

Professor: Dr. Chris Black  
 Office: HEC #268 Des Moines Center  
 Office Hours: By arrangement  
 Email : [blackc@cwu.edu](mailto:blackc@cwu.edu). Email is the most reliable way to reach me.

Required Handouts provided by the professor via Canvas.  
 Materials: GeoGebra software, downloadable from [geogebra.org](http://geogebra.org)

#### ABOUT THIS COURSE:

This class focuses on mathematical learning in the middle grades and the application of developmentally appropriate best teaching practices. Mathematical topics will include:

- ▷ **Number and operation:** Division of fractions, basic number theory, rational and irrational numbers, percentages, exponents and scientific notation
- ▷ **Ratio and proportional reasoning:** ratios, rates, proportions, ratio tables, and linear relationships.

#### GOALS FOR COURSE & HOW THEY WILL BE ASSESSED:

<ul style="list-style-type: none"> <li>● Represent proportional relationships using tables, graphs, equations, diagrams, mathematical models, and verbal descriptions.</li> </ul>	Mastery quizzes
<ul style="list-style-type: none"> <li>● Use and explain arithmetic operations and their properties through the addition, subtraction, multiplication and division of integers and other real numbers including irrational numbers. Explain and solve problems involving standard and alternative algorithms.</li> </ul>	Mastery quizzes
<ul style="list-style-type: none"> <li>● Demonstrate the ability to embed CCSS-M Mathematical Practices in the instructional process to deepen conceptual understanding.</li> </ul>	Reflections on progressions documents, lesson plans
<ul style="list-style-type: none"> <li>● Demonstrate the ability to guide student discourse in mathematical problem solving, argumentation (creation and critiquing), literacy, and in-depth conceptual understanding.</li> </ul>	Lesson planning, discussion, & analysis
<ul style="list-style-type: none"> <li>● Engage in developmentally and culturally responsive teaching of mathematics.</li> </ul>	Lesson planning, discussion, & analysis
<ul style="list-style-type: none"> <li>● Demonstrate knowledge of learning progressions, including conceptual and procedural milestones and common misconceptions, within each content domain and connections to instruction.</li> </ul>	CCSS scavenger hunt, learning progressions, reflections on the progressions documents
<ul style="list-style-type: none"> <li>● Design and implement a wide range of assessment strategies to inform mathematics instruction and support student learning.</li> </ul>	Assessment assignment, assessment reflection, lesson plans
<ul style="list-style-type: none"> <li>● Select, use, and determine suitability of the available mathematics curricula, teaching materials, and other resources including manipulatives for the learning of mathematics for all students.</li> </ul>	Final Desmos project, GeoGebra

## ADAPTATIONS FOR WINTER 2021:

Due to the COVID-19 pandemic, the following policies are in effect:

- To the extent that it is possible, please stay in touch with me if COVID-19 affects your ability to do the work in this course.
- If you must miss a class, you do not need to provide a reason. If anyone is missing, class sessions will be recorded and class recordings will be available on Canvas for you to watch & play along with when you are able.
- There is no late penalty for any assignment. There is a due date on the schedule, but any work can be completed for full credit until the last day of the quarter.
- Any assignment can be rescheduled as needed – just ask! When possible, ask before the day of the scheduled event, but due to the extraordinary circumstances we're living under right now, all requests will be honored. Let me know what adjustments you need so I can make the necessary arrangements.

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### GRADING:

Lesson plan drafts (2):	5 pts each
Lesson plans (2):	35 pts each
Learning progressions (2):	10 pts each
Lesson presentations (2):	10 pts each
Progression reflections (2):	10 pts each
GeoGebra activities (5):	10 pts each
Assessment task (1):	35 pts
Reflection on assessment (1):	15 pts
Mastery quizzes (8):	10 pts each
Common Core scavenger hunt (1):	15 pts
Connections assignments (15):	Scale to 100 pts
Final Desmos project & presentation (1):	40 pts
Professionalism:	25 pts
<hr/> TOTAL:	<hr/> 500 pts

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### LESSON PLANS & LESSON PLAN DRAFTS:

You will write & revise two Lesson Plans: one on an assigned Number System standard and one on an assigned Ratio & Proportion standard. You are expected to submit quality first attempts at the Lesson Plans, using the official Teach STEM lesson plan format. I will provide feedback which you will use to revise your draft for the final Lesson Plans.

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### LEARNING PROGRESSIONS:

For each lesson that you will plan and teach, you will first create a learning progression document. The Learning Progression describes students' development of an overarching concept or skill that is required to master the content standards.

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### PRESENTATIONS OF LESSONS:

The assigned topics for the lesson plans will be linked in a strand, and the students writing lesson plans in that strand will give a joint 10-15 minutes presentation on the connections between their lessons, and how one lesson depends on another. There are two such presentations planned, as the final drafts of the lesson plans are due.

## REFLECTIONS ON THE PROGRESSIONS DOCUMENTS:

The Progressions documents delve further into the coherence of the Common Core State Standards. You'll read through and write a reflection on the middle-level Number Systems progression and the middle-level Ratio & Proportion progression.

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## GEOGEBRA ACTIVITIES:

You will use GeoGebra to perform 5 mathematical tasks relevant to teaching the number system and ratio & proportion standards that are the focus of this course. These activities are designed to teach you the different capabilities of GeoGebra for both instruction and creation of professional-looking mathematical documents such as handouts, quizzes, and tests.

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## ASSESSMENT TASK:

The assessment that you write to accompany the lesson that you teach from your learning segment needs to assess the stated outcomes of your lesson, the specified CCSS content standards from the lesson, the language function and language targets from the lesson, and at least one MP standard from the lesson.

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## MASTERY QUIZZES:

Mastery quizzes will administered roughly once per week, with a total of 8 quizzes covering the middle school standards on ratio and proportion and the number system. These 20-minute quizzes can be retaken up until 3 times until mastery of the topic is demonstrated. The first attempt will be administered during class, and it is your responsibility to arrange for a retake when necessary. Mastery is indicated by a quiz with no more than one incorrect response. The mastery tests measure procedural fluency in the topics listed below.

1. division of fractions and number theory
  2. rational numbers
  3. inequality, order, and absolute value
  4. operations on rational numbers
  5. irrational numbers
  6. properties of exponents & scientific notation
  7. rate and ratio reasoning
  8. proportional relationships
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## CCSS SCAVENGER HUNT:

In this assignment, you'll study the coherence of the Common Core Standards for Mathematics to provide clarity on the expected content at various grade levels.

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## CONNECTIONS ASSIGNMENTS:

Each day of class we will discuss a lesson from one of three middle school mathematics curricula: *Illustrative Mathematics*, *Eureka Math*, and *The Connected Mathematics Project (CMP)*. These daily assignments are due at midnight the night before class, and allow you to reflect on how the lesson addresses the associated Common Core Standard.

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## FINAL DESMOS PROJECT:

The final project is an analysis of existing Desmos activities with respect to grade-level appropriateness and the Common Core State Standards. Results are presented through a written component and a 10-15 minute presentation to the class.

#### PROFESSIONALISM:

Students in the teacher preparation programs have one foot in the world of students and the other foot in the world of professional teachers. Professionalism includes time management, responsible behavior, attention to detail, engagement, attendance, and treating fellow students and the professor with respect.

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#### HONOR AND RESPECT:

Each of us should consider our placement at this institution to be a privilege. We need to have respect for one another, and for ourselves. In light of these facts, cheating in any form will not be tolerated. You are encouraged to work together on homework problems, however anything you turn in with your name on it should have been written by you alone. In a course where much of your grade is determined by your proof writing, plagiarism is a concern. The word “plagiarize” is defined by Merriam-Webster as “to steal and pass off (the ideas or words of another) as one’s own: use (another’s production) without crediting the source.” This is a very serious offense and jeopardizes your position in a teacher preparation program.

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#### ACCOMMODATION FOR RELIGIOUS OBSERVANCES:

In compliance with RCW 28B.137.010, Central Washington University makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Students must present written notice to their instructor within the first two weeks of class listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information.

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#### STATEMENT ON DIVERSITY:

CWU expects every member of the university community to contribute to an inclusive and respectful culture for all in its classrooms, work environments, and at campus events. As a student in this course, you are expected to treat your professors, fellow students, and other people affiliated with your work at CWU with respect, regardless of their sex, race and color, religion and creed, national origin, sexual orientation, gender identify and gender expression, disability and use of assistive devices or a service animal, and veteran or military status.

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#### EXPECTATIONS FOR STUDENT CONDUCT:

Students in this class are expected to interact with students and the professor professionally. Instances of disruptive conduct, obstructive conduct, or harassment (see definitions below from the Washington Administrative Code) will be referred to the Dean of Student Success.

Per WAC 106-125-020, the term “disruptive” or “obstructive” conduct means conduct, not protected by law, that interferes with, impedes, or otherwise unreasonably hinders the normal teaching, learning, research, administrative, or other functions, procedures, services, programs, or activities of the university. The term includes disorderly conduct, breach of the peace, violation of local or university noise policies, lewd or obscene conduct, obstruction of pedestrian or vehicular traffic, tampering with student election processes, or interfering with the orderly conduct of university investigations or disciplinary proceedings, including interfering with or retaliating against any witness, party, or other participant.

The term “harassment” means unwelcome and offensive conduct, including verbal, nonverbal, or physical conduct, that is directed at a person because of such person’s protected status and that is sufficiently serious as to deny or limit the ability of a student to participate in or benefit from the university’s educational program, or that creates an intimidating, hostile, or offensive environment for any campus community member(s). Protected status includes a person’s actual or perceived race, color, national origin, gender, disability, or other status protected by law.