	Reasoning	NA	--	NA/--	
C9	Alt. Assessment	--	1	--/1	
D1	Attitudes	3	2	1.5	1
D2	Interest	3	2	2.5	1
D3	Habits of Mind	3	2	2.5	1
D4	Safety	NA	NA	NA	
D5	Participation	3	2	2.5	1
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	3	2	2.5	1

Rating Review Sheet
Lesson Plan No. 1-8

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	2	1	1
A3	Deep understanding	3	1	2	2
A4	Problem-solving	3	2	1	1
A5	Collaborative Groups	3	1	2	2
A6	Technology	1	NA	1/NA	
A7	Alternative Assessment	3	1	2	2
A8	Other	3 (integrations of theme)	--	3/--	
A9	**OVERALL: Student-Centered Instruct. Goals**	4	1	3	3
B1	Content central to new standards	3	1	2	2
B2	Content connects to other topics	3	3	3	0
B3	Content connects to oth. disciplines	3	3	3	0
B4	Content connects to oth. lessons	3	1	2	2
B5	Mastery of topic/skills important	3	1	2	2
B6	Other	3 (strategies)	--	3/--	
B7	**OVERALL: Course/Material Minimum Expectations**	--	1	--/1	
C1	Conceptual Knowledge	3	1	2	2
C2	Problem-solving (process)	3	2	1	1
C3	Analyzing	3	1	2	2
C4	Communicating	3	1	2	2
C5	Tools	3	NA	3/NA	
C6	Knowledge of facts/routines	3	1	2	2
C7	Making Connections	3	2	1	1
C8	Reasoning	3	1	2	2
C9	Alt. Assessment	3	--	3/--	
D1	Attitudes	3	2	1	1
D2	Interest	3	2	1	1
D3	Habits of Mind	3	1	2	2
D4	Safety	NA	2	NA/2	
D5	Participation	3	1	2	2
D6	Other	3 (comprehensiveness)	--	3/--	
D7	**OVERALL: Evidence of Effectiveness Goals**	--	1	--/1	

Rating Review Sheet
Lesson Plan No. ___1-9____

Item #	*Item Title*	*Rater 1 (A)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	1	2	2
A2	Hands-on	3	1	2	2
A3	Deep understanding	3	1	2	2
A4	Problem-solving	3	1	2	2
A5	Collaborative Groups	1	1	1	0
A6	Technology	NA	NA	NA	0
A7	Alternative Assessment	3	1	2	2
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	3	1	2	2
B1	Content central to new standards	3	1	2	2
B2	Content connects to other topics	3	1	2	2
B3	Content connects to oth. disciplines	1	3	2	2
B4	Content connects to oth. lessons	2	1	1	1
B5	Mastery of topic/skills important	3	1	2	2
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	2.5	1	1.75	2.75
C1	Conceptual Knowledge	3	1	2	2
C2	Problem-solving (process)	3	1	2	2
C3	Analyzing	NA	1	NA/1	
C4	Communicating	3	1	2	2
C5	Tools	3	NA	3/NA	
C6	Knowledge of facts/routines	3	2	1	1
C7	Making Connections	2	1	1	1
C8	Reasoning	2	1	1	1
C9	Alt. Assessment	3	1	2	2
D1	Attitudes	3	1	2	2
D2	Interest	3	1	2	2
D3	Habits of Mind	3	1	2	2
D4	Safety	3	1	2	2
D5	Participation	3	1	2	2
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	3	1	2	2

Rating Review Sheet
Lesson Plan No. 4-0

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	2	3	2.5	1
A2	Hands-on	3	3	3	0
A3	Deep understanding	2	3	2.5	1
A4	Problem-solving	3	3	3	0
A5	Collaborative Groups	3	3	3	0
A6	Technology	1	NA	1 / NA	
A7	Alternative Assessment	2	3	2.5	1
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	2	3	2.5	1
B1	Content central to new standards	3	3	3	0
B2	Content connects to other topics	1	2	1.5	1
B3	Content connects to oth. disciplines	1	1	1	0
B4	Content connects to oth. lessons	1	--	1/--	
B5	Mastery of topic/skills important	3	1	2	2
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	2	2	2	0
C1	Conceptual Knowledge	2	2	2	0
C2	Problem-solving (process)	2	2	2	0
C3	Analyzing	2	2	2	0
C4	Communicating	2	2	2	0
C5	Tools	3	NA	3/NA	
C6	Knowledge of facts/routines	2	3	2.5	1
C7	Making Connections	1	1	1	0
C8	Reasoning	2	2	2	0
C9	Alt. Assessment	2	--	2 / --	
D1	Attitudes	2	--	2/ --	
D2	Interest	1	--	1/ --	
D3	Habits of Mind	2	--	2 / --	
D4	Safety	3	--	3/ --	
D5	Participation	2	--	2 / --	
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	2	2	2	0

Rating Review Sheet
Lesson Plan No. 4-1

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	2	3	2.5	1
A3	Deep understanding	3	2	2.5	1
A4	Problem-solving	3	3	3	0
A5	Collaborative Groups	2	3	2.5	1
A6	Technology	2	NA	2/ NA	
A7	Alternative Assessment	3	1	2	2
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	2	3	2.5	1
B1	Content central to new standards	3	3	3	0
B2	Content connects to other topics	2	3	2.5	1
B3	Content connects to oth. disciplines	2	3	2.5	1
B4	Content connects to oth. lessons	1	3	2	2
B5	Mastery of topic/skills important	3	3	3	0
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	2	3	2.5	1
C1	Conceptual Knowledge	3	2	2.5	1
C2	Problem-solving (process)	3	3	3	0
C3	Analyzing	2	2	2	0
C4	Communicating	2	3	2.5	1
C5	Tools	3	NA	3 / NA	
C6	Knowledge of facts/routines	3	3	3	0
C7	Making Connections	2	3	2.5	1
C8	Reasoning	--	2	-- / 2	
C9	Alt. Assessment	3	1	2	2
D1	Attitudes	3	2	2.5	1
D2	Interest	2	2	2	0
D3	Habits of Mind	2	2	2	0
D4	Safety	3	2	2.5	1
D5	Participation	2	2	2	0
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	2	2	2	0

Rating Review Sheet
Lesson Plan No. 4-2

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	2	2.5	1
A4	Problem-solving	3	2	2.5	1
A5	Collaborative Groups	1	3	2	2
A6	Technology	1	NA	1 / NA	
A7	Alternative Assessment	3	3	3	0
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	3	3	3	0
B1	Content central to new standards	3	2	2.5	1
B2	Content connects to other topics	2	1	1.5	1
B3	Content connects to oth. disciplines	3	2	2.5	1
B4	Content connects to oth. lessons	2	2	2	0
B5	Mastery of topic/skills important	3	3	3	0
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	3	2	2.5	1
C1	Conceptual Knowledge	3	3	3	0
C2	Problem-solving (process)	3	3	3	0
C3	Analyzing	3	2	2.5	1
C4	Communicating	3	3	3	0
C5	Tools	2	NA	2/ NA	
C6	Knowledge of facts/routines	3	3	3	0
C7	Making Connections	3	1	2	2
C8	Reasoning	3	2	2.5	1
C9	Alt. Assessment	3	3	3	0
D1	Attitudes	3	2	2.5	1
D2	Interest	3	2	2.5	1
D3	Habits of Mind	3	2	2.5	1
D4	Safety	3	2	2.5	1
D5	Participation	3	2	2.5	1
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	3	2	2.5	1

Rating Review Sheet
Lesson Plan No. 4-3

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	3	3	0
A4	Problem-solving	3	3	3	0
A5	Collaborative Groups	3	3	3	0
A6	Technology	2	NA	2/NA	
A7	Alternative Assessment	3	3	3	0
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	3	4	3.5	1
B1	Content central to new standards	3	3	3	0
B2	Content connects to other topics	3	3	3	0
B3	Content connects to oth. disciplines	3	3	3	0
B4	Content connects to oth. lessons	3	3	3	0
B5	Mastery of topic/skills important	3	3	3	0
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	4	4	4	0
C1	Conceptual Knowledge	3	3	3	0
C2	Problem-solving (process)	3	3	3	0
C3	Analyzing	3	3	3	0
C4	Communicating	3	3	3	0
C5	Tools	3	3	3	0
C6	Knowledge of facts/routines	3	3	3	0
C7	Making Connections	3	3	3	0
C8	Reasoning	3	3	3	0
C9	Alt. Assessment	3	3	3	0
D1	Attitudes	3	3	3	0
D2	Interest	3	3	3	0
D3	Habits of Mind	3	3	3	0
D4	Safety	2	3	2.5	1
D5	Participation	3	3	3	0
D6	Other	--	3	--/3	
D7	**OVERALL: Evidence of Effectiveness Goals**	4	4	4	0

Rating Review Sheet
Lesson Plan No. _4-4___

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	2	2.5	1
A2	Hands-on	3	3	3	0
A3	Deep understanding	2	2	2	0
A4	Problem-solving	2	3	2.5	1
A5	Collaborative Groups	3	3	3	0
A6	Technology	1	NA	1/NA	
A7	Alternative Assessment	2	1	2.5	1
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	2	2	2	0
B1	Content central to new standards	2	2	2	0
B2	Content connects to other topics	2	1	1.5	1
B3	Content connects to oth. disciplines	2	1	1.5	1
B4	Content connects to oth. lessons	1	2	1.5	1
B5	Mastery of topic/skills important	2	3	2.5	1
B6	Other	--	--	--	
B7	**OVERALL: Course/Materials Minimum Expectations**	2	2	2	0
C1	Conceptual Knowledge	2	2	2	0
C2	Problem-solving (process)	2	2	2	0
C3	Analyzing	2	2	2	0
C4	Communicating	2	2	2	0
C5	Tools	2	NA	2/NA	
C6	Knowledge of facts/routines	2	2	2	0
C7	Making Connections	2	2	2	0
C8	Reasoning	2	2	2	0
C9	Alt. Assessment	2	1	1.5	1
D1	Attitudes	2	2	2	0
D2	Interest	3	2	2.5	1
D3	Habits of Mind	2	2	2	0
D4	Safety	3	2	2.5	1
D5	Participation	2	2	2	0
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	2	2	2	0

Rating Review Sheet
Lesson Plan No. 4-5

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	1	2	2
A4	Problem-solving	3	3	3	0
A5	Collaborative Groups	2	--	2/--	
A6	Technology	3	3	3	0
A7	Alternative Assessment	3	3	3	0
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	4	3	3.5	1
B1	Content central to new standards	3	2	2.5	1
B2	Content connects to other topics	3	NA	3/NA	
B3	Content connects to oth. disciplines	3	3	3	0
B4	Content connects to oth. lessons	2	2	2	0
B5	Mastery of topic/skills important	3	1	2	2
B6	Other	--	--	--	
B7	**OVERALL: Course/Materials Minimum Expectations**	4	2	3	2
C1	Conceptual Knowledge	3	1	2	2
C2	Problem-solving (process)	3	2	2.5	1
C3	Analyzing	3	2	2.5	1
C4	Communicating	3	3	3	0
C5	Tools	2	NA	2/NA	
C6	Knowledge of facts/routines	3	1	2	2
C7	Making Connections	3	2	2.5	1
C8	Reasoning	3	1	2	2
C9	Alt. Assessment	3	--	3/--	
D1	Attitudes	3	2	2.5	1
D2	Interest	3	2	2.5	1
D3	Habits of Mind	3	2	2.5	1
D4	Safety	3	3	3	0
D5	Participation	3	3	3	0
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	4	2	3	2

Rating Review Sheet
Lesson Plan No. 4-6

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	2	2.5	1
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	2	2.5	1
A4	Problem-solving	3	2	2.5	1
A5	Collaborative Groups	3	3	3	0
A6	Technology	2	NA	2/NA	
A7	Alternative Assessment	3	3	3	0
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	4	3	3.5	1
B1	Content central to new standards	3	2	2.5	1
B2	Content connects to other topics	3	3	3	0
B3	Content connects to oth. disciplines	3	3	3	0
B4	Content connects to oth. lessons	2	2	2	0
B5	Mastery of topic/skills important	3	2	2.5	1
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	4	2	3	2
C1	Conceptual Knowledge	3	2	2.5	1
C2	Problem-solving (process)	3	2	2.5	1
C3	Analyzing	3	2	2.5	1
C4	Communicating	3	3	3	0
C5	Tools	3	NA	3/NA	
C6	Knowledge of facts/routines	3	2	2.5	1
C7	Making Connections	3	3	3	0
C8	Reasoning	3	--	3/--	
C9	Alt. Assessment	3	3	3	0
D1	Attitudes	3	2	2.5	1
D2	Interest	3	2	2.5	1
D3	Habits of Mind	3	2	2.5	1
D4	Safety	3	3	3	0
D5	Participation	3	3	3	0
D6	Other	--	--	--	
D7	**OVERALL: Evidence of Effectiveness Goals**	4	2	3	2

Rating Review Sheet
Lesson Plan No. 4-7

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	3	3	0
A4	Problem-solving	3	2	2.5	1
A5	Collaborative Groups	3	3	3	0
A6	Technology	3	3	3	0
A7	Alternative Assessment	3	2	2.5	1
A8	Other	--	--	--	
A9	**OVERALL: Stndent-Centered Instruct. Goals**	4	3	3.5	1
B1	Content central to new standards	3	3	3	0
B2	Content connects to other topics	1	--	1/--	
B3	Content connects to oth. disciplines	1	2	1.5	1
B4	Content connects to oth. lessons	1	1	1	0
B5	Mastery of topic/skills important	3	2	2.5	1
B6	Other	--	--	--	
B7	**OVERALL: Conrse/Materials Minimnm Expectations**	2	2	2	0
C1	Conceptual Knowledge	3	3	3	0
C2	Problem-solving (process)	3	2	2.5	1
C3	Analyzing	3	2	2.5	1
C4	Communicating	3	2	2.5	1
C5	Tools	3	3	3	0
C6	Knowledge of facts/routines	3	2	2.5	1
C7	Making Connections	2	2	2	0
C8	Reasoning	3	2	2.5	1
C9	Alt. Assessment	3	--	3/--	
D1	Attitudes	3	2	2.5	1
D2	Interest	2	2	2	0
D3	Habits of Mind	3	2	2.5	1
D4	Safety	3	2	2.5	1
D5	Participation	3	2	2.5	1
D6	Other	--	2	--/2	
D7	**OVERALL: Evidence of Effectiveness Goals**	3	2	2.5	1

Rating Review Sheet
Lesson Plan No. 4-8

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	3	3	3	0
A4	Problem-solving	3	3	3	0
A5	Collaborative Groups	3	3	3	0
A6	Technology	3	--	3/--	
A7	Alternative Assessment	3	3	3	0
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	4	3	3.5	1
B1	Content central to new standards	3	3	3	0
B2	Content connects to other topics	3	3	3	0
B3	Content connects to oth. disciplines	3	3	3	0
B4	Content connects to oth. lessons	3	3	3	0
B5	Mastery of topic/skills important	3	3	3	0
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	4	3	3.5	1
C1	Conceptual Knowledge	3	3	3	0
C2	Problem-solving (process)	3	3	3	0
C3	Analyzing	3	3	3	0
C4	Communicating	3	--	3/--	
C5	Tools	3	--	3/--	
C6	Knowledge of facts/routines	3	3	3	0
C7	Making Connections	3	3	3	0
C8	Reasoning	3	2	2.5	1
C9	Alt. Assessment	3	3	3	0
D1	Attitudes	3	3	3	0
D2	Interest	3	3	3	0
D3	Habits of Mind	3	3	3	0
D4	Safety	3	3	3	0
D5	Participation	3	3	3	0
D6	Other	3 (blank)	3	3	0
D7	**OVERALL: Evidence of Effectiveness Goals**	4	3	3.5	1

Rating Review Sheet
Lesson Plan No. 4-9

Item #	*Item Title*	*Rater 1 (C)*	*Rater 2 (B)*	*Mean Score*	*Range*
A1	Inquiry-based	3	3	3	0
A2	Hands-on	3	3	3	0
A3	Deep understanding	2	3	2.5	1
A4	Problem-solving	--	3	--/3	
A5	Collaborative Groups	3	3	3	0
A6	Technology	1	--	1/--	
A7	Alternative Assessment	2	3	2.5	1
A8	Other	--	--	--	
A9	**OVERALL: Student-Centered Instruct. Goals**	2	3	2.5	1
B1	Content central to new standards	3	3	3	0
B2	Content connects to other topics	1	3	2	2
B3	Content connects to oth. disciplines	1	3	2	2
B4	Content connects to oth. lessons	1	3	2	2
B5	Mastery of topic/skills important	3	3	3	0
B6	Other	--	--	--	
B7	**OVERALL: Course/Material Minimum Expectations**	2	3	2.5	1
C1	Conceptual Knowledge	3	3	3	0
C2	Problem-solving (process)	3	3	3	0
C3	Analyzing	3	3	3	0
C4	Communicating	2	--	2/--	
C5	Tools	2	--	2/--	
C6	Knowledge of facts/routines	3	3	3	0
C7	Making Connections	2	3	2.5	1
C8	Reasoning	3	2	2.5	1
C9	Alt. Assessment	3	3	3	0
D1	Attitudes	2	3	2.5	1
D2	Interest	2	3	2.5	1
D3	Habits of Mind	--	3	--/3	
D4	Safety	3	3	3	0
D5	Participation	3	3	3	0
D6	Other	--	3	--/3	
D7	**OVERALL: Evidence of Effectiveness Goals**	2	3	2.5	1

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