

MakerBot Lesson Plan #1

3D Modeling and Printing a Small Residence to Enhance an Erosion Lesson

Second Grade

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Brooklyn, NY

18 December 2011

This lesson was made possible by NYUPoly K-12 STEM Ed and MakerBot Industries

Lesson Purpose: Students will learn how to create a 3 dimensional building using 3dtin.com CAD software.

Lesson Behavioral Objectives: Students will be able to design their own building on the computer and output a real plastic building on the Thing-O-Matic.

Relationship to Previous Lesson: These buildings will expand on a lesson about erosion. We will present children with a real world problem of building a home near a river. Instead of just showing a model with sand moving, they will see some buildings fall into the river.

Materials Needed: Laptop computers, internet access, 3D printer such as the TOM, and a river table (can be improvised with some deep trays with sand)

Sequence of Lesson:

Motivation: Ask children if they want to make their own toy plastic house after seeing examples from the 3D printer.

Steps for this Lesson:

Day 1-Give the students a mini-lesson demo on the basic tools (pencil, eraser, extrude, and save) in 3Dtin.com. Make sure to do this on a big screen. Give one student 8 snap cubes to make something quickly. Demonstrate how I can copy it in the virtual 3D space on the computer. Have students repeat this at the tables with each of them receiving 8 blocks. Each student will work independently on a laptop trying to replicate the block formation in 3Dtin.com. This will take one full class period.

Day 2-Have students draw a building on graph paper. They can only draw by coloring in full boxes with a pencil. This will get them ready of the constraint of their designs only being drawn with cubes. (This limitation was forced on me due to technical difficulties getting our laptops to support Chrome and OpenGL shapes. I will resolve this issue before our next project.) Have students begin replicating their drawing in 3Dtin.com.

Day 3-5 Spend at least three 45 min sessions allowing children to design their buildings. Encourage them to add details like windows, doors, chimneys, etc. Make sure their building has a flat footprint that is printable.

Day 6-Have students place printed buildings on river banks while the water is flowing slowly. Once all buildings are placed increase flow of water to simulate a large storm. Have students observe how the increased flow causes erosion. Hopefully a few buildings will fall in water. Have children complete attached Home Design Reflection Sheet.

Assesment: Have students self-assess buildings with attached rubric. Teacher should use rubric for buildings and evaluate Home Design Reflection sheet.

Extensions: Encourage students to try 3Dtin.com if they have a computer at home or at the public library. Teach a lesson about foundations and stability. Try to develop footings to be buried in sand(which represents soil) so they touch the base of the stream table(which represents bedrock).