



This course supports a performance assessment. It covers 7 competencies.

## Introduction

Welcome to Mathematics Learning and Teaching!

### Overview

Mathematics Learning and Teaching will help you develop the knowledge and skills necessary to become a prospective and practicing educator. Students will be able to use a variety of instructional strategies to effectively facilitate the learning of mathematics. This course focuses on selecting appropriate resources, using multiple strategies, and instructional planning, with methods based on research and problem solving. A deep understanding of the knowledge, skills, and disposition of mathematics pedagogy is necessary to become an effective secondary mathematics educator. There are no prerequisites for this course.

### Getting Started

You will generally read from the electronic textbook provided to you by WGU (*Elementary and middle school mathematics: Teaching developmentally, 8th Edition*, by Van de Walle, Karp, & Bay-Williams.) Sometimes you'll be provided a carefully selected Internet resource that will help you learn what you need to know. When you've developed the required competencies, you'll be asked to engage in the three Tasks and submit them. NOTE: The textbook references MyEducationLab, but this resource is not provided to you because it is not needed to gain the competency to complete the assessment in this course.

### Teaching Dispositions Statement

Please review the [Statement of Teaching Dispositions](#).

## Mathematics Learning and Teaching

### Competencies

This course provides guidance to help you demonstrate the following 7 competencies:

- **Competency 662.1.1: Learning Activities to Teach for Understanding**  
The graduate integrates principles and models of teaching for understanding into learning activities.
- **Competency 662.1.2: Teaching Through Problem Solving**  
The graduate integrates problem solving into learning activities to build conceptual understanding.
- **Competency 662.1.3: Teaching Strategies**  
The graduate evaluates teaching tools and strategies for the purpose of planning



learning activities.

- **Competency 662.1.4: Aligning Learning Activities to National Standards**  
The graduate evaluates learning activities for alignment with the National Council of Teachers of Mathematics (NCTM) standards.
- **Competency 662.1.5: Standards and Best Practices in Teaching and Learning**  
The graduate incorporates standards and best practices for the teaching and learning of mathematics for all students into instructional practice.
- **Competency 662.1.6: Evaluating Student Work**  
The graduate uses multiple assessment strategies to evaluate student understanding and guide instruction.
- **Competency 662.1.7: Differentiated Instruction**  
The graduate accommodates the needs and abilities of diverse students in the planning of learning activities.

### **Seek help when you need it**

Your Course Instructor is an important resource for you to take advantage of as you progress through your study. Your Course Instructor will be able to help guide your learning, answer questions, and provide valuable information. Be sure to consult your Course Instructor frequently.

### **Pacing Guide**

The suggested schedule for completing the course:

- Week 1: Begin National Standards and New Approaches
- Week 2: Finish National Standards and New Approaches; Task 1
- Week 3: Teaching Strategies for Numbers, Algebra, and Statistics
- Week 4: Evaluating Student Work; Task 2
- Week 5: Teaching Strategies for Geometry; Differentiated Instruction
- Week 6: Task 3

### **Supplemental Activities**

At times you may need more information or practice than what has been provided in the course. In addition to consulting with your Course Instructor, you can access optional and supplemental activities by using the word "supplemental" in the Course Search box. These activities can be enriching, but they are not essential for becoming competent.

### **National Standards and New Approaches**

It is important to be able to teach for understanding as well as teach through problem solving. It is also important to know what the national standards are for mathematics learning and teaching. It is very important to understand that the goal of deep conceptual understanding is best met through teaching strategies that have students learn via problem solving, which is quite different than learning to solve problems.



## Teaching for Understanding, Week 1

Read the following chapters in *Elementary and Middle School Mathematics*:

- [chapter 1 \("Teaching Mathematics in the 21st Century"\)](#)
- [chapter 2 \("Exploring What it Means to Know and Do Mathematics"\)](#)

## National Standards and Best Practices, Week 1

The Common Core State Standards for Mathematics (CCSSM) are K–12 standards that have been adopted by the majority of states. The CCSSM are built on the best math standards from across the country as well as international models and current research. Even if the state in which you will be teaching has not adopted them, it is important that you have a firm understanding of the CCSSM, including the grade-level standards, standards for mathematical practice, and the key shifts in how these standards differ from previous standards. Read the following:

- [Mathematics Standards](#)
- [Key Shifts in Mathematics](#)

While the CCSSM set important grade-specific and mathematical practice goals, they do not define how the standards should be taught or which materials should be used to support the standards. It is still the role of the district and teacher to determine how best to select and implement curriculum that will serve their students. [Principles to Action](#) is a National Council of Teachers of Mathematics (NCTM) document developed to fill this gap. It provides teachers and others with a set of best practices for implementing the CCSSM. It focuses on eight research-based effective teaching practices that promote students' learning and mathematical thinking. [A PDF copy of this highly-recommended publication can be purchased for \\$4.99.](#)

## Problem-Based Teaching and Learning, Week 2

Review the following in *Elementary and Middle School Mathematics*:

- [chapter 3 \("Teaching Through Problem Solving"\)](#) in *Elementary and Middle School Mathematics*
- [chapter 4 \("Planning in the Problem-Based Classroom"\)](#) in *Elementary and Middle School Mathematics*

Read the following from *Flip Your Classroom: Reach Every Student in Every Class Every Day*:

- [chapter 4 \("How to Implement the Flipped Classroom"\)](#)

## Task 1, Week 2

This task requires watching a problem-based learning activity and evaluating it for alignment with NCTM standards. Complete and Submit Task 1 in [TaskStream](#). If you do not pass, contact your Course Instructor.

## Teaching Strategies for Numbers, Algebra, and Statistics



It is important to help students have a variety of experiences to build on their sense of number in order to learn advanced number concepts and develop an understanding of algebra. Algebra is the gateway to more advanced mathematical topics, concepts, and procedures.

### **Numbers, Week 3**

Read at least two of the following groupings of chapters in *Elementary and Middle School Mathematics*, depending on your area of personal and professional interest:

- Number Sense and Basic Facts, [chapters 8, 10, 11](#)
- Developing Computation Skills, [chapters 9, 12, 13](#)
- Fractions, Decimals, and Percents, [chapters 15, 16, 17](#)

### **Advanced Numbers and Algebra, Week 3**

Read the content-specific teaching strategies in the following chapters of *Elementary and Middle School Mathematics*:

- [chapter 14 \("Algebraic Thinking: Generalizations, Patterns, and Functions"\)](#)
- [chapter 23 \("Exponents and Real Numbers"\)](#)

### **Statistical Thinking, Week 3**

Read the content-specific teaching strategies about statistics in the following chapters of *Elementary and Middle School Mathematics*:

- [chapter 21 \("Developing Concepts of Data Analysis"\)](#)
- [chapter 22 \("Exploring Concepts of Probability"\)](#)

## **Evaluating Student Work**

It is important to understand multiple assessment strategies to evaluate student understanding and guide instruction.

### **Evaluation and Assessment, Week 4**

Read the following in *Elementary and Middle School Mathematics*:

- [chapter 5 \("Building Assessment into Instruction"\)](#)

To learn about how you might support cross-curricular achievement and greater student achievement by integrating writing as a formative assessment tool in your math classroom, read the following articles:

- [Writing in Mathematics](#)
- [Writing Math](#)

### **Task 2, Week 4**

This task requires creating three types of assessments for probability and statistics. Complete and Submit Task 2 in [TaskStream](#). If you do not pass, contact your Course Instructor.

## **Teaching Strategies for Geometry**



It is important to help students have a variety of experiences to build on their sense of shape and visualization skills in order to develop a more structured and rigorous understanding of geometry.

### **Geometric Thinking, Week 5**

Read the content-specific teaching strategies about geometry in the following chapters of *Elementary and Middle School Mathematics*:

- [chapter 18 \("Proportional Reasoning"\)](#)
- [chapter 19 \("Developing Measurement Concepts"\)](#)
- [chapter 20 \("Geometric Thinking and Geometric Concepts"\)](#)

### **Differentiated Instruction**

It is important to understand the needs and abilities of diverse students in the planning of learning activities.

### **Equitable Differentiation, Week 5**

Read the following in *Elementary and Middle School Mathematics*:

- [chapter 6 \("Teaching Mathematics Equitably to All Children"\)](#)

### **Task 3, Week 6**

This task requires creating an extremely detailed problem-based lesson plan on geometry with extra emphasis on differentiated instruction accommodations. Complete and Submit Task 3 in [TaskStream](#). If you do not pass, contact your Course Instructor.