

Ziplines & Stunt Work  
STEM Activity

Situation:

A stuntman or stuntwoman will travel down a zipline.

- 1) Brainstorm how you can engineer a carrier that will safely send a stunt person down the entire zipline. Sketch your carrier in the space below. Then, test your design.

- A GREEN cable represents the zipline.
- A cup represents the basket carrier.
- A figure(ine) represents a stuntman or stuntwoman.
- A pink notecard represents the stunt mattress/target
- Other given materials include: steel marble, straw, pink string, white index card, scissors, masking tape, and 2 paper clips.

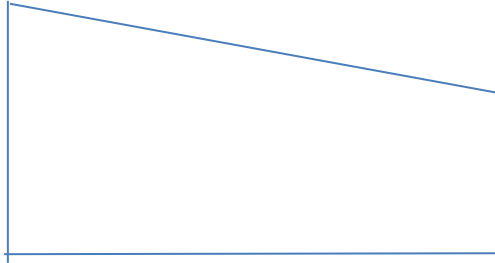
The stunt person will be remotely released from the carrier.

- 2) Modify the cup so that the stunt person can be remotely released from the carrier. Sketch your plan in the space below. Then, test your design.

The stunt person must land safely.

- 3) Not only does the stunt person need to be released remotely from the carrier, he/she also needs to land on the stunt mattress/target in order to land safely. Make any necessary changes and re-test your design. What changes did you make in your overall design?

The stunt coordinator surveys the scene and sketches the zipline set up as shown below.



- 4) Determine the vertical rise of the zipline and the horizontal distance covered by the zipline. Illustrate these numbers in the picture above.
  
- 5) Determine the slope of the zipline as a percent. Show your work below.  
NOTE: Slope percent =  $\frac{\text{rise}}{\text{run}} \times 100$
  
- 6) Using a zero-base protractor, determine the angle of descent. (NOTE: The angle of descent is the same as the angle of elevation.)
  
- 7) (Optional) Write the equation of the line modeling the zipline.

Additional Resources:

- <https://pbskids.org/designsquad/build/target/>
- [https://www.adrenalindreams.com/video\\_gallery\\_air\\_bag\\_safety\\_features.html](https://www.adrenalindreams.com/video_gallery_air_bag_safety_features.html)
- <https://view.joomag.com/steamed-magazine-october-2016/0560636001474562057?page=15>
- [https://pbskids.org/designsquad/pdf/parentseducators/nasa\\_ds\\_guide\\_508\\_07on\\_target.pdf](https://pbskids.org/designsquad/pdf/parentseducators/nasa_ds_guide_508_07on_target.pdf)