This course supports the assessment for DGT1. The course covers 4 competencies and represents 2 competency units.

**Introduction**

**Overview**
This course will help you not only strengthen your math thinking and communications skills but also develop problem-solving strategies and computer skills. Consider the value of engaging your students in math and computer applications. When possible, plan your instruction around big ideas rather than isolated skills. As you work through the course activities, be aware of potential student difficulties and your potential interaction with the math content.

**Pre-Clinical Experiences**
In Foundations of Teaching, you completed some video-based pre-clinical experiences (PCEs). In Effective Teaching Practices, you will find that a PCE is a more hands-on experience. The PCE tasks in this domain require a minimum of 30-40 hours of in-school observations and reflections; in addition, you will be asked to teach actual lessons that require planning and presentation. You will need to analyze practice as it relates to educational theory, reflect upon your own practice, record these thoughts, and draw conclusions about your application of these theories.

**Pre-Clinical Experience: Cohorts**
As the need arises, you will be able to attend weekly pre-clinical experience cohorts, which have the primary purpose of allowing students from the DOT, DMT, and DGT assessments to collectively discuss issues that arise during the completion of PCE tasks. The cohorts are also meant to provide a venue for open and active discussion with regard to clarification of task requirements, implementation of relevant mathematics pedagogy in the classroom, and any other relevant issues. What is great about these cohorts is that everyone benefits. While you are requesting clarification with regard to a specific PCE task, you will also have an opportunity to learn about future PCE tasks in the DOT, DMT, and DGT assessments. Another benefit to attending these cohorts is that it will serve as preparation for the mandatory demonstration teaching seminar that will appear later on in your program.

*Note: Prior to starting the first section, "Preparing for Success," you should carefully read through the requirements of this course with the intent of acquiring an overview of what is expected of you. Such an overview will ensure that you are prepared for the pre-clinical experiences found throughout this course.*

**Competencies**

This course covers the following competencies:

- **Competency 602.5.1: Teaching Methods-Mathematics (Secondary)**
  The graduate provides effective, research-based mathematics instruction.
• **Competency 202.1.1: Number Systems and Algebraic Structures**
  The graduate understands the real number system and its relationship to the complex number system; understands important algebraic structures; and understands the significance of functions in the study of number systems.

• **Competency 202.2.1: Geometry (MS)**
  The graduate understands synthetic, analytic, and transformational geometries and their relationship to measurement, and understands how geometry and measurement develop from intuitive investigations to formal arguments.

• **Competency 202.4.1: Precalculus**
  The graduate understands and applies the principles of trigonometry; mathematical modeling; and logarithmic, exponential, polynomial and rational functions.

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

**Course Instructor Assistance**
As you prepare to successfully demonstrate competency in this subject, remember that course instructors stand ready to help you reach your educational goals. As subject matter experts, mentors enjoy and take pride in helping students become reflective learners, problem solvers, and critical thinkers. Course instructors are excited to hear from you and eager to work with you.

Successful students report that working with a course instructor is the key to their success. Course instructors are able to share tips on approaches, tools, and skills that can help you apply the content you’re studying. They also provide guidance in assessment preparation strategies and troubleshoot areas of deficiency. Even if things don’t work out on your first try, course instructors act as a support system to guide you through the revision process. You should expect to work with course instructors for the duration of your coursework, so you are welcome to contact them as soon as you begin. Course instructors are fully committed to your success!

**Preparing for Success**

The information in this section is provided to detail the resources available for you to use as you complete this course.

**Learning Resources**
The learning resources listed in this section are required to complete the activities in this course. You will be automatically enrolled in the learning resources. Simply click on the links provided in the activities to access the learning materials.

**Automatically Enrolled Resources**

You will be automatically enrolled in the learning resources. Simply click on the links provided in the activities to access the learning materials.
The multimedia textbook below is included and contain videos, practice problems, and quizzes.


### Additional Preparations

#### Graphing Calculator

Acquire a graphing calculator and familiarize yourself with how to use it. Refer to the WGU Calculator and Scratch Paper Guidelines document for calculators permitted on WGU exams. If you are in a secondary mathematics program, refer to the WGU Calculator Recommendations for Secondary Math and Science Programs document for calculator suggestions for your degree program.

### Educational Technologies

The use of appropriate technology in math classrooms is advocated by the NCTM. In fact, the Technology Principle is one of the core principles espoused by the NCTM. You will now begin to explore how to go about harnessing the power of technology tools to capture students' attention; empower students mathematically, and motivate students to learn. Why would you want to use technology to teach math? Are there times when its use is perhaps not appropriate? When might that be?

#### Educational Technology Overview

After completing the following activities, you will be required to construct an original lesson plan using appropriate, research-based, age-specific pedagogies with a focus on exploring how to solve systems of linear equations involving two equations with two unknowns by using selected educational technologies. You will be able to

- describe how to fully integrate a variety of educational technologies with clear and easy-to-follow directions for students;
- discuss the visual and computational advantages of using a variety of educational technologies in the constructed lesson;
- demonstrate the three possible types of solutions that can be obtained from a system of two equations with two unknowns;
- construct graphical representations that support the aforementioned assertions with regard to the three possible types of solutions;
- explain how the content can be applied to other mathematics or to real-world examples; and
- construct a learning environment that has students discover, develop, derive, and conceptually understand how to solve systems of equations with two unknowns using selected educational technologies.

Reflect upon these skills and abilities as you engage in the upcoming materials. Ask yourself about your comfort level with technology. You are attending an online university, so presumably you feel fairly comfortable using technology, but you may not have ever done so in a math classroom. What challenges do you foresee as you embark upon this technology integration
journey? What issue do you envision your students might have?

This topic addresses the following competency:

**Competency 602.5.1: Teaching Methods-Mathematics (Secondary)**
The graduate provides effective, research-based mathematics instruction.

**Using Technology to Enhance Mathematics Instruction**

Read chapter 5 (“Using Technology to Enhance Mathematics Instruction”) in *Teaching Secondary Mathematics*. Record any questions or reflections you have in your study notebook. You may also want to check the message board for this topic to see what others have posted about this. Interact with others who have posted there by answering questions or posting your own.

*Note: There are 125 enrichment units for the secondary school classroom in* *Teaching Secondary Mathematics*. *It is recommended that you go to the table of contents on pages vii-viii to identify the enrichment units that are most commensurate with the requirements set forth in the upcoming performance task. A review of these units may help to stimulate ideas for the lesson plan that you need to construct for upcoming performance task. For this section, you should focus on those units that employ technology to explore relevant topics (e.g., enrichment unit 11).*

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**Solving a System of Equations Using Technology**

The following web resources will show you how to solve a system of equations using an appropriate method (i.e., Gaussian elimination) and recognize the different types of solutions that you can encounter. The specific topic you will teach will naturally depend upon the curriculum being taught in the classroom in which you are placed. Be sure to consult with your cooperating teacher as you determine the topic which you will teach.

- [Gaussian Elimination](#)
- [Systems of Linear Equations: Definitions](#)

The specific topic you will teach will naturally depend upon the curriculum being taught in the classroom in which you are placed. Be sure to consult with your cooperating teacher as you determine the topic which you will teach.

**Creating Meaning for and With the Graphing Calculator**

Read the following journal article, available in the WGU e-reserve:

In this activity, you will focus on the appropriate use of educational technology (i.e., a graphing calculator or a computer) to solve a problem. An example is supplied below of resources for using technology to teach the mathematical topic of systems of linear equations. What you actually teach for the upcoming performance task, however, will depend on what is being taught at the school in which you were placed. What follows is an exploration of the possible types of solutions that you may acquire from a system of two linear equations with two unknowns. Symbolically, if \( x \) and \( y \) are the two unknown variables and \( A, B, C, D, E, \) and \( F \) are any real constant, the system of two linear equations with two unknowns becomes the following:

\[
\begin{align*}
Ax + By &= C \\
Dx + Ey &= F
\end{align*}
\]

You will need to be able to solve for both \( x \) and \( y \) using an appropriate graphing calculator. There are three types of solutions that can be obtained from such a system of linear equations. What are they? The best way to think about this is to think about it graphically. You have two lines on a Cartesian plane where you are attempting to identify the different ways in which the lines can be positioned. You should first solve this linear system of equations by hand and then use an appropriate graphing calculator or software program.

### Graphing Calculators

Which graphing calculator should you use? The Texas Instrument (TI) 83 or 84 series of graphing calculators are recommended, since they are the ones used most often in middle schools and high schools. Instructions on how to perform calculations are provided in most manuals that come with the graphing calculator when you purchase it.

### Math with Microsoft Excel

Which software program should you use? This is a much more difficult question to answer than which graphing calculator you should use. There are many to choose from. If you are using Microsoft Office Suite, then you will probably have access to Excel. With a little creativity, you can use Excel to explore the three types of solutions. If you go to the following web resources, you will find a wealth of information on Excel. These web resources will provide you with the basics. One of the easiest ways to use Excel to solve a system of equations is to use matrices.

- Help for Excel 2007
- Excel Tutorial
- Graphing With Excel
- Physics Laboratory Excel Tutorials

As you engage in these materials, reflect and record your thoughts about the following questions:
What are advantages to using technology to teach mathematics?
What are the potential disadvantages?
What connections can you make between this content and other mathematics or real-world examples?
What are ways in which you can help students discover, develop, and derive mathematical concepts?
In what ways can you help students construct their own understandings of the desired content and skills?

Graphing Calculator Versus the Computer, Part I

You will soon be asked to teach how to use the graphing calculator and the computer to solve a given problem from the secondary mathematics curriculum. As you are guided through an exploration of provided learning tools, you should ponder the following questions with the intent of constructing and internalizing the desired understandings. These understandings were previously identified under prior learning topics.

What are ways in which you can help students integrate technology in selected mathematics lessons?
In what ways can you help children construct their own understandings of desired content and skills using technology?

Graphing Calculator Versus the Computer, Part II

The following are some prompts for you to consider:

What are the similarities and differences between the potential use for a graphing and a scientific calculator?
What is the equation for a line?
Lines can be graphed on a Cartesian plane where the x-axis is the abscissa and y-axis is the ordinate. Describe in your own words what the slope (i.e., change in y value over change in x) and the abscissa intercept represent.
What does it mean for two lines to be parallel? How many solutions exist for this case? Explain.
What does it mean for two lines to intersect each other? How many solutions exist for this case? Explain.
What does it mean for two lines to coexist in the same region of space (in other words, two lines that lie on top of each other.)? How many solutions exist for this case? Explain.
For the aforementioned three cases, how could you use a graphing calculator or software program to explore the existence of solutions for each set of linear equations?
What connections can you make between the employed technologies and the mathematics content that is explored in this activity with real-world applications?

Recall that the actual topic that you end up teaching will be determined by what is being taught at the school in which you are doing your PCE placement.
Task 602.5.1-06 Performance Task

Complete the following task in Taskstream:

- STP: Math Technology: Task 602.5.1-06

For details about this performance assessment, see the "Assessment" tab in this course.

PCE Performance Task Overview

See Taskstream DGT1 task 602.5.1-06 for detailed instructions. Contact the supervisor of your school placement to arrange to observe a secondary mathematics teacher teach students to use a graphing calculator or the computer to solve a given problem from the secondary mathematics curriculum. Write a description (suggested length of 1/2 -1 page) of the delivery of the instruction you observe.

Contact the supervisor of your school placement to arrange to teach a small group of six to ten secondary mathematics students. Using a prescribed lesson plan template, develop an original 20-30-minute lesson plan (submit this as an attachment to this task) in which you teach students how to use a graphing calculator or the computer to solve a given problem from the secondary mathematics curriculum.

Note: You will need to meet with the classroom teacher before the PCE to determine which problem(s) to teach and to discuss which teaching strategy or strategies might be most effective.

The classroom teacher must observe your instruction and complete the observer checklist found in Taskstream. (The observer will submit this checklist to WGU through the account in Taskstream.) You will need to provide the observer a copy of your lesson plan to review before this observation.

Taskstream Task Clarifications

This task will help to facilitate initial teacher-candidate-teacher collaborations in the field to promote an introduction to a selected teaching dynamic. You will be required to communicate directly with the teacher on record in an approved school to facilitate the downstream construction and implementation of an appropriate lesson plan. You will also be responsible for completing an observer checklist found in Taskstream and completing a guided reflection protocol form. Throughout this task, you should ponder the advantages and disadvantages to using technology in the secondary mathematics curriculum and relevant real-world applications.

Data Analysis of Real-World Data
Technological tools now exist that are specifically designed to gather real-world data. These tools can be used in math classrooms to explore physical phenomena. Students seem to really enjoy "getting their hands dirty," so to speak, as they collect their own data. This allows them to take ownership of the problem-solving process and can be a great motivator.

**Mathematical Modeling**

There is a lot to digest here, so take your time and try to recall the techniques that you will review. You have very likely been exposed to these concepts before but perhaps without the context that will now be provided. If you have trouble following along, just think how confusing this could be to a student. How might you help break this information apart into more easily-digestible pieces? What prerequisite skills must be mastered prior to moving on to new material? How will you ascertain whether or not your students have gained those skills?

After completing the following activities, you will be required to construct an original lesson plan using appropriate research-based, age-specific pedagogies for which the focus is on using selected educational technologies to construct mathematical models to be used to make future predictions. You will be able to

- provide appropriate data collection and management strategies;
- describe how to fully integrate a variety of educational technologies with clear and easy-to-follow directions for students;
- lead students who are unfamiliar with linear regression through the steps to fit a line using least squares. **Note:** *Middle grades students should be led to rely on technology for the computationally intense learning, while high school students may be led through the technology, the hand computation, or both*;
- assess the quality of a mathematical model using simple statistical measures;
- construct graphical representations that support the aforementioned assertions;
- make future predictions using the obtained mathematical model;
- discuss mathematical factors that might make the aforementioned predictions inaccurate;
- discuss real-world factors that might make the aforementioned predictions inaccurate; and
- construct a learning environment that has students discover, develop, derive, and conceptually understand how to use selected educational technologies to construct mathematical models to be used to make future predictions.

This topic addresses the following competency:

- **Competency 602.5.1: Teaching Methods-Mathematics (Secondary)**
  The graduate provides effective, research-based mathematics instruction.

Using Technology to Enhance Mathematics Instruction
Read chapter 5 ("Using Technology to Enhance Mathematics Instruction") and chapter 6 ("Assessment") in Teaching Secondary Mathematics.

Note: There are 125 enrichment units for the secondary school classroom in Teaching Secondary Mathematics. It is recommended that you go to the table of contents on pages vii-viii to identify the enrichment units that are most commensurate with the requirements set forth in the upcoming performance task. A review of these units may help to stimulate ideas for the lesson plan that you need to construct for upcoming assignment. For this section, you should focus on those units that employ technology to explore relevant topics (i.e., enrichment units 119 and 122).

Record any questions or reflections you have in your study notebook. You may also want to check the message board for this topic to see what others have posted about this. Interact with others who have posted there by answering questions or posting your own.

Linear Regression Overview

Review the material contained in the following web resources about regression:

- Scatter Plots and Regressions
- Linear Regression and Excel

These web resources will provide you with the basics with regard to linear regression, least squares method, scatter plots, and mathematical modeling. What is mathematical modeling? Mathematical modeling allows you to construct mathematical relationships that can be used to make predictions about the real world.

You should think about mathematical modeling as consisting of

- construction of research questions,
- data collection and management,
- results,
- analyses,
- conclusions, and
- future predictions.

Construction of Research Questions
Before you undertake any investigation of real-world phenomena, you need to be very clear about the question(s) that are the focus of the investigation. What specific research questions are being investigated?

Data Collection and Management
What methods will be used to collect the data? How much data will be collected? In what ways will you manage the data? Spreadsheets (e.g., Microsoft Excel) are a wonderful way to manage large sets of data. Graphing calculators can also be used to organize data in much the same way that a spreadsheet is used.

Results
What specific quantitative measures do you want to use to explain the real-world data that you are studying? For instance, quantitative measures of central tendency (i.e., mean, median, and mode) and dispersion (i.e., variation, standard deviation, and range) are often used. Mathematical modeling approaches use the least squares method to construct a best-fit line $y = mx + b$ where $m$ and $b$ are the best-fit slope and $y$-intercept, respectively.

Analysis
When performing a linear regression, you must assess the quality of the generated linear model $y = mx + b$. There are a variety of statistical methods that can be used to make such an assessment (i.e., correlation, coefficient of determination, etc.). A quick way to make such an assessment is to use the generated linear model to make future predictions. For high and low values for $x$, does the predicted $y$ make sense? Another quick way to make such an assessment is to superimpose the generated linear model onto a $y$-versus-$x$ scatter plot of the actual data. How close are the data points to the superimposed linear model?

Future Predictions
If the generated linear model is assessed as being credible, you should be able to use the model to make relevant future predictions. Two related concepts involve interpolation and extrapolation. What is interpolation? What is extrapolation? What role do these concepts play in making future predictions? The following web resource should help to clarify these concepts.

Explore the links found on the following web page and use them to refresh your memory of linear regression, interpolation, and extrapolation:

- [Ask Dr. Math: Archives](#)
- [Linear Regression Applet](#)
- [Resources for Teaching Math](#)

Above is a website that allows you to experiment with linear regression techniques and processes.

In this activity, you will need to perform a linear regression using technology.

Brainstorm ways in which you can help students discover, develop, and derive the mathematical concepts that are associated with this activity. In what ways can you help students construct their own understandings of the desired content and skills?
Study Notebook Assignment

- U.S. POPClock Projection
- Lesson Plan

This is a "homework" assignment. You will not need to submit this activity to Taskstream. Rather, you will create this in your study notebook.

You will need to use the lesson plan template at the link above to construct an original lesson plan to promote an understanding of how linear regression can be used to make future predictions using U.S. census data. The lesson plan should include an appropriate title, relevant definitions, a purpose, lesson objectives, pre-instructional techniques, instructional procedures and strategies, and anticipated discourse. You will use selected technologies to construct a linear model that can be used to make future predictions. If you were to implement the lesson plan you created, would your students have fun? How can you construct the desired classroom dynamic so that students will enjoy learning? If you can make this a fun lesson, it is predicted that students will be much more likely to be engaged.

1. Using the lesson plan template at the link above, create an original lesson plan to assist the learning of linear regression and its application to projecting U.S. census data into the future.
2. Include directions for retrieving historical national population estimates from the U.S. Census Bureau for each 10-year period from 1900 to 1990 from the U.S. Census Bureau POPClock projection at the website listed above.
3. Lead a student who is unfamiliar with linear regression through the steps to fit a line using least squares. Note: Middle grade students should be led to rely on technology for the computationally intense learning, while high school students may be led through the technology, the hand computation, or both.
4. Apply a linear regression to population growth forecasting.
   a. Use it to predict the population of the United States in 2010 and 2020.
   b. Discuss mathematical factors that might make those predictions inaccurate.
   c. Discuss real-world factors that might make those predictions inaccurate.

Data Analysis of Real-World Data

How do you learn how to use these data collection devices and software tools? Are there benefits to using such technologies? Can you identify several benefits? One of the benefits of using these technologies is that how you use them can be adapted quite easily for students with special needs or with learning-style preferences. How can these technologies be adapted? The best way to address this question is to identify a special need or learning-style preference and then make the appropriate connections.
After completing the following activities, you will be required to construct a description of how to use appropriate research-based, age-specific pedagogies for which the focus is on the analysis of real world data using a variety of educational technologies. You will be able to

- explain how selected educational technologies can be used to enhance a mathematics curriculum;
- explain the importance of appropriately integrating these technologies into a mathematics curriculum;
- explain the benefits and potential drawbacks of the technologies' use;
- provide research that supports the aforementioned assertions;
- adapt such practices to include students with special needs or learning-style preferences;
- construct student projects that incorporate the use of a variety of educational technologies that emphasize data collection, data analysis, and the use of both; and
- construct a learning environment that has students discover, develop, derive, and conceptually understand how to use selected educational technologies that emphasize data collection, data analysis, and the use of both.

This topic addresses the following competency:

- **Competency 602.5.1: Teaching Methods-Mathematics (Secondary)**
  The graduate provides effective, research-based mathematics instruction.

### Enriching Mathematics Instruction

Review chapter 5 ("Using Technology to Enhance Mathematics Instruction") and read chapter 7 ("Enriching Mathematics Instruction") in *Teaching Secondary Mathematics*. Record any questions or reflections you have in your study notebook. You may also want to check the message board for this topic to see what others have posted about this. Interact with others who have posted there by answering questions or posting your own.

### Data Collection and Analysis

There are a variety of educational technologies that can be used for data collection and analysis. In this activity, the data collection devices that you will learn how to use include Texas Instruments' CBL2 (calculator-based laboratory) and Texas Instruments' CBR (calculator-based ranger). To find out more about how to purchase these devices, go to the following web resources for Texas Instruments:

- [Microsoft Excel](https://www.microsoft.com/en-us/microsoft-365/excel)

There are a variety of educational technologies that can be used for data collection and analysis. In this activity, the data collection devices that you will learn how to use include Texas Instruments' CBL2 (calculator-based laboratory) and Texas Instruments' CBR (calculator-based ranger). To find out more about how to purchase these devices, go to the web resources shown above for Texas Instruments.
In this activity, the data analysis software tool that you could learn how to use is Microsoft Excel. To find out more about how to purchase it, go to the web resource shown above.

*Note: You are not required to purchase these products, but rather, research their appropriate use in mathematics classrooms. You may want to search Google Scholar or the WGU Library for articles that reference the use of these tools in math classrooms.*

Brainstorm ways in which you can help students discover, develop, and derive the mathematical concepts that are associated with this activity. In what ways can you help students construct their own understandings of the desired content and skills?

**Task 602.5.1-44 Performance Task**

Complete the following task in Taskstream:

- STP: Math Technology: Task 602.5.1-44

For details about this performance assessment, see the "Assessment" tab in this course.

Design an electronic slide presentation in which you discuss some of the technology tools available for real-world data collection and analysis.

You will need to research the classroom use of real-world data collection devices (calculator-based laboratory and calculator-based ranger) and data analysis software (Fathom or Excel). You will construct an electronic slide presentation that explains how these devices can be used to enhance the secondary mathematics curriculum.

**Dynamic Graphing Tools**

People have come a long way since the days when straightedge and compass rulers were the only tools used in a geometry class. Nowadays, there are several exciting dynamic geometry software programs available for use. These programs allow you to create geometric figures that can be rotated, stretched, shrunk, reflected, etc. Thus the objects become dynamic in the sense that they can be moved and manipulated, with the results immediately seen and available for further investigation. Why would such a program be useful? What are the potential drawbacks to allowing students to use such software?

**Dynamic Graphing Tools**

What are the potential benefits of using dynamic geometry software? Are there any potential issues surrounding its use? If so, what might they be? Have you ever used this sort of software? If so, was it easy to use? Did you find it difficult to learn how to use it? What are some of the major differences between the use of such software and more traditional geometry teaching methods?
After completing the following activities, you will be required to construct an original lesson plan using appropriate research-based, age-specific pedagogies for which the focus is on transforming selected geometric objects using dynamic geometry software. You will

- become familiar with a variety of dynamic software packages;
- be able to distinguish between static and dynamic geometry problems;
- use a variety of dynamic geometry software packages to create geometric objects;
- understand what it means to mathematically transform a geometric object;
- use a variety of dynamic geometry software packages to reflect, rotate, and translate geometric objects;
- be able to provide a comprehensive discussion of the instructional procedures used to engage students; and
- construct a learning environment that has students discover, develop, derive, and conceptually understand how to use selected educational technologies that explore the use of selected dynamic geometry software.

This topic addresses the following competencies:

- **Competency 202.2.1: Geometry (MS)**
  The graduate understands synthetic, analytic, and transformational geometries and their relationship to measurement, and understands how geometry and measurement develop from intuitive investigations to formal arguments.

- **Competency 602.5.1: Teaching Methods-Mathematics (Secondary)**
  The graduate provides effective, research-based mathematics instruction.

**Using Technology to Enhance Mathematics Instruction**

Review chapter 5 ("Using Technology to Enhance Mathematics Instruction") and chapter 8 ("Extracurricular Activities in Mathematics") in Teaching Secondary Mathematics. Record any questions or reflections you have in your study notebook. You may also want to check the message board for this topic to see what others have posted about this. Interact with others who have posted there by answering questions or posting your own.

*Note: There are 125 enrichment units for the secondary school classroom in Teaching Secondary Mathematics. It is recommended that you go to the table of contents on pages vii-viii to identify the enrichment units that are most commensurate with the requirements set forth in the upcoming performance task. A review of these units may help to stimulate ideas for the lesson plan that you need to construct for upcoming performance task. For this section, you should focus on those units that employ technology to explore relevant topics (i.e., enrichment units 25, 111, and 114).*

**Static Versus Dynamic Geometry**
• Geometric Shapes and Figures
• Figures and Polygons

Review the material contained in the web resources listed above covering relevant geometry topics. These web resources should provide you with an overview of the field of geometry and also basic geometric shapes. You should combine this knowledge with the terms static and dynamic. It is recommended that you look up the terms static and dynamic in any dictionary and make the appropriate connections.

Dynamic Geometry Software

Review the following websites:

• Geometer's Sketchpad
• Cabri Geometry II Plus Evaluation Version Download
• Dynamic Geometry Explorations
• Teacher's TV: Using Dynamic Geometry
• National Library of Virtual Manipulatives

The web resources shown above should be helpful with making the distinction between these terms. The first site above has a free demo of Geometer's Sketchpad. The second site above provides a free demo of Cabri. Interact with the many dynamic geometry explorations linked at the "Dynamic Geometry Explorations" website. At the "Teacher's TV: Using Dynamic Geometry" website, view the "Demonstrating Dynamic Geometry" video.

There are many types of "transformations" in mathematics. The three transformations that must be explored in this activity include reflections, rotations, and translations. You should first clearly define each transformation and then be able to apply them to selected geometric objects. Conduct an Internet search for geometric transformations if you are unclear as to what is meant by this term.

The "National Library of Virtual Manipulatives" website above will provide you with a variety of interactive dynamic geometry programs that will allow you to interact with and better understand reflections, rotations, and translations. Go to the "National Library of Virtual Manipulatives" URL and scroll down the screen until you see the links entitled "Transformations-Reflection," "Transformations-Rotation," and "Transformations-Translation." These dynamic activities were constructed for pre-K-2nd graders, grades 3-5, grades 6-8, and grades 9-12. It is predicted that you will have fun with these programs. Yes, even adults can play with them.

How do you learn how to use these software programs? One way to learn how to use them is to actually "play" with them. These programs come with detailed instructions on how to use them. Once you get them downloaded, you should just play with them. The more you experiment with creating and transforming selected geometric objects, the more proficient you will become.
Brainstorm ways in which you can help students discover, develop, and derive the mathematical concepts that are associated with this activity. In what ways can you help students construct their own understandings of the desired content and skills?

Read the journal article listed below, available at the WGU e-reserve. Reflect upon the following questions: What is a static geometry problem? What is a dynamic geometry problem? The terms *static* and *dynamic* have very specific meanings in mathematics. You need to be clear about the specific meanings of these terms.


**Task 602.5.1-45 Performance Task**

Complete the following task in Taskstream:

- STP: Math Technology: Task 602.5.1-45

For details about this performance assessment, see the "Assessment" tab in this course.

For this task, you will create a lesson plan in which you teach students how to use dynamic geometry software to explore interactive geometric designs. You may use Geometer's Sketchpad or Cabri Geometry, or you may use one of the following free resources:

- GeoGebra
- Google SketchUp

**Final Steps**

Congratulations on completing the activities in this course! This course has prepared you to complete the assessment associated with this course. If you have not already been directed to complete the assessment, schedule and complete your assessment now.