Appendix F – Scope & Sequence

3-D Printing: Vehicle Engineering

(Three-week activity)

Requires fifteen to nineteen 45-minute class periods.

Note: Time required will vary with the number of 3-D printers available. This scope and sequence is based on using one 3-D printer for a class of 25 students.

Teacher	Students
1 Class	
□ Introduce the unit using the Day 1 Presentation – Engineering Design.	□ View the presentation.
□ Lead a discussion on the engineering design process and the challenge.	□ Participate in the discussion on the engineering design process and the challenge.

Teacher	Students
1 Class	
□ Introduce Rapid Prototyping using the *Day 2 Presentation – Prototyping*.	□ View the presentation.
□ Show the *3-D Printing* video.	□ View the video.
□ Break students into five teams. Hand out *Engineering Notebooks* and *Competition Catalogs* to each student team.	

Teacher	Students
2 Classes	
□ Have students work on preliminary concepts for the design challenge.	□ Record ideas, notes, and sketches in their *Engineering Notebooks*.
□ Check on student progress and answer questions students might have as they work through their design ideas.	□ Students complete the Design Matrix section of the notebook.

Teacher	Students
1 Class	
□ Go through the *Day 5 Presentation – Experimental Design.*	□ View the presentation.

Design Solutions

(3-week activity)

Requires fifteen to nineteen 45-minute class periods

Note: Allowing students to 3-D print each design solution might increase the time required, but it is the preferred method to use.

Teacher

1 Class

- ☐ Review the Presentation 1 *PowerPoint* file.
- ☐ Insert the video into the appropriate *PowerPoint* slide.
- ☐ Lead a discussion to introduce the unit, using the Presentation 1 *PowerPoint*.
- ☐ Distribute the Design Logbook.

Students

- ☐ View the *PowerPoint* presentation.
- ☐ Discuss the information presented in the *PowerPoint* slides.
- ☐ Complete the activities on the Day 1 pages in the Design Logbook.

Teacher

1 Class

- ☐ Provide a link to the introduction video.
- ☐ Provide access to the *Tinkercad* software.
  - Install *Tinkercad* on student computers.
  - Provide a link to the online version.
  - Provide access to the iPad version.
- ☐ Provide access to the video tutorials.

Students

(Work in teams of two.)

- ☐ View the *Adding and Sizing Solids* video tutorial.
- ☐ Practice the techniques shown in the video about creating objects.
- ☐ View the *Moving and Snapping* video tutorial.
- ☐ Practice the techniques shown in the video about moving objects and snapping to objects.

Teacher

1 Class

- ☐ Provide access to the *Tinkercad* software.
- ☐ Provide access to the video tutorials.

Students

(Work in teams of two.)

- ☐ View the *Grouping and Combining Shapes* video tutorial.
- ☐ Practice the techniques shown in the video about grouping objects.