Maker Challenge: Cardboard Catapult Lesson Plan

Objectives:

- Students will participate in a maker cycle
    - Design a catapult using
    - Test their catapult & make revisions
    - Design a catapult game

Materials

Try to gather a collection of cardboard & your choice of adhesives to have on hand to allow students to make choices

There are lots of possible cardboard options:
Cardboard Boxes of all sizes: don't forget about Cereal or Shoe Boxes
Cardboard Tubes: Paper Towel or Toilet Paper Rolls

Adhesive or Connector Options
Glue (sticks, bottles, hot glue guns)
Tape (scotch, masking, duct)
Makedo Kit
Paper Punch and String or Zip Ties

Rubber bands will also be key!!
Different sizes and widths

Procedure

1. Have your students watch this video from Grant Wood AEA's Digital Learning Team about the Cardboard Catapults to learn about the challenge.

You help to construct your students' learning path. You can leave it completely open-ended and have them learn through making. Or you can give them some research time to build up background knowledge about different types of catapults. If you chose that path, here's a a few resources to get you started:

a. Physics.org - is searchable and filterable by different grade levels
b. Physics Classroom Lesson- projectiles
c. Teach Engineering - lesson plans, handouts are shared on this site

2. Decide as a class what kind of object you will be launching. *In the video, the class used hacky sacks.*
3. Give students a set time to sketch their catapult design. *Depending on the level of your students, you could encourage them to label and give dimensions to their sketch.*

At this point, consider your class & supplies available. You may have enough supplies to allow students to work independently, or you could have students share their designs and work as a group as shown in the video to help put together a larger design. ***It's important to allow students to choice in what they make.***

4. Review any safety measures with students depending on the supplies that are available.
5. Allow build time for students.
    a. At about ½ way during their build time, add in a sharing moment.
    b. Pair up the students to share their progress so far. Have students focus on:
        i. What are they making? Share original design.
        ii. Have they run into any problems?
    c. Allow the pair to discuss solutions to problems or offer advice as to how they could continue to innovate the designs.
6. Facilitate a class/group discussion about what kind of catapult game they would like to participate in. Keep it simple, have students create and agree upon 5 game rules or less.
7. Take photos or video of their cardboard catapults and share them back with us
        i. Once you are done, submit your photos to us by tagging us on social media @dlgwaea or emailing makerspace@gwaea.org to have your school join our online Maker Community. Please make sure that if you submit photos or videos to us, that all students have the proper release to have their photos posted.

Extension Ideas

- Change the launch object and have students make adjustments to their catapults
- If you created a game based off of precision, design a new game to test distance
- Create a Redemption Day! If the students' catapults were not performing as they'd like, allow them to add in 1 new material not made of cardboard.

Resources

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Standards

Depending on how you complete the makerspace challenge, you can connect to a variety of different standards. Here are just a few examples…

Having your students sketch or plan using technology? Link back to Iowa Core - 21st Century Skills

Will you tie into remaking new shapes or calculating area? Iowa Core Math: Geometry

Planning and creating models is a big part of Iowa Core Science Standards: Engineering Design