A Wild Ride! Week 2: Grades K-2

Day 4: My Wild Ride: Plan and Create

Teacher/Parent Background

Scientists and engineers are always faced with challenging questions and problems. In order to best explain the world around them or propose valuable solutions, scientists and engineers follow steps to accomplish these goals. In engineering fields, engineers use the Engineering Design Process to propose solutions to problems in order to make the world a better place or to provide some much needed fun!

Overview

In this activity, young learners will use their experiences with force (pushes and pulls), motion (a change in position)and the engineering design process to build a roller coaster.

Related Standards

- **Plan and carry out investigations** which demonstrate how equal forces can balance objects and how unequal forces can push, pull, or twist objects, making them change their speed, direction, or shape.

Key Terms

- matter - the "stuff" that everything is made of
- force - a push or a pull
- motion - a change in the position of an object
- engineers - people who design and/or build things to solve problems
- engineering design process - a set of steps engineers use to propose solutions to problems
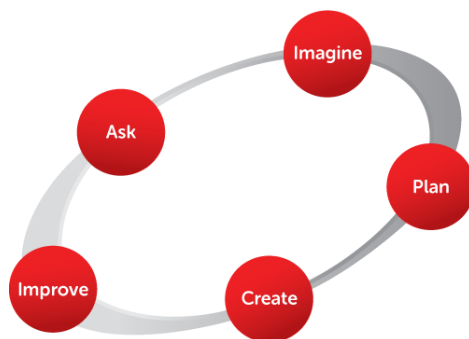
The Engineering Design Process

● blueprint - a design plan

Materials List

● 3D objects which can roll from Day 1
● roller coaster track supplies from Day 2
● Imagine handout from Day 3
● crayons or pencils
● building supplies (tape, scissors, glue, etc.)
● videos and/or books about roller coasters (optional)
  ○ [Wild Waves Enchanted Village](#)
  ○ [Little Dipper](#)
  ○ [Road Runner Express](#)
  ○ Roller Coaster by Marla Frazee
  ○ Zoom! by Diane Adams

Activity Description

1. Revisit the student's roller coaster plans on the Imagine handout. Briefly review his/her ideas and then discuss which plan his/she thinks is best.
   ○ You have two different blueprints for your roller coaster. You can only build one. Which one do you want to build? Why?
     ■ The student's decision could be based on style, types of or quantities of materials available, building space available, etc. There is no wrong answer to this question.
2. Provide the student with time, space, materials and adult support (as needed) to create his/her roller coaster based on his/her selected plan.
   ○ Reminder you can:
     ■ build only what you drew (i.e., If the plan shows one loop, the roller coaster has only one loop).
     ■ use only the materials labeled in the plan (i.e., if the tunnel is labeled as a paper towel tube then a pool noodle or other material cannot be used to make the tunnel).
     ■ build for _____ minutes (time allotment is flexible to your schedule/student's attention span).

Closure

Once the student has finished creating or the allotted time has elapsed, provide the student with time to test the roller coaster. Assist him/her in recording the results (i.e., video record using a phone, record on paper, etc.) Then discuss successes and struggles that he/she experienced during the Create stage of the engineering design process:

- What part(s) of creating your design did you find easy? Why?
- What part(s) of creating your design did you find difficult? Why?
- What did you most enjoy about creating your roller coaster? Why?
- What was your least favorite part about building your roller coaster? Why?
- If you had more time/materials/space, what would you do next?
- Were there any materials you wish you had but didn't? Why?
- What advice would you give another student who is trying to design and create a roller coaster?

Before wrapping up the lesson, be sure to remind the student that he/she will have the opportunity to complete the next stage of the engineering design process tomorrow - improve. It may be difficult for the student to "walk away" from the challenge at this point. He/she will probably want to test more and begin improvements right away. Try to avoid this as it is important to provide time for the student to reflect on his/her plan, the results of his/her test and possible improvements.

Extension

Encourage learning from failure using available resources:

- The Most Magnificent Thing by Ashley Spires
- Succeed by Failing: Crash Course Kids video
- Rosie Revere, Engineer by Andrea Beaty
- Ish by Peter H. Reynolds
- Beautiful Oops! By Barney Saltzberg