

Teacher Guide/Lesson Plan – Creativity & Innovation: Design Mini-Project

In this project, students will be given creative freedom to design something they feel there is a need for. This could be anything from a better phone or a device to improve air quality in their school. The importance of leaving it open-ended is for students to get **creative and innovative** with this project and what they feel there is a specific need for. Students will work in groups of two for this project.

Step 1: Solo Brainstorming

- Have students work independently/quietly without communicating with their partner.
- 5 minutes to come up with some ideas.

Step 2: Empathy

- Students will be given 5 minutes to discuss these questions with their partner:
 1. What is empathy?
 2. Why do you think empathy is the first step in the design process?
 3. What are ways innovators can practice empathy?
- Once students are done discussing with their partners, ask them to share their responses. Then, read the definition of empathy from Slide 8 and the ways innovators can practice empathy from Slide 9.

Step 3: Beginning process (Slide 10)

- Partner A has 2-3 minutes to interview partner B about their design idea. The goal is for students to take notes while asking their partner about the type of design idea they have, why they have it, what they like or do not like about it, etc. Do not make comments. Just question, observe, and take notes.
- Partner B now has 2-3 minutes to do the same.
- Tell students to **be specific in their interview. Ask questions about the specific elements their partner has chosen to include in their design idea.**
- Students should be given time to discuss/decide with their partner which design idea they are going to continue with. Ask them to utilize the communication tips they learned from the previous lesson.

Step 4: Engineering Design Process

- Inform students that they will be using the Engineering Design Process to complete this project. At the end of the project, the teacher must be able to clearly see that each step of the Engineering Design Process was followed.
- The engineering design process **emphasizes open-ended problem solving and encourages students to learn from failure.** This process nurtures students' abilities to create innovative solutions to challenges in any subject.
- **If students have never seen the Engineering Design Process, explanations will be included in the PowerPoint. If students have seen it before, these slides can be skipped.**

Breakdown of the project:

5-10 minutes: Introduction of the Project, Discussion Questions & Individual Brainstorming

10 minutes: Empathy (discussion & explanations)

10 minutes: Beginning process/partner discussions

10 minutes: Explanation of Engineering Design Process

=35-40 minutes

Design Project

=2-3 classes

Design Mini-Project Rubric:

CATEGORY	4: Exceptional	3: Skillful	2: Adequate	1: Basic	Score
Follows Instructions	Listened 100% of the time and fully completed assignments/tasks.	Listened most of the time and mostly completed the assignments/tasks.	Listened some of the time and completed only half of the assignments/tasks.	Did not listen well and completed less than half of the assignments/tasks.	
Materials	Appropriate materials were selected and creatively modified in ways that made them exceptionally better.	Appropriate materials were selected to make the design work.	Appropriate materials were selected but could have used different/additional materials to enhance the design.	Lacking necessary materials to make the design successful.	
Recording Data	Professional looking and accurate representation of the data. Sketches and/or graphs are drawn accurately and labeled.	Most calculations and measurements done accurately. Sketches and/or graphs are drawn and labeled.	Data, calculations, and measurements recorded may be accurate or inaccurate. No sketches or graphs are shown.	Data is not recorded OR it is mostly inaccurate, and no sketches or graphs are shown.	
Design & Redesign	Accomplished all tasks for which it was designed. Design is neat, functional, and creative. Redesign enhanced the success of the design.	Accomplished some tasks for which it was designed. 1-2 design details could have been refined to make it more functional. Creative design. Redesign successfully the success of the design.	Only worked partially for which it was designed. 3-4 design details could have been refined to make it more functional. Some creativity in design. Redesign had no impact on the success of the design.	Accomplished no tasks for which it was designed. Construction appears careless or haphazard. Many details need refinement for a strong and functional product. Little creativity. Redesign did not help success of the design.	
Presentation	Uses several visual aids that show considerable work/creativity which make the presentation better. Stays on topic all (100%) of the time. Shows a full understanding of the topic.	Uses 1 visual aid that shows considerable work/creativity which makes the presentation better. Stays on topic most (99-90%) of the time. Shows a good understanding of the topic.	Uses 1 prop/visual aid which makes the presentation better. Stays on topic some (89%-75%) of the time. Shows a good understanding of parts of the topic.	Uses no props/visual aids OR the props/visual aids chosen to detract from the presentation. It was hard to tell what the topic was. Does not seem to understand the topic very well.	