



Western Technical College

10522118 EDU: Techniques for Math

Course Outcome Summary

Course Information

Description	Students learn key terminology and research-based strategies to support learners in math domains: numbers, base ten operations, algebraic thinking, geometry, probability/statistics and measurement and data. Current practice including manipulatives, problem-solving and assessment will be covered within the framework of state and national standards.
Career Cluster	Education and Training
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	72

Pre/Corequisites

Prerequisite None

Textbooks

No textbook required.

Program Outcomes

1. Demonstrate instructional support strategies for content areas
2. Demonstrate instructional support strategies for content areas
3. Implement developmentally appropriate practices to foster learning
4. Implement developmentally appropriate practices to foster learning
5. Adapt instruction to meet the diverse needs of all learners
6. Adapt instruction to meet the diverse needs of all learners
7. Incorporate the reflective process to promote professional growth
8. Incorporate the reflective process to promote professional growth

Course Competencies

1. Explain factors that influence the nature of mathematics instruction

Assessment Strategies

- 1.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

Your performance will be successful when you:

- 1.1. identify professional organizations that influence mathematics instruction
- 1.2. identify standards that influence mathematics instruction.
- 1.3. reference current resources
- 1.4. describe how technology is used in mathematics instruction.
- 1.5. describe how writing in mathematics enhances critical thinking.
- 1.6. explain how personal experiences influence personal beliefs about mathematics learning.

Learning Objectives

- 1.a. Describe current trends in mathematics instruction.
- 1.b. Compare past and current philosophies in mathematics education.
- 1.c. Examine positions of professional organizations.
- 1.d. Examine the Principles and Standards for School Mathematics (NCTM 2000).
- 1.e. Examine the Wisconsin State Standards.
- 1.f. Identify classroom practices that meet national or state standards.
- 1.g. Analyze local district math curriculum.
- 1.h. Review current research affecting the way children learn and the way math is taught.
- 1.i. Describe position statements of national math organizations on the use of technology in instruction.
- 1.j. Share personal experiences that have influenced one's feelings towards mathematics learning.
- 1.k. Identify gender bias in one's personal background in regards to mathematics learning.
- 1.l. Identify stereotypes found in society that discourage females from doing well in mathematics learning.

2. Analyze mathematics assessments

Assessment Strategies

- 2.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

Your performance will be successful when you:

- 2.1. identify formative assessments used in mathematics
- 2.2. identify summative assessments used in mathematics
- 2.3. align assessment with stated objective

Learning Objectives

- 2.a. Describe the relationship between assessment and learning.
- 2.b. State the purpose of assessment.
- 2.c. Define performance assessment.
- 2.d. Define portfolio assessment.
- 2.e. List performance assessments in math.
- 2.f. Relate state and national standards to assessment.
- 2.g. Describe Concrete-to-Representational-Abstract (CRA) Assessment.
- 2.h. Describe Error Pattern Analysis.
- 2.i. Describe Flexible Mathematics Interviews

3. Explore teaching techniques for numbers and operations

Assessment Strategies

- 3.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

Your performance will be successful when you:

- 3.1. identify an objective based on the needs of the student(s)
- 3.2. select activities to teach/reinforce the stated objective

- 3.3. select manipulatives that are appropriate for the given objective
- 3.4. select a children's book related to the given objective
- 3.5. create a hands-on activity
- 3.6. create a grade-level appropriate activity
- 3.7. link activity to a standard
- 3.8. recommend a technology app, website, or software program that reinforces the selected objective

Learning Objectives

- 3.a. Explore teaching strategies/techniques for counting and cardinality.
- 3.b. Explore strategies/techniques for Base Ten.
- 3.c. Explore teaching strategies/techniques for early number sense.
- 3.d. Explore teaching strategies/techniques for place value.
- 3.e. Explore teaching strategies/techniques for computation (addition, subtraction, multiplication, and division.)
- 3.f. Explore teaching strategies/techniques for fractions and decimals.
- 3.g. Explore teaching strategies/techniques for ratio, proportion, and percent.
- 3.h. Research quality pieces of literature to support numbers and operations.
- 3.i. Explore strategies/techniques to solve real-world mathematical problems using numbers and operations.
- 3.j. Identify assessments used to measure students' learning of numbers and operations.

4. Explore teaching techniques for algebra

Assessment Strategies

- 4.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

Your performance will be successful when you:

- 4.1. identify an objective based on the needs of the student(s)
- 4.2. select activities to teach/reinforce the stated objective
- 4.3. select manipulatives that are appropriate for the given objective
- 4.4. select a children's book related to the given objective
- 4.5. create a hands-on activity
- 4.6. create a grade-level appropriate activity
- 4.7. link activity to a standard
- 4.8. recommend a technology app, website, or software program that reinforces the selected objective

Learning Objectives

- 4.a. Explore teaching strategies/techniques for computation (addition, subtraction, multiplication, and division.)
- 4.b. Explore strategies/techniques for variables and linear equation.
- 4.c. Describe ways educators can encourage algebraic thinking.
- 4.d. Understand properties of addition, subtraction, multiplication, and division
- 4.e. Explore strategies/techniques for representation and problem solving.
- 4.f. Explore strategies/techniques to analyze patterns and relationships.
- 4.g. Research quality pieces of literature to support algebraic thinking.
- 4.h. Explore strategies/techniques to solve real-world mathematical problems using algebraic expressions and equations.
- 4.i. Identify assessments used to measure students learning of algebraic thinking.

5. Explore teaching techniques for geometry

Assessment Strategies

- 5.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

Your performance will be successful when you:

- 5.1. identify an objective based on the needs of the student(s)
- 5.2. select activities to teach/reinforce the stated objective
- 5.3. select manipulatives that are appropriate for the given objective
- 5.4. select a children's book related to the given objective
- 5.5. create a hands-on activity

- 5.6. create a grade-level appropriate activity
- 5.7. link activity to a standard
- 5.8. recommend a technology app, website, or software program that reinforces the selected objective

Learning Objectives

- 5.a. Summarize the van Hiele Levels of Geometric Reasoning.
- 5.b. Explore strategies/techniques for geometry as shape; line segments and rays, angles, two-dimensional figures, three dimensional figures
- 5.c. Explore strategies/techniques for geometry as transforming shapes; congruence transformations, symmetry, similarity
- 5.d. Explore strategies/techniques for geometry as measurement; systems of measurement, perimeter and area, surface area and volume
- 5.e. Explore strategies/techniques for graphing.
- 5.f. Research quality pieces of literature to support geometry.
- 5.g. Explore strategies/techniques to solve real-world mathematical problems using geometric principles.
- 5.h. Identify assessments used to measure students learning of geometry.

6. Explore teaching techniques for measurement

Assessment Strategies

- 6.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

Your performance will be successful when you:

- 6.1. identify an objective based on the needs of the student(s)
- 6.2. select activities to teach/reinforce the stated objective
- 6.3. select manipulatives that are appropriate for the given objective
- 6.4. select a children's book related to the given objective
- 6.5. create a hands-on activity
- 6.6. create a grade-level appropriate activity
- 6.7. link activity to a standard
- 6.8. recommend a technology app, website, or software program that reinforces the selected objective

Learning Objectives

- 6.a. Describe the measuring process.
- 6.b. Explore teaching strategies/techniques for attributes of measurement; length, capacity, weight, area, volume, temperature, and time.
- 6.c. Explore teaching strategies/techniques for arbitrary and standard units of measure.
- 6.d. Explore teaching strategies/techniques for formulas; area, perimeter, volume and surface area.
- 6.e. Explore teaching strategies/techniques for equivalences and conversions.
- 6.f. Explore teaching strategies/techniques for estimating measurements.
- 6.g. Explore teaching strategies/techniques for representing and interpreting data related to measurement.
- 6.h. Research quality pieces of literature to support measurement and data.
- 6.i. Explore strategies/techniques to solve real-world mathematical problems using measurement and data.
- 6.j. Identify assessments used to measure students learning of measurement and data.

7. Explore teaching techniques for statistics

Assessment Strategies

- 7.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

Your performance will be successful when you:

- 7.1. identify an objective based on the needs of the student(s)
- 7.2. select activities to teach/reinforce the stated objective
- 7.3. select manipulatives that are appropriate for the given objective
- 7.4. select a children's book related to the given objective
- 7.5. create a hands-on activity
- 7.6. create a grade-level appropriate activity
- 7.7. link activity to a standard
- 7.8. recommend a technology app, website, or software program that reinforces the selected objective

Learning Objectives

- 7.a. Explain the reason for the increased attention to data analysis and probability in elementary classrooms.
- 7.b. Explore teaching strategies/techniques for displaying data.
- 7.c. Explore teaching strategies/techniques for analyzing data.
- 7.d. Explore teaching strategies/techniques for descriptive statistics: Mode, Median, Mean, Central Tendency, Variation, Range, Variance, and Standard Deviation.
- 7.e. Explore teaching strategies/techniques for probability.
- 7.f. Investigate chance processes and develop, use, and evaluate probability models.
- 7.g. Research quality pieces of literature to support statistics and probability.
- 7.h. Explore strategies/techniques for solving real-world problems for data analysis and probability.
- 7.i. Identify assessments used to measure students learning of statistics and probability.

8. Explore teaching techniques for probability

Assessment Strategies

- 8.1. Oral, Written, Graphic and/or Skill Assessment

Criteria

Your performance will be successful when you:

- 8.1. identify an objective based on the needs of the student(s)
- 8.2. select activities to teach/reinforce the stated objective
- 8.3. select manipulatives that are appropriate for the given objective
- 8.4. select a children's book related to the given objective
- 8.5. create a hands-on activity
- 8.6. create a grade-level appropriate activity
- 8.7. link activity to a standard
- 8.8. recommend a technology app, website, or software program that reinforces the selected objective