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EDU 397.B01: Methods- PK-4 Early Numeracy

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(Copied from Moodle Online text thus not formatted for Word Document)

EDU 397.B01 - Methods: PK-4 Early Numeracy

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To make an appointment with me: Call 243-4280 or contact via email

Course Purpose:

Students will learn about mathematics concepts, methods of instruction, and use of instructional materials, including manipulatives and technology, appropriate to Grades PK-4 in accordance with Montana's Common Core State Standards for Mathematics. Additionally, student will learn techniques for assessing students to uncover their thinking about and competency in counting and cardinality, operations and algebraic thinking, number and operations in Base Ten, fractions, measurement and data, and geometry. Students will also have opportunities to apply their knowledge about teaching and learning in an early childhood field experience.

Learning Goals:

The overarching goal for this course is to help you develop as an effective professional decision-maker who will be able to do the following:

1) Understand and demonstrate through teaching sample lessons what students are to learn in each grade level PK-4 using appropriate methods and tools, as well as, understand the contextual factors that influence their learning.

2) Understand the assessment process as a means to uncover student thinking and apply this understanding with one student by developing formative assessments to determine the level of a student's understanding of a selected standard, analyze the data, and plan and implement an intermediate teaching intervention that demonstrates early childhood learning of mathematics as a direct result of having taught students in the early childhood school field experience.

3) Create and critique meaningful learning experiences for early childhood mathematics students.

4) Describe how young children learn mathematics including counting and cardinality, operations and algebraic thinking, number and operations in Base Ten, fractions, measurement and data, and geometry.

5) Explore and use instructional tools and strategies to support students' access to mathematics learning, including elements of equitable instruction, meeting the needs of diverse learners, and UDL considerations.

6) Use teaching materials and resources including manipulatives, technology, literature, cultural connections, and interdisciplinary connections to effectively teach students in the co-requisite field experience course.

Required Textbooks:

Montana Office of Public Instruction (2011). *Montana's Common Core Standards for Mathematic*s. (Hard copy available in UM Bookstore or online via link in Moodle Resources)

Van de Walle, J.A., Lovin, L.H., Karp, K.H. & Bay Williams, J.M. (2018). *Teaching student-centered mathematics: Developmentally appropriate instruction for grades PK-2* (3rd ed.). Boston, MA: Pearson.

Van de Walle, J.A., Lovin, L.H., Karp, K.H. & Bay Williams, J.M. (2018). *Teaching student-centered mathematics: Developmentally appropriate instruction for grades 3-5* (3rd ed.). Boston, MA: Pearson.

Attendance and Participation:

Attendance and participation is very important on a weekly basis. Many pertinent ideas are discussed and all instructional methods are experienced only in class. Being present for the entirety of class and actively participating are an essential part of your learning. If you need to miss a class, please email—this is a professional courtesy. You may not miss more than three classes (without a medical or pre-approved excuse) during the semester to remain eligible to participate in your required early childhood field experience.

Reading and Reflecting:

You will have weekly readings (and/or videos) assigned, both from our textbooks and various journal articles. You should keep evidence, in a form of your choice (video diary, quick sketch, notes, journal, etc.), of your knowledge of the content and how you are assimilating the text and other readings into your learning and your practicum experience.

Assignments: (20%)

Please refer to Moodle for specific weekly assignments. Weekly assignments consist of Moodle reflections, forum posts, reviewing and analyzing lessons, teaching a mini-lesson or number talk, and preparing work for the upcoming class. **All forum posts on Moodle will be due by Sunday 11 pm. Written work (handouts or problems from class) will be due at the beginning of the next class.**

It is best to read the weekly post prior to each Wednesday class.

Moodle is the primary means through which you will receive course materials and submit assignments. Also, please make sure to check your UM Student Email account regularly, as course announcements will be sent via email and it is my primary means of communicating with you. Assignment feedback is given via the grade book comments.

Teaching and Assessing Mathematics in the Pre-K Classroom: (25%)

Use the templates or rubrics on the Moodle Assignments Drop Box page to craft your submissions.

You will have the opportunity to observe beginning learners through a series of videos from the Erikson Institute Early Math Collaborative. It will be your responsibility to identify Montana Early Childhood Standards for Mathematics and learn how these standards are being integrated into centers and large group activities. You will focus on both how the students are learning and how the teachers use questioning and guidance to direct student learning. Assignments will be given through Moodle and discussed in detail during class.

Fractions Critical Area Project (25%)

Use the templates or rubrics provided in Fraction Units to craft your submissions.

This project will allow you to research, study, and use Montana's Common Core State Standards for Mathematics in K-4 to research four centers and

develop one home offline activity and one online app that supports student learning in a selected Critical Area, as well as design a means for parents to assess student understanding as a result of engaging in these learning experiences.

You are encouraged to work in small groups for this project.

The activities you research should have a focus on application and/or conceptual understanding, as well as be hands-on and minds-on in order to deepen and/or extend student learning around standards from that Critical Area; they may not be worksheets, but rather engage the student in thinking activities.

You will complete a brief overview of 2 centers/stations activities and then develop ONE from either partner/group member that includes all the directions and materials necessary to fully implement it as an at-home activity. Additionally, you will design guides for the parents to use at home. A template for the write-up of this project and a rubric detailing the expectations for the project will be provided in Moodle during our unit on fractions.

The Center will be presented during class. All group members are expected to be present on Zoom to present the activity and supporting resources.

Case Study Math Experience: Integrating Mathematics Assessment and Instruction (30%)

Use the Narrative Template (rubric) located in the Assignments Drop Box page to craft your write up that you will hand in.

During your field experience, you will work with one child as part of the Level 1 Case Study and the Capstone Project. You will work through the assessment-instruction cycle multiple times with this student in an effort to gather evidence of the student's mathematical understanding around specific standards/concepts using formative assessment and developing an instructional plan to provide individualized instruction. Your plan should be crafted in consultation with your field experience cooperating teacher.

You will gather evidence using formative assessment to infer the extent of this student's understanding of the selected standard. You will analyze and use the data from the assessment to make decisions about how to best address this student's needs. You will implement individualized mini-lessons to address the student's needs and develop deeper conceptual understanding of the standard. The mini-lessons should reflect the instructional practices and

methods you are learning in this course. You will re-assess the student to gather additional evidence as to the extent of student's understanding and make inferences about the effectiveness of the instruction. Be sure to collect samples of the student's work as evidence of his/her learning. (Seek permission to video, audio record or use student work. Adapt by removing names from written work, video with out face shots, etc.)

After multiple instruction-assessment cycles, you will craft a narrative, discussing the student's mathematical understanding, his/her growth, and effective tools/strategies to use with this student when teaching mathematics. You must include evidence to justify your claims and recommendations. A rubric detailing the expectations for the project will be provided in Moodle.

Narrative is due in Moodle by the last day of regular classes, but preferred within 1 week of completion of Case Study experience.

Grading Scale & Academic Honesty

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code.

The grading scale for this course is as follows:

A	95-100
A-	92-94.4 (Normal rounding to next whole number applied to 0.5 and above)
B+	90-91.4
B	87-89.4
B-	84-86.4
C+	81-83.4
C	78-80.4
C-	76-77.4

D 68-75.4

F <68

You will be expected to engage in regular self-reflection and self-evaluation throughout the course. The goal of this process is to help you grow as a mathematics teacher and develop into an effective professional decision-maker.

Disability Statement

If you have a disability for which accommodations are needed for you to perform to your highest potential in this course, arrange a meeting with me in the first week of the semester. During this meeting we will discuss what accommodations you need and will receive in this course. Please be sure to contact me within the first week of the semester and provide your DSS letter.

Classroom Environment and Norms

In order to maintain a safe and productive learning environment, we will observe the following norms:

- Start and end on time
- Actively participate
- Be willing to share your thinking and ideas with others
- Be willing to push the boundaries of your comfort zone
- Minimize side conversations
- Manage your technology responsibly

Remember that you are expected to reflect high levels of professionalism at all times, including in class and during your Field Experience! Please consult the standards for Professional Behaviors for more detail, and let me know if you have any questions.

Themes of a Learning Community

It is part of the human condition that we simultaneously strive to be self-sufficient individuals and respected members of larger social communities. Although we value personal autonomy, we are ultimately social creatures who need each other not only for companionship but also to bring meaning and purpose to our lives. It is through our connections with other, our shared decision-making, our common purpose, and support for each other's growth that we satisfy our needs as humans. A learning community is a special kind of community that is sometimes created in the classroom or in

educational institutions as a whole. It comes into being with everyone involved in the learning process shares a common purpose and commitment to learning. A growing body of research now supports the view that learning occurs best in communities. Because the concept of learning community has been used in many different contexts, it must have a specific meaning before it can be of value as a unifying theme. For our purpose, then, a learning community is one characterized by the following elements:

Integration of Ideas

Members of a learning community look beyond the traditionally segmented curriculum and think about the interrelationships among ideas. They work with a variety of fields of study and search for unifying themes that cross-disciplinary lines. There is an emphasis on ideas that either explain realities or help deal with actual problems.

Cooperative Endeavors

In a learning community knowing and learning are viewed as communal acts, and members are encouraged to assist each other to learn and grow. There is a commitment to engage all learners cognitively, emotionally, and psychologically in constructing knowledge that is active and personally meaningful. In the process members create a cohesiveness that encourages a sense of personal responsibility and commitment to their group and its goals.

Respect for Diversity and Individual Worth

A learning community embraces diversity with respect to ideas, abilities, viewpoints, ages, learning styles, and cultural backgrounds. Diversity is valued and the inherent worth of each individual is respected. The ethics of caring and mutual respect are viewed as essential for creating supportive learning environments that enhance each member's self-esteem and foster risk-taking, creative conflict, and excellence.

GOALS TO STRIVE FOR AS A PROSPECTIVE TEACHER OF EARLY GRADES MATHEMATICS:

	Exemplary (A)	Proficient (B)	Developing (C)	Unsatisfactory (Less than C)
THE TEACHING AND LEARNING OF MATHEMATICS				
Fostering a Student-Centered Learning Environment	Instruction consistently provides students with the opportunity to explore, make sense of, think and reason about, and talk about mathematics; Multiple strategies and pathways are anticipated and encouraged; Teacher is facilitator of learning	Instruction often provides students with the opportunity to explore, make sense of, think and reason about, and talk about mathematics; Multiple strategies and pathways are encouraged; For the most part, teacher is facilitator of learning	Instruction sometimes provides students with the opportunity to explore, make sense of, think and reason about, and talk about mathematics; Multiple strategies and pathways are sometimes highlighted; Teacher is more giver of knowledge than facilitator of learning	Instruction rarely provides students with the opportunity to explore, make sense of, think and reason about, and talk about mathematics; Multiple strategies and pathways are discouraged; Teacher is the giver of knowledge
Knowledge of MT's Common Core Standards for Mathematics	Consistently identifies appropriate content standards and Standards for Mathematical Practice (SMPs); Makes SMPs an integral part of all lessons and assessments	For the most part, identifies appropriate content standards and Standards for Mathematical Practice (SMPs); Makes SMPs a part of all lessons and assessments	Inconsistently identifies appropriate content standards and Standards for Mathematical Practice (SMPs); Makes SMPs a part of some lessons and assessments	Struggles to identify appropriate content standards and Standards for Mathematical Practice (SMPs); SMPs are an "add-on" in some lessons and assessments
	Consistently demonstrates deep	Consistently demonstrates	Demonstrates some understanding of	Demonstrates weak understanding of

Mathematics Content Knowledge	understanding of mathematics concepts; Lessons and assessments always reflect correct mathematics	understanding of mathematics concepts; For the most part, lessons and assessments reflect correct mathematics	mathematics concepts; Lessons and/or assessments may reflect incomplete mathematics or misconceptions	mathematics concepts; Lessons and/or assessments often reflect incorrect mathematics
Mathematics Pedagogical Knowledge	Lessons and assessments reflect a balance among conceptual understanding, application, and procedural skill and fluency; Assessments are designed to uncover student thinking and/or misconceptions; Instruction emphasizes the *why* behind *how*; Consistently pre-plans a variety of questions that engage students in both content and the SMPs; Consistently plans for and facilitates math talk; Utilizes appropriate manipulatives, models, and other math tools, including technology, in all lessons; Plans for meeting the needs of diverse learners by developing specific supports	Lessons and assessments usually reflect a balance among conceptual understanding, application, and procedural skill and fluency; Assessments are usually designed to uncover student thinking and/or misconceptions; Instruction incorporates the *why* behind *how*; Pre-plans a variety of questions that engage students in both content and/or the SMPs; Plans for and facilitates math talk; Utilizes appropriate manipulatives, models, and other math tools, including technology, in most lessons; Plans for meeting the needs of diverse learners by developing general supports	Lessons and assessments include conceptual understanding and application, but may over-emphasize procedural skill and fluency; Assessments attempt to uncover student thinking and/or misconceptions; Instruction may emphasize *how* more than *why*; Pre-plans some questions that engage students in content or the SMPs; Plans for some math talk; Sometimes utilizes appropriate manipulatives, models, and other math tools, including technology; Sometimes plans for meeting the needs of diverse learners by developing general supports	Lessons and assessments over-emphasizes procedural skill and fluency and may include little conceptual understanding or application; Assessments fail to uncover student thinking and/or misconceptions; Instruction mostly focuses on *how*, not *why*; Rarely pre-plans questions; Rarely plans for math talk; Rarely utilizes appropriate manipulatives, models, and other math tools, including technology: Fails to plan for meeting the needs of diverse learners

Knowledge of the Assessment-Instruction Cycle	Engages in continuous assessment that is developmentally appropriate for PK-4 students; Consistently uses evidence from assessments to make appropriate instructional decisions that move student learning forward	Engages in assessment that is developmentally appropriate for PK-4 students; Uses evidence from assessments to make appropriate instructional decisions that move student learning forward	Engages in assessment that is not always developmentally appropriate for PK-4 students; Attempts to use evidence from assessments to make instructional decisions	Engages in assessment that is not developmentally appropriate for PK-4 students; Fails to use evidence from assessments to make instructional decisions

	Exemplary (A)	Proficient (B)	Developing (C)	Unsatisfactory (Less than C)
DEVELOPING AS A PROFESSIONAL EDUCATOR				
Collaboration	Consistently works well and in cooperation with others in class and the field experience; Actively seeks opportunities to share ideas/perspectives and incorporate the ideas/perspectives of others into work; Well coordinated co-teaching experiences	For the most part, works well and in cooperation with others in class and the field experience; Is open to opportunities to share ideas/perspectives and incorporates many of the ideas/perspectives of others into work; Coordinated co-teaching experiences	Often works well and with in cooperation others in class and the field experience; Sometimes shares ideas/perspectives and may occasionally incorporate the ideas/perspectives of others into work; Co-teaching experiences reflect some lack of coordination	Struggles to work well and with in cooperation others in class and the field experience; Reluctant to share ideas/perspectives and rarely incorporates the ideas/perspectives of others into work; Co-teaching experiences are uncoordinated
Self-Reflection and Growth	Welcomes and immediately implements feedback from instructor and field experience mentors; Accurately identifies strengths and areas for refinement; Strong evidence of growth as a mathematics teacher over the course of the semester	Is open to and implements feedback from instructor and field experience mentors; For the most part, accurately identifies strengths and areas for refinement; Evidence of growth as a mathematics teacher over the course of the semester	Accepts and implements some feedback from instructor and field experience mentors; Inconsistently identifies strengths and areas for refinement; Some evidence of growth as a mathematics teacher over the course of the semester	Resists and/or fails to implement feedback from instructor and field experience mentors; Struggles to identify strengths and areas for refinement; Little evidence of growth as a mathematics teacher over the course of the semester

Professionalism	Always adheres to classroom norms; Interacts with civility and respect at all times in all aspects of the course and field experience; All oral and written communication is of high quality	Usually adheres to classroom norms; Interacts with civility and respect most of the time in all aspects of the course and field experience; Most oral and written communication is of high quality	Usually adheres to classroom norms; Interacts with civility and respect most of the time in most aspects of the course and field experience; Quality of oral and written communication is inconsistent	Sometimes adheres to classroom norms; Struggles to consistently interact with civility and respect in most aspects of the course and field experience; Poor quality of oral and written communication