

STONE CHILD COLLEGE  
TEACHING AND ASSESSING K-8 MATHEMATICS - EDU 420  
COURSE SYLLABUS

COURSE INFORMATION

- A. Teaching and Assessing K-8 Mathematics EDU 420, 3 credits
- B. Co-requisite: EDU 480 Clinical Experience Level 2- Seminar
- C. Prerequisite: Admissions to the TEP program
- D. Fall Semester

INSTRUCTOR INFORMATION

TBD

COURSE DESCRIPTION

Teaching and Assessing K-8 Mathematics focuses on learning theories and teaching strategies for grades K-8. The class is based on the ideas, goals, and recommendations of the National Council of Teachers of Mathematics (NCTM), namely that all children can and do enjoy mathematics, that children learn best by actively exploring and investigating math, and that problem solving, reasoning, and communication are important goals of mathematics teaching and learning. Furthermore, the NCTM Standards are the guide in studying the interrelationship between the process and content strands. In addition, candidates will explore classroom materials, models and technologies appropriate for use with elementary students. Additionally, the class will emphasize implementing the Montana Common Core State Standards in Mathematics. Candidates will explore classroom materials, models, and technologies appropriate and effective in guiding mathematics instruction.

REQUIRED TEXTS

Van de Walle, J., Karp, K. and Bay-Williams, J. (2009) *Elementary and Middle School Mathematics: Teaching Developmentally*, 7<sup>th</sup> Edition. Allyn and Bacon ISBN: 978-0205573523

COURSE INFORMATION

This course supports candidates' growth as K-8 science educators by engaging them in a comprehensive set of activities which... 1) allow candidates to experience, examine, and reflect upon teaching and learning strategies for the K-8 science classroom. 2) provide teaching opportunities in which candidates use the skills and knowledge that support effective science instruction. 3) require candidates to apply their knowledge of teaching in the development of science units designed for use in supporting the learning of diverse students. 4) facilitate the development of candidates' understanding of science literacy and how to develop it in students. 5) engage candidates in active inquiry of the relationships between teaching and learning and of other issues related to science education. Candidates will gain familiarity with instructional methods and materials that are aligned with state and national standards and are developmentally appropriate, with a particular emphasis on inquiry based learning and other forms of research-based pedagogy. Students will examine instructional models and curricular materials known to foster K-8 students' conceptual understanding of core science concepts, awareness of the nature of science, and proficiency in using science process skills. Infused topics include the effective

use of instructional technology to support student learning, science safety, formative and summative assessment, and cultural competency.

## STANDARDS FOR MATHEMATICS AND INDIAN EDUCATION FOR ALL

- Montana Mathematics Common Core Standards:  
[http://opi.mt.gov/Curriculum/montCAS/MCCS/index.php#gpm1\\_4](http://opi.mt.gov/Curriculum/montCAS/MCCS/index.php#gpm1_4)
- NCTM Standards and Principles: <http://standards.nctm.org/document/appendix/numb.htm>
- Essential Understandings Regarding Montana Indians:  
<http://opi.mt.gov/pdf/indianed/resources/essentialunderstandings.pdf>

## PEPP STANDARDS AND InTASC PRINCIPLES

10.58.532 (e) Candidates will be able to demonstrate knowledge, understanding, and use of the major concepts and procedures that define number operations, algebra, geometry, measurement, data analysis and probability to engage elementary students in problem solving, reasoning, constructing arguments, communication, connections, and representation, including culturally inclusive lessons and examples relating to American Indians and tribes in Montana;

InTASC Principle 5 Application of Content: The candidate understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.

Assessment Indicator 2.3: Integrate cross-disciplinary skills, such as critical thinking, problem solving, creativity, and communication to help learners learn the content

## COURSE OBJECTIVES

Through the successful completion of this course, the candidate will demonstrate that they are able to:

1. Compare the features of the Montana Common Core State Standards (CCSS) at the Office of Public Instruction (OPI) and the standards found in the Interstate Teacher Assessment and Support Consortium (InTASC) and Montana PEPPS;
2. Name and compare at least two different elementary math curriculums;
3. Write daily and unit lesson plans to advance K-8 student mathematical knowledge;
4. Name at least four manipulatives and demonstrate instruction with at least one math manipulatives;
5. Develop a math learning center;
6. Describe at least three problem solving strategies;
7. Describe at least one theory associated with mathematical learning;
8. Compare computer programs and websites that target elementary mathematics.

## COURSE REQUIREMENTS

### **Response Paper (100 points): Personal Math Autobiography and Philosophy**

**Part 1:** Write about your learning experiences in mathematics throughout your educational career as a student. What topics, lessons, teachers, incidents, or experiences had positive or negative impacts on how well you learned math, and how you perceive mathematics. Based on the literature provided and Chapter 2 concerning constructivism in mathematics education based on Vygotsky and Piaget's work, discuss how this theory relates to the way YOU were taught mathematics. How did the way you were taught mathematics shape your attitude about mathematics? What was the impact and why?

**Part 2:** Based on these experiences as a learner, what methods, tactics, and philosophy will you employ as a teacher. How will you implement these beliefs? Compare your evolving philosophy of teaching math to each of the Mathematics Common Core State Practice Standards. Also relate it to the literature provided and textbook concerning constructivism in mathematics education.

**Integrated Unit Plan (100 points)** Prepare a 5-day unit teaching a concept with a “big ideas” focus. Look for at least an example of the concept from one textbook. The unit must be made up of the following: at least one problem solving activity, a children’s literature book, IEFA, manipulatives and/or technology. Appropriate resources to use include elementary textbook samples, NCTM journals, NCTM Principles and Standards for School Mathematics manual, Van de Walle texts (including the course textbook). Develop a Rubric for the assessment of the unit and have the assessment aligned with the unit objectives. This assessment should be designed for the end of the unit – not for each lesson. ATTACH the RUBRIC. Each person will *teach one of the lessons to the class.*

**Parent Response (40 points):** A parent questions your approach to teaching mathematics and the Common Core Practice Standards. Justify the use of a problem solving/constructivist environment in your classroom using research (NCTM Journals and electronic data bases subscribed through the library), observations you have made, standards, etc. Write as though you were speaking directly to the parent defending your instruction for the Unit Plan in which you developed. Professionally done involves expressing appreciation for parent interest and directly contacting you with his/her questions.

**Readings (5 pts per assignment x 12 assignments = 60 points):**. Each assignment requires a graphic organizer that illustrates or states a minimum of 5 points of enlightenment with an explanation and new vocabulary with student’s own definition to keep in word bank.

**Evidence Documentation Form (100 points)** Refer to the Evidence Documentation Rubric

#### GRADING SCALE

Grades will be assigned according to the following points breakdown:

400-360 = A    359-320 = B    319-280 = C    279-240 D    Below 240 = F

#### COURSE RESPONSIBILITIES

Knowledge of the course content, class lectures, assignments, and syllabus content are the responsibility of the student regardless of absenteeism. If the syllabus is changed in any way you will be notified.

#### CREDIT HOURS

Following the SCC credit hour policy, to meet the identified objectives of this course, this 3 credit course, delivered over a 15 week term will approximate about 3 hours a week classroom time for about total of 45 hours of instructional time. In addition out-of-class student work will approximate a minimum of 6 hours each week.

#### INSTRUCTIONAL METHODOLOGIES

The instructor will utilize a variety of instructional strategies including, but not limited to, discovery learning, cooperative learning, group projects, presentations and discussions, case study analysis, web related learning, Smart-boards, guest speakers, and other resources.

## EVIDENCE DOCUMENTATION RUBRIC AND GUIDELINES

**Evidence Documentation Form:** The essential elements for this assessment are: The artifact must demonstrate the candidate’s ability to **integrate cross-disciplinary skills, such as critical thinking, problem solving, creativity, and communication to help learners learn the content** (Assessment Indicator 2.3) by demonstrating knowledge, understanding, and use of the major concepts and procedures that define number operations, algebra, geometry, measurement, data analysis and probability to engage elementary students in problem solving, reasoning, constructing arguments, communication, connections, and representation, including culturally inclusive lessons and examples relating to American Indians and tribes in Montana.

| Essential Elements   | 0 Unacceptable  | 1 Developing   | 2 Proficient   | 3 Exemplary   |
|--|---|--|--|---|
| <p><b>The artifact must demonstrate the candidate’s ability to integrate cross-disciplinary skills, such as critical thinking, problem solving, creativity, and communication to help learners learn the content</b> by demonstrating knowledge, understanding, and use of the major concepts and procedures that define number operations, algebra, geometry, measurement, data analysis and probability to engage elementary students in problem solving, reasoning, constructing arguments, communication, connections, and</p> | <p>Unacceptable (0) is defined to be a level of work lacking clear demonstration of more than one of the essential elements being assessed.</p> | <p>Developing (1) is defined to be a level of work that indicates all essential elements have been demonstrated, but one of those critical elements are underdeveloped to the degree it would be prudent for the candidate to receive additional preparation in the underdeveloped area.</p> | <p>Proficient (2) is defined to be a level of performance that indicates all assessed elements have been developed to the degree that it is reasonable to conclude the candidate has succeeded in meeting the stated expectations of the assessment.</p> | <p>Exemplary (3) is defined to be a proficient candidate who has developed beyond expectations in 50% or more of the essential elements being assessed.</p> |

representation,  
including culturally  
inclusive lessons and  
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American Indians and  
tribes in Montana.  
The Evidence  
Documentation Form  
must reflect the 6 traits  
of writing.