How to link Squares and Cubes (2D and 3D) and the properties of these shapes to Algebra problems

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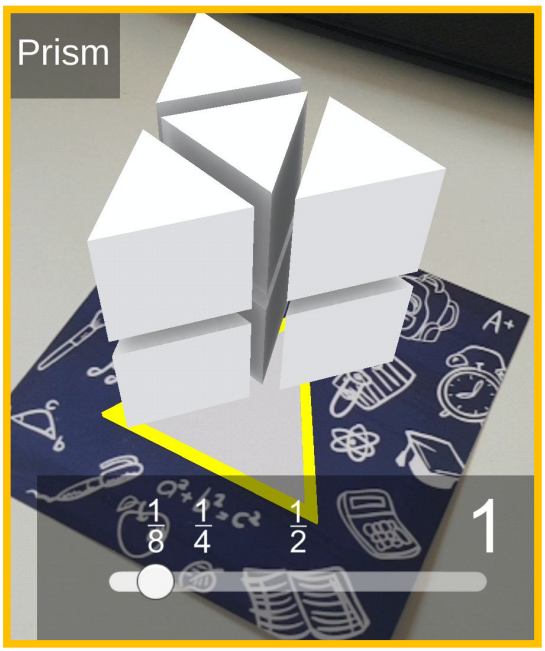


Timeframe of activity: 120 min

Tags: Mathematics Technology

Grade Level: Grade 9 extension

App/Tech Tools: Clever Books Geometry Marker - square/Cube Unity 3D and Vuforia

Additional material: Algebra Tiles, Lego Blocks, Mega Cube, Paint 3D and Merge Cube

Ex-Model the Product of Two Binomials Using Algebra Tiles

How To- Augmented Reality App Tutorial for Beginners with Vuforia and Unity 3D

Learning Objectives:

Instill a deeper understanding of mathematical concepts by using the CPA (Concrete, Pictorial, Abstract) approach of Singapore Mathematics.

Lesson Activity:

1. Revision of the properties of a square including perimeter and area.

   Revision of a regular hexagon (cube) properties including total surface area and volume.

   use Clever Books Geometry Marker - square/Cube.

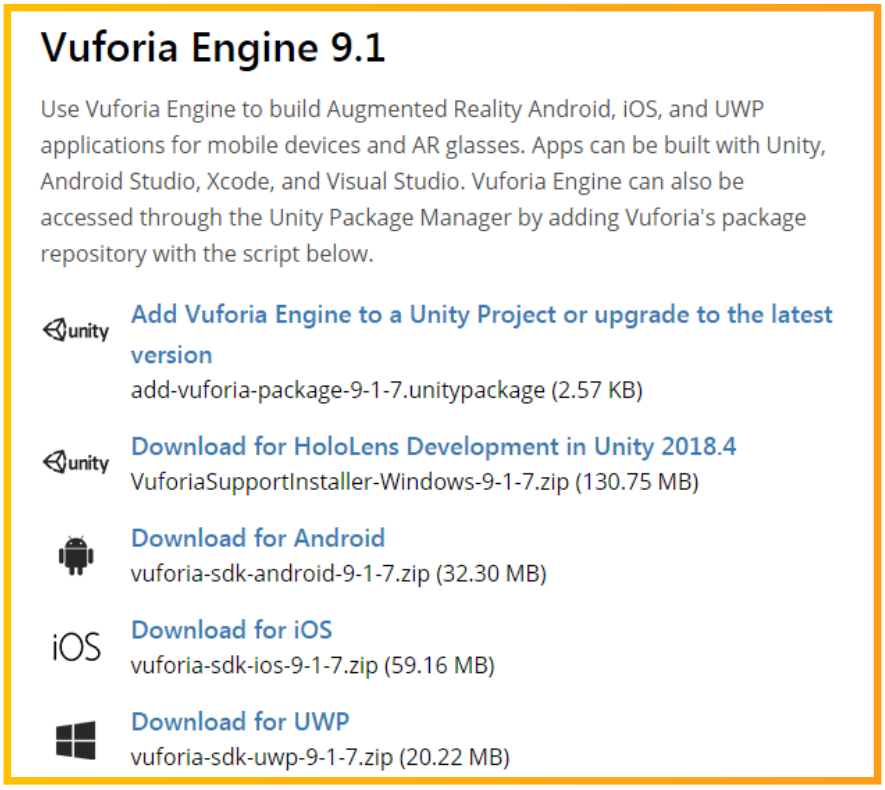
2. Model squaring a binomial using Algebra Tiles.
3. Using Lego Blocks model a binomial cube.
4. Using a Mega Cube, Unity 3D and Vuforia create a marker based Augmented Reality App that models 6 different examples of a binomial cube, each linked to a face (marker) of the cube.

Questions outline:

- Students would be divided groups to create a model using the Lego or the AR App to expand a set of different binomial squared problems.
- Here the students are asked to write coding for a virtual robot that has to move in a virtual playfield according to the solution of the algebraic equations or solving perimeter i.e., students could once make the robot move on the playfield by simple addition of the sides of the figure and see the result and then would apply formula and check the result how the robot moves and compare the result. Students can also use the features of AI to train their model to perform in an efficient manner i.e. would give perfect result for the values it has not been trained for.

Additional Ideas (optional):

We can also use Paint 3d and https://miniverse.io/cube to create our own 3d Models and use it in AR to further enhance the idea of solving algebraic equations using 3D cubes. As the 3D model is created by the teacher therefore it has a personalized effect that students like a lot.


Vuforia Engine 9.1
Use Vuforia Engine to build Augmented Reality Android, iOS, and UWP applications for mobile devices and AR glasses. Apps can be built with Unity, Android Studio, Xcode, and Visual Studio. Vuforia Engine can also be accessed through the Unity Package Manager by adding Vuforia's package repository with the script below.
Add Vuforia Engine to a Unity Project or upgrade to the latest version
add-vuforia-package-9-1-7.unitypackage (2.57 KB)
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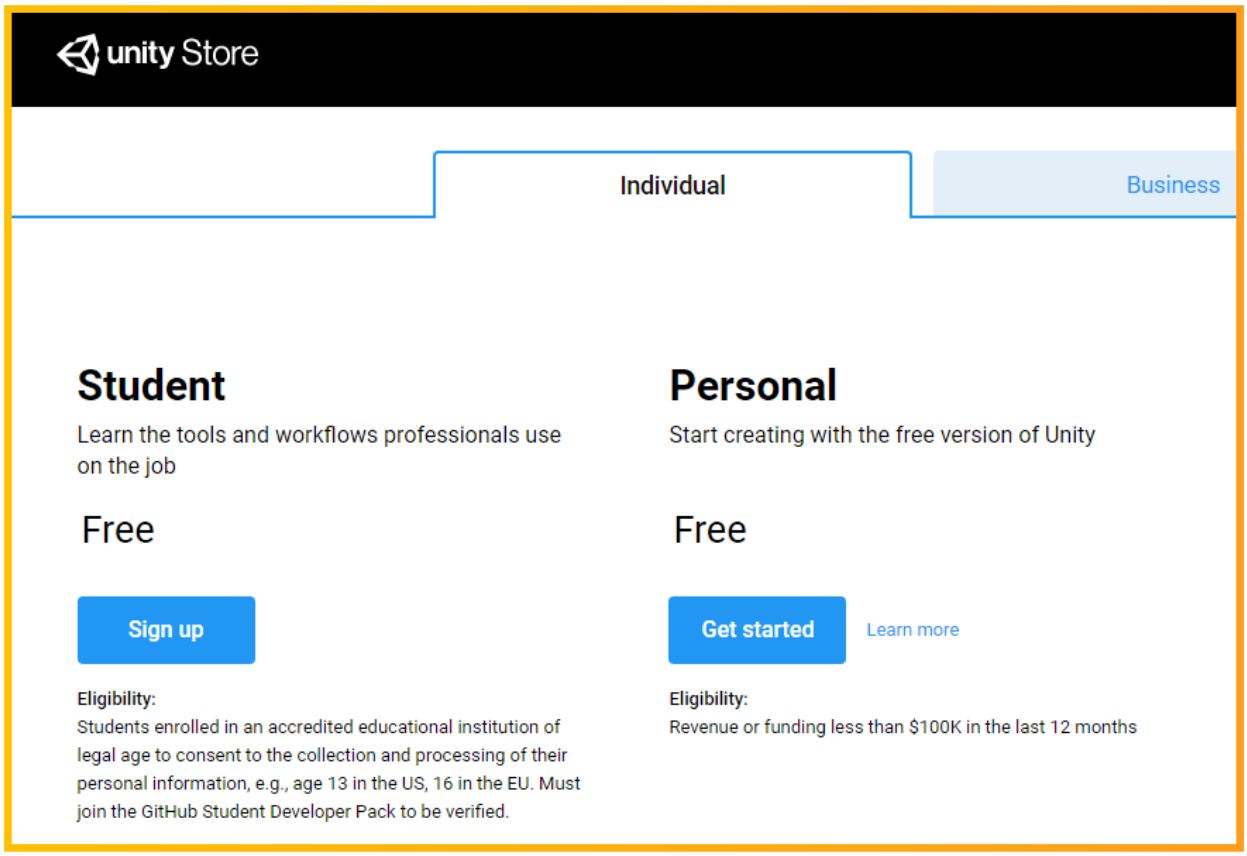
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Learn more
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