Professional Development Institute

Flex Course Syllabus

Supporting Math Foundational Skills in the Primary Grades (K-3)

PDI Course Number: 108T02

UCSD Course Number: EDUC40223

If you would like information about receiving post-baccalaureate (graduate) credit for completing this course, please click here.

Course Timeline

Participants have one year to complete the course. Participants must spend a minimum of three weeks in this course.

Course Description

Do you find that your K-3 students often struggle with the most basic of mathematical principles? Do you want to find a way to better support those students as they learn to unlock the gift of mathematics? The intent of this course is to provide a toolbox of both information and activities that K-3 teachers can use to support students who struggle to understand and grasp both the meaning and the manipulation of basic math principles. Some of the topics include counting and cardinality, counting objects, rote counting, number sense of quantity, counting on and back, operations of addition and subtraction, composing and decomposing numbers, the application of mathematical foundational skills within the problem-solving process, and guiding students to use their problem-solving and critical-thinking skills to make real-world connections. Teachers will also learn how to determine student levels and how to choose and design assessments to best utilize the resources that are available within a typical math curriculum. As teachers work through this course, they will learn how to create meaningful and engaging activities in order to promote student ownership, and they will learn how to establish home connections so that those mathematical habits of mind can flourish. By the end of this course, teachers will feel like they have the tools and strategies needed to effectively teach math foundational skills.

Educational Outcomes

1. Teachers will learn about the importance of the five building blocks of mathematics and how they relate to the critical areas in mathematics at the K-3 level.
2. Teachers will understand the critical mathematics standards and clusters which are addressed in K-3.
3. Teachers will understand what the mathematical practice standards are and how they relate to the teaching of mathematical foundational skills.
4. Teachers will learn how to determine student mathematical levels in grades K-3.
5. Teachers will understand the role that progress monitoring plays in the development of mathematical foundational skills.
6. Teachers will be introduced to three different types of assessment (diagnostic, formative, and summative), including specific strategies for incorporating same into the teaching of mathematical foundational skills.
7. Teachers will learn how to take advantage of the various strategies and resources to supplement their regular math curriculum.
8. Teachers will understand that counting and cardinality is the first layer of the foundation of early mathematical skills, and they will learn various strategies for incorporating same as they learn to further explore the counting sequence.
9. Teachers will examine the skill and foundation of counting objects, and they will learn various strategies for incorporating same into their daily mathematical foundation lessons.
10. Teachers will learn strategies to help students master rote counting, the most recognizable and supported piece of numeracy.
11. Teachers will learn a variety of clearly-defined teacher-modeled strategies in an effort to assist students in the development of flexibility in number sense.
12. Teachers will learn specific strategies for counting-up-from, counting-up-to, counting-down-from, and counting-down-to, as they incorporate same into their daily mathematical foundation lessons.
13. Teachers will learn a variety of strategies for recognizing ways to emphasize and develop conceptual understanding in regard to addition and subtraction.
14. Teachers will learn specific strategies for composing and decomposing numbers as they incorporate same into their daily mathematical foundation lessons.
15. Teachers will learn strategies for creating a variety of opportunities for problem solving within their mathematical foundational lessons.
16. Teachers will understand how to help students apply their knowledge of mathematical foundational skills within the problem-solving setting.
17. Teachers will learn how to use mathematics as a tool to make real-world connections.
18. Teachers will learn how to design engaging and stimulating mathematical activities so that students are more likely to take ownership over their own learning.
19. Teachers will learn how to establish home connections in order to foster and nurture important mathematical habits of mind.

Instructional Media

- Online Discussions
- Online Engagement
- Online Collaboration
- Instructor Feedback
- Instructor Interaction
- Online Resources and Websites
- Supplemental Instructional Materials
- Printable Classroom Resources

Evaluation

- Test #1 (5% of final grade)
- Test #2 (5% of final grade)
- Test #3 (5% of final grade)
- Test #4 (5% of final grade)
- Test #5 (5% of final grade)
- Autobiography and Goals for the Course (10% of final grade)
- Article/Video Reflection (15% of final grade)
- Course Collaboration/Share Ideas with the Class (10% of final grade)
- Cumulative Assignment/Project: Develop Three Lesson Plans (20% of final grade)
- Culminating Practicum (20% of final grade)

Topical Outline

Unit One

- The Importance of Establishing Foundational Skills
- Critical Areas in Mathematics
- A Review of the Math Practice Standards
- **Assignment #1**
  Write an autobiography including information about yourself, your grade level and what you specifically hope to learn about establishing foundational skills in some of the more critical areas of mathematics within your K-3 classroom. Your autobiography should be a minimum of three paragraphs.
- **Test #1**

Unit Two

- Determining Student Levels
- Choosing and Designing an Assessment Style
- Utilizing Resources Within Your Math Curriculum
- **Assignment #2**

As an educator, it is important to be aware of the research, studies, and professional work done in the field. In the course, you will find an article and video that are relevant to the specific course content. Read the article and then write an essay with your thoughts.

- **Test #2**

Unit Three

- Counting and Cardinality
- Counting Objects
- Rote Counting
- **Assignment #3**
  Online Discussion Board Participation/Engagement: Please post a tip, strategy, or idea that specifically relates to effectively introducing and engaging K-3 students in some of the skills that are important to any number of critical areas of mathematics and will make a difference to other teachers in their own classrooms. Your assignment should be a minimum of three paragraphs and detailed enough for another teacher to easily follow. This is a great opportunity to share and collaborate with other teachers at your grade level around the country. Take time to review and respond to other postings that are relevant to your classroom population in order to gain effective ideas to use immediately in your classroom
- **Test #3**

Unit Four

- Number Sense of Quantity
- Counting On and Back
- Operations of Addition and Subtraction
- Compose and Decompose Numbers
- **Test #4**

Unit Five

- Foundations of Problem Solving
- The Application of Foundational Skills within the Problem-Solving Process
- Using Mathematics as a Tool to Make Real-World Connections
- **Test #5**

Unit Six

- Taking Ownership through Engagement
- Establishing Home Connections and Mathematical Habits of Mind
- **Assignment #4**
  Develop three separate lesson plans that introduce students to, or enhance their concept of, three different mathematical foundational skills that were discussed throughout the

course (counting and cardinality, counting objects, rote counting, number sense, counting on and back, operations of addition and subtraction, composing and decomposing numbers, foundations of problem solving, and making real-world connections). Each lesson plan must include an engaging and stimulating math activity that is designed to support the particular mathematical foundational skill under investigation. Each lesson plan should include the appropriate grade level to which the lesson plan best applies, as well as any specific mathematical standards.

- **Assignment #5**
  The culminating practicum is a three-step process. (1) In the first assignment, you were asked what goals you had and what you hoped to learn from the course. Think back to your original goals for this course. Write a minimum two-paragraph reflection specifically describing how what you learned can be used to help you reach those goal(s). (2) Next, write a minimum three-paragraph plan that specifically describes the ways in which you intend to implement a particular strategy you learned in this course into your own teaching situation. (3) Last, write a minimum two-paragraph reflection describing a student you have or have had in the past. Then, discuss how the strategies you learned in this course will specifically benefit that student as you put your plan into action.

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