

How elite IS “Elite”?

Comparing the accuracy of Nerf Darts.

Question:

Which blaster dart,
Nerf Elite 2.0 or Adventure Force,
is more accurate?

Research

Nerf Dart Comparison - Coop772 (youtube.com/watch?v=81wTM1fpzDY)

Nerf Elite darts are not some of the best kind of darts, but they're not the worst. Some darts that aren't accuracy darts are slightly better than Nerf Elite, but there are other darts that are way worse.

Dart Review! New for Fall 2018 Adventure Force Nerf Compatible "Waffle" Dart Packs @ Walmart
- Foam From Above (youtube.com/watch?v=UdbN4qBBLCK)

Adventure Force darts had pretty consistent grouping. They had "very little variance in flight path".

Hypothesis

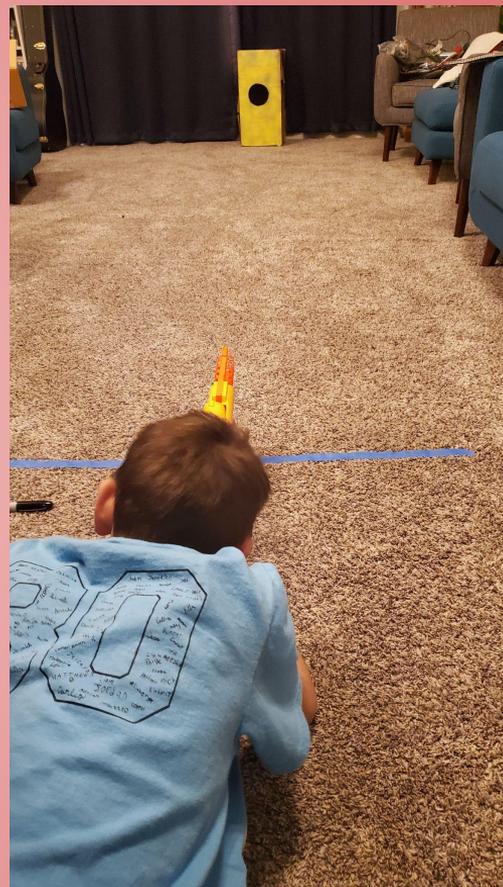
Based on my research, I think the Adventure Force darts will be more accurate.

This is because one of the videos said that the Adventure Force darts had good groupings (good precision) and the other video showed that Nerf Accustrike darts are pretty accurate themselves and have very similar tips as the Adventure Force darts. The Nerf Elite darts have a round tip that make it drop more and did not have as good groupings compared to the Accuestrike (Adventure Force) darts.

So I expect the groupings and accuracy to be better for the Adventure Force darts than the Nerf Elite 2.0.

Procedure

- 1) **Create a target.** Cut a hole 6 inches in diameter in a cardboard box. This will be your target. Darts that make it into the hole will be considered successes. Darts that stay outside the box (after bouncing off or missing the box entirely) will be considered failures.
- 2) **Set up target range.** Place the target at a quiet location and use painters tape to create a line on the floor exactly 15 feet from the target. Shoot all shots for the experiment from behind this line.
- 3) **Choose one nerf gun for the experiment.** This makes sure that all the darts are all shot with the same pressure. (Different guns would produce different air pressures and would make the darts shoot differently.) We are using the Nerf Alpha Strike sniper blaster for our experiment.
- 4) **Find multiple people to shoot the darts.** Different people can have different accuracies with the blasters. Having different people shoot for your experiment will make sure that results do not depend on the shooter. For our experiment, Liam, Mom, and Dad, and I will all shoot 20 darts.
- 5) When shooting, **switch between the Nerf Elite 2.0 darts and the Adventure Force darts**, alternating one at a time. This is to make sure that if getting tired affects accuracy, it affects both types of dart equally.
- 6) **Have each shooter shoot 20 darts total** at the hole in your target, switching between Nerf Elite 2.0 and Adventure Force (10 of each).
- 7) **Collect data after each shooter.** Record the number of successes (in the box) and the number of failure (outside the box) for each type of dart.



Variables

In our experiment, the independent variable is the different darts used, the Nerf Elite 2.0 and the Adventure Force.

The dependent variable is the accuracy of the darts. The number of darts that make it into the target hole should only depend on which type of dart it is.

We have several control variables:

- 1) Tiredness is a variable we are controlling by switching between darts. This way, being tired doesn't affect accuracy on one type of dart more than the other.
- 2) The type of blaster used is something we control. This is because different blasters can be more accurate than each other. By using one and only one blaster, we make it so the blaster is not a variable.
- 3) The target and the target distance are variables we control. We will use the same target, a six inch hole, at the same distance, fifteen feet, for every shot used in our experiment.

Materials

For this experiment, we will need the following:

- 1) Nerf blaster, preferably long range
- 2) 1 target, a cardboard box with a 6" hole.
- 3) Painter's tape
- 4) 2 different types of nerf or nerf compatible darts
- 5) Paper and pencil to record data

Preparation and Safety

Before completing this experiment, we will need to:

- 1) Gather materials.
- 2) Choose blaster and darts and have ready.
- 3) Create target (6" hole in cardboard box).
- 4) Place painter's tape 15' from target.
- 5) Have all shooters ready.
- 6) Have chart ready for data collection.

To make sure our experiment is as safe as possible,

- 1) Everybody will stand behind the shooter.
- 2) We're using nerf darts, so they won't hurt very much.
- 3) Our target is in front of the living room curtains which will stop the darts without breaking any windows.

Data (15 feet away)

15 feet	Success (Adv Force)	Failure (Adv Force)	Success (Nerf Elite)	Failure (Nerf Elite)
Elliott	2	8	0	10
Liam	2	8	2	8
Mom	1	9	0	10
Dad	0	10	1	9
Total	5	35	3	37

Adventure Force Success Rate = $5/40 = 12.5\%$

Nerf Elite Success Rate = $3/40 = 7.5\%$

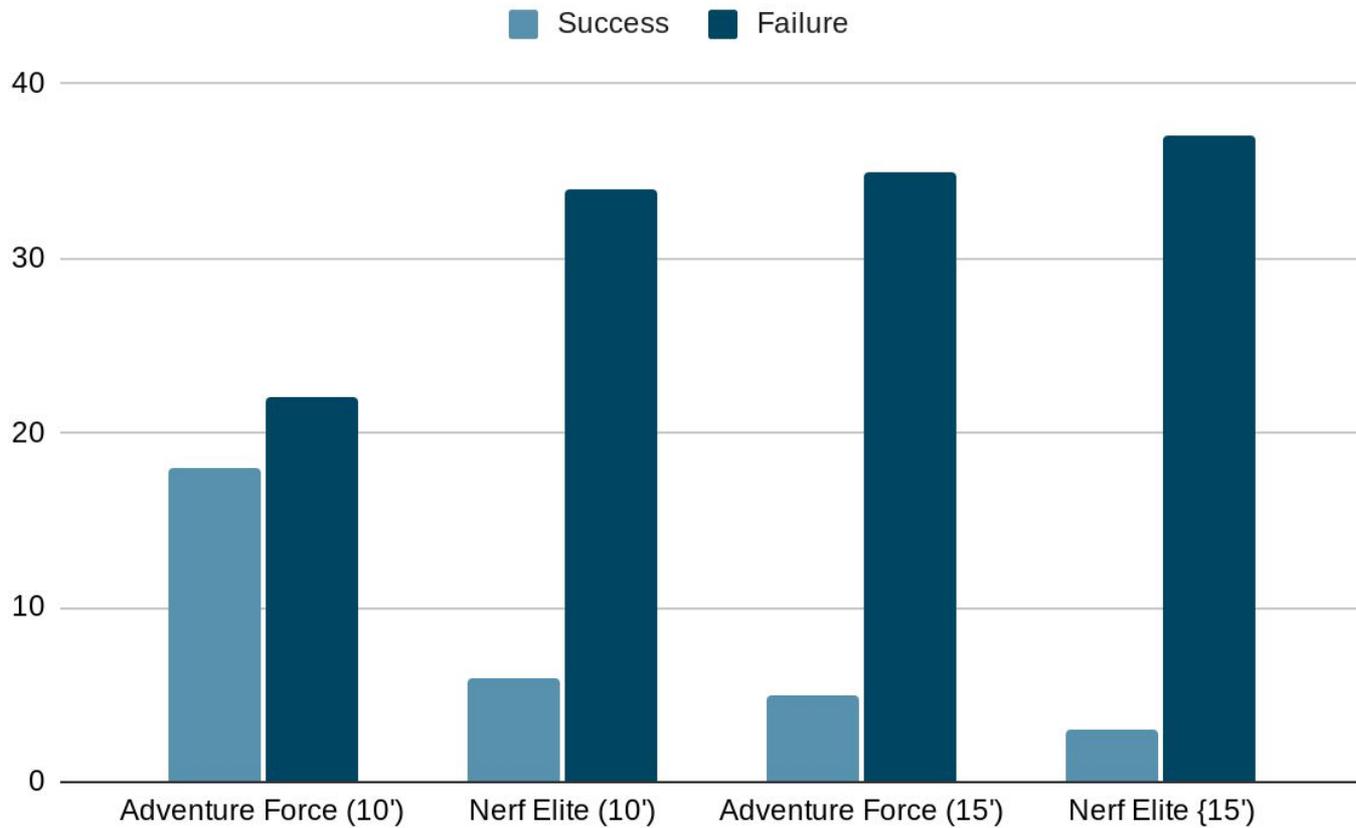
Data (10 feet away)

10 feet	Success (Adv Force)	Failure (Adv Force)	Success (Nerf Elite)	Failure (Nerf Elite)
Elliott	7	3	2	8
Liam	5	5	2	8
Mom	3	7	0	10
Dad	3	7	2	8
Total	18	22	6	34

Adventure Force Success Rate = $18/40 = 45\%$

Nerf Elite Success Rate = $6/40 = 15\%$

Graphs



Conclusion and Discussion

Because we were getting low success rates at 15 feet, we decided to do the experiment again at 10 feet away from the target.

At 15 feet, the success rate for the Adventure Force darts was 12.5%. The Nerf Elite darts had a success rate of 7.5%, much lower than 12.5%.

At 10 feet, the success rate for the Adventure Force darts was 45%. And the Nerf Elite darts had a success rate of 15%. That means the Adventure Force darts were three times as successful!

My hypothesis based on our research was that the Adventure Force darts would be more accurate than the Nerf Elite. **My data supports this hypothesis.**