Professional Development Institute

Flex Course Syllabus

Math Manipulatives in the Primary Classroom (K-2)

PDI Course Number: 35T02

UCSD Course Number: EDUC41675

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 want to use manipulatives to help your students understand math concepts more concretely? This online course is designed for teachers in grades K-2 who want to learn how to incorporate manipulatives into their everyday teaching in order to guide their students to become critical and logical mathematical thinkers. The course begins by discussing math standards and the role of manipulatives in problem solving. A plethora of suggestions for how to incorporate specific manipulatives into your math instruction in order to improve the way students approach complex mathematical topics are provided. Specific manipulatives discussed in the course include linking cubes, color tiles and counters, pattern blocks, number lines, base ten blocks, place value chips, and hundreds charts to build basic math foundation skills. Ways to introduce play money and clocks are also included. Strategies and activities for using attribute blocks, Cuisenaire rods, rekenreks for addition and subtraction skills, tangrams, and geoboards as an introduction to geometry are shared. Additionally, an overview of how to create a math workshop using hands-on manipulatives is also included. By the end of this course, teachers will have a solid understanding, as well as the tools they need, to use math manipulatives to strengthen their students' math skills.

Educational Outcomes

1. Teachers will understand the basics of the Common Core State Standards for Mathematics and NCTM Standards.
2. Teachers will understand and appreciate the role manipulatives play in the mathematical problem-solving process.
3. Teachers will discover the benefits and advantages of using math manipulatives in the classroom.
4. Teachers will learn specific strategies to incorporate manipulatives into their mathematics instruction in order to challenge their students' problem-solving abilities.
5. Teachers will learn how to use math manipulatives to link concrete ideas with abstract concepts.
6. Teachers will learn how to use manipulatives as a teaching tool in order to support a student-centered classroom.
7. Teachers will learn how linking cubes can be used to strengthen students' mathematical problem-solving skills.
8. Teachers will learn how color tiles and counters can be used to strengthen students' mathematical problem-solving skills.
9. Teachers will learn how rekenreks can be used to strengthen students' mathematical problem-solving skills.
10. Teachers will learn how number lines can be used to strengthen students' mathematical problem-solving skills.
11. Teachers will learn how Cuisenaire rods can be used to strengthen students' mathematical problem-solving skills.
12. Teachers will learn how hundreds charts can be used to strengthen students' mathematical problem-solving skills.
13. Teachers will learn how base ten blocks can be used to strengthen students' mathematical problem-solving skills.
14. Teachers will learn how place value chips can be used to strengthen students' mathematical problem-solving skills.
15. Teachers will learn how to incorporate manipulatives into the understanding of money in order to strengthen students' mathematical problem-solving skills.
16. Teachers will learn how to incorporate manipulatives into the telling of time in order to strengthen students' mathematical problem-solving skills.
17. Teachers will learn how pattern blocks can be used to strengthen students' mathematical problem-solving skills.
18. Teachers will learn how attribute blocks can be used to strengthen students' mathematical problem-solving skills.
19. Teachers will learn how geoboards can be used to strengthen students' mathematical problem-solving skills.
20. Teachers will learn how tangrams can be used to strengthen students' mathematical problem-solving skills.
21. Teachers will gain a basic understanding of how to set up a math workshop in order to best incorporate the use of manipulatives in the mathematical problem-solving process.

22. Teachers will learn how to create problems that result in real-world implications in order to make mathematics meaningful for their students.

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: Write Lesson Plans (20% of final grade)
- Culminating Practicum (20% of final grade)

Topical Outline

Unit One

- Teaching Math to Young Children
- Introduction to the Common Core Standards for Mathematics and the NCTM Standards
- The Role of Manipulatives in Problem Solving
- **Assignment #1**
  Write an autobiography including information about yourself, your grade level and what you specifically hope to learn about using manipulatives in the classroom. Your autobiography should be a minimum of three paragraphs.
- **Test #1**

Unit Two

- Linking Cubes
- Color Tiles and Counters
- Rekenreks
- **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

- Number Lines
- Cuisenaire Rods
- Hundreds Charts
- **Assignment #3**
  Online Discussion Board Participation/Engagement: Please post a tip, strategy, or idea that specifically relates to effectively using manipulatives 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

- Base Ten Blocks
- Place Value Chips
- Manipulating Money
- **Test #4**

Unit Five

- Telling Time
- Pattern Blocks
- Attribute Blocks
- **Test #5**

Unit Six

- Geoboards

- Tangrams
- Creating a Math Workshop
- **Assignment #4**
  Develop three complete lessons that you would like to now teach using any of the manipulatives that were introduced throughout the course. Each lesson must focus on a different manipulative, and the manipulatives you choose should be used to showcase mathematical concepts that were not presented within the course (e.g., partitioning a rectangle into equal rows and columns using pattern blocks). Be sure to note which manipulative you are illustrating, the grade level to which it is most appropriate, and step-by-step instructions for the lesson. The lesson should be described in enough detail so that someone else can teach it. Keep in mind that this assignment is a cumulative project and therefore, you are expected to demonstrate the knowledge you gained from the course and your ability to apply what you have learned in a practical setting.
- **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.

Bibliography

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