

Description of Projects/Standards for Blended Geometric Applications Class 2020-2021
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Unit 1 - Basic Geometry

Adventure Interactive - Pythagorean Theorem - Sweden - an Adventure assignment allows students choice of which problems they practice. After each problem they receive a clue about the mystery country they are exploring. By the end, they will have enough pieces of the puzzle to guess where they are. Student choices will affect the types of clues they will receive and allows for additional practice for enrichment or remediation.

Standards:

NYMA.9-12.GEO-G.SRT.8

Use sine, cosine, tangent, the Pythagorean Theorem and properties of special right triangles to solve right triangles in applied problems.

NYMA.NY-8.G.7

Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

Unit 2 - Parallel & Perpendicular Lines

Masked Mathematician - Geometric Constructions (Alexander Graham Bell) - Students will solve between 8 to 20 problems across four puzzles. They may need to cross out letters, complete word searches, eliminate options or solve ciphers. When complete, each puzzle will reveal a clue. These clues will correspond to the information provided on the Suspect List – with the exception of the quote on Puzzle 4 that is attributed to the Masked Mathematician. After students have a clue, they can rule out suspects of who the Masked Mathematician may be. These clues will NOT completely reveal the Masked Mathematician so students will have to make an educated guess -- and may be surprised by the result. Just like on *The Masked Singer*.

Standards:

NYMA.NY-7.G.3

Describe the two-dimensional shapes that result from slicing three-dimensional solids parallel or perpendicular to the base.

NYMA.NY-7.G.5

Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

NYMA.NY-7.G.1

Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

NYMA.NY-7.G.2

Draw triangles when given measures of angles and/or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

NYMA.NY-7.G.4

Apply the formulas for the area and circumference of a circle to solve problems.

Unit 3 - Triangles

Adventure Interactive - Finding Angles of Triangles - Israel - an Adventure assignment allows students choice of which problems they practice. After each problem they receive a clue about the mystery country they are exploring. By the end, they will have enough pieces of the puzzle to guess where they are. Student choices will affect the types of clues they will receive and allows for additional practice for enrichment or remediation.

Standards:

NYMA.9-12.GEO-G.SRT.8

Use sine, cosine, tangent, the Pythagorean Theorem and properties of special right triangles to solve right triangles in applied problems.

NYMA.9-12.GEO-G.SRT.6

Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of sine, cosine and tangent ratios for acute angles.

Unit 4 - Polygons and Quadrilaterals

Escape Interactive - Shape Classifications - Digital Escape Room - Students will work in small groups to find and solve clues on classification of shapes and open interactive locks. Created in Google Slides.

Standards:

NYMA.NY-5.G.4

Classify two-dimensional figures in a hierarchy based on properties.

NYMA.NY-5.G.3

Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.

MIDTERM Project:

Toothpick Bridge -- Integrated Geometry & Engineering STEM Project - This 21st Century Math Project is an opportunity to integrate subjects with hands-on STEM based learning. Students will engage in an engineering design process. In "Bridge Building" students will analyze geometric designs of four common bridge types. They must label all of the angles using what they know about parallel lines, transversals and triangles. Most of the bridges have symmetry. Students can assume each similar section is congruent to each other. In "Contest Scoring", students will analyze the data of a hypothetical toothpick bridge contest to determine the winner. In "Toothpick Bridge" students will research, design, build and test their own bridges in a class-wide competition. Who can build the strongest bridge? To conclude, students will present their results and reflections of their design project.

Standards:

NYMA.9-12.AI-N.Q.1.ii

choose and interpret units consistently in formulas and choose and interpret the scale and the origin in graphs and data displays.

NYMA.9-12.GEO-G.GMD.4

Identify the shapes of plane sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

NYMA.9-12.AI-N.Q.1

Select quantities and use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

NYMA.9-12.GEO-G.CO.12

Make, justify, and apply formal geometric constructions.

NYMA.9-12.AI-N.Q.1.i

interpret and guide the solution of multi-step problems

NYMA.9-12.AI-N.Q.1.iii

choose and interpret the scale and the origin in graphs and data displays.

NYMA.9-12.GEO-G.MG.1

Use geometric shapes, their measures, and their properties to describe objects.

NYMA.NY-7.G.1

Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

NYMA.9-12.GEO-G.MG.3

Apply geometric methods to solve design problems.

Unit 5 - Right Triangle and Trig

Bullet Trajectory -- Applied Trigonometry Forensics Project - In order to bring justice for victims, crime scenes have to be carefully dissected to bring about evidence to find and convict a criminal. One way this happens is through a careful analysis of the blood spatter. The shape of a blood spatter tells a great deal about the angle in which it hit the ground. This can enlighten investigators when they are trying to determine the height or distance that the crime took place. (Part 1) In “Blood Spatter Analysis”, students are guided through developing a strategy using trigonometry to calculate the angle of impact of a blood spatter. They are asked follow up questions, about the height of the killer however the killer could be crouching, on a piece of furniture, etc. that could affect the investigation. (Part 2) In “Area of Convergence” students will be guided through a geometric look at area of convergence through the use of tables of data. (Part 3) In “Crime Scene Investigation” students will create crime scenes for students to calculate and interpret. Students are asked to sketch the crime scene and calculate it and interpret it.

Standards:

NYMA.9-12.GEO-G.SRT.8

Use sine, cosine, tangent, the Pythagorean Theorem and properties of special right triangles to solve right triangles in applied problems.

NYMA.9-12.GEO-G.MG.1

Use geometric shapes, their measures, and their properties to describe objects.

Unit 6 - Area, Surface Area and Volume

Adventure - Area of Complex Figures - Zimbabwe - an Adventure assignment allows students choice of which problems they practice. After each problem they receive a clue about the mystery country they are exploring. By the end, they will have enough pieces of the puzzle to guess where they are. Student choices will affect the types of clues they will receive and allows for additional practice for enrichment or remediation.

Standards:

NYMA.NY-7.G.6

Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles and trapezoids. Solve surface area problems involving right prisms and right pyramids composed of triangles and trapezoids. Find the volume of right triangular prisms, and solve volume problems involving three-dimensional objects composed of right rectangular prisms.

NYMA.NY-6.G.1

Find area of triangles, trapezoids, and other polygons by composing into rectangles or decomposing into triangles and quadrilaterals. Apply these techniques in the context of solving real-world and mathematical problems.

NYMA.NY-7.G.4

Apply the formulas for the area and circumference of a circle to solve problems.

Person Puzzle Interactive - Vertices, Edges & Faces - Florence Kelley - Person Puzzles highlight individuals with diverse backgrounds who have made significant contributions to our world. Students will solve 8 problems to gather enough information to identify the person being described by the clues.

Standards:

NYMA.NY-1.G.1

Distinguish between defining attributes versus non-defining attributes for a wide variety of shapes. Build and/or draw shapes to possess defining attributes.

CCSS2.G.A.1

Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

Final Project:

Dream House -- Integrated Area, Perimeter & Scale STEM Project - This Dream House project focuses on Area, Perimeter and Scale skills. Students are scaffolded conceptually and mathematically by the time they are asked to design their own Dream House.(Part 1) In "Apartment Renovation" students will familiarize themselves with architectural symbols, scale, area and perimeter calculations. (Part 2) In "Design a Kitchen" students will measure scale drawings and be introduced to some simpler building codes. They will conclude by drawing their own scale kitchen that meets code.

(Part 3) In "New Home Builder" students will be asked to appraise the value of houses based on the square footage of their blueprints. They will use Nearby Home Sales to estimate the new home's worth. (Part 4) In "Dream House" students will put their practice to use by designing their own dream house.

Standards:

NYMA.9-12.GEO-G.GMD.4

Identify the shapes of plane sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

NYMA.NY-7.RP.3

Use proportional relationships to solve multistep ratio and percent problems.

NYMA.NY-7.G.6

Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles and trapezoids. Solve surface area problems involving right prisms and right pyramids composed of triangles and trapezoids. Find the volume of right triangular prisms, and solve volume problems involving three-dimensional objects composed of right rectangular prisms.

NYMA.NY-6.G.3

Draw polygons in the coordinate plane given coordinates for the vertices. Use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

NYMA.NY-6.RP.3.d

Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

NYMA.9-12.GEO-G.MG.1

Use geometric shapes, their measures, and their properties to describe objects.

NYMA.NY-7.G.1

Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

NYMA.9-12.GEO-G.MG.3

Apply geometric methods to solve design problems.

NYMA.NY-7.G.2

Draw triangles when given measures of angles and/or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.