

IPTE Secondary Mathematics PBA.

Performance	Completion Record
A. Complete a “Four by Four” project in which you choose four topics and describe four ways to present and assess the topic. See details in Appendix A.	Date Completed: Supervisor <sup>1</sup> : Comments:
B. Coached Lesson. Choose one of the lessons featured in the Annenberg/CPB video library of mathematics lessons and conduct it with a group of your peers and, when possible, in your internship. Work with an experienced teacher as coach and write up an analysis of your performance as viewed on videotape. Details in Appendix B.	Date Completed: Supervisor: Comments:
C. Complete a Student Interview Project. Details in Appendix C	Date Completed: Supervisor: Comments:
D. Write a compare-and-contrast paper on what research says about teaching mathematics in the middle school and in the high school.	Date Completed: Supervisor: Comments:
E. Complete the Student Achievement Performance Sample (SAPS) for a topic in secondary mathematics.	Date Completed: Supervisor: Comments:
F. For each of three different topics, describe three activities that can be used to launch a problem-solving based lesson on the topics.	Date Completed: Supervisor: Comments:

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<sup>1</sup> Signature of Course Instructor or Site Coordinator or Clinical Teacher.

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<p>G. Attend the state conference of the Colorado Council of Teachers of Mathematics in the fall and write a brief paper describing the highlights of the day.</p>	<p>Date Completed: Supervisor: Comments:</p>
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**Appendix A.**

Four by Four Report

Your sources can be textbooks, lessons you have seen, WWW sites and/or materials, supplementary curriculum materials, and replacement units. Try to include one of each. One purpose of this project is to get you familiar with what is available, so explore!

For your Paper on Four Key Topics choose four topics from the following.

Proportion	Slope of a line	Relations among fractions,
Ratio	Scale Drawings	decimals and percent.
Linear Equations	Similarity	Factors and Exponents
Decimals	Coordinate Geometry	Graphical Display of Data
Integer Arithmetic	Reflections and Rotations	Five ways of describing a
Area and Perimeter	Probability	function(context, picture, symbolic, table, verbal)

In addition to listing your sources, your report should describe

1. How the topic is introduced (directly or imbedded in a context or problem). A copy from a textbook, along with a brief description from you will be useful here.
2. How much attention is devoted to the topic. Chapter, page, week, day?
3. How the presentation connects the topic to other topics.
4. The kind of work expected of the student: exercises, applications or contextual problem solving?
5. Whether the presentation is more prescriptive or more exploratory.
6. Whether the presentation emphasizes conceptual understanding or procedural mastery.
7. How the presentation relates to ideas discussed in our class.

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8. How you might augment the presentation.
9. Your evaluation of the strengths and weaknesses of each of the four presentations

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### **Appendix B.** Lesson Analysis Guide

This project may involve one lesson or a sequence of lessons on one topic. Your report should contain the Title of Lesson, Objectives of the Lesson, How you launched the lesson, What you asked students to do, and What you think you accomplished both in your students' learning and in your progress as a teacher. Also address the items below. It is strongly recommended that your lesson(s) be videotaped so you can refer to the video in addressing the items.

What mathematics did the students appear to be learning and what evidence did you see that they were learning?

Which of the Colorado Mathematics Standards were addressed?

How did your lesson(s) develop conceptual understanding and procedural skill?

What routines and practices did you use that supported learning?

What did you do to encourage students to take responsibility for their learning?

How were the students learning from each other?

What kinds of questions did you ask? (Exploratory or didactic or other?)

How did you respond to student questions?

What would you do the same and/or differently next time?

Appendix C. Interview Project.

**Interview Project Guidelines**

There are several purposes for this project:

- To learn a bit about how to probe student thinking on a specific math topic,
- To begin to think about how to assess understanding,
- To practice effective questioning, and
- To critique your own work.

**Planning**

Work with your clinical teacher to get ideas for the concept of interest. It might be interesting to probe how well students understand something they have studied in the recent past, or are going to be studying.

Choose which Colorado Math Standard and related Expectation you are exploring.

Arrange to interview four students (six if you work with a partner, three each).

Examine the sample reports and protocols provided by your instructor.

Read rest of this guide so you will know what else you need to plan.

**Conducting the Interview**

1. Locate a quiet place where you can talk 1-on-1 and videotape the interviews. The camera need not show the face of the interviewee, but we should be able to hear both of you clearly. This will help recall specific statements when you are analyzing your work. Also, avoid strong back lighting. Ideally, the light should come from behind the camera.
2. Some children are anxious about being interviewed, so tell each one at the start you are primarily interested in how he/she thinks about some ideas in math; they are not going to be graded; this is only for your own math class; you and your instructor are the only people who will look at the video.
3. Avoid asking “helping” questions or prompts. Avoid leading them to an answer you think is correct—they are probably not thinking like you anyway. You are probing their thinking, not trying to teach them something. In rare situations you may have to explain the goal of a task further or remind them of the meaning of some word. But if you keep trying to help them, they will think getting a right answer is the main goal.

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4. Consult the suggestions about questions and probes in the back of the packet. Most importantly, use adequate wait time. Avoid asking them questions while they are thinking. You want to give them plenty of opportunity to expose their thinking, not simply “get it done.”
5. Avoid congratulating them profusely for each response. Rather than “Awesome!” a calm “Okay.” or “You’re doing fine.” is sufficient, if you need to say something. Enthusiasm has its place, but there is no need to be their cheerleader. Also, you don’t want to suggest they are getting “right” answers; this will put the focus on getting done rather than exploring thinking processes and justification of answers.
6. Recording sheets are fine, but avoid those that require you to write a lot. This often makes youngsters suspect they are being graded. You will have the video to refer to for specific recollections.
7. If you are partnering to do the interviews, one person should serve as observer to provide feedback about the process. Often a “critical friend” will notice something that results in instant improvement for you both. See #4 below.

### The Report

1. Describe the Colorado Mathematics standard you are addressing and the particular topic within that standard.
2. Describe the activity and any apparatus you will use—manipulatives, verbal problems. Describe the protocols you will use, that is, what you will say to them, what you will ask (prompts) them in order to probe their thinking, what you will look for that indicates understanding or lack of.
3. Results and analysis. Describe how the youngsters did; a narrative for each is fine.
4. Describe what you thought of your performance. Did you use adequate wait time? Did you use leading questions? Did you use open-ended questions? Did you probe student responses with directives such as “Tell me more about your thinking.” “How can you prove that?” Refer to the questioning guide in the course packet.
5. Describe what you learned in this activity, about students and yourself.
6. Cue the videotape of your interviews to a five-minute segment that shows you or the interviewee doing something of interest mentioned in your write-up. This might be a point where a student said something very funny, or a segment showing you using good questioning skills, or a segment showing you doing something that you plan to improve on in future interviews, or something about which you want particular feedback from your instructor. If you are working with a partner, be sure you each use a different tape, unless you submit your reports in the same envelope.
7. Take all measures to have the video on VHS format. If your camera records only on some other format, arrange to have it converted to VHS or be VHS playable. Another possibility is to put your

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report and video on a CD for viewing on a computer, in which case there is no need for VHS, but be sure it will play on both Mac and Windows.

8. Turn in the report and videotape in a 9x12, manila envelope with your name on the outside. Partners should each turn in a report for themselves, but they can be in the same envelope. If partners turn in projects individually, be sure you are on separate videotapes.
9. A thorough report will require at least five pages, more if you include samples of student work.

### Evaluation

In grading the interview project we will be looking for

- Getting the math correct—probes that effectively get at the concept of interest
- Distinguishing between conceptual understanding and procedural skill
- Well thought out, purposeful protocols
- Good wait time and questioning skill, or at least improvement over time
- Good sound quality—can the viewer hear both you and your subjects?
- Good lighting. No strong back light that makes subjects invisible.
- Sufficient probing of subject's thinking—reluctance to accept simple Yes/No responses
- Conciseness—no need to probe a wide array of concepts, keep it simple but deep
- Well-written report—graduate level insights and language usage
- Reader friendly presentation—few, if any, typos and spelling errors; correct grammar; neat, not messy, etc.