

## Graduate Credit Requirements:

### PRDV 76018 TERC: Implementing *Investigations 3* in the K-5 Classroom

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**Course Title:** PRDV 76018 TERC: Implementing *Investigations 3* in the K-5 Classroom

**Number of Credits:** 3

**Instructor of Record:** Karen Economopoulos

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#### Course Information

##### Dates:

June 20-August 31<sup>st</sup>, 2018

- June 20 – August 1, 2018 – Online sessions
- August 15, 2018 – Final paper submitted to instructor
- August 31, 2018 – Grades posted

##### Format:

- 7 weeks: asynchronous online course
- Expected time spent on activities and readings per week: 4 hours
- Expected writing time per week: 2.5 hours (plus additional time for writing the paper at the end of the course)

#### Course Schedule (7 weeks)

Week	Session
1	Orientation Session
2	Session 1: Counting & The Number System
3	Session 2: Addition and Subtraction, Part 1
4	Session 3: Addition and Subtraction, Part 2
5	Session 4: Multiplication and Division
6	Session 5: Geometry and Measurement
7	Session 6: Fractions

#### Course Requirements for Graduate Credit

In addition to completing all 7 sessions of the course and completing 3 substantive posts per week on the course discussion forum in response to the content of each session, participants who are taking the course for Graduate Credit will also be responsible for the following:

- Completing all additional readings; these readings are available on the course's Google Classroom site.

- Responding to all Read and Reflect written assignments. These written reflections should be based on what is learned from the session activities and readings as well as the additional readings.
- Responses to these assignments will be submitted via Google Classroom each Wednesday in the form of a Google Doc. Each Read and Reflect assignment should be titled “Read and Reflect for [week # and name of session]”.
- Writing an 11 paper (minimum); typewritten, double-spaced, 12-point font; free of grammatical and spelling errors; submitted not later than August 15, 2018 via Google Classroom.

## Course Assignments:

### Orientation Session

#### Additional Readings

- Russell, S.J and Schifter D. *Investigations 3: Making Sense of and Persevering with the Mathematical Practices* Pearson.
- Illustrative Mathematics. (2014, February 12). Standards for Mathematical Practice: Commentary and Elaborations for K-5. Tucson, AZ.

#### Read and Reflect

- **Read:** *Investigations 3: Making Sense of and Persevering with the Mathematical Practices* Pearson
- **Review:** *Investigations* and the Mathematical Practices pp. 44-45 from the Orientation Session readings
- **Select** one of the Math Practices that you are interested in learning more about.
- **Read:** the essay for your chosen Practice in the Standards for Mathematical Practice: Commentary and Elaborations for K-5.
- **Written Reflection:** Summarize in your own words, your understanding of your selected Math Practice (MP). Reflect on and describe, an example of how the selected MP, was enacted or could be enacted in your grade level.

### Session 1: Counting and the Number System

#### Additional Readings

- Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common Core State Standards in Mathematics (draft). Grade K, Counting and Cardinality and Grades K–5, Operations and Algebraic Thinking*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.
- Economopoulos, K. (2018, Feb. 26) Counting is Serious Business.

#### Read and Reflect

- **Read:** Progressions for CCSSM *Counting and Cardinality in Kindergarten* pp. 4-5.
- **Read:** the blog post by Economopoulos -- Counting is Serious Business
- **Review:** the Place Value reading you read for the session
- **Written Reflection:** write a response to one of the following:
  1. Use what you read in *Counting is More Than 1, 2, 3* and the *Counting and Cardinality Progression* to identify and reflect on the aspects of counting that students engage in and what students in the following video and reading from Session 1 seem to understand about counting:
    - *Anno’s Counting Book* (video)

- *Counting What's in a Mystery Box* (reading)
2. Describe a situation in your own classroom that highlights the complexities of counting and/or students' developing understanding of the number system.

## Session 2: Addition and Subtraction, Part 1

### Additional Readings

- Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common Core State Standards in Mathematics (draft). Grade K, Counting and Cardinality and Grades K–5, Operations and Algebraic Thinking*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.
- Boaler, J. (2015). Fluency without fear: Research evidence on the best ways to learn math facts.
- Russell, S. J. (2000). *Developing Computational Fluency with Whole Numbers in the Elementary School*

### Read and Reflect

- **Read:** Progressions for CCSSM *Operations and Algebraic Thinking* pp.6-11
- **Read:** *Fluency without Fear* by Jo Boaler and *Developing Computational Fluency* by Susan Jo Russell.
- **Written Reflection:** What does it mean to be computationally fluent? How does the work that students do in the early grades support the development of computational fluency?

## Session 3: Addition and Subtraction, Part 2

### Additional Reading

- Moschkovich, J. (2013). *Principles and Guidelines for Equitable Mathematics Teaching Practices and Materials for English Language Learners*

### Read and Reflect

- **Read:** Moschkovich's article
- **Written Reflection:** In her article, Moschkovich recommends 4 mathematics teaching practices for ELL students. Discuss one recommendation that particularly resonated with you. Mention what about the practice interested you and how you might apply it to your work with students.

## Session 4: Multiplication & Division

### Additional Readings

- Economopoulos, K. (2018, Jan 22). What does it mean to be smart?
- Hollister, A. (2018, March 5) A division solution: Amazing or perplexing
- Murray, M. (2018, March 12) That seems way too big
- Murray, M. (2018, May 21) The Hard Work of Counting by Groups.
- Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common Core State Standards in Mathematics (draft). Grade K, Counting and Cardinality and Grades K–5, Operations and Algebraic Thinking*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona

### Read and Reflect

- **Review:** Reading(s) from the Multiplication and Division Session.
- **Read:** Progressions for CCSSM *Grades K–5, Operations and Algebraic Thinking*: pp. 22-32 and the 4 blog posts listed above.

- **Consider** how the Multiplication and Division session supports and illustrates particular aspects of the progression of learning.
- **Written Reflection:**  
Write down:
  - One complexity students often encounter when learning about multiplication and one complexity students often encounter when learning about division
  - One of the ways students develop fluency with these operations
  - One lingering question you have about students' work with multiplication and division in *Investigations*

## Session 5: Geometry & Measurement

### Additional Readings

- Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common Core State Standards in Mathematics (draft). Grades K–5, Geometry*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona.
- Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common Core State Standards in Mathematics (draft). Grades K–5, Geometric Measurement*. Tucson, AZ: Institute for Mathematics and Education, University of Arizona
- Whole-Class Discussions. *Implementing Investigations at Grade 2*.

### Read and Reflect

- **Read:** CCSSM Progressions for Geometry pp. 2-18 and K-5 Geometric Measurement pp. 2- 27.
- **Consider:** How did the Geometry and Measurement session support and illustrate particular aspects of the progression of learning?
- **Read:** Whole-Class Discussions
- **Written Reflection:** Reflect on the reading and examples of discussions you have viewed or read about in this course. How do you currently engage students in mathematical discussions in your classroom? How might you like to further develop how you facilitate mathematical discussions?

## Session 6: Fractions

### Additional Readings

- Nasir N.S. *Why Should Mathematics Educators Care About Race and Culture?*
- Martin, D. Teacher Strategies: Recognizing Social Barriers to Math Education
- Martin, D. African American Social Identity and Math Education

### Read, Watch and Reflect

- **Read:** Nasir's article
- **Watch:** the two Martin videos
- **Written Reflection:** What do the article and videos bring up for you as a teacher? How do you see aspects of the article and videos impact your teaching?

## Final Paper

- Write an 11-page (minimum) paper; typewritten, double-spaced, free of grammatical and spelling errors, due no later than **August 15, 2018** on one of the following topics:

Supporting Engagement in the Standards for Mathematical Practice

Select two Mathematical Practices that are of interest to you (you can use the Practice you discussed in your first reflection for this assignment)

Select a content area on which you want to focus. Describe how the Practices you selected could be enacted by students at your grade level in this particular content area. Give illustrative examples.

Next, think about how you will support student enactment of these Practices. What resources in *Investigations* will you draw on? How will you work to facilitate discussions in which students have opportunities to explore each other's mathematical ideas and enact the Practices? Give specific examples.

OR

#### Supporting Computational Fluency

What does it mean to be computationally fluent? Describe the different aspects (building blocks) of computational fluency and how students at your grade level are working on each of them. Be sure to reference the Boaler and Russell articles in your description.

Discuss the challenges you see students encounter as they develop computational fluency and what you are doing presently to support students in becoming computationally fluent.

Share the new learning about computational fluency you have gained in this course and how you plan to apply this learning to your teaching practice. Offer specific examples.

OR

#### Reflecting on the Teaching and Learning of One Mathematical Topic

Choose a mathematical topic (for example: subtraction, place value, geometry, or fractions) that you have felt less comfortable with as teacher or as math learner. Describe some of the factors that have made this topic feel less comfortable than other mathematics topics for you.

Describe how this topic is addressed in the *Investigations* curriculum, including how students' understanding of this topic builds and deepens across the grade levels. Cite relevant readings from the course in your description.

Explain how this course has added to your understanding of the teaching and learning of this topic and discuss how your new understandings will affect your teaching of the topic. Give specific examples from the units at your grade level that address this topic.

## **Grading Criteria**

- *10% Participation* – Completing all sessions of the course by: engaging in the activities, solving the problems and reading the readings provided each week
- *50% Assignments* – Writing 3 substantive posts on the discussion forums each week and completing the graduate credit readings and the Read and Reflect written responses each week.
- *40% Final Paper*: The final paper must be at least 11 type-written pages in length double-spaced, 12-point font; free of grammatical and spelling errors; due not later than August 15, 2018.

## **Academic Honesty Policy**

- Students who register for this course agree to “maintain high standards of academic honesty and scholarly practice. They shall be responsible for familiarizing themselves with the published policies and procedures regarding academic honesty. Academic honesty requires but is not limited to the following practices: appropriately citing all published and unpublished sources, whether quoted, paraphrased, or otherwise

expressed, in all of the student’s oral and written, technical and artistic work.”

- Please also refer to the Framingham State University Graduate Catalog at <http://www.framingham.edu/graduate-and-continuing-education/documents/grad-catalog-0910.pdf>.

### **Academic Accommodations Policy**

- “Framingham State University offers equal opportunities to all qualified students, including those with disabilities and impairments. The University is committed to making reasonable accommodations as are necessary to ensure that its programs and activities do not discriminate, or have the effect of discriminating, on the basis of disability. Academic Support serves students with learning and psychiatric disabilities as well as students with visual, mobility and hearing impairments. For further information, please visit the website at <https://www.framingham.edu/academics/center-for-academic-success-and-achievement/disability-access-services/index>