BEEP 4311 — Math and Science in Dual Language Settings

Section 001, Fall 2008 — Tuesdays 5–8 PM, Room 308 Pickard Hall

Instructor Information

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Course Information

Prerequisites: completion of core courses, plus concurrent enrollment in other internship block courses
Required course materials:

1. *Math and science for young children*, by Charlesworth & Lind. Delmar Learning (4th ed., 2003).
2. *Dialogue on early childhood science, mathematics, and technology education*, by the American Association for the Advancement of Science. Washington, DC: Project 2061/AAAS (1999). Available from the AAAS or online (see link on web site).
3. Course packet for BEEP 4311, available on the class web page

Students are expected to bring the above texts to class at every meeting, to have read all assigned readings, and to be ready to discuss them in class that day. Detailed week-by-week assignments are given below.

Course home page: http://mathed.uta.edu/kribs/4311.html
Last day to withdraw: October 31

Class policy on drops, withdrawals, academic honesty, and accommodating disabilities follows the University policy on these matters. Copies can be obtained upon request.

Learning outcomes: This course is designed to prepare future EC–4 teachers *pedagogically* to teach math and science in dual language settings. After completing this course, students will be able to:

- demonstrate knowledge about the NCTM and NSES standards and the TEKS.
- reflect upon experiences observing classroom teachers and teaching students in a bilingual EC–4 setting.
- demonstrate competency in a hands-on approach with emphasis on bilingual EC–4 students being active participants in their own learning.
- demonstrate awareness of learner-centered proficiencies.
- show competence via the TExES exam.
- record, report and evaluate using performance-based assessment.
- consider the role of student thinking in making instructional decisions.
- design developmentally appropriate lessons that integrate math and science across the curriculum.

Grading: The grade for this course is determined as follows (further details below):

- 20% Preparation & Participation
- 20% Reflections
- 20% Fieldwork: Planning
- 20% Fieldwork: Student Thinking (Student Interview & Case Study)
- 20% Final Exam

A calendar for this course is given on the last page of this syllabus.

All work for this course is to be edited and executed with care and professionalism. Final course grades are based on the accumulation of points for each assignment, with a maximum of 100% possible. Students, therefore, also have some control over what they may choose to do or not to do, depending on the final grade each student desires. The final grading scale for total points will be the traditional 90–100=A, 80–89=B, 70–79=C, etc., except for the exam, in which case I may give a more generous letter grade conversion after examining the papers.

Attendance Policy: Attendance & participation in our class activities are crucial, as most of what I hope you will take with you from this course will happen in our classroom. Attendance will be taken every time we meet, by means of a sign-in sheet. It is *the student's responsibility* to sign in each week, and to follow up with the instructor as necessary. Each student is allowed one absence for reasons of health, religion, etc. (TExES practice exam) without penalty. Arriving substantially late or leaving early counts as half an absence. Each absence beyond the one allowed will reduce the final grade by one-half letter grade, or 5 percent.

Written Assignments: Each student will be allowed one late submission during the semester, which must be turned in *before* the on-time papers for that assignment are handed back to the class at large (see also homework policy on page 9). If you have any questions or uncertainties about an assignment, please consult with the instructor *before* the due date. Unless otherwise noted, assignments are to be submitted on both paper and ossa.uta.edu (except for graphics and copies of student work). Grading will take into consideration the following:

1. *All* written (out-of-class) assignments should be neatly typed, with good grammar and minimal typographical errors. At the top of the first page you should put your name, class with section number, the date, and the title of the assignment. (Cover pages not required.) Spelling counts — if there's any profession where proper spelling, grammar and punctuation are critical, it's K–12 education.
2. Be sure to follow directions/answer the question that is asked. This is where most points are lost.
3. Use graphics and/or pictures when appropriate (these obviously need not be typed).
4. Give a coherent argument/explanation of your position. Organize it, and, when appropriate, suggest a response. You must explain yourself *clearly* in order to get credit for what you *mean* to say.
5. Use specific details/examples to illustrate a point or clarify an explanation.

Class Format: This class will meet on campus, every week from August 26 to December 9. At the same time, students will spend the equivalent of one day a week in a bilingual EC–4 classroom, approved by the UTA Field Office. Class discussions will draw on students' field experiences. There will be one in-class exam.

Class: Our in-class discussions will be organized around some of the big issues in math education. Classes will include small-group activities, large-group discussions, and watching some videos, usually of exemplary teachers and activities. Class will be conducted in both English and Spanish, in order to provide a common context for discussing issues particular to dual language settings.

Field hours: Students must complete internship requirements and paperwork as detailed in the BEEP Handbook and information from the UTA Field Office. This includes, but is not limited to, regular attendance at the assigned school under the direction of the assigned mentor teacher(s), for the duration of the *ISD* semester; an informal and a formal observation of lessons presented in the mentor teacher's class, evaluated by both the mentor teacher and the UTA supervisor, in each field assignment; and summary evaluations from the mentor teacher(s) at midsemester and semester's end. Paperwork should be submitted to the UTA supervisor, or to the Field Office if the UTA supervisor so directs. Failure to complete all required elements of the field experience will prevent the assignment of grades for the inquiry block courses.

How to study for this course: The rule of thumb for university courses is that you will spend twice as much time out of class as in class. This is a 3-credit course, meaning that you should be prepared to spend a total of 9 hours per week in and out of class on this course, even though on some weeks, you may not need this much time. 3 of the hours go to the lab hours and associated activities (like driving, and making entries in your time sheets). 2 of the hours you spend in class. Of the corresponding four out-of-class hours, expect to spend about 1 hour writing your reflection, 2 hours on the readings, 1/2 hour preparing for class (perhaps those 2 1/2 hours should be combined), and an average of 1/2 hour per week on the other major assignments. You may wish to work on some of the assignments early; timing of major assignments is made to ensure that all students have the necessary opportunities to complete them.

Preparation & Participation

You are expected to come to class prepared, and to participate in our class discussions, in both small and large groups. Preparation involves reading the assigned texts, making notes on them in order to be able to participate effectively in class discussions, and bringing all necessary materials and texts to class with you.

Preparation for class will be assessed informally during small and large group discussions on either the case studies or the activity assigned for that day. Case studies are designed to spark discussion (typically, how would you react to the situation described?); activities will occasionally need to be begun outside of class in order to be finished and discussed in class, and for both of these purposes you need to take notes outside of class to remind yourself of the points you want to make, or the questions you want to ask.

Participation includes raising questions of your own as well as responding to those asked by others, and being prepared to contribute by having read the assigned readings for each week and prepared responses to the case studies. When you do not think you have any answers to share, you should ask a question, because chances are you're not the only one who has it. If you find you have difficulty speaking up in *large* group, write down a few questions before class which arose for you during the readings. I expect students to speak up in large group at least half the time (i.e., every other week). When working in *small* groups, it is often useful to have the following roles assigned, to make sure the group does not stagnate: (1) facilitator/moderator, (2) recorder, (3) speaker (for the group, in whole-class discussions), (4) materials coordinator. Small groups should always have three or four members. Of course, participation also includes appropriate, professional behavior (e.g., not working on outside projects in class, paying respectful attention while someone else is speaking). If at any time you are unsure how you are being graded in these areas, please ask your instructor.

Final Exam

This class has an in-class final exam as well as a take-home midterm (discussed on the next page). The exam will be comprehensive, over all the material in the text/course packet, but should be fairly short (less than an hour). I will not dredge up obscure facts mentioned once, but, for example, I might ask a reflection question regarding one of the videos we have watched. The discussion questions at the end of each chapter in the textbook, as well as in the coursepack, are good for review.

The exam will consist of two parts: short answer questions, and reflection essays, of the type assigned as homework (but shorter). Examples of each type follow. We will talk more about specifics as exam time nears. A sample exam will be handed out two weeks (and WWW-posted) in advance; in the meantime, use the diagnostic questions in Section II of the coursepack to gauge your knowledge (it also has some sample exam questions). The exam will be closed-book, but you may bring a 3.5"×5" index card with notes on both sides.

Sample short answer exam question: Contrast the properties of base ten blocks and coins for teaching place value and multiplication.

> *Sample answer:* Base ten blocks are proportional while coins are nonproportional materials; blocks lend themselves to 2-D and 3-D array representations of multiplication, while coins can only be stacked in one dimension.

Sample reflection essay exam question: List three problem solving techniques that you think you do well, and discuss briefly how you could try to foster them (specifically those you listed) in your students.

Sample answer: 1. Work backward — Many problems involving inequalities can be worked backward if you know what you are trying to prove. I would encourage students to associate reversible operations with doing and undoing the corresponding manipulations with concrete materials.

2. Make a model — Even problems without a concrete context can often be modeled concretely. I will use concrete models to introduce and familiarize new topics, and provide students similar materials to do the same.

3. Identify patterns — By organizing observations in helpful ways like tables, I can see patterns that reflect mathematical structures in a problem. Helping my students to organize in these ways will help them do so, too.

Reflections

It is important for preservice teachers to develop (a) good teaching habits, including reflection, and (b) a portfolio representing their experiences and achievements in teaching. Toward both these goals, you will write several short reflective essays in this class. The midterm in this course is a take-home composed of ten reflection questions on cross-curricular issues in EC–4 education; each response should be roughly a paragraph (say 150 words) in length. I encourage you to begin working on it from the first week, in order not to have to try to write all ten responses the last few days before it is due. The five individual reflections you will turn in throughout the course involve more detailed analyses of student thought, in preparation for the student interview and the case study, two major assignments due toward the end of the course. Each of these should be about one page (300 words) in length. Feel free to show me preliminary drafts.

All due dates are given on the calendar. All reflections must be submitted both on paper and on *via LiveText* (for later use in assembling your portfolio) following the guidelines given above for written work. Clarity of written expression and depth of analysis will be considered in your grade, *as will the extent to which you address the specific questions asked.* When in doubt, consult the instructor ahead of time. Any reflections involving graphics or other nontext may be submitted on paper. You will be allowed to submit a rewrite to any one response for which you have already received a grade on the last week of classes (Wk 15).

Reflection 1. Standards and reality. Choose one of the NCTM Curriculum Standards (see Figure 1-3 in the textbook, pp. 6–10) and one of the TEKS elements that most closely parallels it (see web site cited on page 3 of the course packet and course web site — only the summaries are given in the course materials). First, compare these two standards with each other: are they really asking the same thing? are they written in the same spirit? Second, compare them with the reality of a math classroom. What are the biggest challenges to helping students meet this particular standard? Identify standard and grade level.

Reflection 2. Triangles interview. For the assignment we are going to reach back into the elementary grades to see how children develop notions about geometrical ideas — in particular, [tri]angles. Get several (say 5) students and tell them that you need their help with a math assignment. You want to know what they think about some shapes. Provide a pen or pencil and paper, and ask these questions:

(1) What is a [tri]angle? (2) Can you draw five [tri]angles for me?

(3) Can you draw 5 other shapes which are not [tri]angles? (4) Why are these other shapes not [tri]angles? After you thank them for their time, write down their answers to the first and last questions above immediately. Then write a reflection (not a transcription!) on the results, addressing the following issues:

• Did all the triangles have a horizontal "bottom" side, i.e., "sitting up", like this: Δ ? If so, why do you think so? • What kind of understanding did the children have of "triangle"? Can you speculate on what kinds of experiences their understandings are based? • Be sure to give ages or grade levels for the students.

Reflection 3. Invented strategies. Now that you have seen, through the videos, readings, and class discussions, some of the strategies children have invented for performing arithmetic computations, consider one such invented strategy in particular (such as on CP pp. 27–30), and answer the following questions:

- What mathematics did the child who used it have to understand in order to develop and use specifically this strategy? i.e., what was the motivation? Be specific: don't just say "the basics of adding".
- More generally, what mathematics do children need to understand in order to be able to invent their own strategies and approaches?
- What is the relationship between these invented strategies and the traditional algorithms?
- What questions does this work raise for you?

The strategy may involve whole numbers, fractions or decimals.

Reflection 4. Children's work samples. Collect three samples of work from students: one which you feel is strong and two which are not so strong. Explain what pleases you about the one, and give an analysis of the other two. What are your learning goals for each of the three students? (What do they need to try next?) Focus on the mathematical work and don't just chalk errors up to being rushed. Don't choose samples which do not show work or student thinking, as the point of the assignment is to show me your ability to analyze student errors. Also, don't focus on whether or not the work is neat – this is certainly helpful, but gives

little insight as to what mathematics the student understands. Attach student samples to your reflection (photocopies are acceptable).

Reflection 5. Assessment activity. The "dead fish" vignette in Chapter 12 of *Dialogues...* appears in a piece on assessment. Write an assessment of each participant in this conversation: what does the student know, or not know, as evidenced by her/his remarks? Finally, contrast the kind of knowledge you get from this assessment with the kind of things you would know about your students' abilities from a written assessment (for students of comparable ages).

Midterm Questions (at least half the responses must be in Spanish)

1. Math anxiety. Describe your worst experiences learning math. What can you do to help your students avoid math anxiety? Be sure to address the points you raise in your own bad experiences.

2. Bilingual classrooms. Identify at least two issues or events which occurred in the bilingual classroom where you are observing, which would not have occurred, or would have occurred differently, in a classroom where the students were all native English speakers. How did your mentor teacher deal with them? How would you deal with them?

3. Web site review. Visit one of the web sites listed either in the course pack or on my math ed resources web page, `http://mathed.uta.edu/kribs/mathed.html`, and write a short, critical review. Be specific.

4. The size of an idea. Describe a moment in one of the classes you observed this week when the teacher had to judge the "size" or significance of an idea that arose in a whole-class conversation (by students), and decide whether or not to follow it up. Did the teacher follow it up? Do you agree with that decision?

5. Classroom culture. In what ways does the culture of the classroom shape students' opportunities to become competent in a given subject area — to develop conceptual understanding as well as procedural fluency? What is the work of the teacher to create a classroom culture conducive to successful learning? In particular, what does it take to start deliberately developing such a culture at the beginning of the school year? You may wish to consider one particular subject area in order to focus your response.

6. Integrated curricula. To what extent have you observed integration of subject areas in lessons in your field placement?

7. Classroom technology. Choose an article from a professional journal (I suggest *TCM*, or *Technology and Children* (www.iteawww.org)) which deals with implementing technology in the math classroom. Write a review of the article (give full citation) which includes a summary and what you thought was interesting about it. Describe which aspects of the lesson or activity would be most challenging to implement. If you have doubts about an article's suitability, ask the instructor ahead of time.

8. Ending a lesson. What do you need to do in order to end a lesson successfully? If time constraints prevent you from completing a lesson, what must be done in order to provide a solid stopping point from which you can continue later?

9. Teaching to the test. As a teacher you will face a lot of pressure to "teach to the test" — standardized tests like TAKS. Most often this is done using worksheets and drill. Mathematics educators claim, however, that it is possible to have a constructivist classroom in which children engage in problem-solving activities and yet still score as well as other students on standardized tests, and there is some evidence to back them up. Now that you have seen a real classroom and had some opportunities to teach in it, *where do you stand on this issue?* Do you think you will be able to foster creative and critical thinking without losing performance on TAKS tests (if so, how?), or do you expect you will have to sacrifice some gains in one or both of the two? Put yourself in the shoes of a classroom teacher and justify your answer — defend it to school administrators and/or research on children's learning, as appropriate.

10. Diversity/equity. What measures do you see in place in your field school and classroom to support diversity and equity in learning? Have you observed any ability grouping, whether homogeneous or heterogeneous, within or between classes? If so, comment on any impact you have observed on the students.

Fieldwork: Planning

One part of a teacher's work is selecting, evaluating and developing lessons and activities appropriate for her/his students. Toward this end, you will critique a set of curriculum materials with which you are familiar and develop a lesson. Each assignment counts 10% of the course grade.

Curriculum Evaluation

Choose one of the math or science textbooks/materials in use in your mentor teacher's classroom and critique it. Consider the learning theory behind it — how does the author believe children learn, based on the content (by telling them, or by allowing them to explore)? Do the exercises go beyond rote drill to encourage critical thinking? Is it readable — can children learn from using it? Is it easy to plan a good lesson with it? etc. You may want to choose one activity and focus on it: what science or math it involves, where it falls short, etc. Be sure to provide a *complete* citation. If you do not have access to a set of math or science curriculum materials in your field placement, please see me ASAP.

Lesson Plan

You are to choose a topic of your choice from EC–4 mathematics and science, and develop it into a single lesson. Ideally this should be one of the lessons you teach in your field classroom. Use the lesson plan form provided in the intern handbook. In addition, be sure to specify the following:

- what ability/knowledge assumptions you make on the part of the student(s)
- how students will work to construct *their own* understanding of the material presented
- any integration with other subject areas, especially literature
- what use is made of manipulatives or real data
- a complete materials list, including citations for any books/software used
- a brief reflection on how the lesson went, or, if you do not actually teach the lesson, what points you think would be most challenging for you.

Fieldwork: Student Thinking

These two portfolio assignments will require you to consider in depth the mathematical thinking of one particular student or group of students, a task which is one of the most important a teacher must perform on a daily basis. Each of these assignments will be worth 10% of the course grade.

Field Confidentiality: In this course you will be asked to report, in writing and during class discussions, on your interactions with K–12 students. It is important to protect the confidentiality of students, and for this reason it is usual to give first names only in discussion, and to ensure that any written reports prevent the possibility of identifying students by name. This may include changing students' names, or omitting names of teacher and school. If you, your mentor teacher or anyone else has a concern about protecting student confidentiality, please do not hesitate to discuss it with your instructor.

Student Interview

One goal of this course is to help you develop the ability to listen to the ways children think as they build an understanding of different aspects of mathematics. One way to develop this ability is to interview a student in grades EC–4, in which you ask the child questions to see what the child understands about mathematics. Interviews not only help you understand more clearly that individual child's level of understanding on certain topics, but may help you develop a sense of the types of response typical of most students at a certain age or grade level. Your assignment is to plan, conduct, and write up an interview with one student of your choice (with the consent of the child and the child's parents and/or teacher).

Approach the interview as an opportunity to listen to the mathematical sense-making of one particular child. This is *not* a tutoring session, nor a quiz, but an interview whose purpose is for you to understand the mathematical thinking of the child. As one teacher put it, it is "just to see what they know, not like a quiz." Finding out what a child knows involves asking questions to which the child may not know the answer. Don't push the child in a certain direction (i.e., toward the right answer).

Before:

When you invite a child to participate, explain that you would like to interview him/her for a class where we are interested in knowing what children (you can say first-graders, second-graders, etc., as appropriate) think about mathematics. Make it clear that you value the child's ideas, and that this is more like a news interview than a quiz (don't mention testing). Most children feel good to hear that an adult is interested in their ideas.

You also need to make it clear to any relevant adults what you are doing. Take a copy of the letter on the next page (or, if you like, write one of your own) to the child's parents and/or teacher ahead of time in order to clear the interview with them and explain its purpose.

Once you know your interviewee, prepare starting point questions: Wonder what children would think about a certain topic. Also, make sure your questions are appropriate to the child's age. Explore the student's ideas about numbers and other mathematical ideas. Ask the student to perform some tasks, which might include reading and writing numbers, counting, adding, subtracting, etc. Feel free to draw from the readings, from the videos we have seen in class, or from activities we have done.

During:

You should record (audio or video) the interview so that you can refer back to it later in making your write-up. You will not need to provide a complete transcript of the interview, but you should cite some dialogue that strikes you as especially important in understanding this child's level of mathematical understanding.

Begin with a question you feel is well within the child's capabilities, and build from there. Do not act frustrated or disappointed if the child does not know the answer to a question — you should expect to have some questions like that, in order to understand the limits of the child's understanding. Instead, either ask a smaller part of the question or move on to another topic.

Although you will come with starting-point questions prepared, you will need to follow carefully what the student does and says during the interview, and follow up on responses with questions that build on the discussion already generated. Remember that the point of the interview is to find out as much as you can about the student's ideas, not to try to teach the student anything. Also note that in order to determine the limits of the student's understanding, you will have to get to a question the student cannot answer.

Some interviewing tips:

- *Maintain neutral verbal and body language.* Avoid reactions that make the child think that his/her answer is right or wrong. If the child asks for confirmation or whether an answer is correct, respond with "That's fine" or "You're doing okay."
- *Probe, don't lead.* Do not try to direct the child to a certain response. Instead, ask for elaboration on the child's reasoning.
- *Allow the child to answer.* Wait after asking a question, and after the child's initial response, in order to allow the child to formulate and communicate his/her entire response, including the thinking behind the answer. Do not interrupt or correct the child's wording or writing; if something is unclear, wait until the child has finished, and then ask for clarification.
- *Consider both concrete* (context-based) *and abstract versions of a question.* A child unable to answer "What's 7×5?" might be able, for instance, to figure out how many days are in 5 weeks.
- See Reys, pp. 57–58 for more tips. Your instructor also has the field guide accompanying the Reys text, which has tips as well as some suggested sequences of questions for various mathematical topics.

After:

In your write-up, give an overall narration of the interview (e.g., say what tasks you asked the child to perform), and include dialogue that you found especially helpful in gaining insights into the child's thinking. Point out what you learned about the child's thinking, *and* what you still don't know. Describe anything surprising that happened, what questions were raised for you, and what you think you learned from the process. What should this child work on next? One question you might consider as you write is, what would you say to a parent about this child's thinking?

University of Texas at Arlington College of Education

August 1, 2008

Dear Parents and Teachers,

One of the goals of the teacher preparation program at the University of Texas at Arlington is to help preservice teachers develop the ability to listen and understand the ideas and thinking of their future students. The preservice teacher who has contacted you regarding a student interview is enrolled in one of the program's field-based methods courses, BEEP 4311 — Math and Science in Dual Language Settings. One of the major assignments in this course requires each preservice teacher to conduct an interview with a middle school student, and to find out as much as possible about what mathematical ideas the student has. This interview is not part of the official assessment process at the child's school; rather, it is like an interview conducted for a newspaper or news program, following which the interviewer explains what (s)he has learned about children's mathematical thinking in general, as well as about what this particular child thinks.

I ask, therefore, and this preservice teacher asks, for your consent to this interview. It should take between ten and fifteen minutes, and I am sure that the interviewer will be happy to discuss what (s)he learns with you. I believe that the experience will enrich both the interviewer individually and our class as a whole, as well as being a positive one for the child, for his or her ideas to be of interest to a teacher. If you have further questions about the interview, I encourage you to discuss them further with this preservice teacher.

Very sincerely,

Christopher M. Kribs-Zaleta
Associate Professor, UTA Mathematics Education

Case Study

During the course we will read and discuss in class several case studies, most from the *Developing Mathematical Ideas* casebook and some from the coursepack, all describing events in other teachers' classrooms. During the second half of the semester, you are to write a case describing a discussion involving one or more students, similar to these cases. A case is neither a complete transcript of a lesson nor as prefabricated as an interview, although it is very helpful to include direct quotes and dialogue from students.

You must base your case on a conversation for which you were present, and preferably in which you were involved, but it could come out of a lesson you observed, or a conversation among two or more students. You may choose to narrow in on one or two students, or on one small group, or you may describe a whole-class conversation. (It could even take place outside the classroom, especially for preservice teachers with limited classroom exposure.) The most important thing is that the episode illustrate some aspect of children's mathematical thinking.

In writing your case study, begin by describing briefly the class's larger context (including grade level) and the topic under discussion; then describe the relevant parts of the conversation in as much detail as you can manage. Include what you are thinking as you work with the students. Finish up by summarizing your evaluation of the students involved and saying what issues and questions you still have after this conversation. Include an analysis of the students' thinking, and questions the case raises for you.

Most of the case studies we will read center on the mathematical topics of place value and the four arithmetic operations, but your case may touch on any topic in science or math; in fact, cases describing conversations about science, bilingual classrooms, or on other mathematical topics, are especially welcome. We will discuss the writing of cases in more detail the week before they are due, but of course you are encouraged to begin sooner, especially if you have a good conversation fresh in your mind. I will be glad to work with you one-on-one in helping you write your case.

Homework

Each week you are expected to read the assigned readings carefully, submit any assignment that is due, and make notes on the one or two case studies that will ensure you have something to say when we discuss them in class (in particular, how would you react if you were the teacher in this classroom?). The calendar on the back of this page details the readings and reflection for each week, and the due dates for other major assignments. Some weeks, you will need to make additional preparations for class, as indicated on the calendar. Below, these additional assignments are explained, as well as specifications for the readings that do not come from the texts, the coursepack, or the casebooks.

Week 2: Additional readings are: Section I of the course pack, and electronic readings with links given on mathed.uta.edu (see course home page) — Chapter 3 (Principles) and overview of *PSSM* (NCTM's *Principles and Standards for School Mathematics*), the NSES, and the TEKS web site. Also, copy and cut out the cards to be used for the game "Capture" in the coursepack and read the rules.

Week 7: Read the chapter on Representations from *PSSM*.

Week 8: Read the e-Algebra articles linked from the home page.

Week 9: Read the activity "Romans and Mayans" in the coursepack and work through the problems; bring your work and answers to class for discussion. Also read the rules for the activity/game "Close to 100" and bring a set of cards for it to class.

Week 10: Work through the "Diagnosing Student Work" activity (#1–8) in the coursepack; bring your work to class for discussion.

Week 11: 1. Work through the "Diagnosing Student Work" activity (#9–17) in the coursepack; bring your work to class for discussion.

2. Write, and bring to class, story problems involving the division $32 \div 5$, to which the answers should be, respectively: (a) 6, (b) 7, (c) 6 or 7, (d) 6.4, (e) 6 remainder 2, (f) $6\ \frac{2}{5}$.

3. Write and bring to class a measurement division of fractions (story) problem, and a partitive division of fractions problem.

Week 13: If you have a set of Lego-like blocks, bring it.

Week 15: Bring a small (hand size) mirror from home.

Homework policy

- One late paper per student. The first time a paper is submitted late (meaning after class ends on the due date) signifies the student's agreement that this will be the one late paper submitted, and not any subsequent paper.
- One rewrite per student (as described in Reflections).
- Each student will also be allowed one electronic submission during the semester (instead of paper – LiveText still required); all subsequent electronic submissions will not be graded. (Faxed submissions do not count as electronic, but you should follow up a fax with an e-mail or phone call to make sure I receive the fax promptly.)

BEEP 4311 Calendar, Fall 2008

Week	Date	Topics	Covered	Readings (Due)	Assignment Due
1	Aug. 26	Intro, Learning Theory		*none*	*Get coursepack*
2	Sep. 02	Curriculum, Standards, Notions of M/S	CL1,2; AAAS1, additional; DMI4		additional
3	Sep. 09	Problem Solving, Scientific Inquiry	CL3; AAAS3, CPA1; DMI6		R1
4	Sep. 16	Early number & science concepts	CL5-9,15,16,23,24; DMI26		*none*
5	Sep. 23	Measurement, Observation	CL18,19,21*,32; CPC1,2		Lesson plan
6	Sep. 30	Organizing, Patterns, Change	CL10,11,17,21*,28; CPC8		*none*
7	Oct. 07	Representations	CL20,21*; additional; CPC5,6		Midterm
8	Oct. 14	Algebraic thinking, Life science	CL25,26,31*,34; additional; CPC7		R2
9	Oct. 21	Place value, Physical science	CL30,35,40; DMI13,14		Interview, additional
10	Oct. 28	Add./Sub., Earth & space science	CL27,33,36; CPA2; DMI16,17		additional
11	Nov. 04	Mult./Div., Environmental science	CL37,39; AAAS6, CPA3; DMI18,22		Curr. eval., additional
12	Nov. 11	Fractions, Systems	CL14,29; AAAS7; FDRP45,52		R3
13	Nov. 18	Geometry, Health science	CL12,13,22,31,38; CPC3,4		R4, additional
14	Nov. 25	Assessment	CL4; AAAS12; cases TBA		R5
15	Dec. 02	Diversity, Equity, Technology	CL41; AAAS11,15, CPA4; cases TBA		Case study, additional
16	Dec. 09	EXAM	*none*		study for exam

Abbreviations used in reading assignments:

From course materials: CPA = c'pack article, CP C = c'pack case, CL = Charlesworth & Lind unit, AAAS = *Dialogue...* chapter
From casebooks: DMI = DMI *case* number, FDRP = Barnett et al. *page* number (see refs. below)
For additional readings and assignments, see the other side of this page.

Casebook bibliography (both are available in the Science & Engineering Library):

DMI Deborah Schifter, Virginia Bastable, Susan Jo Russell (eds.). (1999). *Building a system of tens : casebook (Developing mathematical ideas).* Parsippany, NJ: Dale Seymour. *QA141.15 .B94 1999*

FDRP Carne Barnett, Donna Goldenstein, Babette Jackson (eds.). (1994). *Fractions, decimals, ratios, and percents: hard to teach and hard to learn?* Portsmouth, NH: Heinemann. *QA117 .F698 1994*