

EDU 486: Teaching Math and Science in Urban Grades, 1-3
with Dr. Bob Louisell
Metropolitan State University
Management Education Center (MEC), M 1100
Tuesdays, 6-9:20 p.m.

Professor's Note About This Course: As early childhood educators, many of you will accept positions teaching in the primary grades of public schools. In this position, you will be expected to teach your students mathematics and science. The purpose of this course is to help prepare you for teaching these subject to children in a developmentally appropriate way. . After completing this course, you should know how to:

- converse with children to find out *their own* ideas about particular math or science concepts.
- assess children's understandings in order to make decisions about how to teach them.
- engage children in constructivist activities with hands-on models. Your students will *love* science and math!
- develop lessons that help children to understand basic concepts and standards for math and science.
- help children notice how math and science apply to their everyday lives.
- foster a child's curiosity about the natural and physical world.
- model your own curiosity in your personal life and in the classroom.

<u>Dates</u>	<u>Class Topics</u>	<u>Type of Activity</u>
August 27	Introductions, Course Syllabus & Philosophy Children's ideas about the moon Constructivism	<i>Discussion</i> <i>Video-discussion</i> <i>Lecture-Discussion</i>

Reading: **Louisell, *I Do, and I Understand, Chapter 1.***

September 3	Children's Ideas About Science Interviewing Children to Discover <i>Their</i> Ideas	<i>Lecture-Discussion</i> <i>Video-Discussion</i>
-------------	---	--

Reading: **Louisell, *I Do, and I Understand, Chapters 2.***

September 10	Interviewing Children About Math/Science Listening-- <i>Really</i> listening!--to Young Children	<i>Lecture-Discussion</i> <i>Lecture-discussion</i>
--------------	--	--

Reading: **Louisell, *I Do, and I Understand, Chapter 3.***

September 17 **About Teaching Math and Science** *Lecture-Discussion*

Counting and Pre-Number Activities

Conservation of Length and Number

Videotapes

Counting With Understanding

Lecture-Discussion

Reading: **Louisell, *I Do, and I Understand*, pages 61-65 and pages 67-70.**

September 24 **Counting and Pre-Number Activities (Continued)**

Comparisons (more/less,tall/short, etc.) *Cuisenaire Rods*

Matching /one-to-one matching

cubes, felt objects, etc.

Book about 3..."

paper, crayons

Pentaminoes

blocks

Counting, Counting On, Counting Back

unifix track

Classification

A-Blocks, People Pieces...

Class Inclusion

Writing numerals

lecture-discussion

What to Do When They Don't Conserve *Schematic, p. 80.*

Reading: **Louisell, *I Do, and I Understand*, Chapter 4 (remaining pages).**

Assignment Due: **Clinical interview.**

October 1 **More On How To Teach Science**

Lecture-Discussion

Clay Boats/Sink & Float

Activity for Children, 7.4 & 7.7

Reading: **Louisell, *I Do, and I Understand*, Chapter 7.**

October 8 Pendulums: Activity for Future Teachers 7.4

Hands-on Activity

Science Processes

Lecture-Discussion

Reading: **Louisell, *I Do, and I Understand*, Chapter7, pages 129-141.**

October 15 *Mystery Powders*

Activity for Children 9.1

The Learning Cycle

Lecture-Discussion

Reading: **Louisell, *I Do, and I Understand*, pages 141-152.**

October 22 Mealworms (Activity for Future Teachers 7.1) *Hands-on Activity*
 Science Curricula for Primary Grades *Lecture-Discussion*
 Selecting Topics for Family Science Night *Course Assignment*

Reading: *Louisell, I Do, and I Understand*, Chapter 7.

October 29 Optics and Shadows *Hands-on Activity*
 Colored Solutions *Hands-on Activity*

Teaching Children To Add *Unifix Cubes*

Reading: *Louisell, I Do, and I Understand*, Chapter 5, pages 89-92.

Assignment Due: Lesson plans for Family Science Night.

November 5 **Teaching Children To Subtract** *Unifix Cubes*
 Addition and Subtraction Facts
Games For Practicing Addition and Subtraction *Games*

Reading: *Louisell, I Do, and I Understand*, Chapter 5, pages 92-93.

November 12 **Family Science Night (School to be announced)** *teaching*

November 19 **Teaching Children About Multiplication, Place Value, and Division**

Introducing multiplication	<i>Dominos game</i>
Facts: Commutative law and identity element	<i>Lecture-Discussion</i>
The concept of grouping (Strawderman)	<i>Lecture-Discussion</i>
Skip-counting	<i>Unifix cubes, number track</i>
Field trips to observe house numbers	<i>Lecture-Discussion</i>
The "trading game"	<i>Dienes blocks, dice</i>
Proportional models	<i>Lecture-Discussion</i>
2-digit addition without regrouping	<i>Dienes Blocks, unifix cubes,</i>
2-digit addition with regrouping	<i>Dienes Blocks, unifix cubes,</i>
	<i>popsicle sticks</i>
2-digit subtraction without regrouping	<i>Dienes Blocks, unifix cubes,</i>
Subtraction with regrouping	<i>Dienes Blocks, unifix cubes,</i>
Teaching Children to Divide	<i>Cubes, etc</i>

Reading: *Louisell, I Do, and I Understand*, Chapter 5, pages 99-108.

Assignment Due: Paper about how young children learn science.

November 16

Thanksgiving Holiday! (No Class)

December 3

Teaching Children About Measurement
Teaching Children About Fractions

Body parts, hands, shoes, etc.
fraction tiles, strips, etc.

Reading: Louisell, *I Do, and I Understand*, Chapter 6.

December 10

Project Work/Thematic Teaching
Connecting Math to the Real World

Photographic Slides
Lecture-Cooperative Groups

Reading: Louisell, *I Do, and I Understand*, Chapters 10-11.

Assignments Due: Take-Home Exam for Math *and* clinical experience evaluation and written reflections.

Course Requirements:

1. Conduct a clinical interview with a child, aged 5-8, on conservation of number and length. Videotape the interview and interpret it according to the interview protocol provided in a course handout. Submit the interview, with recording, by the assigned date. Note: Most of the Assessment Activities in the textbook may be used as interview protocols. Others will be provided in the form of course handouts.
2. Prepare and teach 3 "hands-on, minds-on" lessons for a Family Science Night scheduled in a local school. Follow the format provided in course handouts and class sessions.
3. Complete a math methods exam by the scheduled date. You will be given a study guide to help you prepare for this exam.
4. Submit a paper on how young children learn science. In your own words, it should explain the philosophy of science teaching presented in the textbook, especially Chapters 2, 3, 7, 8, and 9, and it should express your own ideas related to this philosophy. As a guideline, it should be approximately 1000 words.
5. Complete a clinical experience practicum in a local early childhood setting (10 hours). You should observe or help teach math or science at some point during this field experience. Submit comments and questions about your experience to me (See course handout for format), and earn a satisfactory evaluation from your cooperating teacher.
6. This is a pre-professional course. Attendance *and* participation is expected. You will often be asked to work in cooperative groups during class. More than one absence may affect your grade. Per the university's attendance policy, four or more absences (more than 20%) may result in failure for the course. Persistent tardiness may be counted against your attendance record.

Text: *I Do, and I Understand: Helping Young Children Discover Science and Mathematics*, by Robert Louisell (with guest chapters by Stephen Hornstein and Peter Frost).

Professor Contact Information: Robert.Louisell@metrostate.edu

Weighting of Requirements for Grading Purposes:

Clinical Interview With Child About Science/Math	=20% of total course grade
Family Science Lessons/Family Science Night	=20% of total course grade
Take-Home Math Exam	=20% of total course grade
Paper: How Young Children Learn Science	=20% of total course grade
Field Experience Hours	=10% of total course grade
Attendance, Participation, Cooperative Work	=10% of total course grade

Assignment Due Dates:	September 24	=Clinical Interview
	October 29	=Lesson Plans for Family Science Night
	November 12	=Teach at Family Science Night
	December 10	=Take-home exam for Math <u>and</u> clinical experience evaluations and reflections

Intellectual Property Statement for this Course: The redistribution of audio or video recordings from the course to individuals who are not students in the class is prohibited without the express permission of the faculty member and any of the students who are recorded.

Notes: