

Arrow Aerodynamics

New Mexico

Supercomputing challenge

Final report

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Number 79

Melrose junior high

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Our project is studying the aerodynamics of an arrow after being fired from a bow. We are wanting to find a way to help hunters with choosing the right arrows and arrow tips. We are also working to find out the different weights of the arrows and arrow tips so that hunters may see how far the arrow would travel. Our project is about the aerodynamics of arrow flight. We choose this project because we all like to hunt and shoot bows. We choose these variables because they will affect the arrow in these ways. Some of these things that can change with bows are:

- A)the size of the bow,
- B)its pull pounds,
- C)the arrow length,
- D)the weight of the arrow,
- E)draw length of the bow,
- F)the arrow head size,
- G)the pounds the arrow can withstand,
- H)the composition of the arrow (wood or carbon),

The size of the bow will affect the hunter because if it's a little bow then it will not have enough power and won't kill the animal you're hunting for. The pull of pounds will affect the Hunter because if he just gets a bow without knowing anything about it when he goes hunting it might be too easy to pull back or too hard to pull back. And also it will affect the arrow. The arrow length will affect the way it fires so if the arrow is too short then when you pull it back then the arrow will go through your hand or arm. If the arrow is too long then it will go faster and straighter so it will hit your target faster and harder.

The weight of the arrow also affects hunting because if the arrow is too light then it will brake of splinter if it is too heavy then the arrow will fall to the ground faster. Arrow head size will do different thing for the arrow if the head is too heavy then the arrow will fall to the ground faster if the arrow head is too light then it will keep going for a while. The pounds the bow can withstand will be good to know because if the arrow doesn't take a lot of pounds like I said above the arrow will break in half or splinter and if it splinters in to your hand arm or anything that the splinters might hit. Composition of the arrow would also be good to know because wooden arrows would splinter and carbon wouldn't they would just snap in half so carbon arrows will be a better thing to shoot so they don't splinter everywhere it will just go one place. We want hunters to know the optimum lengths of an arrow for their bow and the different kinds of tips for the arrow based upon their individual needs.

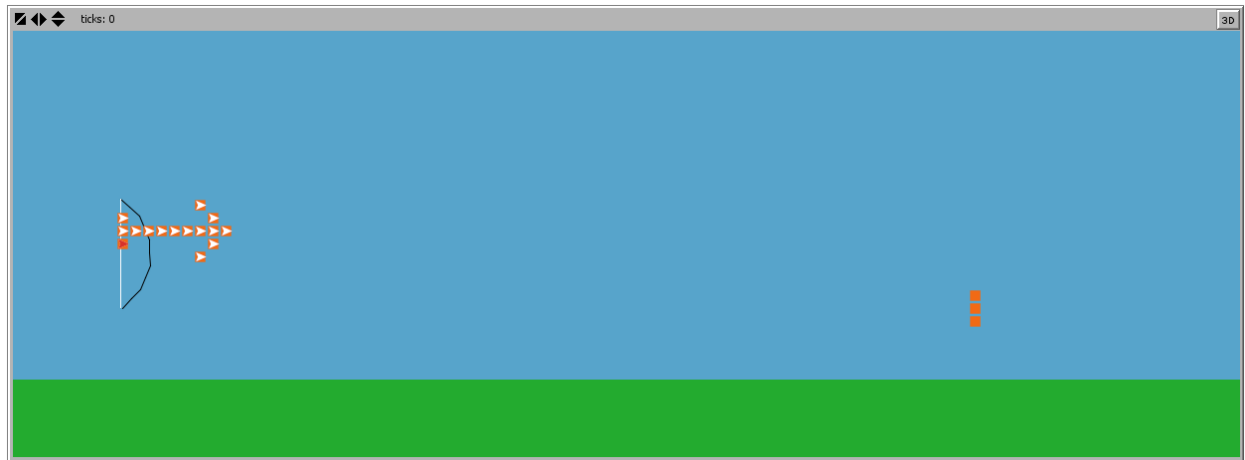
Our hope for our results are that an arrow will have good aerodynamics so the arrow will fly straight with maximum impact. We hope that hunters take notice of our project and use it to help them. We are interested in this because we are all in a type of shooting competition. We want to help hunters and other people in shooting competitions. We are making a computer program in NetLogo to simulate shooting a bow while using gravitational pull that affects the arrow when being fired from a bow. Our variables are the length of the arrow, the weights pulled back, and the weight of the arrow and the arrow tip.

As we change the patterns we will see the different affects. We will continue doing research over this project and get help from local experts. The members of our group have shot many different types of arrows and have gotten data by shooting at different 3D targets. We have used different draw lengths and weights over the years we that we have been shooting in these shooting competitions. Our code to date includes the making of the bow, the formation of arrows that fly across the screen, and targets that the arrows will hit. Our next steps will to be fix the way the arrow flies after we do more research on the aerodynamics of their flights. Our project is studying the aerodynamics of an arrow after being released from a bow. We are wanting to find a

way to help hunters with choosing the right arrows and arrow tips. We are also working to try out the different weights of the arrows and arrow tips so that hunters may see how far the arrow would travel. We are interested in this because we are all in several different types of shooting competitions. We want to help hunters and other people in shooting competitions. The members of our group have shot many different types of arrows and have gotten data by shooting at different 3D targets. We have used different draw lengths and weights over the years that we have been shooting bows in various competitions. We are making a computer program in NetLogo to simulate shooting a bow while using gravitational pull that affects the arrow after being released from a bow. Our variables will be: The length of the arrow, the weight pulled back on the draw string, the weight of the arrow. The arrow tip, and the type of arrow tip. Our next steps are to fix the way the arrow flies to make it more realistic. This will require additional research on the math to show the aerodynamics of their flights. We will test our model by shooting our own bows and comparing the results to the program.



This is a picture of what we are trying to do. The little black dot on the bottom of the screen is the target for the arrow will hit. Soon we will be able to turn the target to game so there will be Elk, Deer, Birds, Rabbits and raccoons.



Heres a picture of the bow we are using. And a different target .

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Significant achievement =

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