



# NEW YORK STATE MIGRANT EDUCATION PROGRAM

## **TITLE: Preparing Students for Success in Geometry Class**

**DESCRIPTION:** *Preparing Students for Success in Geometry Class*, resources contain four major topic areas, handouts, and coordinating video lessons meant to set students up for success prior to entering High School Geometry. The topics were chosen based on what students should know as basic skills and knowledge before starting Geometry class.

For each topic area, Migrant Educators are provided with a Student Handout, Teacher Guide, and coordinating video lessons. These resources are great to use during the summer to pre-teach and to fill in any gaps of foundational geometry skills. In this Facilitator Guide, you will find specific instructions for using the materials.

**DEVELOPED BY:** Kimberly McLean, HS Mathematics Teacher and Class of 2021 Advisor at Spencerport High School

## **FACILITATOR GUIDE**

### **GENERAL INFORMATION ABOUT GEOMETRY:**

Geometry is a course that is designed to emphasize the study of the properties and applications of common geometric figures in two and three dimensions. It includes the study of transformations, similarity, and the concept of parallelism. Thinking skills used in problem solving situations, and applications to the real world, such as perimeter, area, and volume, are stressed.

### **BACKGROUND INFORMATION: HOW THE FOUR TOPIC AREAS WERE SELECTED**

Developer Kim McLean sat down with Geometry teachers to discuss the essential understandings of a high school Geometry course.

**Topic 1 – Basics of Geometry and Triangles** was chosen because the triangle is the basic building block of all two-dimensional polygons, including rectangles, squares, rhombuses, and kites. Thus, students will be able to utilize their knowledge of triangles to learn about different shapes. In addition, an understanding of triangles can later be extended to the topic of trigonometry.

**Topic 2 – Perimeter, Area, and Volume** was selected because Geometry is a branch of mathematics that deals with shape, size, relative position of figures, and the properties of space. The ideas of perimeter, area, and volume can be applied to all two-dimensional and three-dimensional shapes and figures.

**Topic 3 – Parallel and Perpendicular Lines** was included because the idea of parallelism and special types of angles that are formed when parallel lines are cut by a transversal appear in many of the two-dimensional polygons that are studied in high school Geometry.

**Topic 4 – Transformations and Similar Triangles** was chosen because many rules in Geometry focus on the transformations of figures. From transformations, students are introduced to ideas of congruency and similarity.

## PLANNING FOR STUDENT SESSIONS

In addition to the Student Handout and Teacher Guide for each TOPIC, students will need

- internet/Wi Fi access to the videos on the NYS-MEP website and
- a calculator.

**NOTE:** Presenter McLean uses the TI 84 graphing calculator in the videos.

**FYI:** When the calculator on a smart phone is turned sideways, it doesn't turn into a graphing calculator, but additional functions become available for students to use.

For each topic, students will watch an instructional math video in which the math teacher provides detailed instruction that goes along with the Student Handout. Students will take notes and be guided through multiple examples. There are practice problems ("You Try") sections where students can practice problems that correspond to content examples covered in the videos. Students should complete the practice problems, then check their answers in the Teacher Guide.

The videos and handouts are in English.

## TOPIC 1 – BASICS OF GEOMETRY AND TRIANGLES

### Materials needed

- TOPIC 1 – Student Handout
- Calculator
- TOPIC 1 – Teacher Guide
- TOPIC 1 Videos – [Click here](#) to go to TOPIC 1 on the NYS-MEP website

### Lesson Sequence for TOPIC 1 – Basics of Geometry and Triangles

*Students take notes in the Student Handout while watching video. Refer to the Teacher Guide for answers to the practice problems.*

<b>Video</b>	<b>Sequence of Activities</b>	<b>Video Length</b>	<b>Student Handout - Teacher Guide Page #</b>
Topic 1- <b>Video 1</b>	<i>Basic Geometry Definitions</i>	20 minutes	Pages 2 - 3
Topic 1, <b>Video 2</b>	<i>Basic Geometry Examples</i> Complete practice problems at the bottom of page 6.	30 minutes	Pages 4 - 6
Topic 1, <b>Video 3</b>	<i>Triangle Definitions</i>	9 minutes	Page 7
Topic 1, <b>Video 4</b>	<i>Triangle Examples</i>	16 ½ minutes	Pages 8 - 9
Topic 1, <b>Video 5*</b>	<i>Side/Angle Relationships in Triangles*</i>	9 ½ minutes	Pages 9 – 10*
Topic 1, <b>Video 6</b>	<i>Watch Video 6 - Finding the 3rd side of a Right Triangle</i>	23 minutes	Pages 11 - 13
	Complete Mixed Review *		Page 14 – 16*

\* This lesson or practice could be skipped if needed or if the student is struggling with the workload.

## TOPIC 2 – PERIMETER, AREA, AND VOLUME

### Materials needed

- TOPIC 2 – Student Handout
- Calculator
- TOPIC 2 – Teacher Guide
- TOPIC 2 Videos – [Click here](#) to go to TOPIC 2 on the NYS-MEP website

### Lesson Sequence for TOPIC 2 – Perimeter, Area, and Volume

*Students take notes in the Student Handout while watching video. Refer to the Teacher Guide for answers to the Practice problems.*

<b>Video</b>	<b>Description</b>	<b>Video Length</b>	<b>Student Handout - Teacher Guide Page #</b>
Topic 2, <b>Video 1</b>	<i>Perimeter</i> Complete practice problems, Page 4	12 minutes	Pages 2 – 3
Topic 2, <b>Video 2</b>	<i>Area Formulas</i>	6 minutes	Page 5
Topic 2, <b>Video 3</b>	<i>Area Examples</i> Complete practice problems, Page 8-9	17 minutes	Pages 6 – 8
Topic 2, <b>Video 4</b>	<i>Compound Area</i> Complete practice problems, page 13	18 ½	Pages 10 - 12
Topic 2, <b>Video 5*</b>	<i>Area on the Coordinate Plan*</i> Complete practice problems, page 15*	7 minutes	Page 14*
Topic 2, <b>Video 6</b>	<i>Volume Formulas</i>	5 ½ minutes	Page 16
Topic 2, <b>Video 7</b>	<i>Volume Examples</i> Complete Practice Problems, Pages 19 - 20	15 ½ minutes	Pages 17 – 18

\* This Lesson or practice could be skipped if needed or if the student is struggling with the workload.

## TOPIC 3 – PARALLEL AND PERPENDICULAR LINES

### Materials needed

- TOPIC 3 – Student Handout
- Calculator
- TOPIC 3 – Teacher Guide
- TOPIC 3 Videos – [Click here](#) to go to TOPIC 3 on the NYS-MEP website

### Lesson Sequence for TOPIC 3 – Parallel and Perpendicular Lines

*Students take notes in the Student Handout while watching video. Refer to the Teacher Guide for answers to the Practice problems.*

Video	Description	Video Length	Student Handout - Teacher Guide Page #
Topic 3, <b>Video 1</b>	<i>Slope</i> Complete Practice Problems, Page 3	10 minutes	Page 2
Topic 3, <b>Video 2</b>	<i>Parallel vs. Perpendicular</i> Complete Practice Problems, Page 6	17 ½ minutes	Pages 4 – 5
Topic 3, <b>Video 3</b>	<i>Parallel Lines cut by Transversals</i>	16 ½ minutes	Pages 7 - 8

### Additional Resource

[Angles, parallel lines, & transversals | \(video\) | Khan Academy](#) - Help students learn about parallel lines, transversals, and the angles they form.

## TOPIC 4 – TRANSFORMATIONS AND SIMILAR TRIANGLES

### Materials needed

- TOPIC 4 – Student Handout
- Calculator
- TOPIC 4 – Teacher Guide
- TOPIC 4 Videos – [Click here](#) to go to TOPIC 4 on the NYS-MEP website

### Lesson Sequence for TOPIC 4 – Transformations and Similar Triangles

*Students take notes in the Student Handout while watching video. Refer to the Teacher Guide for answers to the Practice problems.*

Video	Description	Video Length	Student Handout - Teacher Guide Page #
Topic 4, <b>Video 1</b>	<i>Translations</i> Complete Practice Problems, Pages 4-5	14 minutes	Pages 2 – 4
Topic 4, <b>Video 2</b>	<i>Reflections</i> Complete Practice Problems, Pages 8-9	19 minutes	Pages 6 – 8
Topic 4, <b>Video 3</b>	<i>Rotations</i> Complete Practice Problems, Page 12	15 minutes	Pages 10 – 11
Topic 4, <b>Video 4</b>	<i>Dilations (centered at the origin)</i>	8 minutes	Page 13
Topic 4, <b>Video 5</b>	<i>Similar Triangles</i> Complete Practice Problems, Pages 16-17	18 minutes	Pages 14 - 15

### Additional Resources

[Transformations | \(videos and practice\) | Khan Academy](#) - Learn about the most useful math concept for creating video game graphics: geometric transformations, specifically translations, rotations, reflections, and dilations. You will learn how to perform the transformations, and how to map one figure into another using these transformations.

[Intro to Triangle Similarity | \(video\) | Khan Academy](#) - Sal explains what it means for triangles to be similar, and how this follows from the definition of similarity.