

ED 310 TEACHING ELEMENTARY MATHEMATICS & ED 317 PRACTICUM

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ED 315 TEACHING ELEMENTARY SCIENCE

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COURSE DESCRIPTIONS:

This course investigates basic content, pedagogy, and the importance of math and science in an elementary education program. How students learn math and science and effective strategies, including problem solving, use of technology, hands-on inquiry, and addressing diversity will be stressed. Reflection on self, on teaching and on student learning and differences will be emphasized.

Current curriculum trends will be explored and lessons will be developed based on national and state standards.

STATE ELEMENTARY STANDARD #2 on which this class is based:

The kindergarten through 6th grade teacher knows, understands, and uses the major concepts, procedures, and reasoning processes of mathematics that define numbers and operations, geometry, measurement, data analysis and probability, and algebra so that all students understand relationships that can represent phenomena, solve problems, and manage data.

KNOWLEDGE INDICATORS THAT THIS STANDARD IS BEING MET:

1. The teacher knows and understands the mathematical concepts of number sense, number systems, and their properties, computation, geometric figures and their properties, transformational geometry, measurement, data analysis, data representations, probability, patterns, functions, and representations of algebraic and geometric situations/solutions.
2. The teacher understands the five process standards (problem solving, reasoning and proof, communication, connections, and representations.)
3. The teacher is aware of effective developmentally appropriate instructional strategies to help all students learn and use their mathematical skills in many different situations and applications to solve real life problems.
4. The teacher knows a variety of developmentally appropriate assessment tools that align with curriculum and instruction.

PERFORMANCE INDICATORS THAT THIS STANDARD IS BEING MET:

1. Appropriate to students' age and development, the teacher can use and apply, demonstrate, and teach the concepts of number sense, number systems and their properties, computation, geometric figures and their properties, transformational geometry, measurement, data analysis, data representations, probability, patterns, functions, representations of algebraic and geometric situations/solutions.
2. The teacher integrates the five process standards (problem solving, reasoning and proof, communication, connections, representations) into math instruction.
3. The teacher demonstrates the ability to use developmentally appropriate instructional strategies to help all students learn and use their mathematical skills in many different situations and applications to solve real life problems.
4. The teacher uses diverse and developmentally appropriate assessments that align with

curriculum and instruction.

STATE ELEMENTARY STANDARD # 3 on which this class is based:

The kindergarten through sixth grade teacher knows, understands, and uses fundamental concepts in the subject matter of science--including physical, life, and earth and space science-- as well as concepts in science and technology, science in personal and social perspectives, the history and nature of science, the unifying concepts of science, and the inquiry processes scientists use in discovery of new knowledge to build a base for scientific and technological literacy for all students.

KNOWLEDGE INDICATORS THAT THIS STANDARD IS BEING MET:

1. The teacher understands how to plan and conduct authentic research using the process skills.
2. The teacher understands how to design science activities, using science process skills, to teach developmentally appropriate science content.
3. The teacher has knowledge of the basic concepts of life science, physical science, and earth and space science that are developmentally appropriate.
4. The teacher understands how science concepts and processes are used in real life situations.
5. The teacher understands the application of science concepts to technological and societal issues.
6. The teacher is familiar with current science curricular materials and understands the interconnectedness of the science disciplines.
7. The teacher knows a variety of assessment tools including open-ended questions and performance tasks, to assess student learning.

PERFORMANCE INDICATORS THAT THIS STANDARD IS BEING MET:

1. The teacher selects real life problems for students to investigate.
2. The teacher facilitates student planned and conducted investigations.
3. The teacher provides opportunity for students' discovery and application of knowledge.
4. The teacher selects, uses, and maintains equipment properly, stores and disposes of chemicals safely, and handles and cares for animals appropriately.
5. The teacher can articulate priorities of developmentally appropriate science experiences for all students.
6. The teacher demonstrates the design, implementation and evaluation of scientific experiences that are developmentally appropriate, meaningful and challenging for all students, that lead to positive developmental outcomes, and that develop positive dispositions toward science and scientific investigation.
7. The teacher uses a variety of assessment tools including open-ended questions and performance tasks, to assess student learning.

DIMENSIONS OF REFLECTION/DIVERSITY PROFICIENCIES:

The Department of Education has a goal to educate Reflective Educators. The six dimensions are addressed as follows:

- 1. Reflection on self as an emerging, developing, and maturing professional/Prejudice reduction** - class discussions, journals, observations and assignments allow students to explore and challenge beliefs about the teaching of math and science, especially to diverse populations, in today's classrooms.
- 2. Reflection on the context of teaching and learning/Empowering school culture** - guided

observations and discussions allow students to observe and reflect on various approaches to teaching that support learning and empower students from all racial, cultural and social class backgrounds.

3. Reflection on student differences/Knowledge construction - readings, observations, assignments, and discussions focus on diversity as it relates to learning abilities, gender issues, developmental levels, and cultural and social characteristics.

4. Reflection on methods and materials/Equitable pedagogy - discussions, textbook and resource reviews and lesson/unit planning allow students to critique various methods and materials and match teaching styles to students' learning styles in order to facilitate achievement for students from all backgrounds.

5. Reflection on assessment as a process for change/Equitable pedagogy - lesson and unit plans requiring associated assessments allow students to develop appropriate assessments and reflect on the results of these assessments after teaching and assessing students from all backgrounds.

6. Reflection on content/Content integration - assignments and activities require students to develop deep conceptual understanding of content and to include examples from a variety of cultures and groups so that they can successfully illustrate key concepts, principles, generalizations, and theories in subject matter.

OBJECTIVES: (based on the above state standards)

Upon completion of this course, students will be able to:

*explain basic concepts of the NCTM Standards (including the process standards of problem solving, reasoning and proof, communication, connections, and representations), the Kansas Mathematics Curriculum Standards and current curriculum trends in mathematics education.

*explain basic concepts of the National Science Education Standards, the Kansas Science Curriculum Standards and current trends in science education.

*define NCTM, KATM, NSTA, and KATS, use their professional journals, and explain membership benefits associated with each organization.

*explain any math or science content normally required of students in gr. Pre K-8.

*develop effective units and lessons that support district and state standards

*incorporate problem solving, the science process skills, student planned and conducted investigations and authentic research application into developmentally appropriate lessons.

*incorporate various forms of communication and connections (including within the subject area, to other disciplines and to real life into lessons.

*diagnose and assess student performance in a variety of ways, including open ended and performance assessments.

*address student diversity and various learning styles in lessons and units.

*select, use, and maintain equipment and care for animals safely and properly

*use various teaching models and techniques of curriculum delivery including effective questioning, cooperative learning, inquiry, constructivist learning, etc.

*incorporate various classroom organization and management techniques when teaching students.

*incorporate technology into science and mathematics lessons & units.

*develop mathematical and scientific experiences for students which will lead to positive

dispositions toward math and toward science.

*be reflective of self, teaching and student learning

ATTENDANCE POLICY/CELL PHONES/LATE WORK:

Attendance is very important to successful completion of this class. For ED 310 any absence over 4 hours (includes tardiness or leaving early) will result in a drop on the student's final grade of 1/2 % per hour missed. The attendance policy for ED 315 will be explained in class. Students who are absent over 12 hours in math or over 12 hours in science may be given a failing grade for that class.

Cell phones need to be off during class unless prior permission is given.

For ED310, one late assignment, turned in by the beginning of the next class period, will be accepted without a drop in grade. Any additional late assignments will receive 10% off for each class period late. Assignments are considered late if they are not ready at the beginning of class. Contact the instructor in advance if you will be absent to make arrangements for assignments due that day

For ED 315, LATE WORK WILL NOT BE ACCEPTED. Papers will be word- processed, double-spaced, with a highly readable font (I recommend Times New Roman or Courier New) of 12 or 14. Each paper will have FIVE OR FEWER PAGES and FIVE OR MORE REFERENCES. If you are not going to be able to turn in your paper at the beginning of a class meeting, attach it to an email and send it to be timed and dated BEFORE the beginning of the class period in which it is due.

EVALUATION: Students will receive separate grades for ED 310 and ED 315.

ED 310 - MATH

1 Nameplate	10 pts.
1 Lesson plan	150 pts.
1 Unit plan (with mini-lessons)	170 pts.
Bulletin board	50 pts.
1 Report on student thinking	50 pts.
2 Exams	100 pts. each
Journal responses/Article critiques	10 pts. each
1 Math lit. books review	20 pts.
1 Textbook review	20 pts.
Portfolios	100 pts.
2 Completed grade sheets	10 pts. each
Other minor assignments	5-10 pts. each

ED 315 - SCIENCE

1 Lesson plan	150 pts.
Typed reports (# to be determined)	40 pts. each
Full participation in inquiry experiences (i.e to be present in mind and body for the entire experience and work cooperatively with your group.)	100 pts.
Portfolio	100 pts.

Grading scale: A 90-100%, B 80-89%, C 70-79%, D 60-69%, F 59% and below

PORTFOLIOS: Three portfolios are required for math and one for science.

Math Portfolio #1 will contain (1) personal materials; (2) national, state, local **standards and outcomes**; (3) **teaching strategies** including writing objectives, addressing learning styles, communication suggestions, assessment and ideas on making connections inside and outside of math; (4) materials, texts, technology and other **resources**; (5) **classroom management** and organization suggestions; (6) **article critiques** and **journal responses**

Math Portfolios #2 and #3 will contain copies of the units and lessons from each student in the class plus the materials provided by the instructor. These units will be developed from the following strands:

Math Portfolio #2 will contain (1) **geometry** and spatial sense; (2) **measurement**; (3) **data analysis** (statistics and probability); (4) **problem solving** and reasoning; and (5) **algebraic concepts**.

Math Portfolio #3 will contain (1) **number sense** (numbers and our number system), (2) **whole number** operations, (3) **fractions**, (4) **decimals and percents**.

Science Portfolio #1 will contain **materials to be determined later**.

SUPPLIES NEEDED:

The Kansas Mathematics Curriculum Standards and National Council of Teachers of Mathematics Standards, will serve as texts for ED310. Student membership (at \$38) in NCTM is recommended as this will provide students with membership privileges and access through which readings and searches will be assigned. KS standards for math are found at www.ksde.org/outcomes/Mathpg.html and NCTM at www.nctm.org. A packet of handouts should be purchased from the bookstore.

The textbook Teaching Science as Inquiry, 10th edition, by Carlin, Bass and Contant will serve as the text for ED315. Check the WU course-specific website for the Kansas and National Science Standards and other pertinent websites.

Each student needs 3 - 1 1/2" 3 ring notebooks with 6/5/4 divider pages for math, 1 - 1 1/2" 3 ring notebooks for science, loose leaf notebook paper, and 2 two pocket folders. Students need to have math portfolio #1 with them in all math classes and the science portfolio with them for all science classes. Portfolios may be left on the shelves at the back of the classroom in CA304.

ACADEMIC MISCONDUCT POLICY:

All students are expected to conduct themselves appropriately and ethically in their academic work. Inappropriate and unethical behavior includes (but is not limited to) giving or receiving unauthorized aid on examinations or in the preparation of papers or other assignments, or knowingly misrepresenting the source of academic work. Washburn University's Academic Impropriety Policy describes academically unethical behavior in greater detail and explains the actions that may be taken when such behavior occurs. For guidelines regarding protection of copyright, consult www.washburn.edu/copyright/students. For a complete copy of the Academic Impropriety Policy, contact the office of the Vice President for Academic Affairs, Morgan 262, or go on-line to: www.washburn.edu/admin/fac-handbook/FHSEC7.htm#VIII

DISABILITY SERVICES:

The Student Services Office is responsible for assisting in arranging accommodations and for identifying resources on campus for persons with disabilities. Qualified students with disabilities must register with the office to be eligible for services. The office MUST have appropriate documentation on file in order to provide services. Accommodations may include in-class note takers, test readers and/or scribes, adaptive computer technology, brailled materials. Requests for accommodations should be submitted at least two months before services should begin; however, if you need an accommodation this semester, please contact the Student Services Office immediately. Students may voluntarily identify themselves to the instructor for a referral to the Student Services Office. Location: Student Services, Morgan Hall Room 150, Phone: 785-670-1629 or TDD 785-670-1025, E-Mail: student-services@washburn.edu.

CENTER FOR UNDERGRADUATE STUDIES AND PROGRAMS (CUSP):

As a Washburn student, you may experience difficulty with issues such as studying, personal problems, time management, or choice of major, classes, or employment. The Center for Undergraduate Studies and Programs is available to help students either directly through academic advising, mentoring, career counseling, testing and developing learning strategies or by identifying the appropriate University resource. If you feel you need someone with whom to discuss an issue confidentially and free of charge, contact CUSP in Morgan 122, 785-670-1299, advising@washburn.edu.

WITHDRAWAL POLICY:

During fall and spring semesters, students may withdraw from full semester courses through the second week of class with no recorded grade. From the third through the eleventh week a "W" is recorded for any dropped course. Beginning with the start of the twelfth week, there are NO withdrawals, and a grade will be assigned for the course.

OFFICIAL EMAIL ADDRESS:

Your Washburn University e-mail address will be the official address used by the University for relaying important messages regarding academic and financial information. It may also be used by your instructors to provide specific course information. E-mail messages sent to your Washburn University e-mail address will be considered your official notification for important information.

Math/Science Bibliography

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