Egg-cellent Egg Drop

Students work in groups to design solutions to for an egg-drop experiment. They will use an iterative process to test and modify their solutions.

STANDARDS

Science

- 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.
- Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- 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 the criteria for success.
- 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.

Social and Emotional Learning

- Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals
- Utilize positive communication and social skills to interact effectively with others

Computer Science

- Develop resilience and perseverance when approaching CS and CT learning experiences, build comfort with ambiguity and open-ended problems, and see failure as an opportunity to learn and innovate.
- Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs
- Seek and incorporate feedback from team members and users to refine a solution that meets user needs.

DETAILS

SEL Integration: Students work in groups and practice communication skills and develop perseverance when solving ambiguous problems.

Computational Thinking Integration: Students are cultivating design skills to test and modify solutions.

PLAN

Warm Up

- Review with students the "Use-Modify-Create" or design method.
- Why is it beneficial to begin your new design with a solution similar to the one you are trying to create?
- Lead a discussion with students on the quality of "persistence." How does persistence apply to implementation and testing of solutions?

Activity

- Students will work in groups of three or four to create a safe landing for their egg drop.
- Each group will receive three raw eggs and the opportunity to test three solutions in an attempt to keep their egg "alive."
- Groups will utilize the "Use-Modify-Create" method.

Collect materials for each group:

- 3 raw eggs
- Rules
- A way to drop eggs from a height of eight feet (stools, small ladders, chairs, etc.)
- One Egg-cellent Egg Drop Worksheet per student OR per group
- Craft materials (examples include:)

  - Straws
  - Cardboard
  - Cloth
  - Masking tape
  - Duct tape
  - Cardboard tubes
  - Newspaper
  - Boxes
  - Rubber bands
  - Glue
  - Popsicle sticks
  - Baggies
  - Cotton balls
  - Feathers

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Activity Continued

Introduce the task by asking students to read the scenario. Read through the Egg-cellent Egg Drop Worksheet and address any questions.

As a class, discuss Step 1 under "Use." Some possible examples could include parachutes, ladders, or nets.

Set the timer for 60 minutes and allow groups to begin. Remind them to use the worksheet to guide them through the process.

Wrap Up and Assessment

- Ask students to discuss how the "Use-Modify-Create" method impacted their processes.
- How did their team use persistence as they were going through the process?
- What materials do students wish they had? How would this have modified their design?
- Assess student responses using the Journal Entry Scoring Guide (PDF).

Extension

- Have students write about another time in their life that they were persistent or wish they had been persistent.
- To make the challenge easier, add more materials. To make the challenge more difficult, supply fewer materials.
- Have a competition between teams and continue to drop the eggs from higher points. Which team's egg survives? Why?

JOURNAL ENTRY SCORING GUIDE

Descriptor Points	Exceptional 10-9	Effective 8-7	Somewhat Effective 6-4	Needs Work 3-0
Content of Journal Entry	My journal entry is clear, concise, stays on topic, and includes additional supporting information or resources.	My journal entry is clear, stays on topic, and provides useful information.	My journal entry is somewhat unclear or incomplete but stays on topic for the most part.	My journal entry is off topic or missing.
Completeness	My journal activity meets all requirements and includes supporting details.	My journal activity meets all requirements.	My journal activity meets most of the requirements.	My journal activity meets few or none of the requirements.
Conventions	I carefully check my writing for accuracy in spelling, capitalization, grammar, and punctuation, so my journal does not have any mistakes.	I check my writing for accuracy in spelling, capitalization, grammar, and punctuation, and my journal does not have any mistakes that would confuse people while they are reading.	I check my writing for accuracy in spelling, capitalization, grammar, and punctuation, but my journal has some mistakes that might confuse people while they are reading.	I rarely check my writing for accuracy in spelling, capitalization, grammar, and punctuation, and my journal has many mistakes.

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Egg-cellent Egg Drop Worksheet

USE

Brainstorm possible solutions or ideas that could create a safe landing for your egg. Think about other solutions, inventions, or designs that have been used for similar purposes.

Thinking about other designs that already exist, choose a solution that might work best for your egg drop.

MODIFY

How can you modify the solution you chose to meet the exact needs for your egg drop? What must you change for your egg? What can stay the same?

CREATE

It's time to build! Now you will create your design in the hopes of keeping your egg intact.

MODIFY & CREATE

Evaluate the situation. Did your solution work? If not, then you need to make modifications to your design. What must change? What can stay the same?

MODIFY & CREATE

One more chance! If you didn't get it right the last time, this is your last attempt to create the perfect landing for your egg.