BRIGHT ART CHALLENGE

ENTRIES OPEN FEB 5, 2019 - MAY 29, 2019

LESSON PLAN

BUILD & ITERATE YOUR BRIGHT ART MASTERPIECE

It's build time! Students will build, test and refine their Bright Artwork. They will understand the iterative nature of the Engineering Design Process and test their masterpiece for light interactions.

FOR THE CLASSROOM

POSSIBLE APPROACH FOR THE CLASSROOM

LESSON LENGTH
2, 30-50 MINUTES

OBJECTIVE
BUILD, ITERATE, AND TEST YOUR ART PIECE

MATERIALS
SEE BELOW

VOCABULARY:

- Engineering Design Process
- Iterate

MATERIALS

BUILD & TEST

- Worksheet
- Battery Powered LED Light Source
- Recyclables
- Trash
- Borrowed objects (each of which is no more than $10)
- Items found in nature
- Adhesives (ex. tape, glue...) and Fasteners

DOCUMENTATION & SUBMISSION

- Video Camera (any kind-tablet, mobile, video recorder)
- Computer
- Internet
- Access to CONTEST RULES and DESIGN GUIDELINES

PROCEDURE

1. DOWNLOAD AND TEACH THE BUILD & ITERATE POWERPOINT: We have provided a Future Engineers PPT. Feel free to customize it to suit your teaching needs.

2. PRE PREPARATION: Gather and enlist students to bring in supplies for their art piece such as recyclables, trash, items found in nature and/or borrowed objects each with a value of less than $10.

3. BUILD: Students should use the materials they have selected to build their Bright Art piece.

4. TEST

- First, have your students use the worksheet to create a test procedure to demonstrate the light interactions..

PROCEDURE (CONTINUED)

4. TEST (CONTINUED)

- Next, students should use their procedure to conduct a series of tests on their art piece.
- After each test, encourage students to think about how they can improve their designs to demonstrate light interactions more clearly.
- Lastly, students should make iterative changes to improve their art piece.

5. PEER REVIEW

- Assist in a peer review session by having students to run their art piece light interactions test in front of the entire class or in smaller peer reviewing groups.
- Students should answer the following questions:

    What light interactions do you see?

    What do you think will works well with their design?

    What do you think could improve?

BACKGROUND INFORMATION

ENGINEERING DESIGN PROCESS

The engineering design process is a series of steps used to solve problems, and innovate/engineering new creations. Some define it with more steps than others, but at the core, a process where students ask the right questions, use creativity to brainstorm ideas, use design skills to create the plan/design, get hands-on to build a solution, and then iterate, test and refine. Your students are already mid-journey, but here are some steps to explain the steps to your students.

ASK

Engineers must ask questions about the problem they want to solve. What is the goal? What are we trying to solve? What have others done in the past?

RESEARCH

Research includes looking up information that will help you solve your problem or reach your goal. (For example, in this challenge it includes understanding the properties of light and how light interacts with different materials.)

BRAINSTORM

Work with a team to come up with as many possible ideas and solutions as possible. All ideas are good ones and creativity is highly encouraged.

DESIGN

Take your research and brainstorming ideas and come up with a plan or design. Be sure to consider the design constraints.

BUILD

Build out your design. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

BACKGROUND INFORMATION

ENGINEERING DESIGN PROCESS (CONTINUED)

TEST & EVALUATE

Test out your design and see if your build worked. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

IMPROVE

Use what you learned in your testing to make a better version of your solution. Analyze results from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

NEXT GENERATION SCIENCE STANDARDS

MS-ETS1-1: 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-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet th criteria for success.

MS-ETS1-4: Develop a model to generate data for iterative testing and modification of a proposed object, tool or process such that an optimal design can be acheived.

MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed or transmitted through various materials.

BUILD & ITERATE LESSON WORKSHEET

BRIGHT ART TEST

Come up with a simple test to see if your design works and looks like you expected. Then, use the test results to improve your art piece!

What light interactions does your art piece show?

Use the space below to come up with a test procedure to show these light interactions

1)

2)

3)

4)

Use the table below to record the results from your bright art test

TEST #	Observations. (What light interactions did you see? How clear were the interaction/s?)	What changes can you make to improve your light interaction/s display?
TEST 1		
TEST 2		
TEST 3		