Your competence will be assessed as you complete the EFT5 performance assessment and the ELO4/5 objective assessment (to be taken after completing the Specific Teaching Practices domain of study) for this course of study. This course of study may take up to 10 weeks to complete.

Introduction

Overview
Welcome to the Specific Teaching Practices: Math and Science course of study. This course of study provides you with an opportunity to learn how to teach two of the most important subjects in elementary school. Many elementary teachers suggest that they do not like mathematics or science. It is also known that teachers do not spend as much time teaching subjects they do not enjoy or find personally interesting. If you enjoy mathematics and science, this course of study will give you a chance to have fun extending what you know about the subjects and practicing with interesting and creative ways to teach children science and math concepts and procedures. If you do not already enjoy these subjects, the experience of working through the reading assignments and learning activities in this course of study may help you find a new appreciation for two fascinating subjects.

Have you ever seen an elementary student struggle in math or science? Were you one of those students? If so, perhaps you can remember feeling confused, overwhelmed, and frustrated at times. Teachers want to help their students avoid those feelings, and that is why it is so important for them to develop not only a strong knowledge base, but also a sense of confidence in and enthusiasm for mathematics and science.

Throughout this course of study, you will strengthen your understanding in key mathematics and science competencies. Those competencies emphasize an approach that represents the kind of balanced instruction that is necessary in the nation's schools today-that of both content and computation, or process and product. You have already gained a good foundation of basic math and science concepts, and in this course of study, you will apply your existing knowledge to best teaching practices.

Watch the following video introduction for this course:

Outcomes and Evaluation
There are 3 competencies covered by this course of study; they are listed in the "**Competencies for Specific Teaching Practices: Math and Science (EFT5)**" page.

Teaching Dispositions Statement
Please review the **Statement of Teaching Dispositions**. You will complete the following assessments as you work through the course of study.

You will complete the following assessments as you work through the course of study.

Pre-Assessment
You will complete the following pre-assessment:

- PAP4

Objective Assessment
You will complete the following objective assessment:

- ELO4/5

NOTE: This course of study prepares you for one portion of the material necessary to complete this exam. For a list of all courses of study necessary to complete the objective assessment, access the course of study for ELO4/5 on your Degree Plan.

Performance Assessment
You will complete the following performance assessment in TaskStream:

- EFT5

Previews of task instructions and evaluation rubrics for this assessment are available via the "Assessment Preparation" box in the online course of study.

California candidates entering WGU on or after July 1, 2008 should review the **California Teaching Performance Assessments (CalTPA) Requirements for California Students** document.

Preparing for Success

The information in this section is provided to help you become ready to complete this course of study. As you proceed, you will need to be organized in your studies, competent in the indicated areas, and ready to pass the final assessments.

Your Learning Resources

The learning resources listed in this section will be required to complete the activities in this course of study. Follow the instructions provided to access these resources as early as possible in order to give yourself time to become familiar with them.

Automatically Enrolled Resources

You will be automatically enrolled at the activity level for the following learning resources. Simply click on the links provided below and in the related activities to access the learning materials.

VitalSource E-Texts
The following textbooks are available to you as e-texts within this course of study. You will be directly linked to the specific readings required within the activities that follow.

- Koch, J. (2010). *Science stories: Science methods for elementary and middle school*

teachers. (4th ed.) Wadsworth Cengage Publishing. ISBN: 9780547193106.
- Reys, R., Lindquist, M., Lambdin, D. & Smith, N. (2012). *Helping children learn mathematics* (10th ed.). Hobokon, NJ: John Wiley & Sons. ISBN: 9781118001806.

Note: These e-texts are available to you free of charge, but you may purchase hard copies at your own expense through a retailer of your choice. If you choose to do so, please use the ISBN listed to ensure that you receive the correct edition.

Teachscape
You will access video modules from Teachscape at the activity level within this course of study. The Teachscape modules include video lectures, exercises, and interactive elements.
Enroll in Learning Resources

You will need to enroll in or subscribe to additional learning resources as a part of this course of study.

You may already have enrolled in these resources for other courses. Please check the "Learning Resources" tab and verify that you have access to the following learning resources. If you do not currently have access, please enroll or renew your enrollment at this time.

*Note: For instructions on how to enroll or subscribe through the "Learning Resources" tab, please see the "**Acquiring Your Learning Resources**" page.*

MyLabSchool
Check your subscription for CourseCompass MyLabSchool. If your subscription has expired, please contact Learning Resources at learning@wgu.edu to obtain a MyLabSchool Renewal access code.

Math: Teaching for Understanding DVDs
Acquire the Math: Teaching for Understanding DVDs.
Other Learning Resources

You will use the following learning resources for this course of study.

Lesson Planning Best Practices

For this course of study, you will submit lesson plans to TaskStream. The **Lesson Planning Best Practices** resource is available to assist you in developing this important skill.

Please use this resource for this course of study and throughout the remainder of the program.

Additional Preparation

There are many different learning tools available to you within your course of study in addition to the learning resources discussed above. Some or all of them may be very useful to you as your progress through this course of study. Take the time to familiarize yourself with them and determine how best to fit them into your learning process.

Message Boards, FAQs, Note-Taking Tool

Message boards, FAQs, and a note-taking tool are available in every course of study.

Use the "**Additional Learning Tools**" page to review these tools.

The WGU Central Library

The **WGU Central Library** is available online to WGU students 24 hours a day. The library offers access to a number of resources, including over 60,000 full-text e-books; articles from journals, magazines, and newspapers; course e-reserves; and tutorials on how to use these resources and the library. The library also includes a reference service for help with research questions or navigating the library.

For more information about using the WGU Library, view the "**WGU Library: Finding Articles, Books & E-Reserves**" video in the Student Resources section of The WGU Channel.

Center for Writing Excellence: The WGU Writing Center

If you need help with any part of the writing or revision process, contact the Center for Writing Excellence (CWE). Whatever your needs-writing anxiety, grammar, general college writing concerns, or even ESL language-related writing issues-the CWE is available to help you-the CWE offers personalized individual sessions and weekly group webinars. For an appointment, please e-mail writingcenter@wgu.edu mailto:writingcenter@wgu.edu.

Course Mentor Assistance

Course mentors are available to help you. Their job is to aid understanding in areas where you need to improve and to guide you to learning resources. Request their help as needed when preparing for assessments.

Course mentors cannot provide reviews of entire assessments. If you fail assessment attempts, review the provided feedback first, then ask the course mentor specific questions about what you can do to meet the competency standard. Request course mentor assistance as necessary in preparing for second attempts at objective assessments or performance task revisions. Mentors cannot guarantee you pass as they do not evaluate assessments; however, they can provide the assistance and advice necessary to help you succeed.

Please review this **presentation** on the benefits of collaborating with course mentors.

Specific Teaching Practices: Elementary Education Learning Community

You will need to access the Specific Teaching Practices: Elementary Education Learning Community. You can access it through the "Learning Resources" tab. In this community, you will receive notices and instructions related to this course, and you will share ideas and thoughts with your course mentor and other students.

Basic Processes for Mathematics

The activities for this subject will focus on an introduction to mathematics problem solving,

counting, and place value. Elementary teachers need to understand the processes of doing mathematics, which includes problem solving. To solve problems, teachers and students alike need to understand counting and have a basic sense of numbers.

Because mathematics includes conceptual, procedural, and computational learning outcomes, teachers must provide learning conditions that align with these learning outcomes.

When you think of yourself as a math teacher, what skills and knowledge do you believe children need as starting points for learning mathematics? As a teacher, what mathematics and pedagogy skills do you need to have as starting points so you can provide effective math instruction?

Problem Solving, Counting, and Place Value

You will begin your exploration of teaching methods of elementary mathematics by understanding problem solving. You will consider problem solving strategies as well as the prerequisite math and thinking skills children need to possess before they solve mathematical problems of different types.

Problem Solving

Read the following chapter in your *Helping Children Learn Mathematics* textbook:

- **chapter 6 ("Helping Children with Problem Solving")**

As you read this chapter, pay special attention to the different kinds of problem- solving techniques that are presented. Try to think of situations where you could use each of the techniques to solve perplexing mathematical problems. What skills do children need in order to use the given problem- solving strategies?

View the following in the *Math: Teaching for Understanding* DVD:

- program 2
- program 3

Access the following resource:

- **"Problem Solving Bookmark"**.

Develop a list of prerequisite skills students need to have in order to be successful in solving problems.

Problem Solving Teaching Practices

View the following in the *Math: Teaching for Understanding* DVD:

- program 7

Complete the following exercise after viewing the DVD program:

- According to the video, there are seven teaching practices that facilitate problem solving. Please create a graphic organizer that identifies each of these seven practices, and briefly define each one. Then, provide at least one concrete example of how you might incorporate each of these seven practices into a problem- solving lesson of your choosing.

Counting Skills

Read the following chapter in your *Helping Children Learn Mathematics* textbook:

- **chapter 7 ("Counting and Number Sense in Early Childhood and Primary Grades")**

As you read the chapter, take notes to identify ways in which you can engage children in counting. Consider principles and strategies for counting.

Place Value

Read the following chapter in your *Helping Children Learn Mathematics* textbook:

- **chapter 8 ("Extending Number Sense: Place Value")**

As you read, think about how you will teach students the concept of place value.

Specifically, explain to a friend or WGU peer how you would teach children to read and write multi-digit numbers that contain various place values such as ones, tens, hundreds, thousands, tenths, hundredths, thousandths, etc.

602.4.15-04, 38, 39 Performance Task

Complete the following task in **TaskStream**:

- EFT5: 602.4.15-04, 38, 39

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Mathematics Dispositions and Their Effect on Learning

This subject will focus on an introduction to mathematics accuracy and fluency as well as attitudes toward mathematics that can affect performance and achievement.

Have you ever considered that math performance is directly related to individual attitudes about mathematics? Some individuals have the attitude that mathematics aptitude is something you are born with or also believe that there is nothing they can do to learn mathematics if they are born without a "math brain." Consider how that kind of attitude limits children from learning math. If you believe you cannot learn something, you are inclined not to practice the skills or display interest.

State of mind influences motivation and mathematics performance. Students need to become

so familiar with specific mathematical processes that they can execute them without giving them conscious thought. Attitude influences whether or not students are anxious as they approach math situations or if they have a sense of curiosity about problems to be solved.

What are your attitudes about mathematics? How do you believe your attitudes influence the amount of time you spend on math, the kind of activities you provide, and the subtle messages you send children about mathematics?

Accuracy, Fluency, and Attitudes

Working memory holds a limited amount of information at one time. Mathematical operations can be conducted much more rapidly and accurately if some of the facts are automatic. Developing automaticity is a critical component of mathematics instruction.

Accuracy and Automaticity

Review the following chapter in your *Helping Children Learn Mathematics* textbook:

- **chapter 9 ("Operations: Meanings and Basic Facts")**

Access and read the following document:

- **"A White Paper on Computational Fluency (K-12)"**

As you read, think about how fluency in mathematics is developed and how you might structure your math instruction to help your students attain greater accuracy and great automaticity in this subject.

Motivating Children to Learn Mathematics

Read the following chapters in your *Helping Children Learn Mathematics* textbook:

- **chapter 1 ("School Mathematics in a Changing World")**
- **chapter 2 ("Helping Children Learn Mathematics with Understanding")**
- **chapter 3 ("Planning and Teaching")**

As you read these chapters, think about what you have learned in previous work about motivation (intrinsic and extrinsic). Can you create a list of at least three activities that would promote interest and motivation in mathematics?

View the following in the *Math: Teaching for Understanding* DVD:

- program 5

Think of a learning activity that will promote interest in learning a specific concept or skill (e.g., automaticity, place value, problem solving).

602.4.15-14 Performance Task

Complete the following task in **TaskStream**:

- EFT5: 602.4.15-14

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Understanding and Measuring Shapes, Space, and Probability

School-aged children need to understand spatial relationships, how to measure, and basic concepts related to probability. The skills children learn in elementary school enable them to pursue higher mathematics courses that involve data collection and measurement, geometry, and probability and statistics.

The activities associated with this subject focus on helping elementary-aged students develop their knowledge and understanding in geometry, measurement, and probability concepts.

Geometry, Measurement, and Probability

So much of mathematics is related to practical applications. People are confronted with principles and elements of shapes every day. They measure quantities and qualities without giving them much thought and consider whether or not events occur through chance or based on probability.

Geometry and Measurement Instruction

Review the following chapters in your *Helping Children Learn Mathematics* textbook:

- **chapter 15 ("Geometry")**
- **chapter 16 ("Measurement")**

Try out at least two of the learning activities recommended by the authors with the child of a friend or family member (with permission). What worked well? What might you need more practice at?

View the following in the *Math: Teaching for Understanding* DVD:

- program 10

Consider the following questions:

- What skills must students have in order to learn what a parallelogram is, for example?
- How would you make certain that your students have these skills?

Review your textbook for sections on measurement and important formulas such as volume, surface area, area, circumference, and so on. Consider the following question:

- How might you use at least one of the formulas from the "**Surface Area Formulas**" web page when working with an elementary-aged child?

Review the following in your *Helping Children Learn Mathematics* textbook:

- chapter 16 ("Measurement")

View the following in the Math: Teaching for Understanding DVD:

- program 12

Create a list of at least three ways that you might teach measurement to elementary-aged children; perhaps make a list for elementary students and another list for intermediate grades. Consider the following question:

- Can you identify the steps you would take in order to teach an elementary-aged child the formula for finding the circumference of a circle?

Probability

Read the following chapter in your *Helping Children Learn Mathematics* textbook:

- **chapter 17 ("Data Analysis, Statistics, and Probability")**

List the steps used to teach students how to find the probability of obtaining four heads when flipping a coin four times.

Also, search the Internet or other teacher resources to find at least one or two games that would be appropriate for teaching elementary students the concept of probability.

602.4.15-21 Performance Task

Complete the following task in **TaskStream**:

- EFT5: 602.4.15-21

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Problem Solving With Related Concepts

Consider the following scenarios:

- You hand the store clerk a $20 bill for an item that costs $12.42, and you expect to receive correct change back.
- A parent has seven hungry members of the family but only a single pizza, and that parent wants to treat everyone fairly.
- A carpenter is forming a foundation for a new kitchen addition to a home, and he needs to make very sure that the new addition will be level, plumb, and tied into the existing structure correctly.

These scenarios are examples of mathematical problem solving involving fractions, decimals, computation, reasoning, and other calculations. The activities associated with this subject will help you to develop a foundational knowledge of mathematics problem solving, factions, and decimals. This section of the course of study revisits problem solving with an emphasis on how problem solving relates to fractions and decimals. Fractions and decimals, as related concepts, provide opportunities to think about how information is represented, related, and reasoned.

Because mathematics includes conceptual, procedural, and computational learning outcomes, teachers must provide learning conditions that align with these learning outcomes.

Problem Solving, Fractions, and Decimals

How many different ways are there to represent related mathematical concepts? How, as an elementary teacher, can you help children detect and understand relationships that exist?

Fractions

Read the following chapter in your *Helping Children Learn Mathematics* textbook:

- **chapter 12 ("Fractions and Decimals: Meanings and Operations")**

Then view the following in the *Math: Teaching for Understanding* DVD:

- program 9

Access and review the following from **MyLabSchool** ("Course Compass" > "MyLabSchool" > "Foundations of Teaching Pre-clinical Experience (PCE) Videos" > "A Lesson on Fractions") in order to gain a richer understanding of how best to teach equivalent fractions using manipulatives:

- "A Lesson on Fractions"
- Consider how you would teach your own students to learn more about number operations by introducing the concept of equivalent fractions.
- There are four "follow-up" questions after the video clip; try responding to those four questions to test your understanding of this important math concept.

Decimals

Review the following chapter in your *Helping Children Learn Mathematics* textbook:

- **chapter 12 ("Fractions and Decimals: Meanings and Operations")**

Also review the following in the *Math: Teaching for Understanding* DVD:

- program 2
- program 3

Then, examine a fourth and a sixth grade math textbook. Consider the following questions:

- What are some examples of times when rounding and truncating are appropriate?
- Also, can you list at least two different ways in which you might teach decimals to a third grader? What about a fifth grader?
- How might what you have learned previously about problem solving fit into the context of decimals?

602.4.15-11 and 602.4.15-31 Performance Tasks

Complete the following task in **TaskStream**:

- EFT5: 602.4.15-11
- EFT5: 602.4.15-31

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Operations: Facts and Meanings

The activities associated with this subject will help you to more clearly understand pedagogical principles pertaining to order of operations, error correction, and multiplication. What do these three math topics have in common? How is the order orf operations related to the kinds of errors children make? What is the process of multiplication?

Because mathematics includes conceptual, procedural, and computational learning outcomes, teachers must provide learning conditions that align with these learning outcomes. Learning is a process rather than a product. Learning how to do mathematics involves understanding why errors are made, the thought -processes that led to those errors, and strategies for helping correct misconceptions and computational errors.

Order of Operations, Error Correction, and Multiplication

What does order of operations mean? How does the order of operations influence accuracy? What kind of errors do children make when completing problems that depend on operations?

Order of Operations

Read the following chapters in your *Helping Children Learn Mathematics* textbook:

- **chapter 9 ("Operations: Meanings and Basic Facts")**
- **chapter 11 ("Standard and Alternative Computational Algorithms")**

Write a division word problem that would correspond to: 24 ÷ 6.

As you write out the steps to solving this problem, be sure to outline the steps in proper order.

As an added challenge, develop a set of four math problems that would help elementary students work through the four basic math operations.

Elementary Math Properties

Review your *Helping Children Learn Mathematics* textbook for the commutative, associative,

and distributive properties.

Then access the following web page:

- **"Basic Number Properties: Associative, Commutative, and Distributive"**

Create a graphic organizer that will help you to understand and remember these three properties. Consider the following questions:

- How might you teach these properties to a fourth- or fifth-grade student?
- What examples might you use?
- How might you help the student to understand the differences between these properties?

Error Correction and Multiplication

Review the following chapters in your *Helping Children Learn Mathematics* textbook:

- **chapter 4 ("Assessment: Enhancing Learning and Teaching")**
- **chapter 10 ("Computation Methods: Calculators, Mental Computation, and Estimation")**

Review the following chapters in your *Helping Children Learn Mathematics* textbook:

- **chapter 9 ("Operations: Meanings and Basic Facts")**
- **chapter 11 ("Standard and Alternative Computational Algorithms")**

As you read, develop a matrix of misconceptions that elementary students might develop. For example, what misconception might a student have who solves a problem?

- $5 \times -7 = 35$

After reviewing chapter 11 in your textbook, write five things you have learned about teaching multiplication. Try to work with at least one elementary-aged family member or friend; give them a multiplication word problem that involves two-digit numbers. Evaluate how they solved the problem and conduct an analysis for apparent misconceptions.

602.4.15-20 Performance Task

Complete the following task in **TaskStream**:

- EFT5: 602.4.15-20

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Assessing Student Learning

Because mathematics includes conceptual, procedural, and computational learning outcomes, teachers must provide learning conditions that align with these learning outcomes. How many different ways are there to assess mathematical learning? Which strategies help teachers understand misconceptions, check for understanding, and determine if students "get it"? You might think of mathematics assessments as measuring both what students learn as well as how they think. In that respect, math assessments have the potential to measure problem- solving skills and thinking. The activities associated with this subject will introduce you to effective methods of teaching problem solving and assessing students' mathematical learning in the elementary classroom.

Problem Solving and Assessment

This section of the course of study will help you think about assessment of learning and thinking. How is it possible to assess what children are thinking as they solve math problems?

Multi-Step Problem Solving

Complete the following in your *Helping Children Learn Mathematics* textbook:

- **Read chapter 5 ("Mathematical Processes and Practices")**
- **Review chapter 6 ("Helping Children with Problem Solving")**

Complete the following Teachscape module:

- **Number & Operations: Division with Remainders**

If possible, observe an elementary school classroom while students are engaged in a math lesson or investigative project.

- Make a list of instances in which the children show evidence of using one or more of the five mathematical processes.
- Jot down what the children were saying or doing and what possible misconceptions they may have demonstrated.
- What might be 1 or 2 things you could do to ensure their success in this problem?

Here is a fun challenge. Access the following web page:

- **"Play With Numbers and Give Your Brain a Workout"**

Take 15-20 minutes to answer several questions; note the various steps you have to take as you try to solve each problem. Consider how you might apply your insight to the classroom.

Assessing Thinking

Review the following chapters in your *Helping Children Learn Mathematics* textbook:

- **chapter 4 ("Assessment: Enhancing Learning and Teaching")**
- **chapter 6 ("Helping Children with Problem Solving")**

Develop a short assessment (quiz) that might be used to assess students' thinking about a specific mathematical concept or procedure. How do you know your assessment is an accurate measure of students' thinking?

602.4.15-33, 35 Performance Task

Complete the following in **TaskStream**:

- EFT5: 602.4.15-33, 35

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Errors: What Are They, and How Are They Detected?

Have you ever tried to balance your checkbook and the figures did not match up with your bank statement? This is an example of making an error and not knowing why the mistake was made. It requires a careful analysis of each step in the process in order to detect the error and then know how to correct it. Elementary students face the same challenges each day in school, and it is the responsibility of teachers to help them improve their math skills. You must be very alert to the kinds of errors they are making, which may be indicative of misconceptions about important math concepts.

The activities associated with this subject will build upon what you have learned in previous sections to focus more deeply on the detection and analysis of mathematical errors.

Error Detection and Analysis

One of the most important skills you need to possess as a mathematics teacher is identification and correction of errors. That does not mean that you simply know when a child is giving an incorrect response. More importantly, it means that you can think like the child, that you understand mathematics well enough to anticipate the kinds of misconceptions children will have and the kinds of errors they might make, and that you develop instructional strategies to minimize and correct errors.

Analyzing Student Errors

Review the following chapters in your *Helping Children Learn Mathematics* textbook:

- chapter 3 ("Planning for and Teaching Diverse Learners")
- chapter 9 ("Operations: Meanings and Basic Facts")
- chapter 11 ("Standard and Alternative Computational Algorithms")
- chapter 12 ("Fractions and Decimals: Concepts and Operations")
- chapter 14 ("Algebraic Thinking")
- chapter 15 ("Geometry")

Make a list of the kinds of errors that are common for different types of mathematical computations. Think of an example of an error students might make in math due to a misunderstanding or misconception. Jot down why the misconception occurs and how you would help students correct this misconception.

EFT4/EFT5 TaskStream Task 602.4.16-05

Complete the following in **TaskStream**:

- EFT5: 602.4.16-05

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Elementary Science Instruction

The world of elementary science is an exciting one that holds great value for children. Through science, children learn attitudes that are important in understanding life and the world. They learn essential life skills and build curiosity about the environment.

Science provides opportunities for students to learn through discovery, problem solving, data collection, and analysis. The activities associated with these subjects will introduce you to effective, safe science teaching and learning.

Teaching Strategies, Curriculum, and Safety Issues

There are numerous effective inquiry-based, problem-solving, and experiential- learning strategies that teachers can structure to promote scientific thinking. Science instruction and curriculum pose great learning potential, but also carry some risks because children are exposed to materials and equipments that, if not handled properly, can cause injury. Teachers need to understand safety procedures and follow them when providing instruction.

Science Teaching Techniques

Read the following chapters in the *Science Stories: Science Methods for Elementary and Middle School Teachers* text:

- **chapter 1 ("An Invitation to Teaching Science")**
- **chapter 3 ("The Teacher as Mediator and Facilitator of Student Learning")**
- **chapter 2 ("Locating Your Scientific Self")**
- **chapter 5 ("Making Connections: Scientific Exploration in the Students' Own Environment")**

Consider the following questions:

- What might your science classroom look like if you followed the concept learning model, the discovery model, the social constructivist model, or the experimental model?
- What might be characteristics they all have in common? How might they be different?
- How might you differentiate instruction in each model to meet the needs of students who have reading difficulty (dyslexic), writing difficulty (dysgraphia), physical disabilities, are gifted and/or are English Language Learners?
- Which model seems to best fit your own teaching style?

Science Teaching Techniques: Curriculum

Read the following in the *Science Stories: Science Methods for Elementary and Middle School Teachers* text:

- **chapter 12 ("Science Content and Curriculum: The Big Ideas and Your Scientific Self")**

Reflect on the following questions:

- If you could design your own elementary science curriculum for a grade of your choice, what topics would you include?
- What kind of learning experiences would you weave in?
- How would your science curriculum be integrated with other subject areas?

Science Safety

Read the following chapter in the *Science Stories: Science Methods for Elementary and Middle School Teachers* text:

- **chapter 13 ("What's the Big Idea? Matching Assessment to Instruction")**
- **chapter 14 ("Pulling It All Together: Reflection and Self-Assessment")**

Access and read the following documents:

- "**Science and Safety: It's Elementary!**"
- "**Safety in the Elementary (K-6) Science Classroom**"

As you read these documents, think about the kinds of safety hazards that exist in an elementary science classroom.

Then, in a journal or notebook, develop a list of ten important safety tips for your own science classroom.

Legal Issues

Access and review the following:

- "Legal Aspects of Laboratory Safety".

As a teacher, you have an obligation to prevent children from being injured in the classroom. Consider the kinds of ramifications that may result by not planning ahead to prevent injuries from occurring.

Science as "Science"

All teachers need to possess skills that enable them to think like scientists, whether that occurs in a science classroom or other content areas.

Science provides opportunities for students to learn through discovery, problem solving, data

collection, and analysis. There are numerous effective inquiry-based, problem-solving, and experiential learning strategies that teachers can structure to promote scientific thinking. The activities associated with this subject will introduce you to data collection, error analysis, and the integration of science, which are three of the most important elements of effective science instruction.

Data Collection, Error Analysis, and Integration of Science

You have learned about problem solving in the context of mathematics. Problem finding and problem solving are integral in the field of science as well. Critical thinkers make decisions based on information they collect, analyze, and use. They know how to integrate the decision making in a variety of contexts.

Thinking Like a Scientist

Read or review the following in your *Science Stories* textbook:

- chapter 5 ("Making Connections: Scientific Explorations in the Students' Own Environmnent")
- chapter 6 ("Matter Matters: Getting Messy with Ordinary Objects")
- chapter 7 ("Sustained Inquiry: Explorations of Living Things")
- chapter 8 ("Spiraling Curriculum: Explorations of Density")
- chapter 9 ("Virtual and Concrete Models: Explorations in the Solar System")

Consider the following question:

- Why is science instruction an important part of the curriculum, despite the increasing emphasis on reading and math instruction as per the No Child Left Behind mandate?

A child observes that the outside of a cold soda bottle is moist and concludes that the soda is leaking through the glass. What can you as a teacher do to correct this scientific misconception?

Data Collection

Review the following chapter in your *Science Stories* textbook:

- chapter 4 ("Science as a Process: Using the Skills of Scientific Study")

Test your understanding of data collection by creating a brochure on your computer or by hand that you might distribute to peers who are also seeking their elementary certification. In the brochure, you should answer the following questions:

- What is data collection, and how can it be taught in an elementary classroom?
- How can oral questioning techniques be used effectively when talking about science concepts?
- What is constructivist inquiry, and what theorist is most closely associated with this theory?

Science Equipment and Technology

Read the following chapter in your *Science Stories* textbook:

- chapter 10 ("Moving Beyond the Science Kit: Explorations of Electricity and Atoms")

As you read, think about the simple and complex equipment that can be incorporated in science lessons to collect, analyze, and display data. Find out what types of equipment are available for use in the school where you will do your demonstration teaching.

Access and review the following web pages:

- **"Kathy Schrock's Guide for Educators"**

Create a checklist or a database of developmentally appropriate science technology and equipment. Be sure to include at least three examples of technology and at least three examples of equipment that you could use in a lesson of your choice.

Integrating Science With Other Subjects

Read the following chapter in your *Science Stories* textbook:

- chapter 11 ("Planning for Science: Lesson Plans and Instructional Strategies")

Develop a concept map to show how you might integrate science into other subject areas such as language arts, mathematics, or social studies. The following are a few examples of integration to stimulate your thinking:

- Identify a science learning objective that depends on mathematical understanding. What prerequisite math skills would be necessary in order for students to successfully accomplish the science lesson? Create a table or chart that visually aligns the science objective with the necessary math skills.
- Use a science activity to develop oral language skills.
- Use a science activity to develop writing skills.
- Outline a lesson that integrates science and social studies.
- Outline a lesson that integrates science and art or music.
- Write a jingle (song) for the human skeleton or the water cycle.

602.4.17-15 Performance Task

Complete the following task in **TaskStream**:

- EFT5: 602.4.17-15

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Understanding and Misunderstanding Science

The activities associated with this subject will focus on the naïve conceptions students have

related to science that are based on their everyday experiences and their stages of cognitive development. Science teachers need to know about the kind of misconceptions children may hold and design learning activities that help students overcome their false beliefs.

Science provides opportunities for students to learn through discovery, problem solving, data collection, and analysis. There are numerous effective inquiry-based, problem-solving, and experiential learning strategies that teachers can structure to promote scientific thinking.

Science Misconceptions and Corrections

Elementary teachers must confront their own misconceptions and help children confront misunderstandings by providing experiences with science that create conceptual conflict or inconsistencies. In this section of the course of study you will learn about misconceptions and how to confront them.

Science Misconceptions

Access and read the following:

- **"Misconceptions in Science"** document.

As you read, think about specific misconceptions elementary students may have about science; consider the impact of life experiences or language barriers that may contribute to mistaken beliefs.

- What can you as a teacher do to help correct or prevent scientific misconceptions?
- What instructional techniques can you use to promote greater understanding?
- How can you provide instructional support for English Language Learners?
- How can instruction be differentiated to meet the needs of students with reading disabilities (dyslexic), writing disabilities (dysgraphia) and who are gifted?

602.4.17-07 and 602.4.17-10 Performance Tasks

Complete the following tasks in **TaskStream**:

- EFT5: 602.4.17-07
- EFT5: 602.4.17-10

For directions on how to receive access to performance assessments, see the "**Accessing Performance Assessments**" page.

Final Steps

Congratulations on completing the activities in this course of study! This section will guide you through the assessment process.

Assessment Information

The activities in this course of study have prepared you to complete the EFT5 performance assessment and one portion of the ELO4/5 objective assessment. If you have not already completed the assessments, you will do so now.

Accessing Performance Assessments

You should have completed the following tasks as you worked through this course of study. If you have not completed the tasks in **TaskStream**, do so now.

- EFT5: Task 602.4.15-04, 38, 39
- EFT5: Task 602.4.15-14
- EFT5: Task 602.4.15-21
- EFT5: Task 602.4.15-11
- EFT5: Task 602.4.15-31
- EFT5: Task 602.4.15-20
- EFT5: Task 602.4.15-33, 35
- EFT5: Task 602.4.16-05
- EFT5: Task 602.4.17-15
- EFT5: Task 602.4.17-07
- EFT5: Task 602.4.17-10

For directions on how to receive access to performance assessments, see the **"Accessing Performance Assessments"** page.

Note: Please consult with your mentor regarding when you should request to take your assessments for this course. Remember that you will complete this assessment, along with the performance assessments for ELT1/2, EFT5, and EHT4/5 prior to taking the ELO4/5 objective exam.

Accessing Pre-Assessments

When you have completed all the courses of study in the Specific Teaching Practices domain, complete the following pre-assessment:

- PAP4

For directions on how to receive access to pre-assessments, see the **"Accessing Pre-Assessments"** page.

Accessing Objective Assessments

When you have completed all the courses of study in the Specific Teaching Practices domain, complete the following objective assessment:

- ELO4/5

For directions on how to receive access to objective assessments, see the **"Accessing Objective and Outside Vendor Assessments"** page.

Feedback

WGU values your input! If you have comments, concerns, or suggestions for improvement of this course, please submit your feedback using the following form:

- Course Feedback

ADA Requirements
Please review the University ADA Policy.