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Major Project: Engineering Design Challenge

Phase One

1. The BIG idea: Astronauts landed on the moon! (Space/Solar system)
2. Appropriate learning standards:

   *California Common Core Math Standards
   - MP.4 Model with mathematics
   - K.MD.A.1 & K.MD.A.2 Describe and compare measurable attributes
   - K.G.B.4 & K.G.B.5 Analyze, compare, create, and compose shapes

   NGSS California Public School Standards

   *K-2 ETS1 Engineering Design
   - K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
   - K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
   - K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
3. Problem solving used: declarative knowledge- factual knowledge of materials being used and how they react; procedural knowledge- mental models, logical reasoning, abstract reasoning, moderately structured problem-solving skills. Students will need to work a few mini-activities beforehand that will allow them to develop experience and knowledge about how engineers design things and face problems or challenges during the process.
4. Objectives: Design and build ____________________, work through each step of the engineering design process; draw/describe two or three examples of your prototype. Concepts/content: Engineers, design model, Earth, Moon, astronauts, solar system, measurement, data.
5. Possible activities: Moon rover, touchdown challenge (shock-absorbing landing system), straw towers to the moon (teachengineering.org hands-on activity).
6. Best activity for the class: Straw Towers to the Moon! (https://www.teachengineering.org/activities/view/ucd_straw_tower_activity1)