Tools That Work

Economical 3D printers for the classroom and beyond

A Little Bit About Me...

- My name is Bill White
- Applied Engineering and Technology teacher at Avonworth Middle/High School in Pittsburgh, PA.
  - Teaching now for 17 years...going into year 18!
  - Grades 7-12
- 3D printing/additive manufacturing advocate
- Member of 3D Pittsburgh

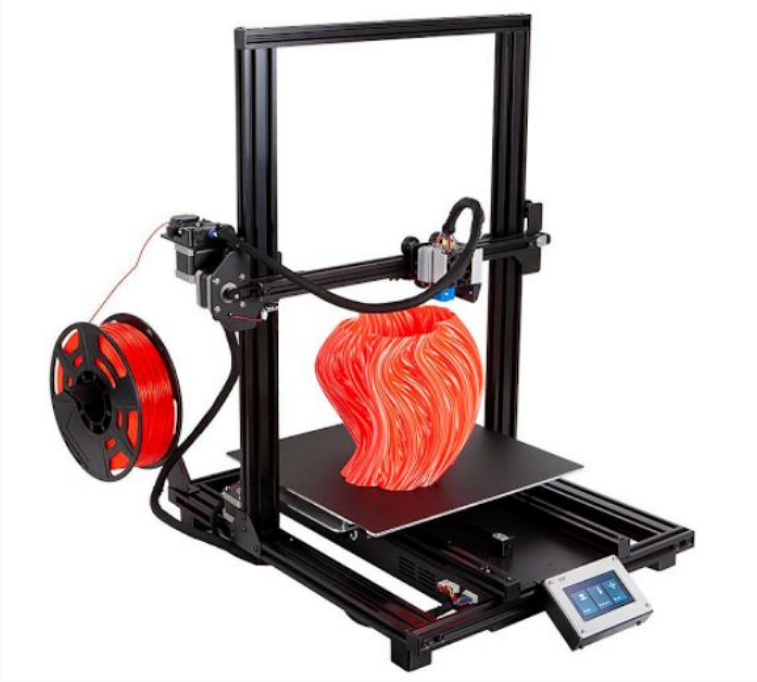
My classroom before the pandemic

- My classes are ALL HANDS-ON
- Traditional schedule
  - 40-45 minute class period
  - 6 unique classes
- 3D printing a part of each of my classes in some capacity
  - 6 3D printers
  - Projects range from simple keychains to automotive parts
  - Students go through the entire design process
- CIM (Computer-Integrated Manufacturing)
  - Weighted class
  - Small, hands-on class
  - Additive manufacturing already fully utilized
  - Design custom parts to solve problems

Virtual Learning...with a hands-on class??

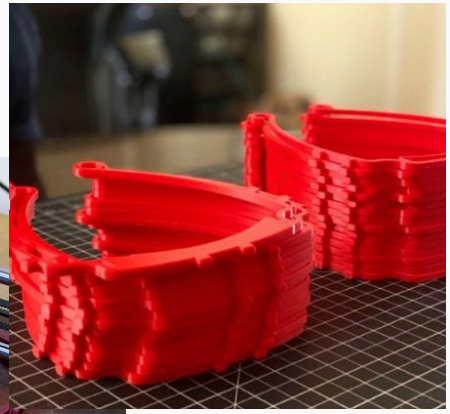
Getting 3D printers in the hands of my students

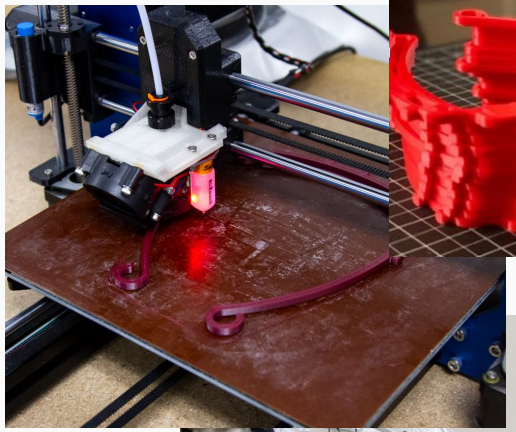
- What worked for me and my district
  - Acquired 8 MonoPrice MP10's from Matterhackers along with PLA and PETG filament
  - Printers were shipped directly to students homes
  - Created video content to teach printer setup to students
    - Demo the processes virtually:
      - Unboxing
      - Initial setup
      - Printing
  - Printed PPE in conjunction with 3D Pittsburgh (local network/resource)
  - Printers were also used for various problem solving/design challenges
  - Created a small district print farm



Curriculum and Skills

- Lessons based off real-world challenges/problems.
  Students learned:
    - Slicing software
    - Printer setup
    - Getting prints to stick and be high quality
- Developing tools to help with the pandemic
    - Helping print PPE with 3D Pittsburgh
    - Research and design
    - 3d Modeling (OnShape, Autodesk)
    - Prototyping
- Other lessons occurred along the way
    - Problem Solving
    - Communication





Alternatives...what can I do?!?!

- Distance learning options
  - Curriculum help/resource
    - I highly recommend PrintLab for awesome curriculum!
    - MatterHackers!
    - Your local 3D printing club
  - Hardware and fabrication
    - Reach out to your local 3D printing community
    - Consider utilizing a local makerspace or reaching out to a local business
    - 3D pens are a great introduction, especially for the younger grades.

Thanks for your time!!

- Any questions?
- Contact info:
  - Bill White - bwhite@avonworth.k12.pa.us
  - Mara Hitner - education@matterhackers.com OR (949) 613-5838 for **educational discounts!**
- Don’t be afraid to reach out to me with any questions!

  Stay safe and have a great school year!