SOUTHERN ILLINOIS UNIVERSITY AT CARBONDALE
DEPARTMENT OF CURRICULUM & INSTRUCTION [CI]
Course Information – Syllabus – Course Schedule

SPRING 2016

THIS IS REQUIRED READING BY ALL STUDENTS IN
CI 120 SPRING 2016

C&I 120 – Mathematics Content and Methods for the Elementary School I
[Sections: 001, 002]

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Wham 326E [Inside suite 322]

OFFICE HOURS: After class
and By appointment

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Always feel free to contact me for an appointment at other times.

CLASS days/times:

Section 1: M,T,Th 11:00 - 11:50 a.m. Wham 202
Section 2: M,T,Th 12:00 - 12:50 p.m. Wham 202

Overarching expectation of students:
To take responsibility for their own learning

Overarching assumption:
That pre-service teachers will take an active role in their own learning

Main spirit in the course
The content of the course will be directly related to the elementary/middle school mathematics curriculum and its teaching – You cannot teach what you do not know

Overarching objectives in the course
. to improve students’ attitudes towards mathematics,
. to change students’ beliefs about what mathematics is,
. to reduce anxiety in doing mathematics, and about mathematics,

. to re-learn, with understanding, much of the mathematical content of elementary/middle school mathematics,

. to learn new mathematical content and pedagogy directly related to the elementary/middle school mathematics curriculum,

. to learn to think in a correct way about teaching mathematics at the elementary/middle school levels

**Overarching course themes**

1. Openness in mathematics education:

   Apply openness to problem solving – routine problems, that is, from the content of the traditional elementary/middle school mathematics curriculum, and non-routine problems; assessment [e.g., van den Heuvel and Becker (2003)]

   Examples of problems and detailed lesson plans (some already available) or roughed out lesson plans (that can be made more detailed)

2. Mental computation:

   Mental computation will be emphasized at every opportunity in the course.

3. Children’s informal mathematics: [e.g., Becker and Selter; Carpenter et al., Cognitively Guided Instruction (CGI) materials]

4. Teaching aids … Representations

   External representations can assist learners to develop their own internal representations. The general attitude towards manipulative teaching aids in the course will be to use them, but “less is more!”

   There will be an emphasis on use of examples to illustrate how students (school and college) develop representations using their own natural thinking abilities to solve problems.

5. Importance of and appropriate ways to develop basic skills

   The addition, subtraction, multiplication and division facts (while avoiding the “drill-to-kill” regime) and place value will be emphasized early in the course.

**Learning/teaching resources**


Selected articles – e.g., open approach to teaching mathematics, characteristics of the elementary/middle school mathematics curriculum (too much repetition)

Videotapes (e.g., Polished Stones, Project Mathematics, Kamii, TIMSS)

Computers (with learning software from Germany))

Calculators – basic functions and fraction calculators

E-mail – posting important reading information to students to enable them to remain up-to-date on current issues in mathematics teaching.

World Wide Web – (a) Reform debates: MathematicallySane and MathematicallyCorrect websites; (b) listserves – math-teach, math-learn, NCSM, ICTM, others; (c) teaching resources: Eisenhower National Clearinghouse (ENC), others

Teaching aids / related print materials

Teaching materials for the course will be developed as the course unfolds around the main foci.

Assessment of students – a subset of the following

Students will develop a comprehensive and well-organized Notebook through the semester [The Glue to the Classroom] -- a 3-inch, 3-ring binder of materials with the following sections: (1) Course organization (objectives of course, course outline, assessment/evaluation information, course resources, final exam schedule, etc.), (2) Class notes, (3) – Assigned reading - Reading summary (Liping Ma chapters), (4) Reading summary (The Open-ended Approach – (Becker/Shimada chapters), (5) Assignments, quizzes, review, etc. (6) E-mail notes, (7) Other handouts, (8) Overall evaluation.

The Notebook will serve as an important basis for assessing/evaluating students and assigning the course grade.

Quizzes (on class work and readings) – true-false, multiple choice, completion, problems or a subset of these

Final exam – with ample time to demonstrate what students know

Writing assignments – several during the course, to improve writing skills
. Instructor subjective evaluation of students

. Regular out-of-class assignments

. Extra credit work

. Other

Learning/teaching resources

Selected articles will be handed out for reading and study and note-taking

Videotapes (e.g., Polished Stones, TIMSS, Project Mathematics)

Computers (with learning software)

Calculators – basic functions and fraction calculators

E-mail – Important reading information will be posted by email to students to enable them to remain up-to-date on current issues in mathematics teaching and education. Students will receive information on “hot” issues in education.

Requirements

Cell phones are not allowed inside the classroom. You are required to shut them off before entering the room and place them in your backpacks. There are no exceptions to this.

Come to every class session and be on time – a strict record will be kept of being LATE or being ABSENT – grades are determined by attendance and late-to-class records. Be in your seat and ready with your Notebook open when the professor begins class.

Be alert and pay attention in class
You may not leave the room during class without permission.

Maintain the NOTEBOOK/binder/portfolio of all course materials [3-inch, 3-ring binder] – THIS IS AN IMPORTANT PART OF THE COURSE AND IS IMPORTANT IN DETERMINING YOUR COURSE GRADE.

Read the Student Conduct Code handed out.

Read the Emergency Information Sheet handed out.

Read Provost’s Syllabus Attachment handed out.

Check the Final Examination Schedule for date of final

Completion of all course work – there will be no grade assigned until all coursework is handed in

Do your own work in the course unless directed otherwise

Actively participate in class activities – Take Responsibility for Your Own Learning

Read and study the books and materials handed out in class

**Resources -- Your fellow students, handouts, textbooks, other Math Lab resources**
-- DRESS APPROPRIATELY FOR CLASS!

-- NO FOOD OR DRINK IS ALLOWED IN THE MATH LAB – WHAM 202/201. [If you have a medical problem, speak with the professor about it.]

-- You are expected to comply with your professor’s expected behavior in class – appropriate conduct at all times. **If you do not comply, you may be asked to drop the course.**

TWO absences without satisfactory reason will result in you final grade being lowered by one letter grade.

Should you miss a class you must provide the professor **with an e-mail note that gives your name, date of absence, and reason.** This note(s) will be retained by the professor. (The professor will decide if the reason stated is satisfactory or not.) [This policy is much more relaxed than those you will encounter as a full time teacher or in other employment. Many employers consider missing work AWOL or abandonment of post. This can get you fired. Your professor wants you to be successful, so he is making you aware that you are expected to be in class, and to be on time.]

Should you miss a class, please consult with another
student in the class to get the missing notes, required work, etc., or see the professor or graduate assistant during office hours. The professor can provide you with guidance and materials as needed. Get the email addresses and you are prepared to contact them to find out what may have been missed.

Please keep daily class notes in your Notebook. At the beginning of each class, write the day and date and highlight it, followed by your notes for the day.

You are required to bring your Notebook to class each day.

Since you are preparing to be teachers, professional conduct is expected at all times. The professor may ask you to drop the course if you fail to attend, fail to be engaged during class, fail to perform at an acceptable academic level, become disruptive or otherwise appear to the professor that you are not serious about becoming a teacher.

The professor respects and values you as a person who aspires to be teacher. Please return this respect to the professor and remember he has achieved and excelled at what you aspire to, so you can learn from him.

There may be some classes that are video-audio taped.
CI 120 COURSE SYLLABUS  -- Sprng 2016

Flow of the course

PRETESTING: Computation

We will pretest students to determine their weaknesses with respect to basic computational skills. Spend some time on students’ difficulties.

DESCRIBE THE COURSE

State expectations of students: materials needed, course outline, class attendance, assignments (reading and writing), assessment/evaluation, and so forth.

ADDITION OF WHOLE NUMBERS

Begin by asking a student to give the answer to, say, $8 + 7 = ?$. Ask how she got the answer. Then explore other ways of getting the answer: counting up from 7 or 8 or 1; doubling and adding (or subtracting) 1; decomposition of 7 or 8 or both. Explore other ways to get the answer. Focus on children’s informal mathematics and their natural ways of thinking mathematically. Examine more examples.

Ask a student to find the answer to, say, an addition problem of two three-digit numbers. Students will see that they all do the problem exactly the same way, the traditional algorithm – discuss why this is the case. What other ways can we do addition? From this find answers to some problems left-to-right, right-to-left, middle-out – discuss what is necessary in order to have this “empowering” way to do addition, that is, knowing place value and the basic addition facts. Discuss partial sums and place value. [Knowing the basic facts and understanding place value is key in elementary school mathematics.]

SUBTRACTION OF WHOLE NUMBERS

In a similar way, deal with a subtraction problem, say,

\[
\begin{array}{c}
34 \\
-7
\end{array}
\]

In what ways might children get the answer (there are many): counting up from 7; counting down from 34; decomposing the 7 to 4 and 3 so 30 – 3; subtracting 7 from 30 and adding 4; seeing that 4 – 7 = -3, so 30 + (-3) = 27; represent the problem on the number line. Focus on mental computation. As an aside, ask students to find the answer to
Ask them why they ‘borrowed’ ten ones from 1, which makes the problem an identical one, namely, 14 – 5? [The reason is that they have simply learned a mechanical procedure and mindlessly carry it out – they do not think.] Discuss this.

Now do a similar thing with the subtraction algorithm as was done with the addition algorithm. Students will find the answer by working right to left, and ‘borrowing.’ Ask, again, why do they do this? Discuss it.

Inquire about other ways to do subtraction and lead to several other algorithms or ways to do subtraction - e.g., the New Zealand approach, the “carrot” approach. Discuss that by using a different approach, or algorithm, subtraction may be done mentally and from left-to-right, right-to-left, or middle-out. Tie this in with Liping Ma’s thinking with respect to decomposition vs. “borrowing” or “regrouping” in subtraction, that is, “borrowing” is a mechanical procedure laden with pitfalls, as opposed to decomposition of numbers that is not mechanical.

Mention that alternate algorithms (to the traditional algorithm) may facilitate mental computation, and that we value this in this course and they should value it in teaching elementary/middle school mathematics.

MULTIPLICATION OF WHOLE NUMBERS

Ask a student to multiply two two-digit numbers. The student will likely use, and only use, the mechanical procedure learned in school – that is, right-to-left and “indent.” Further, they believe there are no other ways to do multiplication, and certainly they believe they cannot do the multiplication mentally! Discuss the pitfalls of the traditional multiplication algorithm, that is, error patterns that students learn (give an example), that are very difficult to correct. [Misconceptions are extremely difficult to undo, or correct.] Now introduce several ways to multiply two two-digit numbers mentally: “Brad Fulton” method [left-to-right, criss-cross method (used by the ancient Vedic people), partial products]. Then extend to multiplying two three-digit numbers mentally, writing the product one digit at a time. Show an algebraic justification for this approach to multiplication.

Then extend to two four-digit numbers (only a little emphasis on four digits). Examine the patterns for multiplication using the criss-cross method – 2 X 2, 3 X 3, 4 X 4.

Discuss a different way to develop multiplication, that is, the German approach that culminates, in grade 4, with all students doing multiplication mentally. Use the German method to, in a natural way, see that (-1) x (-1) = +1, and there is no need to develop artificial “crutch type” problems to explain why the product of two negatives is positive! [Provide a handout in which a
proof is written that the product of two negative numbers is positive – briefly discuss what a proof is.]

Introduce the German “dot chart” teaching aid that is effective in teaching/learning the basic multiplication facts, the distributive property (focus on this), and forming the partial products in finding the product of a two-digit and one-digit number and two two-digit numbers. Students will see how really effective this simple inexpensive teaching aid can be.

Spend some time on the German method, and extend to the product of two three-digit numbers and some elementary algebra – e.g., \((a + b) (a + b); (a + b) (a – b); (a + b + c) (a + b + c)\). Emphasize how it contributes to mental computation.

Discuss the role of knowing the basic multiplication facts and understanding place value – emphasize how empowering it is to them and to elementary school students.

Similarly, deal with division and see the role of the basic facts and place value.

FRACTIONS

Consider multiplication and division of fractions. Use representations to show why the algorithm works for the product of two fractions. Similarly, for division of fractions. The representations may give meaning to the traditional algorithms. For division, illustrate different ways of dividing a fraction by another, and, for sure, emphasize exactly what is involved in division of fractions, that may be hard to understand, and, therefore, why some students find this so challenging. Put special focus on number sense and its importance, using carefully selected examples.

PRACTICE IN COMPUTATION, WHILE SOLVING PROBLEMS

Here we provide a new perspective on practice in developing computational skills using several problems that have the following characteristics; the problems

1. have a simple rule that helps students get into the problem,
2. engage students in mathematical thinking,
3. provide students with computational practice while solving the problem,
4. involve substantial mathematics, that is, they connect mathematical content to content at a higher grade level in school, or beyond.

Recalling that practice in computation is very important in the elementary school, but that a “drill-to-kill” regime is not constructive, introduce each of the following problems, separately.

**Arithmogons Problem**: Students need to know only a simple rule to begin solving the problem; there are many ways to solve the problem; reasoning (and discussion/communication) leads to significant results; practice can be provided on sets of numbers the teacher thinks is important; students will learn about linear equations; results for triangular arithmogons can be generalized to other arithmogons; and so on. Show there is a unique solution for the triangular arithmogon. Point out equivalent ways to solve. Discuss how the triangular arithmogon problem can be
transformed into elementary school curriculum and teaching materials and hand out examples. [NOTE: This may be the first such mathematical experience these students have had.]

We begin with the rule – add the numbers in the two circles to get the number in the square; so 5 + 7 = 12.

![Arithmogon example](image)

Now find the numbers for the squares in the triangular arithmogon below.

![Arithmogon example](image)

Now, we put the numbers in the squares and ask the students to find the numbers for the three circles. Now they have a problem to solve.

![Arithmogon example](image)

We will see that when students, depending on their ages, are given the arithmogons problem, in aggregate there is a variety of methods they may use to solve the problem:

- trial and error: random or systematic
- one linear equation
- two simultaneous equations
- three simultaneous equations
- reasoning – that is, the sum of the numbers in the squares will be twice the sum of the numbers in the circles. Using this idea, any triangular arithmogon can be solved quickly, and only reasoning is involved.
. let the numbers in the squares be \( a, b, c \), rather than particular numbers. If \( x \) represents the number in the top circle, then \( x = a + b - c / 2 \) gives a general solution. Here the student changes her/his perspective on the problem and gets a general solution.

The ‘theory of arithmogons’ can be extended further by considering arithmogons of four sides (How is this case different?), five sides, and so forth.

**Sum of the Squares Problem (1):** Students need to know only a simple rule to begin solving the problem; there are many ways to solve the problem; reasoning (and discussion/communication) leads to significant mathematical findings; practice can be provided on sets of numbers the teacher thinks is important; results for five squares can be generalized to other cases. [Note: Solving the problem connects to: many ways to solve, the concept of an arithmetic mean, ordered pairs, graphing ordered pairs, collinear points, slope, parallel lines, y-intercept, further meaning given to the concept of the mean, arithmetic progressions, finding the n-th term of an arithmetic progression, and using algebra. [The problem also connects to the idea of the average height of a linear graph and the formula for the area of a trapezoid, and an area of mathematics called harmonics, at a higher level – only make reference to it.]

We begin as in the diagram below, in which there are five squares in a row, with the first designated as the “starting number,” the number above designated the “adding number” and a square to the far right designated as the “sum of the squares.” If we begin with the starting number 3 and an adding number 5, then the squares are, consecutively, 3, 8, 13, 18, and 23, where we add 3 to each square successively. Then we add them to get 65 and place it in the square to the right.

Or, as another example, if our starting number is \(-5\) and the adding number is 2, then we have \(-5, -3, -1, 1, 3\) and the sum of the squares is \(-5\).

Now, however, suppose we have the following, where we want to determine the “starting” and “adding” numbers, given the “sum of the squares”:

Here we have a problem to solve. How can elementary school students find the starting and adding numbers?

**Number Pyramid Problem:** Students need to know only a simple rule to begin solving the problem; reasoning (and discussion/communication) leads to significant mathematical findings;
practice can be provided on sets of numbers the teacher thinks is important; a change in a number in one place results in what number change in another place (in the pyramid); exploring the properties of number pyramids; connecting them and the activity to Pascal’s Triangle; and more algebra. In addition to Pascal’s Triangle, the problem connects to the binomial theorem, permutations, combinations, factorial, and other ideas.

We begin with the rule that the number in one square is the sum of the numbers in the two squares below it. Fill in the numbers in the ‘open’ squares in the number pyramids below.

Now consider the number pyramid below. [Selter, 2000]

1. How does the top square change if you add 1 to the first square at the bottom?

2. How does the top square change if you add 2 (3, 4, 5, … n) to the second (third, fourth, fifth, … ) square at the bottom?

3. Suppose four numbers, such as 4, 5, 9, 11, are given. How should they be arranged so that the top square is as large as possible?

4. How should they be arranged so that the top square is as small as possible?

5. What is the relationship to the top square of entering the same integer in each of the bottom squares?

6. What is the relationship to the top square of entering consecutive integers in each of the bottom squares?
7. Is it possible to reach a certain number, such as 100, if the bottom squares are the same?

8. Is it possible to reach a certain number, such as 100, if the bottom squares are consecutive numbers?

9. Can different number pyramids be determined that have a given number in the top square?
   What is the relationship between them? Can you determine how many there are?

10. Can the findings be transferred to number pyramids with 2, 3, 4, 5, 6, 7, … squares in the bottom row?

**Sum of the Squares Problem (2):** Students need to know only a simple rule to begin solving the problem; reasoning (and discussion/communication) leads to significant ways to think about solving the problem – many ways; a change on a number in one place results in what change in another place; exploring properties and connecting them in solving the problem.

**Squares Problem**

```
+---+---+---+
| 5 | 2 |   |
+---+---+---+
| 6 | 4 | 10 |
+---+---+---+
| 11| 6 |   |
+---+---+---+
```

11 + 6 + 9 + 10 + 7 = 43

Now I give you the “sum of the square” and you find a square.

```
+---+---+---+
|   |   |   |
+---+---+---+
|   | 40 |
+---+---+---+
```

All four problems above have the following characteristics that should be emphasized: Students are engaged in mathematical thinking (reasoning/problem solving); students get practice in computation while they solve the problems; and the problems involve substantial mathematics [which means the mathematics of the problem at the elementary school level generalizes to, leads to, is connected to or is a model of further mathematics at a higher grade level (or it is what mathematicians see when they see these “elementary” problems)].

Emphasize to students that as they think about how to solve these problems, and when we discuss their multiple ways of solving them, they are thinking like mathematicians, that is, they are mathematicians and they can and are doing mathematics. [Probably they do not believe this,
so spend some time on what they think mathematics is, and what it really is, that is, an activity that involves reasoning.]

NOTE: We have other nice problems that can be used, depending on various factors – for example, the “Christmas Problem” that provides for many ways to solve and then generalizing to a formula [it involves using the “Gauss” formula: \( S = 1 + 2 + 3 + \ldots + (n-1) + n = n(n+1)/2 \)].

Perhaps briefly discuss proof by mathematical induction; for example, imagine an infinitely long line of students (1, 2, 3, …) and a secret is whispered to the first student in line. Whenever a student hears the secret, that student turns and repeats it accurately to the next student in line. Who in the line knows the secret? [Everyone]. Two assumptions in this story are: 1. student # 1 knows the secret; 2. if a student hears the secret, she/he turns and repeats it accurately to the next student in line.

Now, derive the Gauss formula \( 1 + 2 + 3 + \ldots + (n-1) + n = n(n + 1)/2 \)

SOLVING OPEN-ENDED PROBLEMS

Pose a number of problems for students to solve where the process is open, the end products are open and students’ ways of formulating problems is open. The problems should be carefully chosen so that students can see the many approaches, answers, and ways to formulate problems.

The problems and how they are used in class should be closely connected to the lecture on the “Open Approach.”

FORMULAS FOR FINDING THE AREA OF SEVERAL QUADRILATERALS AND CIRCLE – rectangle, parallelogram, trapezoid, triangle, circle.

Using openness and paper cutting or paper folding, derive the formulas for the areas of a parallelogram, trapezoid, triangle, and circle. Assuming knowledge of the formula for the area of a rectangle \([A = b \times h]\) and the circumference of a circle \([C = 2 \times \pi \times r]\), all the formulas can be nicely derived and are connected to the formula for finding the area of a parallelogram. Show the video from *Project Mathematics!* for students to learn more about the number \(\pi\).

AN EXAMPLE OF AN INTERESTING TEACHING AID – the Papy Minicomputer

Introduce the Papy Minicomputer as a model of the number system – use it for representing numbers (whole numbers, decimals); counting; learning the basic facts; operations on numbers (addition, subtraction, multiplication, division); connect to the idea of multiple representations; place value; and mental computation. Use magnetic buttons on the whiteboard when teaching the minicomputer and have students make their own minicomputer (easy to do). Play a “thinking game” on the minicomputer.

AREA AND PERIMETER ON A GEOBOARD
Introduce the concept of area on the geoboard by showing various polygons and determining the area by partitioning it or by enclosing it in a rectangle and subtracting off parts not in the polygon. Illustrate the use of symmetry in finding areas. Introduce the concept of perimeter (no diagonals shown in a 4-dot square).

Irrational numbers cannot be expressed as the ratio of two integers: a/b, where a, b are integers and b does not equal 0.

Give a general overview of the real number system: counting numbers, whole numbers, integers, rational numbers, irrational numbers, and the real numbers – briefly discuss some properties – e.g., denseness, completeness.

GEOMETRY ON THE GEOBOARD

Use the geoboard to enhance an understanding of line symmetry and introduce reflections, translations and rotations.

Briefly discuss translations and rotations and rotational symmetry, making use of the Mira.

LECTURE: “A PERSPECTIVE ON TEACHING MATHEMATICS IN THE SCHOOL CLASSROOM

This talk introduces students to “openness” in mathematics teaching and how to improve teaching and curriculum at the elementary/middle levels. Also, students learn about lesson records and detailed lesson plans – give examples to students.

Solve several problems in which: the process is open [unique answer, many ways to get it], end products are open [several or many correct answers] and ways of formulating students’ own problems is open. These reinforce what was earlier said about the “open approach.”

Continue open-ended problem solving, as in the following.

JPB 1/20/2016
COURSE SCHEDULE

CI/MATH 120: Mathematics for Elementary School Teachers I

Spring 2016 [Sections 1, 2]

Week 1: January 18 - 22

READINGS ASSIGNMENTS

M  NO CLASS Martin Luther King, Jr. Holiday
T  Pretest
TH Administrative Procedures

Week 2: January 25 - 29

M  Administrative Procedures
T  Addition of Whole Numbers [Algorithms]
Th Subtraction of Whole Numbers [Algorithms]       White Ch. 1

Week 3: February 1 – 5

M  Subtraction of Whole Numbers [Algorithms]
T  Tie in Addition / Subtraction to Liping Ma
Th Multiplication of Whole Numbers [Algorithms]       White Ch. 2

Week 4: February 8 -12

M  Multiplication of Whole Numbers [Mental computation]
T  Percents [Mental computation]       White Ch. 3
Th Division of Whole Numbers [Mental comp’n]

Week 5: February 15 - 19

M  Operations on Fractions
T  NO CLASS – PARTICIPATE IN MATH CONFERENCE
Th NO CLASS – PARTICIPATE IN MATH CONFERENCE

Week 6: February 22 - 26

M  Substantial Mathematics I       Summary of
T  Substantial Mathematics I       Chs. 1-3
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<th>Day</th>
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<td>Th</td>
<td>Substantial Mathematics I, II</td>
<td>White Ch. 4</td>
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**Week 7: February 29 – March 4**

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<th>M</th>
<th>Substantial Mathematics Problems – II</th>
<th>White Ch. 5</th>
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<td>Substantial Mathematics Problems - II</td>
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<td>Substantial Mathematics Problems - III</td>
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**Week 8: March 7 - 11**

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<th>M</th>
<th>Substantial Mathematics Problems - III</th>
<th>Summary of Chs. 4-5</th>
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<td>ADJUSTMENT DAY</td>
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**Week 9: March 14 - 18**

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**Week 10: March 21 - 25**

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<th>OPEN APPROACH</th>
<th>Black Ch. 2</th>
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<td>Open-Ended Problems</td>
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**Week 11: March 28 - April 1**

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<th>Open-Ended Problems</th>
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<td>Formulas for finding the area of figures</td>
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<td>Perimeter of geometric figures</td>
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**Week 12: April 11 – 15**

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<th>Example of a good teaching aid</th>
<th>Black Ch. 3</th>
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**Week 13: April 18 - 22**

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<th>M</th>
<th>Area and perimeter on geoboard / Irrational numbers</th>
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T Area and perimeter on geoboard / Irrational numbers
Th OPEN Black Ch. 4

Week 14: April 25-29

M Use of Learning Software
T Use of Learning Software
Th Use of Learning Software

Week 15: May 2 – May 6

M OPEN
T OPEN
Th OPEN

Week 16: May 9 - 13

FINAL EXAMS WEEK – DATE/PLACE OF FINAL WILL BE ANNOUNCED IN CLASS AND GIVEN IN THE FINAL EXAM SCHEDULE HANDED OUT IN CLASS

NO CLASS ALL WEEK – FINAL EXAMINATIONS

M NO CLASS
T NO CLASS
W NO CLASS
Th NO CLASS
F NO CLASS

REQUIRED BOOKS

Purple (or white) book: Liping Ma – Knowing and Teaching Elementary Mathematics