

ELEMENTARY MATH METHODS
STUDENT'S MANUAL ED 345R 5.1



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COURSE OVERVIEW

Children who understand arithmetic can think and reason mathematically and use what they've learned to solve problems in their everyday lives. Arithmetic instruction typically emphasizes children's proficiency with paper-and-pencil calculations. Arithmetic taught in the context of problem solving, however, emphasizes the use of algorithms as tools to use for decision-making and solving problems.

When you cook, remodel your home, or make purchases, you are using math principles. Human beings have been using these same math processes for thousands of years, across countries and continents. Math is for everyone, and it's not just about pondering imaginary numbers or calculating difficult equations. Math helps us make better daily decisions and perform everyday tasks.

In the prerequisite course, MA 200 R, mathematical algorithms were presented. In this course, you will learn how to teach for understanding and will find ways to engage students actively in their mathematics learning. You will develop arithmetic lessons and activities using the standards and principles for the National Council of Teachers of Mathematics, the Illinois Content-Area Standards and the Illinois Learning Standards. You will also explore how math can help you in your daily life. You'll look at math processes in common situations, such as playing games, cooking and investing money.

Traditional instructional methods teach basic facts and computation first and then application to problem solving. The cooperative problem-solving model taught in this course will reverse this methodology. In order to develop logical reasoning and mathematical thinking, children need to check their logical thoughts against the real world. When they use isolated algorithms, children cannot do this. Problem situations should be the beginning for developing mathematical understanding so that children have a context for the need for computation skills

Students in this course are expected to complete assignments that reflect the model presented. This course will challenge previous understanding or mathematical instruction and present an alternative pedagogy for teaching mathematical understanding and logical reasoning.

COURSE SYLLABUS

I. Course Description

This course is an extension of MA 200R. Content includes a study of the methods of teaching elementary and middle school mathematics.

Emphasis is placed on a diagnostic approach to math instruction and development and to a sound theory of the acquisition of math concepts at the early grades

II. Course Goals

There are **three big ideas** that you should take from this course.^a

A. To **view mathematics** as a “science and **process of making sense** of things” and “to understand what it means to do *mathematics*.” Math is not “a collection of rules and procedures” – it can and needs to be done with understanding. Students should never be allowed to use a strategy without understanding it.^b

B. To maximize students’ learning, embrace “**problem-based, student-centered approaches**” in your mathematics teaching. These approaches are based on students *thinking* about mathematics and making sense of ideas, not just copying the teacher or text’s rules into a notebook and “plugging in” the numbers to find answers.

C. To discover that **math can be intrinsically rewarding** – fun to learn and fun to teach (really!). Your past experiences with mathematics may not have been positive, but you will see how math can be fun and be prepared to make math enjoyable for your students.

III. Course Objectives

As a result of this course you will:

A. Understand and use the Illinois Learning Standards (<http://www.isbe.state.il.us/Default.htm>) and the National Council of Teachers of Mathematics (NCTM) (www.nctm.org) content and process standard for elementary and middle school math education in designing learning experiences (IPTS 1, 4, 5, 6, 7) *Assessed in your lesson plans.*

^a From Van de Walle, J.A. (2004) *Instructor’s manual for elementary and middle school mathematics*, 5th ed. Boston: Pearson Allyn and Bacon, p. 1

^b Campbell, Rowan & Suarez, 1998, in Van de Walle, J.A. (2004) *Elementary and middle school mathematics: Teaching developmentally*, 5th ed, Boston: Pearson Allyn and Bacon, p. 203

- B. Describe how elementary and middle school aged children construct and develop mathematical knowledge and competencies at different levels of complexity including number concepts, operations, place value, computation, fractions, decimals, geometry, and algebraic reasoning. (IPTS 2, 3, 4, 5) *Assessed through math journals, class discussion and activities, and lesson plans.*
- C. Plan mathematics instruction that meets the diverse needs of all students. (IPTS 1-7) *Assessed in your lesson plans*
- D. Be prepared to continuously monitor student mathematics progress through a variety of formal and informal assessment strategies. (IPTS 2, 8) *Assessed in your lesson plans.*
- E. Identify resources and strategies for teaching mathematics in the elementary and middle school, and prepare a set of manipulatives for classroom use. (IPTS 6) *Assessed through your resource assignment and set of manipulatives.*
- F. Reflect upon your own readiness to each elementary and middle school mathematics and establish personal goals to further your professional preparation. (IPTS 11) *Assessed through your lesson plan/presentation/self and peer analysis.*
- G. Prepare all class work, whether oral or written, graded or ungraded, in a professional manner. (See Colossians 4:23, as well as IPTS 11) *Ongoing formal and informal assessment*

IV. Texts

A. Required

1. Van De Walle, J. (2007). *Elementary and Middle School Mathematics Teaching Developmentally*. Sixth Edition. Includes MyLabSchool Access Code Card. Boston, MA: Allyn and Bacon. ISBN 0205499228
2. Johnson, D. (1982). *Every Minutes Counts*. Parsipanny, NJ: Pearson Education, Inc. ISBN0866510818
3. Student Manual for ED 345R, REACH. Available at www.tiu.edu/REACH/manuals. When printing the manual, do not double-side the rubrics attached. These will be used each session during class for your evaluations.

4. Blackline Master for Elementary and Middle School Mathematics Teaching Developmentally found at www.ablongman.com/vandewalle6e. Click on the 2nd RES in top navigation bar. Print one copy each of all Blackline Masters for Session One, and additional copies for any homework assignments you select.

B. Strongly Recommended

1. Burns, M. (2000). *About Teaching Mathematics*. Second Edition. Sausalito, CA: Math Solutions Publications. ISBN 094135525X

V. Materials

You will need a set of materials to complete activities in this course. Put the materials in a container which can be easily transported to and from class each session (large baggy, pencil box, etc.) These materials will easily be used again in an actual future classroom.

- A. One full set of each Blackline Master found at www.ablongman.com/vandewalle6e. Click on the 2nd RES in the top navigation bar. Print additional Blackline masters for members of your cohort when selecting a particular activity.
- B. Calculator
- C. Counters (can be paper shapes or other small manipulatives appropriate for counting: connecting cubes, toothpicks, pattern blocks, candy, beans, etc.)
- D. Index cards
- E. Dice
- F. Set of markers
- G. Playing cards
- H. Base 10 items and sorting storage (i.e. straws or craft sticks with rubber bands; 100 connecting cubes; beans, cereal or candy in 10 cups or 10 baggies; base-ten paper strips and squares for cubes, flats and longs)

Be prepared to make or add additional items, depending on the assigned activities from the readings. All materials can be handmade except Blackline Masters (i.e. ten frame cards, flashcards, etc.) and will be useful for future math classrooms.

VI. Course Outline

A. Session One

1. Readings

- A. Go to www.nctm.org and click on Standards in the left navigation bar and on Standards – Electronic in the Pop Up menu. Each standard consists of two to four specific goals that apply across all the grades. For the five Content Standards, each goal encompasses as many as seven specific expectations for the four grade bands considered in Principles and Standards: prekindergarten through 2, grades 3-5, grades 6-8, and grades 9-12. Read carefully the principles and standards in the grade band that best applies to you. These will be the standards you will use for this course in developing lessons and activities. You will also find these NCTM standards listed in Appendix A at the back of your Van de Walle text.
- B. Read Chapter 1 in *Every Minutes Counts*, “Don’t Do It the Way I Did It.”
- C. Read Chapters 1 – 6 in Van de Walle. Respond to the reading as directed below.

2. Assignments

- A. Mathography – **BEFORE** completing your reading assignments for session one please complete your mathography. Reflect upon your past experience with mathematics: What was math like for you in school? Did you enjoy it? What are memories you have of “doing” math in school? How did math make you feel when you were in school? How does doing math make you feel today? What importance does math play for students today? This assignment must be at least one page, but no longer than two pages.
- B. Reading Response – **AFTER** carefully reading Chapters 1 – 6 please respond to the following:
 - (1) Why is it not a good idea for students to believe that the validity of their answers in mathematics is determined by the teacher or by the answer book?

- (2) Explain in your own words what it means to construct knowledge instead of absorbing knowledge.
- (3) Explain in a way that a colleague in your school would understand why you think it is important to teach through the use of problems.
- (4) How is the “two-page lesson format” different from the viewpoint of teaching through problem solving?
- (5) What is the difference between assessment and evaluation? Should these be separate activities? Explain your rationale.

Note: *Pay particular attention to Chapters 4 and 5. Chapter 4 presents the Problem Solving Lesson format and strategies that are foundational to this course. Also, Chapter 5 begins the framework for differentiating in a problem solving approach, for a variety of students needs. Refer to pages 72-75 in Chapter 5 to see how math textbooks can be adapted using the problem solving format.*

C. Math Unit – Assessment Component (Due Session Four)
For this portion of your Math Unit, you will be creating three different assessments of your choosing for your unit. These assessments must be diverse (formal, informal, project based, rubrics etc...). You will include these in your Math Unit due the last night of class. The assessments you use must be created by you, but you may use a Teachers Edition from a math series to guide you.

B. Session Two

1. Readings

- A. Read Chapter 2 in *Every Minutes Counts*, “The Art of Questioning.”
- B. Read Chapters 7 – 11 in Van de Walle. Respond to the reading as directed below.

2. Assignments

- A. Reading Response – Using the Math Journal created in class reflect upon what you have ready by:

(1) Trying the problems presented in the text

(2) Noting your feeling about what you are learning – frustration, accomplishment, pride, confusion, etc...

(3) Questions you have about what you have read

The Math Journal will be used in class to discuss different topics, gain better understanding of the problem solving process, and learn of multiple ways to solve a problem. Responses will need to be hand written in the journal we have created.

- B. From Chapters 9, 10 and 11 select two activities to try from any chapter. The activities can both come from the same chapter or two different chapters. Develop the two activities and try it at home. Bring any materials necessary to facilitate it in a small group in class. Note the Blackline Masters at www.ablongman.com/avadewalle6w may help you in developing materials for your activity. Print a Blackline master for every member of your cohort for any activity you select.

Note: *Pay careful attention to Chapters 7, 8 and 9. Chapter 7 continues with strategies for differentiating in a problem solving approach, for a variety of student needs. Chapter 8 discusses the impact of technology on mathematics curriculum and instruction. There are a number of exceptional online resources listed at the end of every chapter in this text, Chapter 8 particularly. Chapter 9 begins the development of mathematical concepts and procedures. Each chapter will end with*

recommendations for Literature Connections related to the specific concept.

- C. Lesson Plan 1 – Develop a typed lesson plan using the Problem Based Learning format. This lesson will be part of your Math Unit. You must select one of the mathematical concepts from the Van de Walle text, Chapters 9-24. You may adapt your lesson from a textbook in preparation for your final unit. Bring your lesson plan and all materials to class (enough materials for each member of your cohort). Be prepared to present your lesson to a small group or to your whole cohort, depending on time permitting. See more detail for this assignment in the Activities and Assignments portion of your Student Manual.

- D. Math Unit – Technology Component (Due Session Four)
For your Math Unit you will need to review and evaluate three software programs that correlate with your mathematical concept in your unit. Use the information in Chapter 8 to help you review and evaluate the software you have decided to look at. Once you have found the software that would be best for you to use, incorporate this software into your Math Unit.

C. Session Three

1. Readings

- A. Read Chapter 3 in *Every Minute Counts*, “The New Class Routine.”

- B. Reach Chapters 12 – 15 in Van de Walle. Respond to the reading as directed below.

2. Assignments

- A. Reading Response – Using the Math Journal created in class reflect upon what you have read by:
 - (1) Trying the problems presented in the text

 - (2) Noting your feeling about what you are learning – frustration, accomplishment, pride, confusion, etc...

 - (3) Questions you have about what you have read

The Math Journal will be used in class to discuss different topics, gain better understanding of the problem solving process, and learn of multiple ways to solve a problem. Responses will need to be hand written in the journal we have created.

- B. From Chapters 12, 13, 14 and 15 select two activities to try from any chapter. The activities can both come from the same chapter or two different chapters. Develop the two activities and try it at home. Bring any materials necessary to facilitate it in a small group in class. Note the Blackline Masters at www.ablongman.com/avadewalle6w may help you in developing materials for your activity. Print a Blackline master for every member of your cohort for any activity you select.
- C. Lesson Plan 2 – Develop a typed lesson plan using the Problem Based Learning format. This lesson will be part of your Math Unit. You must select one of the mathematical concepts from the Van de Walle text, Chapters 9-24. You may adapt your lesson from a textbook in preparation for your final unit. Bring your lesson plan and all materials to class (enough materials for each member of your cohort). Be prepared to present your lesson to a small group or to your whole cohort, depending on time permitting. See more detail for this assignment in the Activities and Assignments portion of your Student Manual.

D. Session Four

1. Readings

- A. Read Chapter 4 in *Every Minute Counts*, “More Ideas for Making It Work.”
- B. Read Chapters 16 – 18, and 21 in Van de Walle. Respond to the reading as directed below.

2. Assignments

- A. Reading Response – Using the Math Journal created in class reflect upon what you have ready by:

(1) Trying the problems presented in the text

(2) Noting your feeling about what you are learning – frustration, accomplishment, pride, confusion, etc...

(3) Questions you have about what you have read

The Math Journal will be used in class to discuss different topics, gain better understanding of the problem solving process, and learn of multiple ways to solve a problem. Responses will need to be hand written in the journal we have created.

B. From Chapters 12, 13, 14 and 15 select two activities to try from any chapter. The activities can both come from the same chapter or two different chapters. Develop the two activities and try it at home. Bring any materials necessary to facilitate it in a small group in class. Note the Blackline Masters at www.ablongman.com/avadewalle6w may help you in developing materials for your activity. Print a Blackline master for every member of your cohort for any activity you select.

C. Resource File – For this assignment, you will choose the activity that seems most helpful to you from the following options. See more detail on this in the Assignment and Activities section of the Student Manual.

- Begin or continue to develop a **resource file** that, if maintained, will enable you to keep track of ideas and resources.
- Develop an **annotated list of children’s books** that are helpful for elementary and/or middle school math instruction.
- Develop an **annotated list of websites** that are useful for mathematics instruction with links to the sites.
- **Read, summarize, and reflect upon ten articles** from professional mathematics education journals that deal with special needs (learning difficulties, gifted, English language learners) or gender gap issues in mathematics education.

D. **Course Evaluation:** Please take a few minutes to evaluate this course online. We value your thoughtful feedback about your experience in our courses, and we use this information to assess and change our program as needed. Since some of our most valuable changes have been initiated through the course evaluations, we ask you to provide your input, which is anonymously added to our database. The online feature allows us to

aggregate and disaggregate information to help the School of Education faculty make curricular decisions based on the historical trends and suggestions of multiple cohorts of students. To complete the survey, go to the following address:

<http://www.surveymonkey.com/s.asp?u=66096842317> and follow the prompts to find this course. When you have completed the survey, you will be prompted to print a verification form. Please print this form and hand it in with your assignments for the last evening of class.

VII. Course Requirements

A. Complete all assignments listed in **Section IV** of the course syllabus.

1. Reading and Assignments

Students are expected to complete assigned readings and activities **prior to** each class session. All assignments must be typed in black (double-spaced) using a 12-point standard font. Standard English usage is expected. *Late assignments will not be accepted for credit.* **Requests for incomplete grades must be submitted in writing prior to the end of the course to the instructor, who will forward the request to the Dean of the College of Arts & Sciences for approval. Only the Dean may approve a grade of incomplete.**

2. Portfolio

Each student in an education prefix course is required to maintain a portfolio, which includes at least one sample product from each education course. In a cover memo, explain why you chose the assignment as well as your evaluation of it. This item does not need to be handed in. The final portfolio will be completed during your professional semester (student teaching).

B. Attendance Policy

Because of the accelerated and collaborative nature of the REACH to Teach courses, students are required to attend every class session. Missing a single class means a significant portion of the contact with the faculty member and the learning community has been lost. **For this reason, in all REACH to Teach courses, students missing one class session will be penalized one full letter grade.** Any student missing more than 30 minutes of a course session will be considered absent for the full course session and will receive a grade deduction of one-half to one full letter grade. This includes the accrual of missed class time due to chronic late arrival. **Students missing more than**

one class period will receive not credit for the class and a grade of F will be recorded. The course must then be retaken in order to receive credit. In addition, students may miss no more than two class sessions in a given semester, regardless of the circumstances. If a student misses more than two class sessions during a given semester, the student is required to meet in person with the REACH to Teach Services Coordinator to discuss continuance in the program. Students are responsible for monitoring their own attendance to make sure they do not exceed two classes per semester. The REACH registrar will also monitor attendance and notify the REACH to Teach Student Services Coordinator when a student exceeds two absences for a given semester

Participation points are earned and calculated in the final grade of a course based upon on-time attendance at each session. Students who miss three consecutive course sessions without prior notification to the REACH to Teach registrar will be dropped from the program and will need to apply for readmission

NOTE: The course grade will reflect the level of writing demonstrated in the written assignments, as well as the content. Papers not demonstrating college level writing skills will receive a grade of "F." Quality of writing will be a **significant** component of all written assignments. You are encouraged to edit and proofread all assignments.

VIII. Grading Criteria

Class Participation

Attendance/promptness, quality of work completion, careful reading and class discussion, professional demeanor, contributions to partner and group activities, etc.....40pts.

Session One

Mathography.....25pts
Reading Responses to Chapters 1, 2, 3, 4, 5 and 6.....25pts
Materials for Activities.....5pts

Session Two

Reading Responses to Chapters 7, 8, 9, 10 and 11.....25pts
Activities (2) from Chapters 7, 8, 9, 10 or 11.....20pts
Lesson Plan 1.....15pts
Lesson Plan 1 Presentation.....15pts

Session Three

Reading Responses to Chapters 12, 13, 14, and 15.....25pts
Activities (2) from Chapters 12, 13, 14, and 15.....20pts
Lesson Plan 2.....15pts
Lesson Plan 2 Presentation.....15pts

Session Four

Reading Responses to Chapters 16, 17, 18, and 21.....25pts
Activities (2) from Chapters 12, 13, 14, and 15.....20pts
Resource File.....35pts
Unit.....200pts

Total : 525 pts.

- A 525 – 483
- B 482 – 430
- C 429 – 367
- D 366 – 315
- E 314 and below

ASSIGNMENTS AND ACTIVITIES

Sessions Two and Three

Problem-Based Lesson Format

Note: This format is similar to the Daily Plan on p. 41 of Every Minute Counts

1. Big Ideas you want students to learn as a result of lesson
 - State an objective(s) in observable terms for the lesson
 - IL Learning Standard
 - NCTM Standard

2. Before activities. (This will include your “set” or “hook.”) Estimated time _____

3. During activities. Estimated time _____
(State the task students will work on; articulate what students need to do; think about what hints you will give and/or students you will want to especially observe or assess.)

4. After activities. Estimated time _____
(How will you begin discussion? What will you look for?)

5. How will you assess student learning?

6. What provisions are there for diverse learners?

7. List of resources & materials needed:

Session Two
Lesson Plan 1
Presentation Rubric

Name: _____

| Criterion | Instructor Comments | Points | Self-Reflection Comments about your teaching or responses to peer or instructor feedback |
|---|----------------------------|---------------|--|
| The student motivated/interested the class in the lesson topic. | | /2 | |
| The students had all materials and resources needed to support the lesson. | | /2 | |
| The student presented the content clearly and accurately. | | /3 | |
| The student portrayed the professional demeanor of a teacher. | | /2 | |
| The students used appropriate voice and eye contact. | | /2 | |
| The student's delivery of the lesson followed the problem-based learning model and stated a clear measurable objective. | | /5 | |

| | | | |
|--------------|--|------------|--|
| Total | | /15 | |
|--------------|--|------------|--|

Session Two
Lesson Plan 1
Peer Evaluation Rubric

Evaluators Name _____

Peer Teacher's Name _____

1. What did peer do to motivate/interest you in the math skill or lesson?

2. What was peer's objective? How did peer state the objective?

3. What are the strengths of your peer's presentation and/or activities?

4. What would be a suggestion to help your peer improve/enhance the presentation, lesson and/or activities?

Please circle the point total that best describes the lesson delivery you observed.

| Rubric Points | Descriptors |
|----------------------|--|
| 4 | Peer delivered the lesson in an exceptional manner, without errors. |
| 3 | Peer delivered the lesson well, with few errors. |
| 2 | Peer delivered the lesson in an acceptable manner, with suggestions for improvement. |

| | |
|---|---|
| 1 | Peer needs improvement in order to deliver the lesson in a satisfactory manner. |
|---|---|

Session Three

Lesson Plan 2 Presentation Rubric

Name: _____

| Criterion | Instructor Comments | Points |
|--|---------------------|--------|
| The student motivated/interested the class in the lesson topic. | | /2 |
| The students had all materials and resources needed to support the lesson. | | /2 |
| The student presented the content clearly and accurately. | | /3 |
| The student portrayed the professional demeanor of a teacher. | | /2 |
| The students used appropriate voice and eye contact. | | /2 |

| | | |
|---|--|------------|
| The student's delivery of the lesson followed the problem-based learning model and stated a clear measurable objective. | | /5 |
| Total | | /15 |

Session Three

Lesson Plan 2

Self-Analysis

Name _____

1. How effective was the beginning of your lesson? Did it capture students' attention? What might you have done to improve it?
2. What instructional strategies were used during your lesson? Were your strategies effective for this content? Would other strategies have been more appropriate or useful?
3. Evaluate your use of lesson materials (manipulatives, worksheets, handouts, visual aids). Did they enhance or distract from the presentation of the lesson? Are there additional materials that you would use if you presented this lesson again?
4. Think about your lesson in terms of Bloom's taxonomy of cognitive objectives. To what extent did the lesson provide opportunities for students to think deeply and critically?
5. How did you provide individual differences in your lesson planning and presentation?

6. How effective was your conclusion? How did it summarize the learning experience and bring closure to the lesson?

7. How did you assess students' learning?

Session Four

Resource Assignment Guidelines and Rubrics

You will identify resources and strategies for teaching mathematics that will be helpful throughout your teaching career. For this assignment, you will choose the activity that seems most helpful to you from the following options:

- Begin or continue to develop a **resource file** that, if maintained, will enable you to keep track of ideas and resources.
- Develop an **annotated list of children's books** that are helpful for elementary and/or middle school math instruction.
- Develop an **annotated list of web sites** that are useful for mathematics instruction with links to these sites.
- **Read, summarize, and reflect upon three articles** from professional mathematics education journal that deal with special needs (learning disabilities, gifted, English language learners) or gender gap issues in mathematics education.

Resource file specifics

You will create a math resource file. Your file can be in an electronic format (provide the instructor with hard copies of your file), set up with file cards, in a three-ring notebook, or in another manner that works for you. (The instructor must approve any alternative ideas.)

Suggested sub-categories for the math resource section:

- Articles about teaching mathematics that you have found helpful with a short reflection as to why they are helpful. (If you're using a 3 ring notebook, you may want to copy and include the actual article; if you file is electronic, provide a web link if the article is available electronically, or provide the bibliographic information for electronic and card files. If the article itself is not included or linked, provide a short summary of the article.)
- Assessment Ideas (This can include ideas for test questions, alternative assessment activities, project ideas, etc.)
- Instructional strategies and/or activities for teaching mathematics (methods)

- Internet sites related to mathematics teaching (include URL, a brief description of resources at the site, and information on who sponsors/ maintains the site.)
- Mathematics games (include games you have played or seen played for math instruction, games you or others have created, and ways to adapt known games to be mathematics games)
- Manipulatives (information on and use of)
- Titles and brief description of videos, CDs or other media that are useful in teaching math
- Titles and brief descriptions of computer software for teaching math

You may include other sub-categories in addition to or instead of these; select categories that you think will be most useful to you. The resources you include in your resource file can come from our class, plus your own research. Seek to include quality resources that you can really see yourself using in the future, not just items to fill a numerical quota.

Resource file rubric:

_____ File is neat and attractive; evidences careful preparation **(3 pts.)**

_____ Resources are distributed among at least 4 sub-categories **(2 pts.)**

_____ A variety of quality, useful items are included. **(Should have approximately 30 or more items.)** Only items that relate to mathematics instruction will earn points. To earn the points per item, please include some description of how to use the item, as noted above. (For example, if your entry just says “Cuisenaire rods,” you will not earn full credit. For full credit, you would need to say “Cuisenaire rods” and provide a brief description of how they would be used (grade level, math concept, particular activities/center). **(30 pts.)**

Annotated Children’s Literature List Specifics

Identify at least 20 different quality (you may read & discard some “duds” – use only excellent ones in your list) children’s books (please *read* them) that are useful in mathematics instruction. Provide an annotation for each that includes:

- Bibliographic data in *APA form* (If you are not familiar with APA form, look it up!)
- Brief summary of the story
- Use for math instruction
- Age level

Your annotations need to be your own original writing (i.e. you may not copy a summary off the book jacket, an Internet source, or another source).

Annotated children's literature list rubric:

_____ Annotated list is neat and attractive; evidences careful preparation **(5 pts.)**

_____ The required number of items are included; annotations are original and include required items; quality children's books are included; age level is appropriate. **(30 pts.)**

Annotated Math Website List Specifics

Identify at least 25 different web sites that are useful in mathematics instruction. (Note: This means you will view many more sites, and will select the *best* and most useful sites.)

Provide an annotation for each that includes:

- Bibliographic data in APA form. (If you are not familiar with APA form, look it up! Electronic citations are particularly tricky; see <http://www.apastyle.org/elecref.html> for assistance.)
- Brief summary of resources at the site. Be specific about the math concept and particular benefits of the site – don't just say "lots of games and good ideas." Say, "The game at www.whatever.com is an effective way to review basic facts. Would be good for practice, in lieu of flashcards. Has a self-monitoring element, providing responses for correct and incorrect answers. Colorful backgrounds and fonts with a few graphics, that are engaging and not too distracting."
- Age/Grade level

Your annotations need to be your own original writing (i.e. you may not copy a summary from an Internet or other source). Some, but not all sites in your web list, may be from lists in the text.)

Annotated math website rubric:

_____ Annotated list is neat and attractive; evidences careful preparation

_____ The required number of items are included; annotations are original and include required items; evidence that quality sites were selected; age level is appropriate. **(35 pts.)**

Special Needs Learner Article Specifics

This assignment will help you develop both theory and practice in meeting the needs of special learners. You will read a total of 10 articles. All 10 must be

recent (within the past 5 years). At least 6 of your articles must be from professional journals. The articles should deal with helping special needs learners in mathematics. (Special needs includes not only learning challenges; it can also include challenging the gifted, and addressing the “gender gap.”) The National Council of Teachers of Mathematics (NCTM) publishes several journals including:

- [Teaching Children Mathematics \(TCM\)](#) - a monthly journal for elementary school teachers.
- [Mathematics Teaching in the Middle School \(MTMS\)](#) - a monthly journal for middle school teachers.
- [Online Journal for School Mathematics \(ON-Math\)](#) - a peer-reviewed school journal designed exclusively for the electronic medium.
- [Journal for Research in Mathematics Education \(JRME\)](#) - a research journal for math educators at all levels.
-

Consider going to the library and reading from a physical magazine. *If* you choose an Internet resource, it must be from a reviewed or refereed publication. A good resource for finding an appropriate article would be the library’s on-line database *Academic Search Premier*. Your search is not limited to the journals above; extend your search to journals such as *Exceptional Children* or *Teaching PreK-8*.

Summarize the content of each article in a paragraph or two. This must be your original work. Then reflect upon the author(s)’ ideas. Discuss your agreement or disagreement, and note specific ways you could apply the material in the article to your instruction and pedagogy. This reflection/discussion portion will be another paragraph or two, and should be the most well developed. In all, your summary and reflection on *each* article will be minimally a full double- spaced page, but no more than two pages.

Four more articles may come from other educator magazines and journals, which are not peer reviewed (i.e. The Mailbox emphasizing practical ideas for mathematics that would benefit special learners. You may read an article about math instruction that is not specifically targeting a special population, but as you read, you immediately see the benefits to a non-English speaking child or to a child who needs challenging extensions and further dimension to her math exploration. If this is the case, be very explicit in your second part of the paper, explaining how these strategies will specifically benefit the special population you have in mind.

Special needs articles rubric:

_____ At least six of the ten articles were peer-reviewed and all ten articles provided theory and practice to benefit special learners. **(2 pts.)**

_____ Provides a summary for each of ten different articles. **(15 pts.)**

_____ Reflects on the author(s)' ideas and discusses personal applications for each of the ten articles. **(15 pts.)**

_____ APA style is followed for bibliographies and correct writing mechanics are used. **(3 pts.)**

Session Four

Math Unit Guidelines

Create a complete one-week math unit (5 lessons). **This is your final project and DUE IN COMPLETION on the last evening of class.** Select appropriate grade-level math goals or “big ideas” that are reasonable for one week. Develop 5 sequential lessons with objectives that help students learn the “big ideas.” You will use a textbook as a jumping off point in order to develop your unit.

The unit should reflect the readings in this course.

1. Each daily lesson plan should follow a problem-based learning model and include learning objectives, and the NCTM and IL Learning Standard(s) it meets.
2. Assessment Component – The unit will contain ongoing AND a final, cumulative assessment to determine if the students met the unit's goals.

You will be creating at least 3 different assessments for your math unit. They all need to be different types (formal assessment, informal assessment, alternative assessment, project based assessment etc...) *Copies of any written assessments should be provided.*

3. Technology Component - You will need to review and evaluate three software programs that correlate with your mathematical concept in your unit. Use the information in Chapter 8 to help you review and evaluate the software you have decided to look at. Once you have found the software that would be best for you to use, incorporate this software into your Math Unit.
4. Select lesson plans must be designed with the following exceptionalities in mind. Each of the following exceptionalities should be addressed at least once during the course of the unit. Clearly note in the lesson plan which modifications/adaptations are provided and for which exceptionality.

1. English Language Learners
2. Learning Difficulties
3. Gifted/Talented
4. Learning Styles and Multiple Intelligences
5. Gender Differences

Session Four

Math Unit Grading Rubric

Attach this rubric to your final unit when you submit it to the instructor.

Name: _____

| | |
|--|------|
| Cover Page <i>Title of Unit, grade level, goals or "big ideas", name, current address</i> | /15 |
| Interdisciplinary Connections | /5 |
| Assessment Component | /40 |
| Technology Component | /50 |
| Literature <i>Books, pamphlets, magazine, newspaper</i> | /5 |
| Unit Reflects Problem-Based Learning | /5 |
| Writing Mechanics | /20 |
| Exceptionalities <i>Select lesson plans must be designed with the following exceptionalities in mind. Clearly note the modifications/adaptations or activities for:</i> <ul style="list-style-type: none"> • <i>English Language Learners</i> • <i>Learning Difficulties</i> • <i>Gifted/Talented</i> • <i>Learning Styles and Multiple Intelligences</i> • <i>Gender Differences</i> | /10 |
| Daily Lesson Plans <i>Five lessons, following a problem-based learning model, including, NCTM and IL Learning Standards, <u>not stored in plastic sleeves.</u></i> | /50 |
| TOTAL | /200 |

ILLINOIS LEARNING STANDARDS

ED 345R – Elementary Math Methods

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|--|---|--|--|
| Understands the central concepts, methods of inquiry, and structures of the disciplines and creates learning experiences that make the content meaningful to all students (IPTS 1) | <i>Van de Walle</i> <i>Every Minute Counts</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion Resource file | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion Resource file |
| Understands how students' conceptual frameworks and their misconceptions for an area of knowledge can influence their learning (IPTS 1C) | <i>Van de Walle</i> <i>Every Minute Counts</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Questions about Pedagogy Discussion | Discussion/Introductions Questions about Pedagogy Discussion |
| Understands how students' conceptual frameworks and their misconceptions for an area of knowledge can influence their learning (IPTS 2A) | <i>Van de Walle</i> <i>Every Minute Counts</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Questions about Pedagogy Discussion | Discussion/Introductions Questions about Pedagogy Discussion |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|--|---|--|--|
| Understands human development, learning theory, neural science, and the ranges of individual variation within each domain (IPTS 2C) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Questions about Pedagogy Discussion | Discussion/Introductions Questions about Pedagogy Discussion |
| Understands and identifies differences in approaches to learning and performance, including different learning styles, multiple intelligences, and performance modes (IPTS 3D) | | | Unit | Unit |
| Understands the Illinois Learning Standards, curriculum development, content, learning theory, and student development and knows how to incorporate this knowledge in planning instruction (IPTS 4A) | | | Lesson Plans Unit | Lesson Plans Unit |
| Understands how to develop short and long-range plans consistent with curriculum goals, learner diversity, and learning theory (IPTS 4B) | | | Lesson Plans Unit | Lesson Plans Unit |
| Understands how to integrate technology into classroom instruction (IPTS 4E) | | | Resource file Unit | Resource file Unit |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|--|---|--|--|
| Understand how to review and evaluate educational technologies to determine instructional value (IPTS 4F) | | | Resource file Unit | Resource file Unit |
| Understands how to use various technological tools to access and manage information (IPTS 4G) | | | Resource file Unit | Resource file Unit |
| Understands the uses of technology to address students' needs (IPTS 4H) | | | Resource file Unit | Resource file Unit |
| Understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem-solving, and performance skills (IPTS 6) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Lesson Plans Unit Questions about Pedagogy | Lesson Plans Unit Questions about Pedagogy |
| Understand how to use the results of assessment to reflect on and modify teaching (IPTS 8D) | <i>Van de Walle</i> | | Lesson Plans Unit | Lesson Plans Unit |
| Understands that reflection is an integral part of professional growth and improvement of instruction (IPTS 10A) | | | Self and Peer Reflection/ Microteaching | Self and Peer Reflection/ Microteaching |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|--|---|---|---|
| Understands methods of inquiry that provide for a variety of self-assessment and problem-solving strategies for reflecting on practice (IPTTS 10B) | <i>Van de Walle</i> <i>Every Minute Counts</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Self and Peer Reflection/ Microteaching Questions about Pedagogy Microteaching Lesson Plans Unit | Self and Peer Reflection/ Microteaching Questions about Pedagogy Microteaching Lesson Plans Unit |
| Understands how to run computer software; access, generate and manipulate data; and publish results (TS 1A) | | | Resource file Unit | Resource file Unit |
| Uses appropriate terminology related to computers and technology in written and oral communications (TS 1C) | | | Resource file Unit | Resource file Unit |
| Demonstrates knowledge of uses of computers and technology in education, business and industry, and society (TS 1F) | | | Resource file Unit | Resource file Unit |
| Understands how to use technology in communicating, collaborating, conducting research, and solving problems (TS 2A) | | | Resource file Unit | Resource file Unit |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|------------------------|----------------------------|-----------------------|-----------------------|
| Identifies computer and other related technology resources for facilitating lifelong learning and emerging roles of the learner and the educator in engaged, collaborative learning environments (TS 2B) | | | Resource file Unit | Resource file Unit |
| Uses computer-based technologies including telecommunications to access information and enhance personal and professional productivity (TS 2E) | | | Resource file Unit | Resource file Unit |
| Adheres to copyright laws and guidelines in the access and use of information from various technologies (TS 2H) | | | Unit | Unit |
| Ensures policies and practices are in place to provide equal access to media and technology resources for students regardless of race, ethnicity, gender religion or socio-economic status (TS 2J) | | | Unit | Unit |
| Understands how to apply learning technologies that support instruction \in his or her grade level and subject areas (TS 3A) | | | Resource file Unit | Resource file Unit |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|------------------------|----------------------------|-------------------------------|-------------------------------|
| Explores, evaluates, and uses computer/technology resources, including applications, tools, educational software, and associated documentation (TS 3B) | | | Resource file Unit | Resource file Unit |
| Designs, implements, and assesses student learning activities that integrate computers/technology for a variety of student grouping strategies and for diverse student populations (TS 3D) | | | Resource file Unit | Resource file Unit |
| Practices socially responsible, ethical, and legal use of technology, information, and software resources (TS 3E) | | | Unit | Unit |
| Designs student learning activities that foster equitable, ethical, and legal use of technology by students (TS 3F) | | | Resource file Unit | Resource file Unit |
| Knows advanced features of technology-based productivity tools (TS 5A) | | | Resource file Unit | Resource file Unit |
| Uses advanced features of word processing, desktop publishing, graphics programs, and utilities to develop professional products (TS 5B) | | | All typed assignments Unit | All typed assignments Unit |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|---|------------------------|----------------------------|-----------------------|-----------------------|
| Knows how to access telecommunications resources to support instruction (TS 6A) | | | Resource file Unit | Resource file Unit |
| Accesses and uses telecommunications tools and resources for information-sharing, remote information access and retrieval, and multimedia/hypermedia publishing (TS 6B) | | | Resource file Unit | Resource file Unit |
| Uses electronic mail and web browser applications for communications and for research to support instruction (TS 6C) | | | Resource file Unit | Resource file Unit |
| Uses automated, on-line search tools and intelligent agents to identify and index desired information resources (TS 6D) | | | Resource file Unit | Resource file Unit |
| Understands how to use computers and other technologies in research, problem solving, and product development (TS 7A) | | | Resource file Unit | Resource file Unit |
| Identifies basic principles of instructional design associated with the development of multimedia and hypermedia learning materials (TS 7B) | | | Resource file Unit | Resource file Unit |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|---|--|-----------------------------------|-----------------------|-----------------------------------|
| Develops simple hypermedia and multimedia products that apply basic instructional design principles (TS 7C) | | | Resource file Unit | Resource file Unit |
| Selects appropriate tools for communicating concepts, conducting research, and solving problems for an intended audience and purpose (TS 7D) | | | Resource file Unit | Resource file Unit |
| Designs and publishes simple on-line documents that present information and include links to critical resources (TS 7H) | | | Resource file Unit | Resource file Unit |
| Develops instructional units that involve compiling, organizing, analyzing, and synthesizing of information, and uses technology to support these processes (TS 7I) | | | Resource file Unit | Resource file Unit |
| Participates in courses and other professional development activities to enhance teaching and learning (TS 7L) | | <i>Van de Walle</i> Discussion | | <i>Van de Walle</i> Discussion |
| Understands how to access, evaluate, and use information to improve teaching and learning (TS 8A) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> | Discussion | Resource file Unit | Resource file Unit |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|--|---|--|--|
| Models evaluation and use of information to solve problems and make decisions (TS 8B) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion Resource file | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion Resource file |
| Expects students to intellectually access, evaluate, and use information to solve problems and make decisions in all subject areas (TS 8C) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion Resource file | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion Resource file |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|--|---|--|--|
| Structures instruction and designs learning tasks and assignments to reflect higher-level thinking skills (TS 8D) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion Resource file | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion Resource file |
| Structures and/or facilitates cooperative learning groups as part of students' tasks and assignments (TS 8E) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion |
| Understands the connections among various content areas and is able to analyze ideas, problems, and real- world situations within and across content areas (SCEE 1A) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | | Microteaching Lesson Plans Unit | Microteaching Lesson Plans Unit |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|---|--|----------------------------|--|--|
| Understands the connections among various content areas and is able to interpret and communicate information, reasoning, concepts, and procedures within and across content areas (SCEE 1B) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | | Microteaching Lesson Plans Unit | Microteaching Lesson Plans Unit |
| Uses teaching techniques that demonstrate analysis of ideas, problems, and real-world situations within and across content areas (SCEE 1C) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | | Microteaching Lesson Plans Unit Resource file | Microteaching Lesson Plans Unit Resource file |
| Interprets and communicates information, reasoning, concepts, and procedures within and across content areas (SCEE 1D) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | | Microteaching Lesson Plans Unit | Microteaching Lesson Plans Unit |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|---|---|--|--|
| <p>Demonstrates proficiency in the use of mathematics; understands, communicates, and connects the major concepts, procedures, and reasoning processes of mathematics, including number systems and number sense, geometry, measurement, statistics, probability, and algebra; and promotes all students' ability to apply, interpret, and construct mathematical thinking skills in a variety of situations (26.330) (SCEE 3)</p> | <p><i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i></p> | <p>Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem</p> | <p>Microteaching Lesson Plans Unit Questions about Pedagogy Discussion</p> | <p>Microteaching Lesson Plans Unit Questions about Pedagogy Discussion</p> |
| <p>Understands various approaches used (estimation, mental mathematics, manipulative modeling, numerical/geometric/algebraic pattern recognition, and technology) to interpret and communicate mathematical information, reasoning, concepts, applications, and procedures (SCEE 3B)</p> | <p><i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i></p> | <p>Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem</p> | <p>Microteaching Lesson Plans Unit Questions about Pedagogy Discussion</p> | <p>Microteaching Lesson Plans Unit Questions about Pedagogy Discussion</p> |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|---|--|---|---|---|
| Understands various approaches used (estimation, mental mathematics, manipulative modeling, numerical/geometric/algebraic pattern recognition, and technology) to analyze mathematical ideas, solve problems, and investigate real-world situations (SCEE 3A) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion |
| Understands concepts, skills, and procedures related to number (e.g., integers and natural, rational, and real numbers), number sense, and numeration and their use in real-world situations (SCEE 3C) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion |
| Understands concepts, skills and procedures related to synthetic/analytical geometry and spatial relationships and their use in real-world situations (SCEE 3D) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|--|---|---|---|
| Understands concepts, skills, and procedures related to algebraic relations/functions and their use in real-world situations (SCEE 3E) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion |
| Understands concepts, skills, and procedures related to statistics/data analysis and their use in real-world situations (SCEE 3G) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion |
| Understands concepts, skills, and procedures related to probability/expectations and their use in real-world situations (SCEE 3H) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> <i>Every Minute Counts</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion |

| Learning Standards | Course Readings | In-Class Activities | Assignments | Assessments |
|--|--|---|---|---|
| Understands concepts, skills, and procedures related to measurement and their use in real-world situations (SCEE 3F) | <i>Van de Walle</i> <i>About Teaching Mathematics</i> | Discussion Problem-Solving Activities <i>What are you teaching my child?</i> – Video Horse Problem | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion | Microteaching Lesson Plans Unit Questions about Pedagogy Discussion |

1. Understands the central concepts, methods of inquiry, and structures of the disciplines and creates learning experiences that make the content meaningful to all students (IPTS 1)
2. Understands how students' conceptual frameworks and their misconceptions for an area of knowledge can influence their learning (IPTS 1C)
3. Understands how students' conceptual frameworks and their misconceptions for an area of knowledge can influence their learning (IPTS 2A)
4. Understands human development, learning theory, neural science, and the ranges of individual variation within each domain (IPTS 2C)
5. Understands and identifies differences in approaches to learning and performance, including different learning styles, multiple intelligences, and performance modes (IPTS 3D)
6. Understands the Illinois Learning Standards, curriculum development, content, learning theory, and student development and knows how to incorporate this knowledge in planning instruction (IPTS 4A)
7. Understands how to develop short- and long-range plans consistent with curriculum goals, learner diversity, and learning theory (IPTS 4B)
8. Understands how to integrate technology into classroom instruction (IPTS 4E)
9. Understand how to review and evaluate educational technologies to determine instructional value (IPTS 4F)
10. Understands how to use various technological tools to access and manage information (IPTS 4G)
11. Understands the uses of technology to address students' needs (IPTS 4H)
12. Understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem-solving, and performance skills (IPTS 6)
13. Understand how to use the results of assessment to reflect on and modify teaching (IPTS 8D)
14. Understands that reflection is an integral part of professional growth and improvement of instruction (IPTS 10A)

15. Understands methods of inquiry that provide for a variety of self assessment and problem-solving strategies for reflecting on practice (IPTS 10B)
16. Understands how to run computer software; access, generate and manipulate data; and publish results (TS 1A)
17. Uses appropriate terminology related to computers and technology in written and oral communications (TS 1C)
18. Demonstrates knowledge of uses of computers and technology in education, business and industry, and society (TS 1F)
19. Understands how to use technology in communicating, collaborating, conducting research, and solving problems (TS 2A)
20. Identifies computer and other related technology resources for facilitating lifelong learning and emerging roles of the learner and the educator in engaged, collaborative learning environments (TS 2B)
21. Uses computer-based technologies including telecommunications to access information and enhance personal and professional productivity (TS 2E)
22. Adheres to copyright laws and guidelines in the access and use of information from various technologies (TS 2H)
23. Ensures policies and practices are in place to provide equal access to media and technology resources for students regardless of race, ethnicity, gender, religion or socio-economic status (TS 2J)
24. Understands how to apply learning technologies that support instruction in his or her grade level and subject areas (TS 3A)
25. Explores, evaluates, and uses computer/technology resources, including applications, tools, educational software, and associated documentation (TS 3B)
26. Designs, implements, and assesses student learning activities that integrate computers/technology for a variety of student grouping strategies and for diverse student populations (TS 3D)
27. Practices socially responsible, ethical, and legal use of technology, information, and software resources (TS 3E)
28. Designs student learning activities that foster equitable, ethical, and legal use of technology by students (TS 3F)

29. Knows advanced features of technology-based productivity tools (TS 5A)
30. Uses advanced features of word processing, desktop publishing, graphics programs, and utilities to develop professional products (TS 5B)
31. Knows how to access telecommunications resources to support instruction (TS 6A)
32. Accesses and uses telecommunications tools and resources for information-sharing, remote information access and retrieval, and multi-media/hypermedia publishing (TS 6B)
33. Uses electronic mail and web browser applications for communications and for research to support instruction (TS 6C)
34. Uses automated, on-line search tools and intelligent agents to identify and index desired information resources (TS 6D)
35. Understands how to use computers and other technologies in research, problem solving, and product development (TS 7A)
36. Identifies basic principles of instructional design associated with the development of multimedia and hypermedia learning materials (TS 7B)
37. Develops simple hypermedia and multimedia products that apply basic instructional design principles (TS 7C)
38. Selects appropriate tools for communicating concepts, conducting research, and solving problems for an intended audience and purpose (TS 7D)
39. Designs and publishes simple on-line documents that present information and include links to critical resources (TS 7H)
40. Develops instructional units that involve compiling, organizing, analyzing, and synthesizing of information, and uses technology to support these processes (TS 7I)
41. Participates in courses and other professional development activities to enhance teaching and learning (TS 7L)
42. Understands how to access, evaluate, and use information to improve teaching and learning (TS 8A)
43. Models evaluation and use of information to solve problems and make decisions (TS 8B)

44. Expects students to intellectually access, evaluate, and use information to solve problems and make decisions in all subject areas (TS 8C)
45. Structures instruction and designs learning tasks and assignments to reflect higher-level thinking skills (TS 8D)
46. Structures and/or facilitates cooperative learning groups as part of students' tasks and assignments (TS 8E)
47. Understands the connections among various content areas and is able to analyze ideas, problems, and real-world situations within and across content areas (SCEE 1A)
48. Understands the connections among various content areas and is able to interpret and communicate information, reasoning, concepts, and procedures within and across content areas (SCEE 1B)
49. Uses teaching techniques that demonstrate analysis of ideas, problems, and real-world situations within and across content areas (SCEE 1C)
50. Interprets and communicates information, reasoning, concepts, and procedures within and across content areas (SCEE 1D)
51. Demonstrates proficiency in the use of mathematics; understands, communicates, and connects the major concepts, procedures, and reasoning processes of mathematics, including number systems and number sense, geometry, measurement, statistics, probability, and algebra; and promotes all students' ability to apply, interpret, and construct mathematical thinking skills in a variety of situations (26.330) (SCEE 3)
52. Understands various approaches used (estimation, mental mathematics, manipulative modeling, numerical/geometric/ algebraic pattern recognition, and technology) to interpret and communicate mathematical information, reasoning, concepts, applications, and procedures (SCEE 3B)
53. Understands various approaches used (estimation, mental mathematics, manipulative modeling, numerical/geometric/algebraic pattern recognition, and technology) to analyze mathematical ideas, solve problems, and investigate real-world situations (SCEE 3A)
54. Understands concepts, skills, and procedures related to number (e.g., integers and natural, rational, and real numbers), number sense, and numeration and their use in real-world situations (SCEE 3C)

55. Understands concepts, skills and procedures related to synthetic/analytical geometry and spatial relationships and their use in real-world situations (SCEE 3D)
56. Understands concepts, skills, and procedures related to algebraic relations/functions and their use in real-world situations (SCEE 3E)
57. Understands concepts, skills, and procedures related to statistics/data analysis and their use in real-world situations (SCEE 3G)
58. Understands concepts, skills, and procedures related to probability/expectations and their use in real-world situations (SCEE 3H)
59. Understands concepts, skills, and procedures related to measurement and their use in real-world situations (SCEE 3F)
60. Teaches major concepts, procedures, and reasoning processes related to number systems and number sense, geometry, measurement, statistics, probability, and algebra (SCEE 3J)
61. Selects and uses a wide range of manipulatives, instructional resources, and technologies to support the learning of mathematics (SCEE 3K)
62. Understands the physical, social, emotional, moral/ethical, cognitive, and linguistic development influence learning and uses this understanding when planning curriculum, delivering instruction, and constructing assessment (SCEE 8A)
63. Understands human and cognitive development, learning theories, and the ranges of individual variation within each developmental domain (SCEE 8B)
64. Assesses individual and group performance in relation to cognitive, social, emotional, moral/ethical, and physical development (SCEE 8C)
65. Recognizes and respects differences among students and designs instruction so all students can learn (SCEE 8D)
66. Understands characteristics of gifted and talented students and the characteristics of students with various disabilities (SCEE 9A)
67. Understands how students' learning is influenced by individual experiences, talents, and prior learning, as well as language, culture, family, and community values (SCEE 9C)
68. Understands and identifies differences in approaches to learning and performance, including different learning styles, multiple intelligences, and performance modes (SCEE 9D)

69. Facilitates a learning community in which individual differences and cultural diversity are respected (SCEE 9E)
70. Makes appropriate provisions (in terms of time and circumstance for work, tasks assigned, communication, and response modes) for all students (SCEE 9F)
71. Uses information about students' families, cultures, and communities as a basis for connecting instruction to students' experiences (SCEE 9G)
72. Uses cultural diversity and individual student experiences to enrich instruction (SCEE 9H)
73. Uses a wide range of instructional strategies and technologies to meet diverse student needs (SCEE 9I)
74. Understands how to develop flexible short- and long-range plans consistent with curriculum goals, learners' diversity, and learning theories (SCEE 10B)
75. Understands how to evaluate and integrate technologies, including assistive technology, into classroom instruction (SCEE 10E)
76. Establishes goals and selects learning materials, based on the IL Learning Standards, content knowledge, learning theories, and students' needs, including IEPs (SCEE 10G)
77. Creates flexible short-range and long-term plans based on elementary-level scope and sequence when planning curriculum and instruction (SCEE 10H)
78. Creates learning activities to allow for variation in students' learning styles and performance modes (SCEE 10I)
79. Incorporates experiences into instructional practices that relate to the students' life experiences and to future career and work experiences (SCEE 10J)
80. Creates approaches to learning that are interdisciplinary and that integrate multiple content areas (SCEE 10K)
81. Selects and uses a wide range of instructional resources and technologies (SCEE 10L)
82. Understands principles of an strategies for effective classroom management (SCEE 11A)

83. Understands factors that influence motivation and engagement and how to help students become self-motivated (SCEE 11D)
84. Understands cognitive processes associated with various kinds of learning (SCEE 12A)
85. Understands principles and techniques associated with various instructional strategies (SCEE 12B)
86. Understands how to enhance learning through the use of a wide variety of materials and resources (SCEE 12C)
87. Understands the disciplinary and interdisciplinary approaches to learning and how they relate to life and career experiences (SCEE 12D)
88. Uses multiple teaching and learning strategies and varied resources to promote the development of critical and creative thinking skills (SCEE 12E)
89. Monitors and adjusts strategies in response to learner's feedback (SCEE 12F)
90. Varies his or her role in the instructional process as instructor, facilitator, coach or audience in relation to the content and purposes of instruction and the needs of students (SCEE 12G)
91. Uses a variety of clear, accurate presentations and representations of concepts; uses alternative explanations; and presents diverse perspectives (SCEE 12H)
92. Presents curriculum that demonstrates an interconnection among subject areas that will reflect life and career experiences (SCEE 12I)
93. Selects and uses a wide range of instructional resources and technologies to support learning (SCEE 12J)
94. Understands how individual, cultural, linguistic, and gender differences can affect communication in the classroom (SCEE 13B)
95. Models accurate, effective modes of communication and uses a variety of communication tools, including technology (SCEE 13E)
96. Practices effective listening, conflict-resolution, and group-facilitation skills as a team member (SCEE 13I)
97. Understands assessment as a means of evaluating how students learn; what they know and are able to do in relation to national, state, and local

standards; and what kinds of experiences will support students' future growth and development (SCEE 14A)

98. Understands the purposes, characteristics, and limitations of different kinds of assessments (SCEE 14B)
99. Understands how to select, construct, and use assessment and evaluation strategies and instruments for diagnosis and prescription for the learner (SCEE 14D)
100. Uses assessment results to diagnose students' learning, develop a student profile, align and modify instruction, and design teaching strategies (SCEE 14E)
101. Develops and uses a variety of formal and informal assessments to evaluate the progress and performance of students (SCEE 14F)
102. Understands the methods of inquiry that provide for a variety of self-assessment and problem-solving strategies (SCEE 16B)
103. Understands that reflection is an integral part of professional growth and improvement of instruction (SCEE 16A)
104. Uses classroom observation, information about students, pedagogical knowledge, and research as sources for active reflection, evaluation, and revision of practice (SCEE 16D)
105. Applies knowledge of current research related to national, state, and local guidelines/standards (SCEE 16G)