

Next Generation Science Standards – 5th Grade

Nature of Science & Engineering

Performance Expectations

Science & Engineering Practices

Asking Questions and Defining Problems
Planning and Carrying Out Investigations
Analyzing and Interpreting Data
Developing and Using Models

Constructing Explanations and Designing Solutions
Engaging in Argument from Evidence
Using Mathematics and Computational Thinking
Obtaining, Evaluating, and Communicating Information

Standards for Engineering Design

- 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Engineering Design Challenge

Investigate and Design Catapults (3D Printing)

Lesson	Duration	Essential Question(s)	Lesson Overview
1	4 days	How and why do scientists observe and record? How do engineers use the design process?	1. Unit Pretest and Formative Assessment Probe <i>Doing Science</i> 2. Compare scientists and engineers 3. Introduce, setup, and explore Science Notebooks 4. Fusion Textbook – Unit 1, Lesson 1 “What is Science?” 5. Review the Jamerson Design Process – <i>Skyscraper Design Challenge</i> 6. ELA – DaVinci Names 7. HOMEFUN – Photo Autobiography
2	3 days	What are the qualities of effective teams? How do scientists and engineers communicate?	1. <i>Communicate Like an Engineer</i> – Activity 1, “Engineers Use Precise Language” 2. <i>Communicate Like an Engineer</i> – Activity 2, “Engineers Communicate With Teammates” (Widgets) 3. <i>Traveling Circuits</i> – Hour of Code

3	3 days	How do scientists design investigations?	1. <u>Everyday Science Mysteries</u> – “Grandfather’s Clock” 2. Pendulum Investigation – How does arm length affect period? 3. Fusion Textbook: Unit 1, Lesson 3 “What are some types of investigations?” 4. Fusion Textbook: Unit 1, Lesson 5 “What are some science tools?”
4	9 days	How do scientists design investigations? How do engineers develop solutions?	1. Introduce Tinkercad and 3D Printing. 2. 3D Printed Catapults – Explore and discuss 3. 3D Printed Catapults – How does mass of the projectile affect distance? 4. Catapult Design Challenge 5. Investigations with the 4 Foot Catapult
5	7 days	Which (STEM) careers match my strengths and interests?	1. Learning Styles and Multiple Intelligences Quizzes 2. Explore STEM Careers – Webquest, Interest Survey 3. Webquest – DiscoverE 4. Engineer Wall/Learning Signs Scavenger Hunt 5. Connect Fields of Engineering to Enterprise Village 6. Nature of Science POSTTEST 7. HOMEFUN: Engineering Throughout the Day