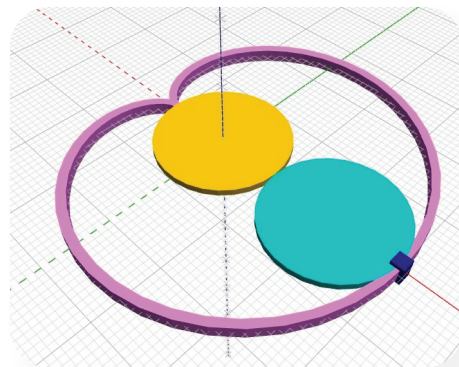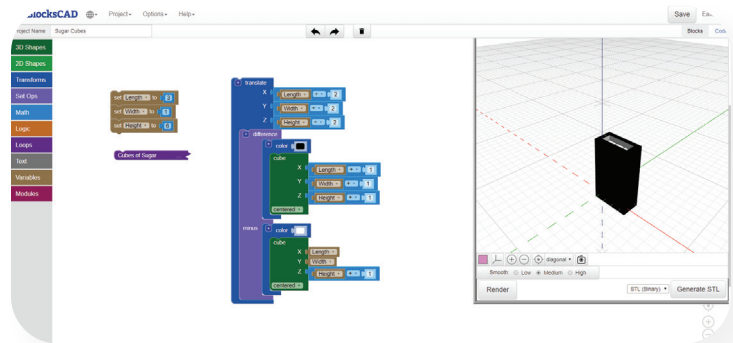# Math and Programming with BlocksCAD

zSpace

Learning Math and Programming

BlocksCAD is a cloud-based 3D modeling tool that encourages students to learn math, computational thinking, and coding concepts through graphical visualization and designing models to be 3D printed.

Math with BlocksCAD

Students create models while building geometrical proficiency and other math skills.

- 3D Cartesian coordinates
- Positive and negative numbers
- Decimals
- Solid shapes like cubes, spheres, and cylinders
- Geometrical transformations, like translation, rotation, reflection, and scaling
- Set operations like union, difference, and intersection
- Arithmetic, including order of operations
- Use variables to create parameterized models
- Plot trigonometric and parametric functions
- Polar coordinates

Programming with BlocksCAD

BlocksCAD is based on the open-source programming language OpenSCAD, a powerful and popular language in the 3D maker community.

Its block-based interface makes programming accessible to 3rd graders through high school.

Students learn to write a computer program to describe a solid 3D model, using:

- Variables to make a design that can change sizes - like a ring
- Loops to make even patterns shapes in a design - like the numbers on a clock or the steps in a staircase
- Randomness in models - like a forest randomly generated from different types of tree shapes
- Conditional logic to add patterns to shapes - rotate every other ring in a line to make an interlocking chain
- Modules to build a library of shapes to use in designs