Teaching Computational Thinking with 3D Printing

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Class outline:

9:00 am  **Introductions & Overview**
9:15 am  – Tour of 3D printers (Makerbot Replicator 2, RepRap Prussa Mendel, Deltabot)
9:30 am  – Complete work flow demo: From design to printed object
9:45 am  – Q&A Session & Break

10:00 am  – **Teaching Computational Thinking using Parametric Design Software**  
           (No Printer Required!)
           – Software Installation
           – Teaching Computational Concepts with OpenSCAD
             – Variables & Expressions
             – Conditionals & Iteration
             – Transformations
             – Modules (user defined macros)
             – CSG Functions
               – Union
               – Difference
               – Intersection
             – Demo of advanced topics

11:00 am **OpenSCAD Practice: Design your own object**
11:45 am  – Print an object

12:00 pm  – Lunch Break, unstructured Q&A, and printer watching

12:45 pm  – What do you do when the printer is finished?

1:00 pm **Using 3D printing in the classroom**
          – Assignment Example
          – What if you don't have a 3D printer?
            – External print / manufacturing services:
              – [http://www.shapeways.com](http://www.shapeways.com)
              – [http://www.sculpteo.com](http://www.sculpteo.com)
            – Wrap up and final Q&A

1:30pm  – Unstructured time to play with 3D printers, ask questions,