

Part III: Discover

We noticed in Part II that the average velocity for the top half and the bottom half of the zipline were different. Now we will investigate average velocities through the middle of the zipline. Remember: **every zipline run should travel the entire length of the ribbon.** You also may wish to run the zipliner a few times and use an average of those times for each item below.

1. Find the average velocity of the zipliner as it travels through the middle half of the zipline. To do this, first mark the points a fourth of the distance from the top and a fourth of the distance from the bottom of the ribbon and record the distance between the two marks. Then find the average velocity of the zipliner as it travels between those marks.

2. Find the average velocity of the zipliner as it travels through the middle third of the zipline. To do this, mark the points a third of the distance from the top and from the bottom of the ribbon and record the distance between the two marks. Then find the average velocity of the zipliner as it travels between those marks.

3. (Time permitting) Choose another interval shorter than the middle third that still includes the halfway mark. Mark a point on the ribbon above the halfway mark and one below the halfway mark. Record the distance between the new marks. Find the average velocity of the zipliner as it travels between the two marks.

PART IV: Inquire

1. We have measured average velocities by calculating distance traveled and the time it took to travel that distance. Is it possible to know exactly how fast the zipliner is traveling the moment it passes the halfway mark? If so, describe how you would determine this instantaneous velocity. If not, explain why not and explain how you might estimate the instantaneous velocity.

2. Writing Assignment: Prepare a brief write-up discussing today's activity. Summarize your group's findings and discuss the question in Part IV. Please type your entry.