

# Trouble-chuting



# Question/Problem and Predictions

**Question:** How does parachute shape affect fall speed? The circular parachute will fall slower because it will catch more air resistance.

**Hypothesis:** If the circular parachute catches more air resistance than the rectangular parachute, then the circular parachute will fall slower because there is more wind pushing it up.

# Introduction

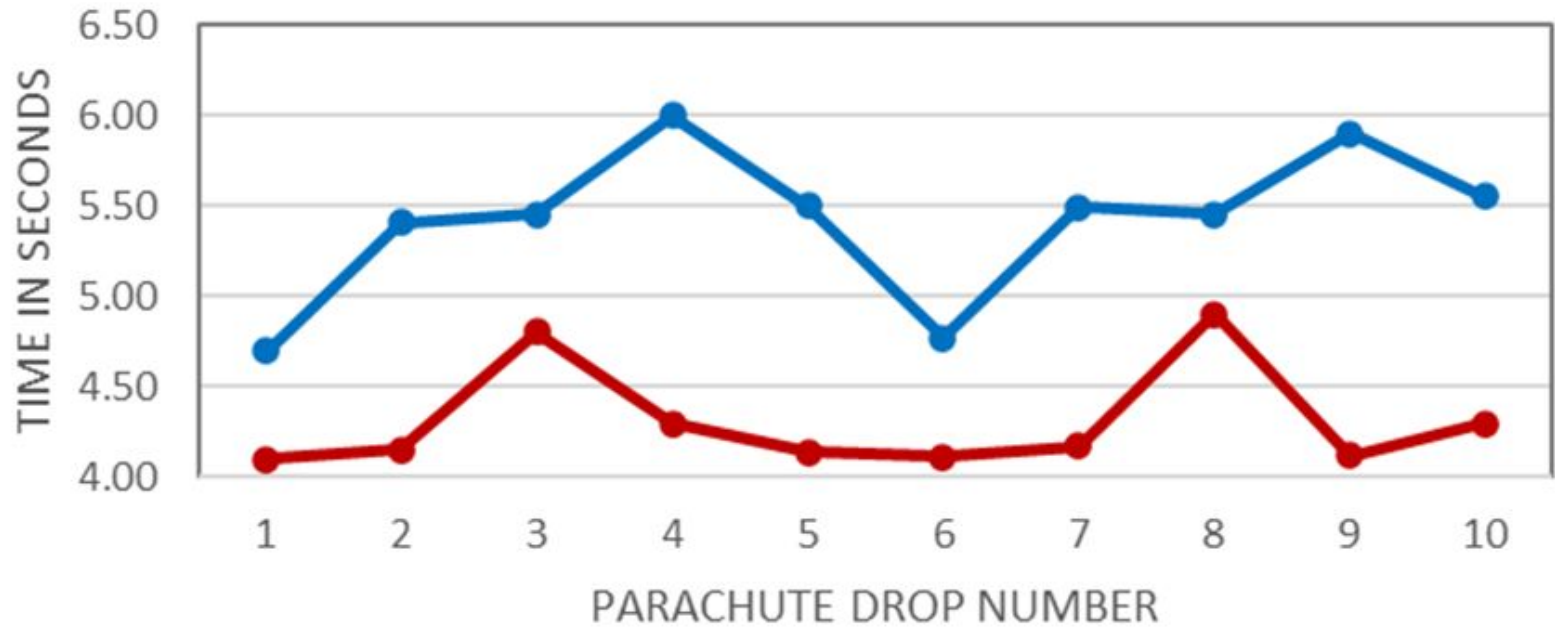
We often see two types of parachutes: circular and rectangular. I'm interested in learning which parachute would stay in the air longer.

# Investigative Methods or Procedures

1. Get measuring tape, calculator, stopwatch, camera.
2. Build one 10-inch x 20-inch rectangular parachute and one circular parachute with radius of 8 inches.
3. For the circle parachute, cut a small hole in the middle of the canopy (about  $\frac{1}{2}$  inch wide). This will prevent the parachute from swaying back and forth when falling.
4. Go to a high place to drop the parachutes multiple times. The high place can be at the top of the stairs of a two story house or at the highest part of the jungle gym at the Safari Park in Sahuarita
5. Drop both parachutes at least 10 times each and record the drop time and observations

## Results and Data Visualization

### GRAPH OF INDOOR DROP TIMES

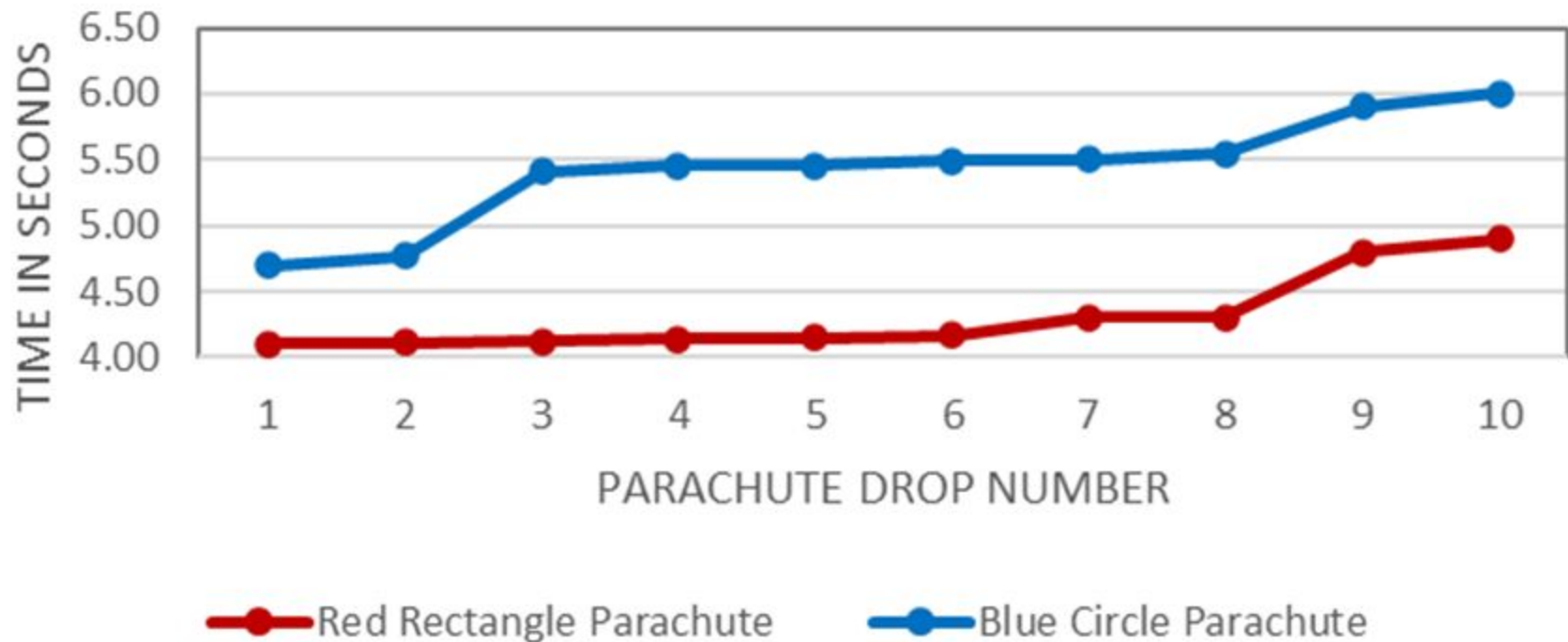


Red Rectangle Parachute

Blue Circle Parachute

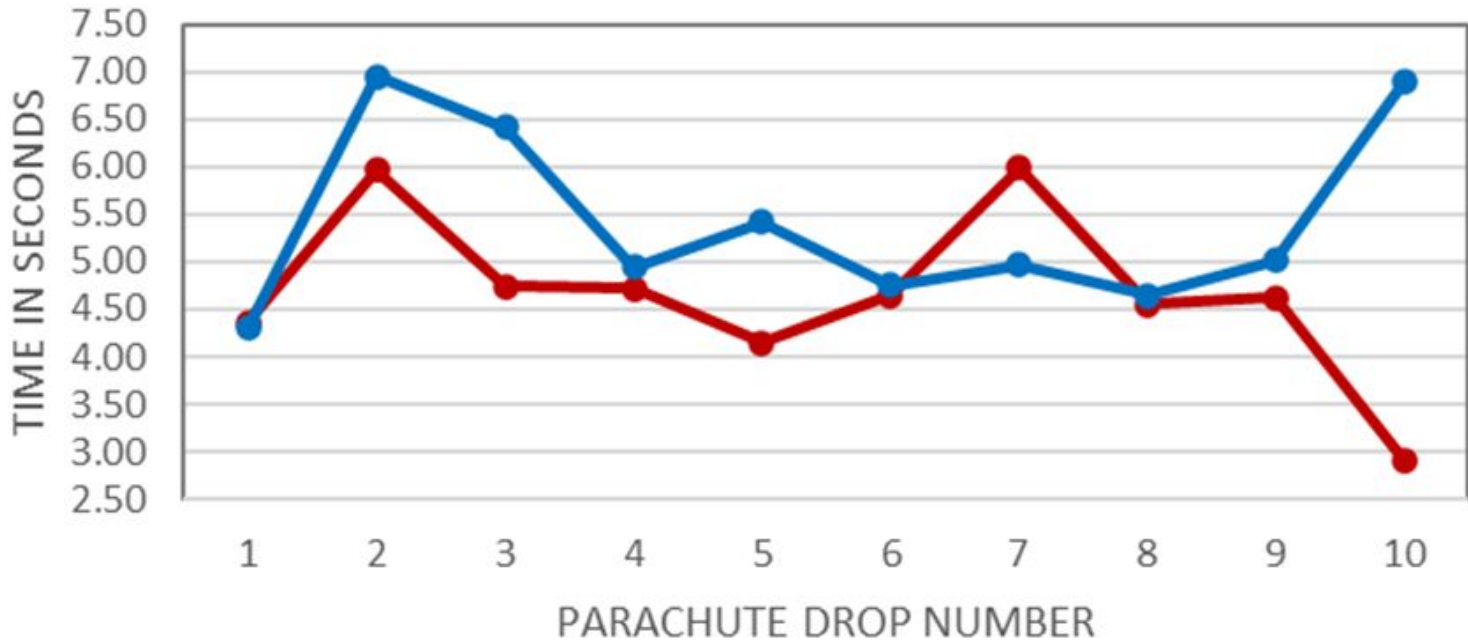
## Results and Data Visualization

### GRAPH OF INDOOR DROP TIMES



## Results and Data Visualization

### GRAPH OF OUTDOOR DROP TIMES

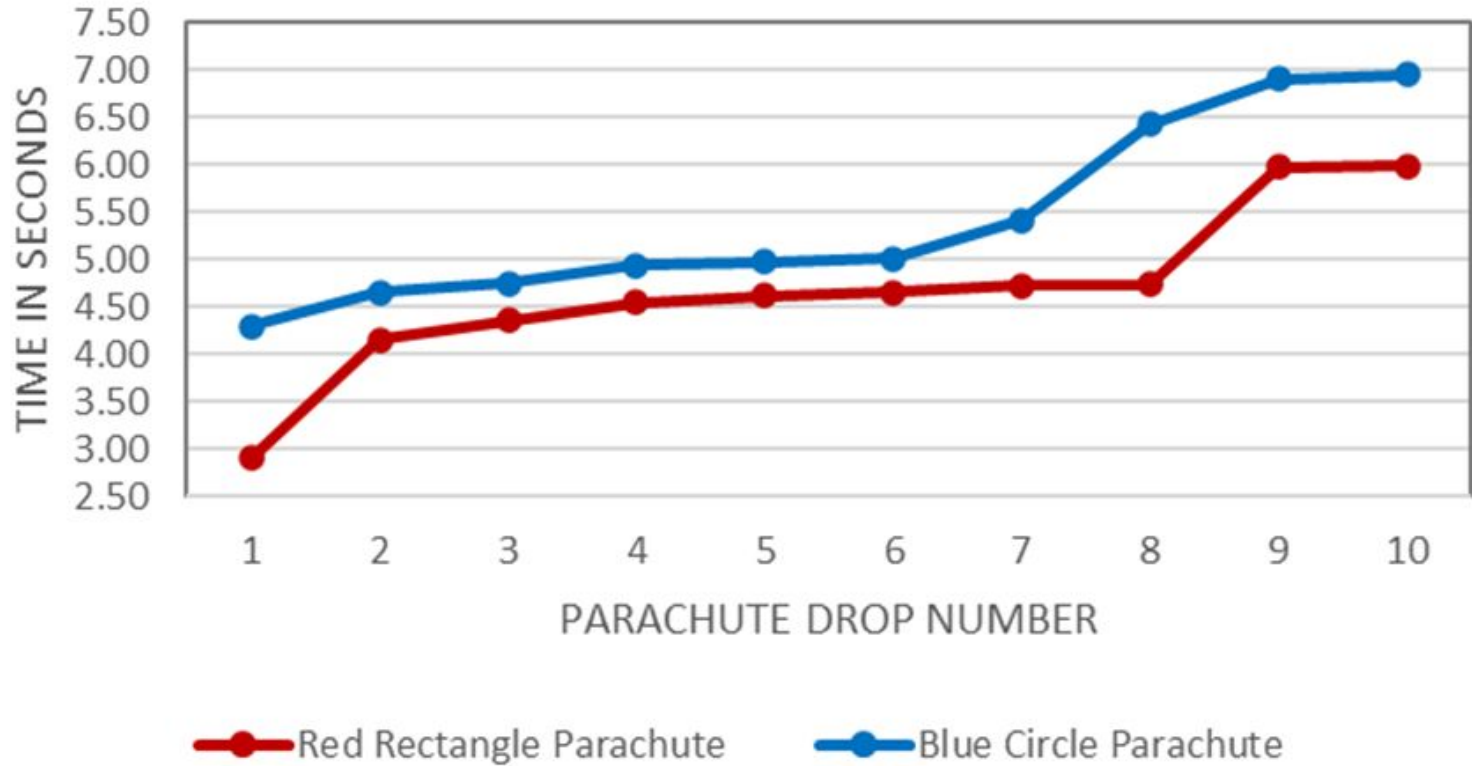


Red Rectangle Parachute

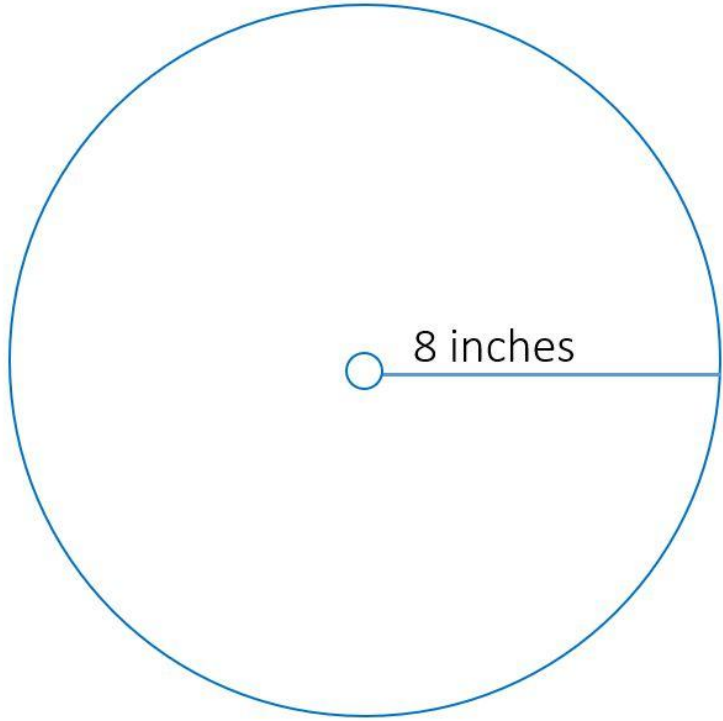
Blue Circle Parachute

## Results and Data Visualization

### GRAPH OF OUTDOOR DROP TIMES







Area  $\approx 200 \text{ in}^2$



Area  $\approx 200 \text{ in}^2$

Results and Data Visualization

INDOOR TIME IN SECONDS	Red Rectangle Parachute	Blue Circle Parachute
	4.10	4.70
	4.15	5.41
	4.80	5.45
	4.30	6.00
	4.14	5.50
	4.11	4.77
	4.17	5.49
	4.90	5.45
	4.12	5.90
	4.30	5.55
	<b>AVG:</b>	<b>4.31</b>

OUTDOOR TIME IN SECONDS	Red Rectangle Parachute	Blue Circle Parachute
	4.36	4.30
	5.97	6.95
	4.74	6.42
	4.72	4.94
	4.15	5.42
	4.65	4.75
	5.99	4.97
	4.55	4.65
	4.62	5.01
	2.91	6.90
	<b>AVG:</b>	<b>4.67</b>

## Results and Data Visualization

	Red Rectangle Parachute	Blue Circle Parachute
<b>Indoor Average</b>	<b>4.31</b>	<b>5.42</b>
<b>Outdoor Average</b>	<b>4.67</b>	<b>5.43</b>

# Discussion and Interpretation

When dropping the parachutes 16 feet indoors ten times, the average drop time of the rectangle parachute was 4.31 seconds. The average drop time of the circle parachute was 5.42 seconds. This is strong evidence that while indoors the circle parachute fell slower than the rectangle parachute.

When dropping the parachute 16 times at the Safari Park, the average drop time of the rectangle parachute was 4.67 seconds. The drop time is actually slower outside the house because there was a slight wind that contributed to parachutes' air resistance. The average drop time of the circle parachute outside was 5.43 seconds. This barely changed from the inside trials. Therefore, the circle parachute seems to be steadier than the rectangle one.

# Implications and Ideas for Future Research

Overall, the circle parachute fell slower by an average of .94 seconds. In the future we could test different shaped parachutes to see if any of them fall slower than the other. Further research could be beneficial to military units that might need precise timing in parachute drops.

# References

Koontz, Robin. *Parachutes, Gravity, and Air Resistance*. Kids Discover. 2014

Blog post available at:

<https://www.kidsdiscover.com/teacherresources/parachutes-gravity-air-resistance/>

Paxton, Lionel. *Parachute Action Adventures for Kids: Paratroopers & Skydiving Heroes*. Scotts Valley, CA: Create Space publishing, 2013