Title
Cubic Units

Description
In this mod, students will create shapes using code and then determine the number of cubic units that combined shapes would make. 11-12 yrs old, Math, Volume, Cubic Units

Learning Objectives
Play with the parameters such as height, width, and amount of lava to predict and test the effects of different sized volcanoes on the earth around it.

Guiding Ideas
Recognize volume as an attribute of solid figures and understand concepts of volume measurement. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. Specifically looking at the Common Core Math Standards:
CCSS.MATH.CONTENT.5.MD.C.3
CCSS.MATH.CONTENT.5.MD.C.4
CCSS.MATH.CONTENT.5.MD.C.5

Student Activities
This activity requires students to have Code Connection open and running with their Minecraft Education Edition.
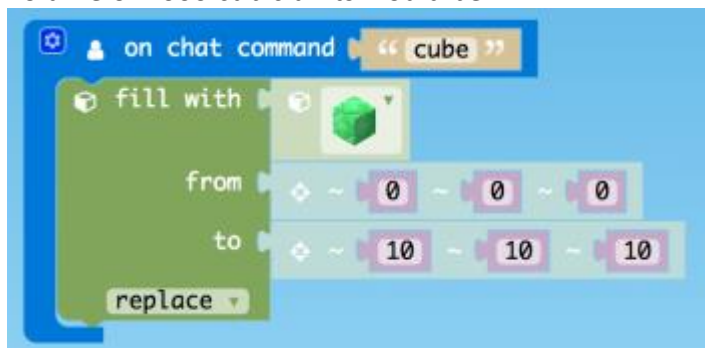
This activity consists of 2 parts:
Create 3D Quadrilaterals
Determine the Volume of Combined Quadrilaterals

Creating 3D Quadrilaterals
Using code, have students create quadrilaterals in Minecraft. For example, a cube that has a volume of 1000 cubic units would be:

Have students create quadrilaterals of different sizes and write down the volume for each one using the Cubic Units Worksheet.

Determine the Volume of Combined Quadrilaterals

Using the four quadrilaterals that your students have already made, have them combine them into one large quadrilateral. For example, if these are the four quadrilaterals:

Have students add offsets to each shape mod to make them 1 large quadrilateral:

Calculate the volume of the large quadrilateral based on the volume of the smaller quadrilaterals, then confirm that volume by counting the number of blocks created with your mod.

Lead a discussion on how the volume would change (or not) if the combined four shapes did not create a perfect quadrilateral (e.g. they were a pyramid instead).

Performance Expectations

Expected outcomes include:

- Understanding how volume is calculated with length, width, and height.
- Visualizing volume with 3D Minecraft blocks.
- Understanding how to combine quadrilaterals to create new quadrilaterals.
- Understanding how to calculate volume of large shapes based on smaller shapes.