



3d printers club

3D Inventions Coaches Notes





Coach Notes:

- **Course Overview (Page 1)**
- **Mission (Page 2)**

In an effort to help guide an instructor through the logistics of this unit, “Coach Notes” has been included as a valuable resource. These notes are meant to clarify expectations as well as provide lists of resources and/or materials based on the authors’ past experiences in teaching this unit.

The strengths of this unit:

- Curriculum is standards-based and involves real-life problem solving.
- Twenty-first century skills are utilized.
- STEM (science, technology, engineering, and mathematics) skills are incorporated.
- The Engineering and Design Process is enforced.
- Students have the opportunity to use CAD (computer aided design) and 3D printers.
- Thinking skills are strengthened (divergent/evaluative/visual-spatial).
- Independent as well as cooperative activities are included.
- Students practice public speaking skills.

The mission:

Students become inventors in this unit and will

- learn about famous inventors and the inventions they created;
- choose a problem in our world that needs a solution;
- use creative thinking skills to design an invention that solves this problem;
- build a prototype (model) of the invention utilizing the 3D printer;
- and create a display and presentation (including an “Elevator Pitch” and “Patent Application”) for a 3D Showcase where they will get to show their inventions to others.

Students’ inventions should fall into one of these categories:

- **Small Inventions** – These inventions are smaller than a four-inch cube. They will be completely printed on the 3D printer.
- **Large Inventions** – These inventions are larger than a four-inch cube. Students will use the 3D printer to print a small prototype of the invention. Students are encouraged, but not required, to also build the invention full-size (if possible).
- **Blended Inventions** – These inventions have small parts that are printed on the 3D printer and are combined with other materials to complete the prototype of the invention.

Before you begin:

- In order for students to understand the expectations that are in place, please ensure you discuss the rubric located on Page 33 of the *Inventor's Log* with your students as you embark on this unit.
- We have included a letter in the *Appendix* that we recommend sending home with your students at the beginning of this unit. Communication helps to ensure success!

Suggested time frame:

- Approximately 9 two-hour sessions
- In addition, there are opportunities for "Going Further" with extension activities.

Suggested Materials:

- 3D printer(s)
- plastic filament for 3D printers (assorted colors suggested)
- Internet access
- student course books (*Inventor's Log*)
- flashdrives (one per 3D printer)
- trifold
- access to basic school supplies
- other materials as determined by student projects
- space for printer to be housed as it is printing (The length of time that it takes a printer to print on object is often time-consuming.)

Going Further:

Websites are listed on Page 3 for students to investigate 3D printing and its impact on our world.

Background on this unit:

This unit was first developed by educators from the Clermont County STEM Program in January 2015 to use with students in grades 3-5 in Bethel-Tate, Clermont Northeastern, and Williamsburg Elementary Schools. This was made possible by the Greater Cincinnati STEM Collaborative 3d Printers Club; the University of Cincinnati; and P&G. As a result of its success with the students that piloted it, the unit was made available to other organizations throughout the Greater Cincinnati area. It was further revised in the fall of 2017 after consultation with coaches and students.