

Ready, Set, Design

Description:

Thinking of solutions within limitations.

Objective(s):

1. Students will use available resources to solve a practical problem.
2. Students will explain their thinking and process.

ISTE/NGSS Standards:

4c: Students develop, test and refine prototypes as part of a cyclical design process.

5c: Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

MS-ETS-1.1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS-1.2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Teq Lesson Plan Activity

Essential Question(s):

1. How can limitations impact creativity positively and negatively?
2. How do limitations impact the Engineering Design Process?

Materials:

- Brown Paper Bags
- A variety of makerspace supplies within each bag
- Challenge Cards
- Design Engineering process graphic organizer

<https://docs.google.com/document/d/1UYqqzT3aMgdNVb6-zog02Q4mY686WuM-2iHSEfsyLps/edit>

<https://www.cooperhewitt.org/2011/09/09/ready-set-design/>

Do Now:

Either discuss the question, "how can limitations help or hurt creativity?" or watch TED talk, "[Embrace the Shake](#)" and discuss central ideas of video.

Lesson:

1. Each group or individual student will receive a brown paper bag.
2. Each bag will contain three random items, which roughly fall into the categories of:
 - Fastener
 - Surface item
 - Structure item
3. Students will receive a challenge card. Cards are open-ended, examples of challenges include:
 - I need to create a safe way to cook with no electricity
 - I need to keep a newborn warm with no electricity
 - I need to collect and carry water
 - I need to carry groceries up several flights of stairs
4. Students will be given 15-20 minutes to complete their tasks, while filling out their graphic organizers.
5. Students will then stop and share what they made, their thinking, challenges they encountered, and how they would improve their product going forward.

IF TIME: Students may complete another challenge or continue to work on their project with additional materials.

Teq™ Lesson Plan Activity

Closure:

1. Students will complete reflection section of Graphic Organizer.
2. Class will work together to put away materials.

Extension:

Students can write about example of limitations triggering creativity.