

 <p>University of Memphis College of Education</p>	College of Education
	University of Memphis
	Instruction and Curriculum Leadership
	ELED 4352
	Math Methods
	Fall 2009
	Dr. Angiline Powell
Office Location: 411B Ball Hall	E-mail: apowell3@memphis.edu
Tuesday 2:00 pm.-4:00 pm 8:00 pm.-8:30pm Thursday 11:00 to 11:30 by appointment	

### College of Education Norms

- I take 100% responsibility.
- I seek equity of voice.
- I am willing to talk about sensitive issues.
- I listen for understanding.
- I appreciate the strengths and contributions of others.
- I bring positive energy and encouragement to the team.
- I commit to the mission of the college.

### **ELED 4352 ---Curriculum and Methods in the Early and Middle Grades (4hrs).**

Teacher candidates will learn developmentally appropriate curriculum for K-8 in literacy, science, mathematics, social studies, and fine arts; methods specific to content areas and evaluate current educational materials such as software, textbooks, and manipulatives. *Twenty hours field experiences.*  
 PREREQUISITE or COREQUISITE: ELED 4351, 4353, 4354, admission to TEP, and completion of ALL coursework except Student Teaching and Professional Seminar.

**Texts:** Heddens, J. W. & Speer, W. (2006). *Today's Mathematics: concepts, classroom methods and instructional activities. 11<sup>th</sup> or 12<sup>th</sup> ed.*

#### **Support of Conceptual Framework**

The primary goals of the math part of the BLOCK are **to help you**, the teacher candidate, to:

1. gain confidence and skills in your ability to undertake teaching elementary/middle school mathematics
2. become familiar with the elementary/middle school mathematics curriculum and with the various manipulatives, models, materials, and instructional methods appropriate for teaching this curriculum
3. develop the ability to communicate with children about mathematics, assess their understanding of specific mathematics, and provide appropriate instruction based on this assessment
4. develop the ability to plan and execute instruction designed to teach conceptual understanding, skills, and problem solving
5. develop the ability to use appropriate assessment strategies, both traditional and alternative, and to evaluate student achievements in mathematics.

### **Assignments**

**All in essay form please**

#### **Email (5pts)**

We can easily communicate through email and in person. You will receive five points if you email me within 24 hours of our second meeting. The subject should be ELED 4352 and the body should include your full name. If you need help with email or attachments, please feel free to contact me after class and I will be glad to help you. All assignments must be turned in at the beginning of class on the due date. If you use a different email please go to <http://iam.memphis.edu/> and forward your email to the account that you use. **Email:** [apowell3@memphis.edu](mailto:apowell3@memphis.edu) Friday September 4<sup>th</sup>, 2009

#### **Autobiography----Due September 10th, 2009**

Please provide me with a "mathematics autobiography." Include (but do not limit yourself) to answering the following questions: **Please answer in essay form, hand in a copy, and place in dropbox on ecourseware** ( items do not have to be order as questions are written) **GO INTO DETAILS!!!!!!**

- Tell me about your family (please include spouses, children, parents, siblings)
- Why you chose education as your major and The University of Memphis as your school?
- Are you "good" at mathematics?
- Tell me about your educational triumphs or disasters. Highlight your mathematics education.
- Do you like or dislike mathematics? Why?
- What do you like about learning math? What do you not like?
- What is your first or strongest memory of learning or doing math?
- Have you ever been embarrassed, humiliated or especially proud of your mathematics ability?

- Do you like/dislike all areas of mathematics equally? If not, which ones do you like/dislike the most? Why?
- Who or what influenced (either positively or negatively) your feelings about mathematics?
- How do you feel about teaching mathematics?
- How do you think your attitude about math will affect your teaching of math?
- Describe a typical day in your future math class.

Please list the math courses that you have successfully completed and whether you took them in high school or college. A partial list is here to jog your memory.

Subject	H.S.	College	Both
Algebra I			
Geometry			
Algebra II			
Tech Prep			
Pre Calculus			
MATH 0990 Foundations of Geometry.			
MATH 1410 Foundations of Mathematics I			
MATH 1420 Foundations of Mathematics II			
MATH 1730 College Algebra Trigonometry.			
MATH 1830 Elementary Calculus.			
MATH 1910 Calculus I			
MATH 1920 Calculus II			
MATH 1601 Statistical Reasoning.			
Other (Please Specify)			

### Clinical Experiences

**Clinical Experiences 1-3 due Thursday October 29<sup>th</sup> 2009;**

**Clinical Experiences 4-5 due Thursday November 12<sup>th</sup>, 2009**

The five assignments are as follows:

- 1. (10pts) Classroom Manipulatives – Finding Them (p. 5) and Classroom Manipulatives – Using Them (p. 6)**  
For this assignment, you may photocopy the pages from your handout and write your answers on the photocopies.
- 2. (10 Pts) Analyzing Classroom Discourse (p. 33, 34,)**  
For this assignment, you should turn in: (1) the observation sheet (p 33); and (2) your responses to the reflection questions. The observation sheet should have your handwritten notes from the class. The reflection questions should be typed up in a word processing program. Please DO

NOT try to hand-write your answers to the reflection questions in the space provided.

3. ***Mathematical Processes (p. 45, 46)***

For this assignment, you should turn in: (1) the observation sheet; and (2) your responses to the reflection questions. The observation sheet should have your handwritten notes from the class. The reflection questions should be typed up in a word processing program. Please DO NOT hand-write your answers to the reflection questions in the space provided on p. 46. Be sure that you include examples in your responses to the reflection questions. It is not enough to say that you saw one of the processes. You must provide specific examples from your observation to support your assertion that the process was present in the lesson.

4. **(30 pts) Student Interview (Choose one interview from the following protocols: p. 64, 65, 66, 67, 68, 69, 72- 95.** Choose one of the protocols listed above as a guide for your interview protocol. Be sure that the protocol is at the appropriate level for the student with whom you will be working. You want the interview to be challenging enough for you to learn something about the student's thinking, but not so difficult that the student cannot answer any questions. You will need to add some questions to the interview in order to gather enough useful information.

The interview should take approximately 30 minutes or less. Schedule a convenient time and location and have all materials ready to go. Find a quiet place for you and the child. Make them feel at ease by telling them that you are trying to learn how they think so you will know more when you are teaching. Above all LISTEN to the student.

Have the child record all written work on paper and attach it to the interview. If the child writes his/her name on the paper, you should block it out before turning in the assignment. Using a clean sheet for each new task will make interpretation of your results easier. You should try to take notes during the interview so that you can recall later exactly what the student did and the questions you asked or modifications you made. However, make sure that your note-taking does not distract the child.

Remember the purpose of this interview is to assess what the child knows and can do rather than report what he/she cannot do. Focus on the process rather than the answer. Ask questions to help you understand the child's thinking. For example, "How would you explain what you did to other students (or to younger children)?" You will need to probe and ask why. *Your job is to assess and accurately record the child's responses and thinking, not to teach the child or correct his/her responses.* Be flexible. If the question asked is too difficult, make it easier. Also, if the child is not challenged by the

question, pose a more difficult one. Be sure to note any adaptations that you make. The interview does not have to be conducted all at one time. If you are losing the child's interest or attention, or if the class schedule is limited, break the interview into smaller parts.

Offer to share your results with the child's teacher if he/she is interested. Remember to respect the dignity of the child and protect the confidentiality of the classroom. Results should be discussed only with the teacher or your instructor in your methods class. The use of pseudonyms for your written report would be appropriate.

You might consider using a tape recorder to record your interview.

(Adapted from Smith, N., Lambkin, D., Lindquist, M., & Reys, R. (2001). *Teaching elementary mathematics: A resource for field experiences*. New York: John Wiley & Sons, Inc.)

### **Choosing Interview Questions:**

The intent of the interview is to take what you have learned in the methods course and to apply that to the assessment of student thinking. You should ask questions that require students to solve problems and explain their strategies to you. This is NOT an interview about the child's feelings or beliefs about mathematics. (Although that is important information, it is not what this interview is about).

First, you need to select a topic on which to focus your interview. The concept that you choose will depend on the grade level of the students with whom you are working. For example, counting is an appropriate interview topic for a kindergarten student, but is probably not appropriate for a third grader. Once you have selected your topic, think about what you have learned about this topic. What are some of the misconceptions or benchmarks of understanding that students demonstrate in learning your topic? How can you design (or adapt) an interview that you could use to assess students' understanding of your content area? For example, an interview on counting would look for evidence that the student has mastered one-to-one correspondence. You must be familiar with the topic of your interview in order to design appropriate questions. Do not attempt to conduct an interview without AT LEAST reading the relevant chapter from your textbook.

Keep in mind that the point of this interview is to learn something about the student's thinking and about what he/she understands, not simply to identify his/her level of proficiency at performing a skill. The purpose is not to simply figure out WHETHER a child can solve a particular type of problem, but to

identify HOW they approach and think about the solving of that problem. For example, do they use manipulatives? If so, how? and for what purpose? Do they use an alternative algorithm? If they use the standard algorithm, do they seem to understand why it works or are they just following the procedure that they were taught? Again, you are trying to learn something about the student's THINKING.

While some very straightforward problems may provide this insight, you will need to think carefully about the purpose of the problems/questions that you choose and what they might tell you about the child's thinking. If you make the problems very complex, you may have trouble pinpointing patterns in the student's thinking. On the other hand, if you make the problems too simplistic, you are equally unlikely to learn anything. This is where your knowledge of the content topic and the students will come into play.

You must also think carefully about the number of questions. The goal is to ask enough questions to give you a good sense of the student's thinking, while not asking so many that the student becomes overwhelmed or bored. You should be strategic about the questions and about the information that they are likely to provide. You do not want to conduct the interview and then find that you do not have enough data about the student's thinking. This can happen when you have too few questions or if your questions are not sufficiently focused.

You will turn in a written report of the results of your interview. Your report should include the following elements:

***A list of the questions asked during the interview.***

This list should include two different types of questions:

The questions on the interview protocol: What did you plan to ask?

The questions asked that were not on the protocol: These are the questions (not included on the protocol) that you ask during the interview to probe the student's thinking. For example, "Why did you do that?" These would also include questions that you add if the original questions are too easy or too difficult.

***A description of what the child did and said.***

This should include information about the child's actions with manipulatives, written strategies, explanations, or anything else that might shed light on his/her understanding of the concept. This description should include as many details about what happened during the interview as you can record and recall. I should be able to read your description and have a good sense of what took place during the interview. This description provides the basis and supporting evidence for your analysis.

***An analysis of what the interview revealed about the child's understanding of the concept(s).***

What did you learn about the student's understanding? What did you learn about how he/she thinks about the concept involved in the interview? As much as possible, try to frame your discussion in terms of the child's strengths rather than weaknesses. Reflect on the concepts, skills, or facts the child appears to understand and his/her present level of development on a concept. Avoid general phrases such as "Jackie is average in mathematics." Be as specific as possible and provide supporting evidence, i.e., examples from the interview, to justify your conclusions.

**Relate what you saw in the interview to what you have learned about this topic from (1) your methods textbook; (2) the content of the methods course; or (3) the *Principles and Standards for School Mathematics (PSSM)*.** For example, did the student do or say things that were consistent with what you have read in the literature on your topic? Did he/she demonstrate any common misconceptions related to this concept?

***Recommendations for future instruction.***

5. **Teaching a mathematics lessons.** You should teach two mathematics lessons using manipulative materials. Your mentor teacher should observe and provide feedback. Please use the lesson plan format found on ecourseware.

**Lesson Plans (40pts)**

Your group is to design three lesson plans using the National Council Teachers of Mathematics standards and principles and a trade book in mathematics. You will pick a content area from the five strands; algebra, geometry, data analysis and probability, measurement and number and operations. The first lesson must be written for the concrete learner, the second for the semi-concrete and the third CANBE at the abstract. Your lesson plans are to cover the K-2; 3-5 and 6-8 grade levels. You are to provide an introduction explaining why you choose the grade book what principles, content standards and process standards you are addressing. A rubric will be provided for the grading of this assignment. Due **Thursday November 26th, 2009**

**Journal Articles (20 pts)**

You should critique an article from an education article. Your report should include an overview of the article, the author's purpose, the author's audience, and a brief summary. The report should include any educational significance of the study. If the article is research-based, outline the literature review participants and the methodology and conclusion. .

Answer the following questions in essay form

1. The main purpose of this article is\_\_\_\_\_.  
(State as accurately as possible the author's purpose for writing the article.)

2. The key question that the author is addressing is\_\_\_\_\_.  
(Figure out the key question in the mind of the author when s/he wrote the article.)

3. The most important information in this article is\_\_\_\_\_.  
(Figure out the facts, experiences, data the authors is using to support her/his conclusion.)

4. The main inferences/conclusions in this article are\_\_\_\_\_.  
(Identify the key conclusions the author comes to and presents in this article).

5. The key concept(s) we need to understand in this article is  
(are)\_\_\_\_\_.  
By these concepts, the author means\_\_\_\_\_.

6. The main assumption(s) underlying the author's thinking is  
(are)\_\_\_\_\_.  
(Figure out what the author is taking for granted {that might be questions}.)

7a. If we take this line of reasoning seriously, the implications  
are\_\_\_\_\_.  
(What consequences are likely to follow if people take the author's line of reasoning seriously?)

7b. If we fail to take this line of reasoning seriously, the implications are  
\_\_\_\_\_.  
(What consequences are likely to follow if people ignore the author's reasoning?)

8. The main point(s) of view presented in this article is (are) \_\_\_\_\_.  
(What is the author looking at, and how is s/he seeing it?)  
Discuss your reaction. Did you enjoy reading the article? Is the information contained in the article feasible, believable and beneficial? Did it make you think differently about the issue? Your critique must be at least two pages in length but no more than five. The journal from which you take the article

cannot be over SEVEN years old. Please include a copy of the articles and a reference page in APA format. September 24th, 2009.

***Problem solving notebook (10pts.)***

The best way to learn to teach mathematics is through problem solving. At the beginning of every class you will have some problems to solve. Please try and solve them and write down your solutions and problem solving methods. These notebooks will be taken up on test days and graded. These are the problems on ecourseware.

**Quizzes and Homework (5 pts each)**

There will be quizzes at the beginning of some classes and possible homework assigned. Their purposes are to keep you abreast of the readings and to prepare you for the multiple-choice part of my test and any standardized test. They are worth 5 points each and cannot be made up by the student.

***Tests (Points vary)***

The tests will include mathematical concepts as well as pedagogical concepts. The questions will normally be short answer, multiple choice, true/false or completion. Problems will be computational, logical, and illustrational in nature. If you must be absent from a scheduled test (with instructor approval), please contact the instructor personally, prior to the absence to make alternative arrangements for taking another more difficult test.

**Attendance, Assignment Policy, and Make-up Policy**

All students are expected to attend all sessions and participate in class discussions and activities. Excessive absences (more than one), excessive tardiness or early dismissals will result in a reduction of your grade. Two early or late arrivals count as one absence. One absence is a freebie. Two absences will result in a reduction of your final grade by three points. our absences will result in a reduction of your final grade by six points. I encourage you to read the chapters before they are discussed in class and we will discuss the information in terms of its validity, feasibility, and value in today's classroom. Have something to share! You are responsible for everything in the text, any additional readings and everything we cover in class. Late assignments will only be accepted with prior permission from the instructor. The grade for the assignment will be adjusted accordingly.

<b><i>Grade</i></b>	<b><i>Percentage</i></b>
A	90-100
B	80-89
C	70-79
D	60-69

**Students with Disabilities:**

It is the policy of the University of Memphis to accommodate students with disabilities pursuant to federal law, state law, and the University's commitment to equal educational opportunities. Any student with a disability, who needs accommodation, for example in seating placement or in arrangements for examinations, **should inform the instructor at the beginning of the course.** Students with disabilities are encouraged to contact Student Disability Services, 110 Wilder Hall, phone 678-2880.

**Plagiarism**

All acts of dishonesty including plagiarism constitute academic misconduct. This is a grave offense and can result in failing the assignment, the class and expulsion from The University of Memphis. This is no joke!

**Professionalism**

Your active participation in this class is essential for building a productive learning community. It is expected that you will give freely of your ideas, constructively react to the ideas of others, and offer constructive suggestions for the good of the group. Responsibility for participation also includes: completing assigned readings and computer activities, willingness to take risks in sharing your opinions, and verbally participating in class discussions and activities. This includes professional dress and attitudes or dispositions toward the subject, the school, your cooperating teacher and last but certainly not least the children.

**FYI Thank you for turning your cell phone on vibrate**

**Course Calendar**

<i>Date</i>	<i>Topic</i>	<i>Readings</i>	<i>Assignments due</i>
Week 1 Thursday Sept 3rd	COE assessment		<b>Email due Friday Sept 4<sup>th</sup> by 5:00 pm</b>
Week 2 Thursday	Learning Mathematics Geometry	Chap. Chapters	<b>It's all about me... Chap. 16 7 a-c; 8a-c; 10a-i</b>

Sept 10th		1 & 16	;12,
<u>Week 3</u> Thursday Sept 17th	Teaching Mathematics Geometry	Chap. 2 & 17	<b>Math Autobiography</b> **due beginning of class place in folder and upload to ecourseware Chap.17 1a-c; 1a-c; 5a-c
<u>Week 4</u> Thursday Sept 24th	Assessing Mathematics Measurement	Chap. 3 & 15	Chap 15 1, 2a-d;3a-c;5a-f; 6a-f;7a-f;8a-f <b>Pick groups</b>
<u>Week 5</u> Thursday Oct 1st	Data Analysis	Chap. 5 & 14	Chap 14 1;3a-e;4a-e;5
<u>Week 6</u> Thursday Oct 8th	Number Sense	Chap. 6	Chap. 6 1, 2, 4, 5a-c,6, 14a-b, 15, 19,23, 24
<u>Week 7</u> Thursday Oct 15th	Test I		
<u>Week 8</u> Thursday Oct 22th	Addition and Subtraction	Chap. 7	<b>Field Experiences</b> 1-3
<u>Week 9</u> Thursday Oct 29th	Multiplication and Division	Chap 8	
<u>Week 10</u> Thursday Nov 5th	Number Theory	Chap. 9	Chap. 9 1a-c, 2 a-c, 4 a-d, 6, 8 a-c, 9a-c, 15a-c, 16 a-c, 17 a-c, 18 a-c 19 a-c 20 a-c 22
<u>Week 11</u> Thursday Nov 12th	Number Theory	Chap. 9	Chap. 9 1a-c, 2 a-c, 4 a-d, 6, 8 a-c, 9a-c, 15a-c, 16 a-c, 17 a-c, 18 a-c 19 a-c 20 a-c 22 <b>Lesson Plans due</b>
<u>Week 12</u> Thursday Nov 19th	Thanksgiving		
<u>Week 13</u> Thursday Nov 26th	Rational Numbers (Fractions)	Chap. 11	Chap 11 1a-b, 2 a-b, 3a-b, 4, 5 a-b, 6a-d, 7a-c, 8a-d, 9, 10
<u>Week 14</u>	Fractions	Chap.	<b>Field Experiences</b>

10/30/2009

Thursday Dec 3rd		12 & 13 if time.	<b>4-5</b> Chap 12 1,2, 4, 5, 6a-c, 7a-c, 8a-c, 9a- c, 11a-c, 12, 13, 16
<u>Week 15</u> Friday Dec 11 <sup>th</sup>		<b>Exam</b>	<b>8:30 to 10:30</b>