Unit 7: Introduction to CAD

Content Area: **Technology**
Course(s):
Time Period: **November**
Length: **4 weeks**
Status: **Published**

Enduring Understandings

- Technical drawings produced through computer aided design and drafting (CAD) programs is standard in present industry.
- A conceptual understanding in mathematics is crucial a designers ability to accurately visualize objects in 3D space.

Essential Questions

- How have CAD programs progressed with time?
- What are the advantages of creating technical drawings digitally?
- Why are various viewpoints necessary to communicate design ideas effectively?
- How is scale presented and utilized in CAD programs?

Content

Skills

- Students will be able to recall and explain boolean operations.
- Students will be able to create a 3D model utilizing constructive solid geometry and boolean operations within a CAD program, similar to TinkerCAD.
- Students will be able to produce 2D technical drawings including dimensions in a CAD software program, similar to AutoCAD to reflect a design solution.

Suggested Activity: https://academy.autodesk.co m/curriculum/chicken-coop?l ogin=1

Resources

Resources:

1. PC or Laptops with internet access, able to run TinkerCAD (or similar program) and the various 3D printer software platforms.

2. TinkerCAD (or other equivalent solid modeling program). TinkerCAD is a free, web-based 3D modelling application which allows users to create objects utilizing constructive solid geometry applications.

3. 3D Printers allow students to realize their designs by producing physical objects from their three-dimensional digital models.

4. Engineers scales allow students to measure items graphically depicted within technical drawings and physical objects according to a set scale.

5. AutoCAD is a computer-aided design (CAD) and drafting program used for producing 2-D and 3-D technical drawings.. AutoCAD is considered an industry standard and was developed and marketed by Autodesk Inc. A free version is available for education.

6. Autodesk Design Academy https://academy.autodesk.com/ , supports educators by providing free, authentic project based learning guides and supporting videos.

7. Monmouth County Executive Airport locally positioned in Wall Township, New Jersey, is a potential location for an authentic learning experience through a field trip, supporting the Exploring Flight unit.

8. Consumable Materials such as bass and balsa wood, foam, hot glue, project kits, aluminum foil, wax paper, balloons, fishing line, cups and other materials are needed to support project based learning. Suggested projects include building a model architectural structure, room or facility, bridge, tower, aircraft and more.

9. Personal protection equipment such as safety goggles and gloves are required when students are at risk of injuring themselves while creating projects or utilizing tools and/or machinery.

10. Hand Tools various hand tools such as easy cutters, craft knives, hot glue guns and hot wire cutting machine will be utilized within the classroom. Safety precautions and training will be taken and provided at all times.

Standards

TECH.8.2.8.A.1	Research a product that was designed for a specific demand and identify how the product has changed to meet new demands (i.e., telephone for communication - smart phone for mobility needs).
TECH.8.2.8.B.1	Evaluate the history and impact of sustainability on the development of a designed product or system over time and present results to peers.
TECH.8.2.8.C.5a	Explain the interdependence of a subsystem that operates as part of a system.
TECH.8.2.8.C.5b	Create a technical sketch of a product with materials and measurements labeled.