

Course Title: Simplifying Fractions!

Instructor: Betsy Allen, MEd., COA

Dates: August 12 - 15, 8:00 - 4:00, September 26 and October 10 4:00 - 7:00

3 Graduate Credits

Course Description

This course will explore research on how students develop a deep understanding of fractional concepts. Participants will look at both the learning progressions and the standards progression of the Vermont Common Core State Standards along with current research. Participants will analyze student work to identify where students are on a learning progression, identify the common misconceptions, and then develop and plan next instructional steps. They will collaborate with other grade level teachers to strengthen and/or develop fraction lessons for their unit, including formative assessments and instructional strategies and lessons, with integrated technology. Participants will deepen their own content knowledge by interacting with materials, research based readings, and class discussions.

Learning Outcomes

1. Participants will deepen their own content knowledge of fractions.
2. Participants will know and understand fraction content of the CCSS across grade levels and the shifts of content.
3. Participants will know the cognitive research about how children develop fractional concepts that is the basis for the learning progressions.
4. Participants will learn how to identify where students are on a learning progression and identify student misconceptions.
5. Participants will develop a variety of instructional strategies to promote student learning
6. Participants will develop and/or strengthen a fraction unit of study and incorporate the use of formative assessments as an instructional strategy.
7. Participants will learn technology applications and games during the course to incorporate them in their instruction.

Required Readings

1. Petit, M., Laird, R., (2015). A Focus on Fractions: Bringing Research to the Classroom. New York, NY: Routledge Group
2. Common Core State Standards
3. "3-5 Progression on Number and Operations - Fractions"
4. Articles selected by instructor

Course Requirements and Grading

Course Requirement	Evidence of Meeting Expectations	Weight
Attendance & Participation	<ul style="list-style-type: none">● Attend all session● Participate in class discussions● Collaborate with colleagues	20%
Reading Assignments	<ul style="list-style-type: none">● Complete required readings	30%
Projects	<ul style="list-style-type: none">● Administer and analyze EDC assessments● Complete project of choice● Present project	40%
Personal Reflection	<ul style="list-style-type: none">● Written reflection about new learning and how that will be incorporated	10%

Class Professionalism and Participation:

Participants are expected to attend the sessions and participate in class discussions by listening to each other, posing relevant questions, clarifying points from readings and lectures and sharing teaching experiences as relevant to the work. *Note: If an absence is unavoidable, please discuss requirements for making up the session with the instructor.*

Readings:

Participants will read assigned text, A Focus on Fractions: Bringing Research to the Classroom, and respond to 3 chapters of choice.

Projects: EDC Assessments

Participants will administer one or more EDC Formative Assessment probes. During class we will analyze the responses for misconceptions and plan next instructional steps.

Project: Fraction Lesson(s) Option 1:

Participants will work from their district/school curriculum to organize, strengthen, identify the gaps, and develop support for their existing unit with details of fraction lessons based common core learning progression and content standards. Participants will identify formative assessment(s) appropriate for the lesson(s). The last day of the class will include individual presentations of a lesson from the unit chosen by the participant. The lesson(s) will include:

- Overview
 - Common Core Standards
 - Essential Questions
 - What students will know and be able to do

- Math vocabulary
- Literature connections, if applicable
- Detailed Lessons
 - Targeted learning goal of the lesson (s)
 - Materials and manipulatives needed
 - Technology to be included in at least one lesson if applicable
 - Differentiated instructional options
 - Formative exit assessment
- Student Work
 - Analyzed for who got it and misconceptions
 - Determine next instructional steps

Project: Fraction Group Lesson Study Option 2

A grade level group of 2 or more teachers will work together to analyze a particular lesson to establish the criteria below. They will plan out the warm-up, the lesson, and the formative assessment. They will follow a Lesson Study format where one person teaches and the others observe. This is followed by a debrief and tweaking of the lesson as the team discusses. Then a second person teaches, is observed, and followed by a debrief. The formative assessment/student work is also analyzed and discussed to determine next instructional steps. Using a videoing recording is optional.

- Overview
 - Common Core Standards
 - Essential Questions
 - What students will know and be able to do
 - Math vocabulary
 - Literature connections, if applicable
- Detailed Lessons
 - Targeted learning goal of the lesson (s)
 - Materials and manipulatives needed
 - Technology to be included in at least one lesson if applicable
 - Differentiated instructional options
 - Formative exit assessment
- Student Work
 - Analyzed for who got it and misconceptions
 - Determine next instructional steps

Personal Reflection: 10%

Participants will reflect upon their own new learning, both pedagogy and content. They will identify shifts in instruction as they planned their unit.

Topic Outline:

Date	Topic	Assignment
August 12	Fractions are Quantities Whole Number Reasoning Common Core Standards with the Learning Progression Visual Models	<u>Focus on Fractions</u> Chapters 1,2&3 CCSS Progression of N&O Fractions and The Number System 6-8
August 13	Partitioning Number Lines Comparing and Ordering	<u>Focus on Fractions</u> Chapters 4,5, 6
August 14	Equivalence Operations: Addition and Subtraction of Fractions	<u>Focus on Fractions</u> Chapters 8 & 9
August 15	Operations: Multiplication and Division of Fractions Project Work Time	<u>Focus on Fractions</u> Chapter 9
September 26	Density of Fractions	<u>Focus on Fractions</u> Chapter 7
October 10	Project Presentations	