

Cy's Zip Line

Grade Level: 3, 4, 5, 6, 7, 8, 9

Duration: 30 - 50

Classification: Classroom

Subject(s): Physics, Math

Categories (STEM): Engineering, Math

Keywords: angles, force, speed, slope, acceleration

Introduction

- Summary: Race to see who can get Cy down the zip line the fastest using angles and slope.
- Description: Students will use their math skills to make a gondola for Cy the mini mascot to ride in down the zip line.

Online Resources: https://pbskids.org/designsquad/parentseducators/resources/zip_line.html

Materials

Materials	Quantity	Reusable?
Plastic cord	7ft Section	Yes
Measuring tape	1 per Group of 4	Yes
Rubber bands	2 per Group of 4	Yes
Paper clips	2 per Group of 4	Yes
Masking tape	3-4 ft per Group of 4	No
Straws	2 per Group of 4	No
Skewers	2 per Group of 4	No
Large Dixie cups	2 per Group of 4	No
Cy mascot doll	2-3 per Classroom	Yes
Scissors	1 per Group	Yes

Directions

- Divide the students into groups of 3 or 4
- Give each group the materials listed above. Do not give them the Cy Mascot Doll.
- Have the students attach the plastic cord at their chosen height and measure the distance from the floor to the top of the zip line
- Without using Cy, each group must construct a basket for Cy to ride down the zip line on safely and quickly. **They can see Cy but cannot practice with him.**

- When most of the baskets are built, put Cy in and have an SRM use their phone to time how long it takes Cy to get from the top to the bottom
- The winning group is the one to safely get Cy down their zip line in the fastest time

Activity Extension

- If time allows, have groups' redesign their basket without changing the zip line
- Take away one material and have the students attempt to build another contraption

Discussion Questions

- Which combination of height made the fastest zip line?
- If they could do the activity again, what would they change?
- What materials did the group use to attach Cy to the zip line? Would changing this impact the speed he traveled at?
- Ask students if they know what slope is. If so, how does height change the slope?

What is happening?

- As the angle increases, Cy moves down the zip line faster.

Applications:

- Majors
 - General Engineering: Engineering process to design, develop, test, and renovate
 - Mathematics: Understanding angles and slope of a graph
 - Physics: How gravity impacts the speed that Cy travels
- Jobs
 - Engineer
- Hobbies
 - Amusement Parks (Corkscrew)
 - Zip lining
- Real world applications
 - Levers
 - Playground
 - Force (Mass) Diagrams (see below)
 - Centripetal Force
 - Friction

