New York State Mathematics Correlation
Geometry (Grade 9-12)

Reference: NY Mathematics Core Curriculum

Introduction

This document correlates Yenka Mathematics software to the content performance indicators of the New York State mathematics core curriculum. It highlights specific areas of the curriculum that are covered by Yenka Mathematics and points to resources that will be useful when teaching the material.

The terminology we have used in this document is as follows:

- **Product***:* this is the relevant Yenka Mathematics product, either Yenka 3D Shapes or Yenka Statistics. More information about these products can be found on the Yenka web page by following the links.

- **Model***:* a pre-made Yenka simulation with step-by-step instructions, which will either teach the pupils part of the curriculum, or give them opportunity to apply the knowledge they already have. These models are found under *Content* when you open Yenka itself, and they are linked to through our website.

- **Tutorial**: a model that explains how to use a particular aspect of the Yenka software. These can be found under *Getting Started* in the *Content* tab of Yenka.

Since the Yenka Mathematics titles are simulators, they will help you to cover other areas of the curriculum too. The final column of the table gives some possible *examples* of how you, or the students, can use Yenka Mathematics to create your own models and cover a wider scope of material. You may wish to look at the *tutorials*, and *training videos* provided on the website, to explore more of the potential uses of the software, and show you how to create your own models.

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Geometry Strand

Band	Indicator	Product	Content (Models)	Example
Geometric relationships	G.G.11 Know and apply that two prisms have equal volumes if their bases have equal areas and their altitudes are equal	Yenka 3D Shapes		Select several *Prisms* from the objects pane, and use the *volume*, *surface area* and *length* measurement tools. Students can then resize the prisms and measure their properties, to find the conditions under which their volumes are equal.
	G.G.12 Know and apply that the volume of a prism is the product of the area of the base and the altitude	Yenka 3D Shapes	- Prisms - Volume of a prism See also: - Volume of a cylinder - Which cylinder has the greatest volume? - Combined volume	Use a selection of the *Prisms* objects, and label lengths and areas using the measurement tools. Students can unfold them into their nets to see more clearly how the volume is calculated. They will then calculate the volume and check their answers on the model.
	G.G.13 Apply the properties of a regular pyramid, including: • lateral edges are congruent • lateral faces are congruent isosceles triangles • volume of a pyramid equals one-third the product of the area of the base and the altitude	Yenka 3D Shapes		Students can use the six *Pyramids* objects, and Measurement Tools, to investigate the features of regular pyramids. Open the pyramids into their nets to see the congruence of their faces more clearly.
	G.G.14 Apply the properties of a cylinder, including: • bases are congruent • volume equals the product of the area of the base and the altitude lateral area of a right circular cylinder equals the product of an altitude and the circumference of the base	Yenka 3D Shapes	- Volume of a cylinder - Which cylinder has the greatest volume?	Line up *cylinders* of different sizes; ask pupils to measure the base area and altitude, and calculate the volume. They can check their answers by opening the properties pane for each cylinder. Calculate the lateral area, then unfold the cylinder into its net and check the answer.

	G.G.15 Apply the properties of a right circular cone, including: • lateral area equals one-half the product of the slant height and the circumference of its base • volume is one-third the product of the area of its base and its altitude	Yenka 3D Shapes	Related model: - Equal volumes	Use the *Cone* objects in various sizes to give students practice in calculating areas and volumes.
	G.G.16 Apply the properties of a sphere, including: • the intersection of a plane and a sphere is a circle • a great circle is the largest circle that can be drawn on a sphere • two planes equidistant from the center of the sphere and intersecting the sphere do so in congruent circles • surface area is $4\pi r^2$ volume is $4/3\pi r^3$	Yenka 3D Shapes		Use the *Sphere* object in the 3D Shapes folder. Students can change the radius using the *Number* presentation object, and see the effect on volume recorded by the *volume Measurement Tool*. Alternatively, the students practice calculating the surface area and volume of a sphere with set volume, and can check their answer by double clicking on the sphere.
Informal and Formal Proofs	G.G.45 Investigate, justify, and apply theorems about similar triangles	Yenka 3D Shapes	- Similar triangles - Find the similar triangle	Copy, resize, rotate and translate triangles. Students can use the *Measurement Tools* to e.g. compare the length of the sides of the triangles, to postulate and confirm theorems about similar triangles.
Transformational Geometry	G.G.54 Define, investigate, justify, and apply isometries in the plane (rotations, reflections, translations, glide reflections) *Note: Use proper function notation*	Yenka 3D Shapes		Yenka Mathematics does not use functions. However, rotations and translations of *2D Shapes* in Yenka may help students to visualise the theory they are learning. Pupils could be asked to perform a particular operation on a shape in Yenka, and then write the function for it; or they can investigate graphically the properties that remain invariant under translations and rotations.
	G.G.55 Investigate, justify, and apply the properties that remain invariant under translations, rotations, reflections, and glide reflections	Yenka 3D Shapes		
	G.G.56 Identify specific isometries by observing orientation, numbers of invariant points, and/or parallelism	Yenka 3D Shapes		

	G.G.58 Define, investigate, justify, and apply similarities (dilations and the composition of dilations and isometries)	Yenka 3D Shapes	Related models: - Similar triangles - Similar cuboids	Copy, resize, rotate, and translate shapes to investigate and become familiar with similarities. Questions could ask students to perform a similarity on Yenka and then write down the corresponding function, or vice-versa.