FUTURE CREATURE CHALLENGE
ENTRIES OPEN APRIL 19, 2019 - JULY 12, 2019

LESSON PLAN
PRESENT & FUTURE CREATURES

It's illustration time! Use the iterative nature of the Engineering Design Process to create your final present and future creature illustrations. Document your illustration, write your short essay and submit.

FOR THE CLASSROOM

POSSIBLE APPROACH FOR THE CLASSROOM

LESSON LENGTH
1, 30-50 MINUTES

OBJECTIVE
BUILD AND REFINE YOUR CREATURE

MATERIALS
SEE BELOW

VOCABULARY:

- Engineering Design Process
- Iterate

MATERIALS

SELECT YOUR OWN METHOD

- Computer & Internet (Your Choice)
- Pen and paper (Your Choice)
- Other illustration tools (Your Choice)

DOCUMENTATION & SUBMISSION

- Camera (any kind-tablet, mobile, or hand held)
- 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: Decide on how your students will be creating their creature illustrations and gather the necessary supplies needed. This could be on paper or with the use of a drawing or illustration design software.

3. BUILD: Students should use the materials they have selected to create their creature illustrations.

4. PEER REVIEW

- Conduct a peer review session by having students share their creatures with others.

PROCEDURE

4. PEER REVIEW (CONTINUED)

- Students should answer the following questions about another persons/groups creature.
  - Is the creature represented correctly?
  - What do you think works well with their illustration?
  - What do you think could improve?

5. ITERATE

- Students should make iterative changes to improve their creature illustration.

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, evaluate 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 or convey? 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 learning about what your animal looks like presently. It also includes researching the creatures habitat and how a rise in sea level will effect it).

BRAINSTORM

Work with a team to come up with as many possible ideas or solutions as possible. All ideas are good ones and creativity is highly encouraged. In this challenge, the brainstorm is what animal to select. You can also brainstorm what type of anatomical adaptations your creature might evolve.

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/illustration can be achieved.

BACKGROUND INFORMATION

ENGINEERING DESIGN PROCESS (CONTINUED)

TEST & EVALUATE

Test or evaluate your design and see if your build is conveying what you intended. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem or challenge.

IMPROVE

Use what you learned in your evaluation to make a better version of your solution. Analyze results from evaluations or 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-LS4-4 Biological Evolution: Unity & Diversity

Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]

- LS4.B Natural Selection: Natural selection leads to the predominance of certain traits in a population, and the suppression of others.
- Cause and Effect: Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.