

GET THAT PLANE!



LESSON OVERVIEW

Grade Levels: K-5

In the book *The Boy and the Airplane* by Mark Pett, the boy must figure out how to get his plane out of the tree! In this activity, students will design their own crazy contraptions that will get things out of trees. Through the engineering design process students will design, discuss, and present their designs. Students will also write a short story featuring their machine and how it will work.

STANDARDS

NGSS K-2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
NGSS K-2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
NGSS 3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
NGSS 3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
CCSS-ELA RI.2.1	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
CCSS-ELA W.2.8	Recall information from experiences or gather information from provided sources to answer a question.
CCSS-ELA RI.3.7	Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur)
CCSS-ELA RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
CCSS-ELA RI.5.1	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
CCSS-ELA RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
CCSS-ELA W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.

OBJECTIVES

- Students will discuss techniques that may be effective in the creation of their prototype.
- Students will design a prototype using the engineering design process.
- Students will discuss their prototypes and techniques that will be used.
- Students will write a short story featuring their machine and how it will work.

MATERIALS

- Engineering Design Process handout
- Paper for sketching
- Writing/ Drawing utensils

PROCEDURE

- STEP 1:** Read the book *The Boy and the Airplane* by Mark Pett and then ask the following questions and have discussions:
- What did the boy do to rescue his plane?
 - What would you do to get your toy out of a tree?
 - What kind of machines could be built to help get a toy out of a tree?
- STEP 2:** Review the Engineering Design Process and discuss with students each step and how it relates to *The Boy and the Airplane*.
- STEP 3:** Students will draw, either individually or in groups, a prototype for a crazy contraption that will get a toy out of a tree. Have them show or label all the components of the contraption.
- STEP 4:** Have the students write a short story about how their machines would work and an adventure they have using their contraption.
- STEP 5:** As a class, view the various designs and discuss:
- Would the design work in real life? Why or why not?
 - What do they like about each other's machines?
 - If they could actually build one of the prototypes, which one would it be? Why?

ENGINEERING DESIGN PROCESS



IDENTIFY THE PROBLEM

What is the problem, and why is it important?

RESEARCH AND BRAINSTORM

Research: What has been done to solve this problem? Who is affected by this problem? What current solutions are available?

Brainstorm: What sort of things can be used to solve this problem? How can current solutions be improved? What materials will you need? Create concept designs.

BUILD

Decide upon your best design, gather your materials, and build your prototype.

TEST

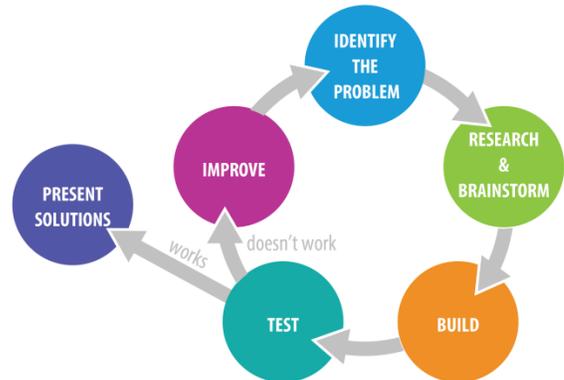
Test your prototype to determine its challenges, problems, and level of effectiveness.

IMPROVE

If the prototype does not work, repeat the process by identifying problems with the prototype design, conducting more research and brainstorming possible improvements, modifying or rebuilding the prototype, and performing additional testing until a solid solution is found.

PRESENT SOLUTIONS

Once an effective solution is discovered, present your work to others. Possible forms of presentation include a project board or multimedia presentation at a meeting or conference, documentation made accessible to those who can benefit from the work, and electronic communication of the solution via email, social media, blogs, websites, digital signs, videos, etc.



RUBRIC

	Target (3)	Meets (2)	Partially Meets (1)	Does Not Meet (0)
CONTRAPTION DESIGN	Does a great job showing an understanding of design for a purpose.	Does an okay job with showing an understanding of designing for a purpose.	Tries but has great difficulty showing an understanding of the design process.	Does not show an understanding of design.
SHORT STORY	Short story is clear and uses evidence to support reasoning.	Short story is clear.	Short story is a little difficult to understand but include critical components.	Short story is difficult to understand and missing several components or is incomplete.
COLLABORATION	Works well with others and discusses ideas in a fair, respectful, encouraging way and is considerate of the feelings of others.	Works okay with others and discusses ideas in a fair, respectful way, but may not be encouraging. Considers the feelings of others.	Works with others, but does not contribute a fair share of work OR is discouraging and does not consider the feelings of everyone.	Does not work well with others and/or discusses ideas in an unfair, disrespectful way.
REQUIREMENTS	Meets all of the requirements for the project.	Meets most of the requirements for the project.	Meets some of the requirements for the project.	Does not meet the requirements for the project.
DEMONSTRATION OF KNOWLEDGE OF CONTENT IN DISCUSSIONS AND ACTIVITIES	Does a great job showing an understanding of the content covered in class.	Does an okay job with showing an understanding of the content covered in class.	Tries but has a difficult time showing an understanding of the content covered in class.	Does not show an understanding of the content covered in class.
Total				/15