Wayne State University  
College of Education  

Course Syllabus

Division: Teacher Education  
Program Area: Mathematics Education  
Course: ELE 3400: Mathematics Curriculum: Preprimary-Grade 9  
Section: 001  
Course Credit: 3 semester hours  
Term/Year: Fall, 2012  
Course Location: Education 255  
Time/Day: 12:50 pm-3:35 pm, Mondays  
Instructor: David J. Whitin  
   Office: 267 Education; phone: 577-1671;  
   email: an7657@wayne.edu  
   Office Hours: Mondays, 4:00-5:30 pm;  
   Tuesdays, 2:30-4:30 pm  
   Call appointment secretary at 577-0902

Course Description:

The overall goal of this course is to introduce students to the major concepts in mathematics for elementary school students. This course focuses on key principles of learning as well as instructional practices that are consistent with those theoretical principles. The goals of this course are consistent with the Principles and Standards for School Mathematics (2000) published by the National Council of Teachers of Mathematics as well as the Michigan Curriculum Framework Standards and Benchmarks for Mathematics (1998).

Course Objectives:

In this course students will be able to:

1) Discuss and implement the goals of the Michigan Curriculum Framework Standards and Benchmarks for Mathematics (1998), and the Principles and Standards for School Mathematics (2000) published by the National Council of Teachers of Mathematics regarding the teaching of mathematics;
2) Instruct children in the use of a variety of technological tools;
3) Assess student learning in a variety of ways, such as tests, written explanations, classroom discussions, applications of concept across subject fields, etc.
4) Plan differentiated instruction for children, with particular attention to those who represent multicultural, language-diverse populations and children with special needs;
5) Reflect on their learning and plan next steps for their teaching;
6) Access digital professional resources to inform their teaching;
7) Identify strategies for building a community of mathematical thinkers;
8) Integrate reading and writing experiences into the mathematics curriculum.

The mathematical content of this course is tied to the test objectives of the Michigan Test for Teacher Certification (MTTC) and to the Michigan Mathematical Standards (MS). Below is a list of those test objectives and their tie to the standards:

1. **Apply a variety of approaches to interpret and solve mathematical problems in real-world contexts.** (MS-problem solving)
   Includes applying appropriate mathematical concepts or strategies (e.g., estimation, mental computation, working backwards, simplifying, modeling, pattern recognition) to solve a problem; evaluating the solution to a problem; and applying mathematical approaches to solve problems in a variety of contexts.

2. **Understand mathematical communication and use mathematical terminology, symbols, and representations to communicate information.** (MS-communicate mathematically)
   Includes interpreting mathematical terminology, symbols, and representations; using graphic, numeric, symbolic, and verbal representations to communicate mathematical concepts and relationships; and converting among graphic, numeric, symbolic, and verbal representations.

3. **Understand concepts and skills related to whole numbers, number theory, and numeration, and apply this knowledge in problem-solving contexts.** (MS-number sense and numeration)
   Includes recognizing and comparing properties of whole numbers and the whole number system (e.g., commutative, distributive); recognizing different classes of problem situations related to whole number operations (e.g., partitive and measurement division); applying concepts of number and numeration systems to compare, order, and round; recognizing the logic of and relationships among mathematical operations; applying mathematical operations in real-world situations; and using a variety of materials, models, and methods to explore concepts and solve problems involving whole numbers and numeration.

4. **Understand and apply concepts and skills related to rational numbers and the fraction, decimal, ratio, and percent interpretations.** (MS-number sense and numeration)
   Includes using integers, fractions, decimals, ratios, and percents to solve problems; comparing and ordering fractions, decimals, and percents; identifying equivalent forms of fractions, decimals, and percents; and using a variety of materials, models, and methods to explore concepts and solve problems involving integers, fractions, decimals, ratios, and percents.

5. **Understand and apply algebraic concepts and methods.** (MS-numerical and algebraic operations and analytical thinking)
Includes deriving algebraic expressions to represent real-world patterns, relationships, verbal expressions, symbols, and pictorial information; applying the concepts of variable, function, and equation to express relationships algebraically; using tables and graphs to explore relationships and make predictions; comparing and using expressions involving exponents, powers, and roots; and using a variety of materials, models, and methods to explore concepts and solve problems involving algebra.

6. Understand and apply principles, concepts, and procedures related to measurement. (MS-geometry and measurement)
Includes estimating and converting measurements within the customary and metric systems; applying procedures for using measurement to describe and compare phenomena; identifying appropriate measurement instruments, units, and procedures for measurement problems involving length, area, angles, volume, mass, time, money, and temperature; and using a variety of materials, models, and methods to explore concepts and solve problems involving measurement.

7. Understand and apply principles and properties of geometry. (MS-geometry and measurement)
Includes recognizing types and properties of plane and space geometric figures; using basic geometric concepts (e.g., similarity, congruence, tessellations) and spatial sense to solve problems; identifying and applying geometric transformations; classifying figures according to symmetries; using coordinate systems on lines and planes to solve problems; and using a variety of materials, models, and methods to explore concepts and solve problems involving geometry.

8. Understand concepts and skills related to statistics and probability, and apply this knowledge to evaluate and interpret data and solve problems in real-world contexts. (MS-data analysis and statistics; probability)
Includes interpreting graphic and nongraphic representations of statistical data (e.g., frequency distributions, measures of central tendency, percentiles); applying concepts of statistics and probability to collect and organize data, identify patterns and trends, and draw conclusions; determining probabilities and making predictions based on simulations or theory; and using a variety of materials, models, and methods to explore concepts and solve problems involving statistics and probability.

9. Understand and apply formal and informal mathematical reasoning processes in a variety of contexts. (MS-reason mathematically)
Includes analyzing problem situations, making conjectures, organizing information, and selecting strategies to solve problems; evaluating solutions to problems; constructing arguments and judging the validity or logic of arguments; and using logical reasoning to draw and justify conclusions from
10. Understand the use of calculators and computers for mathematical exploration and problem solving. (MS-patterns, relationships and functions; problem solving)

Includes recognizing common uses of calculators and computers as tools for learning, exploration, and problem solving; analyzing the benefits and limitations of calculators and computers in problem solving situations; and using strategies and activities involving calculators and computers to investigate and solve mathematical problems.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment of Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>From your work in this class, you will learn to:</td>
<td>Your learning will be assessed by your:</td>
</tr>
<tr>
<td>reference policy documents in developing lessons for students in mathematics, including GLCEs, NCTM Standards, Common Core Content Standards in mathematics</td>
<td>weekly written responses to class readings; projects working with children</td>
</tr>
<tr>
<td>appraise the quality of mathematics instruction based on NCTM’s Standards for School Mathematics and the Common Core Standards of Michigan</td>
<td>weekly written responses to class readings; analyses of in-class videos of classroom mathematics lessons</td>
</tr>
<tr>
<td>demonstrate command of mathematical knowledge for teaching in place value, number and operations, geometry, measurement, graphs, fractions, decimals and percent using <em>Elementary and Middle School Mathematics</em>, Van de Walle, 7th edition</td>
<td>weekly written responses to class readings; final examination; participation in small and large group discussions</td>
</tr>
<tr>
<td>integrate reading and writing experiences into the mathematics curriculum</td>
<td>data project and literature projects</td>
</tr>
<tr>
<td>formulate questions and adopt a stance of listening in order to elicit a child’s thinking on mathematical topics and interpret that thinking</td>
<td>data project and literature projects; weekly written responses to class readings; analyses of classroom conversations</td>
</tr>
<tr>
<td>use concrete materials to model mathematical ideas, linking materials to symbolic representation with clear explanatory language</td>
<td>class participation using base 10 blocks, pattern blocks, unifix cubes, color tiles, geoboards; final examination</td>
</tr>
<tr>
<td>identify strategies for building a community of mathematical thinkers</td>
<td>weekly written responses to class readings; participation in small and large group discussions</td>
</tr>
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<td>apply a variety of approaches to interpret and solve mathematical problems in real-world contexts</td>
<td>weekly written responses to class readings; participation in small and large group discussions</td>
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</table>
MTTC Tests - Michigan Test for Teacher Certification

In the state of Michigan, a pre-service teacher must take and pass a test in each of the content areas in which s/he plans to be certified. At Wayne State University, passing the MTTC tests is a requirement to the student teaching field experience. As a result, it is imperative that pre-service teachers prepare for the tests. There are a number of resources available to teachers to help them prepare for the tests.


2. Study for the tests. Even if you have a major in a subject area, you need to review the material in order to pass the tests. Basic information in the content area is usually tested, so reviewing a basic textbook in your content area (e.g., integrated science, math) and the concepts related to that specific test’s objectives will maximize the chances of succeeding. Also, do an online search for textbooks in your particular area.
   In addition to reviewing the material from a basic textbook, study guides are excellent resources to prepare for these tests. The following websites have study guides that students may purchase at an affordable price:

   • One of the best books for preparing for this test is "The Best Teachers' Test Preparation for the MTTC". The link on Amazon is: http://www.amazon.com/MTTC-REA-Teachers-MichiganCertification/dp/0738600571/ref=sr_1_1?ie=UTF8&qid=1315531491&sr=1-1 This book is published by Research & Education Association. They also have a website www.REA.com/teacher

   • Teaching Solutions - http://www.teachingsolutions.org/mttc.html - has great study guides that you can download directly into your computer. Unfortunately they have not yet developed a study guide for Integrated Science.

   • Mo-Media - http://www.mo-media.com/mttc/ - has study guides.

   • Amazon also has a variety of study guides - http://www.amazon.com/s/?ie=UTF8&keywords=mttc+study+guides&tag=googhydr-20&index=aps&hvadid=1147468841&ref=pd_sl_9caca812mo_b -

Textbooks and Readings:

1) Van de Walle, J., Karp, K. & Bay-Williams, J. (2012). Elementary and middle school mathematics. (8th Edition) Boston: Allyn & Bacon. You may also use the 7th Edition. You may be able to purchase a used copy of this text from www.half.com. Other very good websites are: goodbooks.com and textbooksrus.com. If you purchase an earlier edition of this text (the most recent is 7th), is up to you to find the corresponding page numbers for the homework assignments and reading assignments.
2) All handouts and the class syllabus are posted on blackboard. Please make a copy of the syllabus and bring it to the first class. You do not need to make a copy of the handouts. I will distribute them in class. However, if you should misplace any of the handouts, you can go to BlackBoard and print another copy.

3) You will also need to be familiar with the *Michigan Curriculum Framework Standards and Benchmarks for Mathematics*. Read the mathematics section and either make a copy of it or bookmark it for easy reference. It can be found at the following website: http://www.michigan.gov/documents/MichiganCurriculumFramework_8172_7.pdf

You should also be familiar with the Michigan Mathematics Grade Level Content Expectations. These are specific benchmarks for each grade level. Read the mathematics section and either make a copy of it or bookmark it for easy reference. It can be found at the following website: http://www.michigan.gov/documents/Form_B_Intro_138683_7.pdf

**References:**


Mills, H., Whitin, D., & O’Keefe, T. (January, 1993). Teaching math concepts in a K-1 class doesn’t have to be like pulling teeth-But maybe it should be! *Young Children*, 48, 17-20.


**Professional Resources:**

Detroit Council of Teachers of Mathematics (dactm.org)
National Council of Teachers of Mathematics (nctm.org)
ETA/Cuisenaire: 800-237-3142; www.etacuisenaire.com

There is a large collection of Math Internet Resources located at the following website: http://matheducation.missouri.edu/internetresources.html.

**Academic Course Requirements:**

1) Homework Assignments 12 points Due each class

2) Synthesis of Professional Literature 15 points Due Oct. 15
3) Exploring Math and Literature     15 points     Due Dec. 10
4) Data with Children                15 points     Nov. 5
5) Children’s Literature Sharing     8 points      Due: TBA
6) Final Examination                 28 points     Dec. 17
7) Professional Commitment           7 points      Due throughout!

Note: Plan ahead. Do not wait until the end of the semester to begin these assignments. You have assignments from your other courses that are also due at the end of the semester. Use your time wisely throughout the semester so that you do not feel overwhelmed by the work and submit less than outstanding reports. Remember, assignments can be turned in prior to their due dates.

You are NOT allowed to use any food or candy for any of these assignments. If you fail to follow this guideline you will not receive any credit for the assignment.

All written assignments must be typed, double-spaced, 12 pt. font, and edited carefully for grammar and spelling. You will lose points for frequent errors in grammar, punctuation and spelling. You are also expected to follow APA style in your reports. Helpful websites include the following:

http://guides.lib.wayne.edu/content.php?pid=62358&hs=a (WSU guide for APA)
http://leo.stcloudstate.edu Organization, format, composition, and grammar tips.
http://www.apastyle.org/elecref.html APA-Style Citations for electronic resources

USE NO PLASTIC COVERS OR PLASTIC SLEEVES.
Staple pages at the top left-hand corner, or enclose in a manila envelope if you have pieces of children’s work, etc. that you do not wish to staple. All material will be returned to you.

Be sure to acknowledge the sources of ANY material that is not yours (from books, curriculum guides, internet, etc.). Please read a document on issues concerning plagiarism on Blackboard. Students at this University can be expelled for plagiarism.

Assignment Descriptions:

1) Homework Assignments

For each class session (except the last two) you are expected to complete a written assignment that relates to the week’s readings. These assignments are due at the end of each class. (If you are absent you are expected to submit the assignment during the next class session. No assignment will be accepted that is more than 2 weeks late). Assignments are to be neat.
legible, and clearly explained. They must be edited for grammar, spelling and punctuation. All assignments must be typed. A description of all homework assignments is included at the end of this syllabus. Satisfactory completion of these assignments will contribute to your success on the final examination and on the mathematical section of the MTTC.

2) Review of Journal Articles

You are to find two articles in any or all of the following sources: *Teaching Children Mathematics; Mathematics in the Middle School; Young Children*, and any NCTM Yearbook of the last ten years. I will be loaning to you many of these resources. These articles need to be tied together by either a similar topic, such as fractions, geometry, measurement, computation, etc; or connected by one of NCTM’s Process Standards (discussed in chapter 1 of Van de Walle), such as Communication, Representation, Reasoning and Proof, Connections, and Problem Solving.

If you would prefer to find your articles online you can use the Wayne State University library system. **Note:** I need to approve any article you find.

a) Go to [http://library.wayne.edu](http://library.wayne.edu)

b) Click on “Articles and Databases”

c) Click on “ERIC” on the far right (This is a helpful database)

d) Type in a key word/words on the lines provided. For the first two lines you might want to use “mathematics” and “elementary.” For the last line type in your specific interest, e.g. measurement, geometry, communication, problem solving, and so on.

You are to write a 4-5 page paper that addresses the following points:

- What is the main topic or standard that connects these articles?
- What important mathematical concepts, strategies and skills are found in each article? (You could create a grid that outlines these ideas as you begin to discuss them but this is not required).
- What important mathematical ideas tie the articles together?
- How do these articles relate to the other readings in class?
- How do these articles address the *Michigan Curriculum Framework Standards* and/or the Michigan Grade-Level Expectations?
- Include a reference list at the end of your report. You may use the bibliographic style that is found on this syllabus (APA style).

Do **not quote** from these articles. Instead, use your own language to describe the ideas contained in each article.

3) Exploring Mathematics and Literature

For this assignment you are expected to choose a math-related piece of literature to share with some children. The book you choose is to be from the set of books that Dr. Whitin shares in class. It could be the one that you and your partner share together as your book advertisement or it could be one shared by another classmate.
Think about an interesting way to introduce this book to the children (see handout for some ideas). After this initial discussion read the story to the children. Listen to their comments as you read. Afterwards, ask these open-ended questions to the children:

- Who would like to say something about this story?
- What did you find interesting about this book?
- What questions do you have about this book?
- Did anything surprise you? If so, what was it, and why was it surprising to you?

Listen to their answers and be ready to follow it with other questions/responses, such as:

- Tell us more about your thinking.
- Why was that part interesting to you?

Accept all their responses. Don’t worry that some of their responses may not be mathematical in nature. For instance, the story may prompt them to discuss some of the main themes of the story, such as jealousy, persistence, sibling relationships, and so on.

Next, plan an open-ended experience for the children that is based on the mathematical ideas embedded in this book. Be sure that the experience you plan allows children to record their answers in different ways, and allows for different interpretations and solutions. In this way you are differentiating instruction to meet the needs of all learners. You need to secure Dr. Whitin’s approval for your book and the activity before you begin your work with children.

Include the children’s work in your final report (or at least reproducible copies of their work). These will be returned to you. In your 4-5 page report describe the conversations that occurred as you read the book, (i.e. your introductory talk, and then later conversations as the story was read aloud). Tell specific comments that the children said and describe what you found interesting about their reactions. Tell also about the learning experience you planned. Include your analysis of the children’s work as well: What did you find interesting about their work? You might label some of the work samples as “Figure 1…2…etc” and cite specific ones in your discussion. You do not have to discuss all the children’s work but you might focus on those that you found most interesting. What did you do well in the teaching of this lesson? What next steps do you plan for yourself in the future? As you conclude your report you need to cite two at least two ways that this experience is related to NCTM’s Process Standards (see Van de Walle, chapter 1).

4) Data with Children

For the data assignment you are expected to involve the children (or one child) in gathering information about an appropriate topic. Look for opportunities to collect data about a science topic, a classroom problem, an important decision, etc. (listen carefully because sometimes good graphing topics arise quite unexpectedly; look for a possible topic for graphing as soon as you begin your work in the classroom). Policies or procedures that children often consider to be unfair are often good data topics. Some past topics have included how much time parents have asked children to practice their musical instrument; or the regulation of having to wear
school uniforms. Look for other issues that children are disgruntled about. Some past topics have included: having to share a bedroom with siblings, or possible restrictions about computer use. Look for other topics that interest them, e.g. after-school activities, food, cell phone use, and so on. If it is possible, try having the children (or one child) gather and record the information in their own way. As the child gathers the data look to see if the child encounters any problems, and how he/she attempts to solve them. It is most important that you actually observe the child gathering the data. In this way you can note some places for encouraging a critic’s perspective, as described in the article, “Learning to Talk Back to a Statistic.”

One of the main objectives of this project is to give children the freedom to represent their findings in whatever way makes most sense to them. (We will talk more about this issue in class).

Another main objective is to encourage children to be able “to talk back to a statistic” as described in the article, “Learning to Talk Back to a Statistic.” In your report of 4-5 pages describe the following:

- how you decided upon the topic;
- how you involved the children (or child) in organizing the data in some meaningful way;
- what questions you asked (see below) and how the children responded to these questions;
- what you found interesting about this conversation, as well as the children’s representations of the data; be specific: what particular parts of the conversation went well and why;
- **what elements of a critic’s perspective arose** (see chart in the article you read); this is an essential part of your report.
- how the lesson relates to the *Michigan Curriculum Framework Standards*;
- how the lesson relates to class readings about talk and data;
- what you learned from this experience and what might you do differently next time.

Below are some important ways you can foster a critical perspective with your students. Be sure to include these in your report.

1. Examine the chart in the article, “Learning to Talk Back to a Statistic.”

2. The questions in the far right column, “Important Questions for the Teacher to Ask,” are the kinds of questions that you need to pose for this assignment.

3. Good questions for very young children include: What does your information **not** tell you? What do you **not** know? You need to be prepared to pose at least one answer to such a question so the child better understands what you mean.

4. Ask the child, “Why do you want to gather this information?” Then pursue the issue a bit further by asking, “How could you ask the question to get the data you want?” Brainstorm together a variety of questions (you can add some too if the child no more ideas) that the child might pose related to the proposed topic. Invite the child to predict what might be the likely response to each of these questions and why she thinks so. Ask, “How might the way you asked the question influence the way people might respond?” In this way the child begins to
understand how one’s motive and one’s language influences the data one receives. For instance, one child wanted the family to own a pet but her parents were reluctant to do so. She wanted to ask other family members (aunts, uncles, cousins, grandparents) about whether or not they supported having a pet in the family. She wanted to devise a question to ask that would give her the data she wanted. Can you think of a question she could ask that might support her viewpoint? Can you think of another question that might give her the very opposite kind of response?

5. You might discuss how to title the graph. Brainstorm various titles together and then discuss how each one might convey a different message. For instance, the data that the student teacher gathered about favorite fruit at snack time might label her graph, “Favorite Snacks of Our Class.” Is this accurate? How might it be misleading?

6. Look for opportunities to discuss the distinction between results and conclusions. For instance, in “Learning to Talk Back to a Statistic,” the results showed that more people liked Italian food than Thai food. However, the children were not sure if they could then conclude that many people do not like Thai food since many of them had never tried it. It is important for you to raise this kind of distinction between results and conclusions. You might propose different possible conclusions from the data and ask the child if she agrees with any of them and why or why not.

7. Play the devil’s advocate. It is your responsibility to raise alternative viewpoints and different perspectives. For instance, concerning the “School Uniform Survey” the teacher might ask, “How might parents use this same data against you?” Or, “What if you had decided to count people who only exercised once a week in the category of ‘Very Active’? How might this change have affected your results?”

It is important that you keep careful records of these conversations. You might ask your teacher to jot down all comments, or use a tape recorder during the lesson. Your analysis of the conversation is a very important part of this report.

After this conversation ask each child to write down some observations about the graph. They can write down some of the comments that were shared, or other ones they were thinking of. Include their written work in your report (originals or photo copies) and discuss any of their written responses that you find interesting. Include the graph (or a picture of it) as part of your report as well.

5) Children’s Literature Sharing

You are to share a children’s literature book with the class that has a mathematical dimension to it. You can do this assignment alone or with a partner. I will pass out numerous books in class and you will choose one of these for your report. Your book sharing with the class should not exceed 5 minutes. You might want to read all, or part, of the book aloud (be sure to practice reading it aloud beforehand so you are familiar with the text). You are also expected to share at least 6 ideas of how you might extend the mathematics of the story through an
activity with the children. Do not read from your handout as you share your book with the class.

Submit a one-page handout to me and every member of the class. This handout should have the following elements (see “handouts” on the blackboard site for a sample format):

- Bibliographic reference of book
- Mathematical concepts/strategies embedded in the book
- An engaging way to introduce the book (see handout on this topic)
- A brief synopsis of the book in your own words
- At least 6 possible extension activities to do with children
- A pertinent website that is connected to the main ideas of the book

6) Final Examination

The final examination will cover all readings, homework assignments and class discussions/experiences throughout the semester.

7) Professional Commitment

Professional commitment encompasses your attendance, participation, preparation and attitude. You are expected to attend all class sessions. Excessive absenteeism or tardiness can result in the lowering of your grade (i.e. absent or tardy for more than 10% of class sessions). Please refrain from using digital devices for personal use during class. You are expected to complete all homework assignments on time and be prepared to share this work in class. If you are ill you can email me the homework, or turn it in on the next class session. Homework is not accepted beyond the next class. You are expected to come to class with the day’s readings with you, ready to discuss the main ideas, participate fully in both small and large group discussions, demonstrate a professional attitude by listening carefully to the ideas of others, and by contributing your own personal insights and reflections. An important goal of this course is for us to develop our own learning community. The success of this course is dependent upon the quality of your participation, preparation and attitude throughout the semester.

**Grading Scale:**

<table>
<thead>
<tr>
<th>100-95</th>
<th>A</th>
<th>89-87</th>
<th>B+</th>
<th>79-77</th>
<th>C+</th>
<th>69-67</th>
<th>D+</th>
</tr>
</thead>
<tbody>
<tr>
<td>94-90</td>
<td>A-</td>
<td>86-83</td>
<td>B</td>
<td>76-73</td>
<td>C</td>
<td>66-63</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>B-</td>
<td>82-80</td>
<td>B-</td>
<td>72-70</td>
<td>C-</td>
<td>Below</td>
<td>63</td>
</tr>
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</table>

General Note on Grading: The College of Education faculty members strive to implement assessment measures that reflect a variety of strategies in order to evaluate a student’s performance in a course. For graduate students B grades will be awarded for satisfactory work that meets all course requirements and A will be reserved for outstanding performance. Please note that there is a distribution of grades from A-F within the College of Education.
**Enrollment/ Withdrawal Policy**

Beginning in Fall 2011, students must add classes no later than the end of the first week of classes. This includes online classes. Students may continue to drop classes (with full tuition cancellation) through the first two weeks of the term.

Students who withdraw from a course after the end of the 4th week of class will receive a grade of WP, WF, or WN.
- WP will be awarded if the student is passing the course (based on work due to date) at the time the withdrawal is requested
- WF will be awarded if the student is failing the course (based on work due to date) at the time the withdrawal is requested
- WN will be awarded if no materials have been submitted, and so there is no basis for a grade

Students must submit their withdrawal request on-line through Pipeline. The faculty member must approve the withdrawal request before it becomes final, and students should continue to attend class until they receive notification via email that the withdrawal has been approved. Beginning in Fall 2011, the last day to withdraw will be at the end of the 10th full week of classes. The withdrawal date for courses longer or shorter than the full 15-week terms will be adjusted proportionately.

**Attention Students with Disabilities:**

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services’ mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.

**Religious Observance Policy:**

Because of the extraordinary variety of religious affiliations represented in the University student body and staff, the Wayne State University calendar makes no provision for religious holidays. It is University policy, however, to respect the faith and religious obligations of the individual. Students who find that their classes or examinations involve conflicts with their religious observances are expected to notify their instructors well in advance so that alternative arrangements as suitable as possible may be worked out.
Attention Students with Disabilities:

Attention Students with Disabilities: Wayne State University is committed to providing students with disabilities an equal opportunity to benefit from its programs, services, and activities. If you believe that the limitations imposed by your disability interfere with your ability to fulfill the requirements for this course, please talk to the instructor. Handicappers’ Educational Services (HES) is available to help as well. They are located in Room 583 Student Center Building (577-1851). Voice mail: 577-3365 (TTY).

Class Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/10</td>
<td>Introduction Mathematical goals</td>
<td></td>
</tr>
<tr>
<td>9/17</td>
<td>Principles and Standards Meeting the Needs of All Learners</td>
<td>Chpt.1; MI Standards; Math is Lang. Too chpt;</td>
</tr>
<tr>
<td>9/24</td>
<td>Thinking Mathematically Assessing What Children Know</td>
<td>Butterflies and caterpillars;</td>
</tr>
<tr>
<td>10/1</td>
<td>Dealing with Data</td>
<td>Talk counts; Learning to talk back to a statistic</td>
</tr>
<tr>
<td>10/8</td>
<td>Developing Early Number Concepts</td>
<td>Chpt.8; Hidden messages in talk; Uncovering bias…</td>
</tr>
<tr>
<td>10/15</td>
<td>Developing Meanings for the Operations</td>
<td>Chpt.9; Teaching math concepts in K-1 classroom…</td>
</tr>
<tr>
<td>10/22</td>
<td>Helping Children Master Basic Facts</td>
<td>Chpt.10</td>
</tr>
<tr>
<td>10/29</td>
<td>Place Value Development</td>
<td>Chpt.11</td>
</tr>
<tr>
<td>11/5</td>
<td>Strategies for Whole Number Computation</td>
<td>Chpt.12</td>
</tr>
<tr>
<td>11/12</td>
<td>Fractions</td>
<td>Chpt.15, 16</td>
</tr>
<tr>
<td>11/19</td>
<td>Geometry</td>
<td>Chpt.20 (pp.399-413)</td>
</tr>
</tbody>
</table>
9/17: Examine the five Process Standards on pages 3-4. (They are: Problem Solving, Reasoning and Proof, Communication, Connections, and Representations). Describe how these process standards are reflected in the chapter from *Math is Language Too* (“Talking, Writing and Mathematical Thinking”).

9/24: A) In the article, “*Butterflies and caterpillars,*” examine the incorrect responses of 4.1, 4.2, and 4.3. In your own words explain for each of these responses how the child was thinking about the problem. In each case why was the child’s thinking incorrect? What was the child not thinking about? B) Based on this article, how would you describe what multiplicative/proportional reasoning is? C) Find an article in the newspaper or on the internet in which ratios are used (Please submit this article as part of your homework). Discuss how these ratios are actually used in the article. Do you agree that ratios were the best way to express this problem, issue or argument? (For instance, would using absolute data rather than relative data have been a better strategy?) Why or why not? What might have been another kind of ratio that could have been used?

10/1: There are two parts to this assignment. (A) Describe specific personal connections you can make with the article, “Learning to Talk Back to a Statistic.” What personal experiences have you had with data that relates to the main ideas of this article? (B) Next, find some data in an article on the internet or in the newspaper. What are at least 3 critical questions you can ask about that data? Why would you ask those questions? (Be sure to include this article when you turn in your homework).

10/8: Writing to Learn, p.143, #4.

10/15: Create 8 word problems: 2 each of joining, separating, part/whole, and comparison. Use contexts that relate to an elementary child’s interests. (These problem types are found in Chapter 9).

10/22: Writing to Learn, p.185, #2, #5, #6.

10/29: Compare and contrast the following models for place value: 1) groupable models; 2) pregrouped or trading models; and 3) nonproportional models. You might create a chart or diagram
that shows these comparisons and contrasts. Discuss why these first two manipulatives are called *proportional* materials. How does their construction relate to the concept of proportionality?

11/5: Writing to Learn, p.237-238, #3, #4, #6.

11/12: Complete the exercise on p.300 (Figure 15.15). Which fraction in each pair is greater? Give one or more reasons for your thinking. Do *not use* common denominators, cross multiplication, or drawings. Rely on conceptual understanding. Use the benchmarks of 0, ½ and 1 as the text suggests to guide your reasoning.

11/19: This investigation will help you better understand where pi came from. Gather together a variety of circular objects of various sizes, such as jar lids, tubes, cans, and wastebaskets. Measure the circumference and the diameter of each circular object. Then divide each circumference by its diameter to find out how many diameters it takes to equal a circumference (You should find this answer to be about 3 or so for all ten objects.). When you divide you are finding the ratio of a circumference to a diameter. Make a chart to show your findings. Next, find the average of all those ten ratios. Plot the results on a graph, using the x-axis as the diameter measurement and the y-axis as the circumference measurement. Answer these questions: 1) What do you notice about your graph? 2) Why is pi called a ratio? 3) How does this activity relate to the concepts of similarity and proportionality?

11/26: Make 5 one-inch squares out of paper. How many different shapes can you make by putting these 5 squares together (they must touch edge-to-edge only)? There are 12 possible answers. Try to find as many as you can. Record each shape on graph paper. Write 5 observations of these shapes. Number each shape. Predict which ones can be folded into a box without a top. Record your predictions. Now cut out each shape and test them. Which ones are possible and which ones are not? Write at least 2 reasons why some shapes are possible and others are not. Finally, discuss what important mathematical skills/concepts are embedded in this activity. Submit all this work.

12/3: See p.395 (Figure 19.25). Draw a circle and divide it into at least 8 sectors (16 sectors works best). Cut out these sectors and glue them on a piece of paper so that they resemble an approximate parallelogram. Explain how this model helps to show the formula for the area of a circle. Be *specific in your explanation* so it is clear how the formula is derived.