

Free Online Resource for 3D Modeling and 3D Printing

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Abstract

3D Modeling is an essential 21st century STEM subject, as well as a powerful avenue to teach K-12 students geometry and set theory, help them develop spatial reasoning skills, and ignite their interest in engineering, science, architecture, and arts. In this presentation we introduce a free 3D modeling tool in NCLab based on A. Paoluzzi's Programming Language of Solid Modeling (PLaSM). With PLaSM, students create 2D and 3D models by typing scripts in a simple and elegant language based on Python. The code of this language resembles abbreviated English. For example:

```
c = CUBE(2)
MOVE(c, 2, X)
COLOR(c, BLUE)
SHOW(c)
```

means "c is a cube of size 2; move c by 2 units in the X direction; color cube c blue; show cube c." Without the overhead of traditional commercial software tools such as Autocad or Solidworks, students can very easily define a large variety of objects, move and rotate them, shrink and stretch them, subtract them from each other, create unions and intersections of objects, and much more. They can save their designs in NCLab or on the hard disk of their own computer, publish online and share with others, and export STL files for 3D printing. For this presentation we plan to bring children around 11 years old, to demonstrate what students are capable of learning at this very early age.

References

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