3D Printing in the Classroom

Pete Dulany
pete@dulanyconsulting.com
Hello!

Pete Dulany

President / Founder, Dulany Consulting Inc.
Google Certified Trainer
Apple Teacher
Teaching Veteran / Former math teacher
Adjunct Faculty, Concordia University Chicago
Who’s got a 3D printer?!
Who’s used TinkerCAD?!
Who's made keychains?!
So, what ELSE can we do?
Step 1: Start simple. Morgan and Bubble Wands

An easy activity for elementary students is a “Bubble Wand” in Tinkercad. Why?

- Bubble wands are essentially hollow circles attached to a stick. Two shapes in Tinkercad give you success.

- There are CONSTRAINTS if you want them to modify an initial design.
  - Length of the Bubble Wand
  - Text must be supported from underneath and attached to the wand.
  - The circle and wand must actually fit into the bubbles container which typically has a narrow neck.
  - Get fancy - there’s a reason bubble manufacturers add “texture” to the circle outline.
#2 - PrintABrick.org - Unofficial LEGO brick files

PrintABrick
Web catalogue of LEGO® parts for 3D printing
#3 - BlocksCAD3D.org

- Computer Science with 3D printing
- A great replacement for “Hour of Code” activities you’ve been using for several years
BlocksCAD uses DRAG and DROP (NO Typing Code!)
Lesson 4: Get practice with the ENABLE project

Watch this video about Peyton. He has a 3D printed hand from the ENABLE project at

EnablingTheFuture.org
Lesson 5: Makey Makey meets 3D printing

- Ask yourself the ONE BIG QUESTION that was presented earlier

- What possible uses could there be for “Makey Makeys” in your curriculum?
Lesson 6: Tinkercad and the NEW Balsa Bridge
The problem with balsa wood bridges

- Balsa wood is difficult to “curve” properly
- Normal glue takes a long time to dry
- Once it breaks, re-creating it (or, more iterations) takes significant time and money, making it hard to learn from mistakes in design.
- Construction at home means fragile transportation to school
- Construction at school? Get ready for a mess.

- Where’s the real learning taking place here?
3D printed bridges allow students to:

- Create almost anything they can design in Tinkercad
- Focus more on the design than the construction process
- Easily try features like arches, additional supports, and cross bracing with just a few clicks
- Easily reconstruct a broken bridge for subsequent competitions
- Collaborate and get feedback on initial design before actual construction begins
- Work without knives, glue, soaking wood, long dry times, etc.
Lesson 7: Upcycling artwork

Case Study #1: Wine cork animals

Case Study #2: Old CD case towers

Case Study #3: Cereal box playhouse
Lesson 8: Food safe silicone projects

**Story:** The Illinois / Colorado party with custom chocolates

**Solution:** Tinkercad to the rescue! (You design it!)

**Demo / Lab:** Creating the mold
Lesson 9: A real social study: Redesigning Chicago

Group activity: Using a map and 3D printed objects to visualize a city.

What are some of the problems the city of Chicago currently faces?

How could we redesign the city to address that? (“What if…”)
**Lesson 10 - SOLVE A PROBLEM!**

Make students SOLVE A PROBLEM.

- Use Thingiverse “Challenges” as inspiration: Make it Float, Make it Loud
- Create an object that solves a problem.
  - The terrible Uno Shuffler
  - The wall plate modification
  - Oreo cookie dunker
  - Custom School Logo pieces
  - Replacement remote control cover
BONUS: Manipulatives you can’t find anywhere else (and if you can, they’re PRICEY!)

- Mars Rover - Science
- Math spinners - Math
- Topographical US Maps - Social Studies
- Dinosaur skeletons - Social Studies, Science
- Custom Stencils - Math, Science
- Aztec Calendars - Language Arts, History
- Digital Sundials - Science, History
- “Day of the Dead” skulls - Language, Art
- Cryptix and Maze Puzzlers - Language Arts
So, what’s the next step?

Get comfortable with today’s material and then give us a call to get:

- 10 easy Tinkercad “starter” projects your students can duplicate
- 5 custom “Breakout” box scenarios for your 3D printer, which you won’t find anywhere else online
- A one week STEAM challenge, perfect for the end of the semester
- Custom assistance getting your school logo / crest on 3D objects
- Pre-made “Hand Challenge” kits with “next level” service learning
- (And much more!)

- Get in touch: pete@dulanyconsulting.com
We are **technology trainers** for teachers, by teachers.

3D printing, Chromebooks, iPads, Interactive Boards, STEM Spaces, & MORE!