KIDSPARK EDUCATION

The Design & Engineering Process

STEM-Maker CURRICULUM

v2.3

Team Members:

1. _____   3. _____

2. _____   4. _____

Total Points

Workbook: .... **/11 pts**

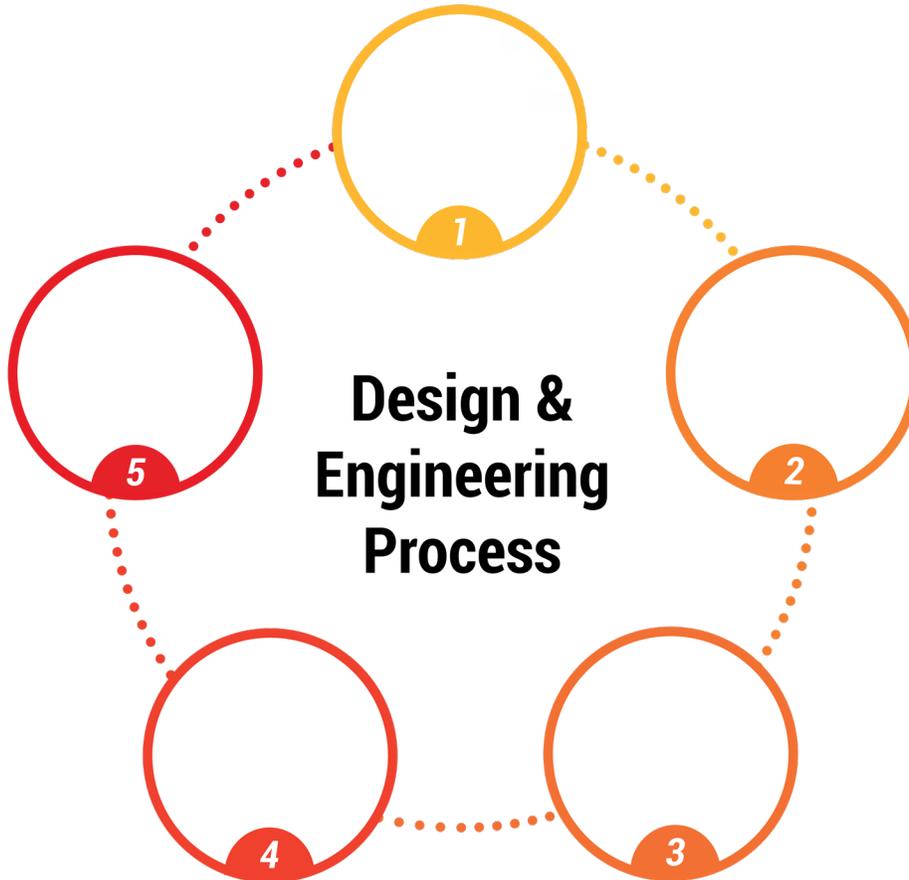**Design Challenge:** .... **/30 pts**

Key Terms
Write the definitions of each key term in the space provided.

1. Design & Engineering Process: _____

_____

2. Design Brief: _____

_____

3. Brainstorm: _____

_____

4. Prototype: _____

_____

5. Empathy: _____

_____

6. Grading Rubric: _____

_____

The Design & Engineering Process

7. ☐ Fill in each step of the Kid Spark Design & Engineering process in the image below.

8. ☐ Discuss the purpose of each step with members in the team.

Build a ROK Blocks Tree

9. ☐ Complete all four steps to assemble a ROK Blocks Tree. **See Curriculum Packet - Page 4**

Understanding a Design Brief
Fill in the correct answer in the spaces provided below.

10. A _____ serves as the guiding document for a project.

11. What is the specific design challenge on page 5? _____

Design & Engineering Challenge

Follow each step in the design & engineering process to develop a solution to the problem.
Place a check in the box as each step is completed. Fill in the blanks when necessary.

1. **Identify The Challenge**

   ☐ Challenge: _____

   ☐ Sub-Challenge: _____

   ☐ Sub-Challenge: _____

   ☐ Sub-Challenge: _____

   ☐ Sub-Challenge: _____

   ☐ Review specifications

2. **Brainstorm Ideas & Solutions**

   ☐ Discuss design ideas.

   ☐ Consider engineering materials and cost.
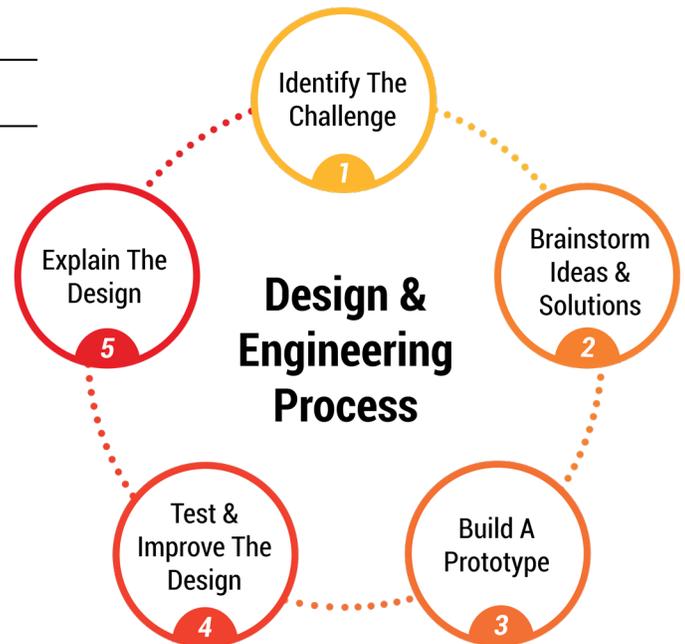
3. **Build A Prototype**

   ☐ Build a working prototype of the design.

4. **Test & Improve The Design**

   ☐ Test & improve the design for performance and consistency.

   ☐ New challenge discovered: _____

   ☐ Review grading rubric and design specifications.

   ☐ Consider ways to reduce cost.

5. **Explain The Design**

   ☐ Prepare to demonstrate and present the design to others.

   ☐ Review project grading rubric.

   ☐ Explain any unique design features that were included.

   ☐ Describe at least one new problem/challenge discovered during Step 4 (Test and Improve The Design)
   and how the team redesigned a new solution.

   ☐ Calculate and share overall dimensions of treehouse. **Length:** _____cm **Depth:** _____cm **Height:** _____cm

Design & Engineering Process

1. Identify The Challenge
2. Brainstorm Ideas & Solutions
3. Build A Prototype
4. Test & Improve The Design
5. Explain The Design

Challenge Evaluation

When teams have completed the design & engineering challenge, it should be presented to the teacher and classmates for evaluation. Teams will be graded on the following criteria:

⚙ **Specifications:** Does the design meet all specifications as stated in the design brief?

⚙ **Performance:** How well does the design work? Is it reliable and consistent?

⚙ **Team Collaboration:** How well did the team work together? Can each student descibe how they contributed?

⚙ **Design Quality/Aesthetics:** Is the design of high quality? Is it structurally strong, attractive, and well proportioned?

⚙ **Material Cost:** What was the total cost of the design? Was the team able to stay on or under budget?

⚙ **Presentation:** How well did the team communicate all aspects of the design to others?

Grading Rubric	Advanced 5 Points	Proficient 4 Points	Partially Proficient 3 Points	Not Proficient 0 Points
Specifications	☐ Meets all specifications	☐ Meets most specifications	☐ Meets some specifications	☐ Does not meet specifications
Performance	☐ Design performs consistently well	☐ Design performs well often	☐ Design is partially functional	☐ Design does not work
Team Collaboration	☐ Every member of team contributed	☐ Most members of team contributed	☐ Some members of team contributed	☐ Team did not work together
Design Quality/ Aesthetics	☐ Great design/ aesthetics	☐ Good design/ aesthetics	☐ Average design/ aesthetics	☐ Poor design/ aesthetics
Material Cost	☐ On Budget ($120 or Less)	☐ Slightly Over Budget ($120-130)	☐ Over Budget ($130-140)	☐ Significantly Over Budget ($141+)
Presentation	☐ Great presentation/ well explained	☐ Good presentation/ well explained	☐ Poor presentation/ explanation	☐ No presentation/ explanation
Points	…………..	…………..	…………..	…………..
Total Points				………….. /30