Science Lab Analysis Essay, Research Paper

Lab Reflection and Analysis

A. Background

Rockets date back to the early 1200, where they were used in China. Warlords would experiment with gunpowder and arrows. The first rockets were actually made by they Chinese, they were 12 arrows placed in a funnel like basket and the end was lit. This primitive invention was named Rocket Propelled Fire arrows (David Harding, 1980). Although the real rocketry started in about 1250 and 100 years later RPGs (Rocket Propelled Grenades) were introduced to the world by Europe and they Arabs (David Harding, 1980)

Modern rockets are used for many things like weapons, space travel, recreation, experiments, and many other things. In the way of rockets used as weapons, there are many types. There are air defense missiles, SAMs (Surface to Air Missiles), ballistic missiles, air to land missiles, air to air missiles, and many other types. As you see there is almost a missile for everything.

One of the newest and most effective missiles that we have is the Tomahawk Cruse missile. Cruise missiles are designed to fly at extremely low altitudes at high subsonic speeds, and are piloted over an evasive route by several mission guidance systems. The name of the main guidance system is TERCOM (Terrain Contour Matching), this guidance system is so effective that a cruise missile can hit it s designated target within 6 feet and can be launched from extremely long ranges (The United States Navy Fact Files, 1998-200).

In terms of recreation model rockets are what people use. Model rockets generally use solid fuel, such as Estes rocket engines etc. Model rocketry is actually a big hobby for some people. It involves building the rocket, this means taking time and carefully preparing all of the parts of the rocket to be put together. Once the rocket is successfully built you must put in an engine and an igniter. The engine sizes run as followed: A half stage, A full stage, B half stage, B full stage, C half stage, C full stage, D half stage, D full stage, E half stage, and E full stage. Once you have the correct engine and the rocket is built, you are ready for launch! That s about it in the way of model rocketry.

Rockets that are used in space launches are the most important thing in the launch. Rockets can boost spacecrafts, satellites, and parts of space stations into space (Toney Osman, 1983). Rocket boosters launch mostly all satellites. They sputnik satellite (the first satellite in space) was launched by an enormous rocket into space. John Glens maiden voyage into space was kicked of by an extremely large rocket compared to the Friendship 7 (John Glens actual space craft that circled the earth 3 times) (Toney Osman, 1983)

Rockets are very complex machines, that s why people refer to rocket scientists as extremely smart people. Rocket scientists have to compute complex equations and calculations. They have to figure out how to make it land where they want it to, how to make it go where they want it to go, and many other things. In Florida at the NASA headquarters and the Kennedy Space Museum, workers spend hours and hours preparing space shuttles and their engines for launch. Everything has to be perfect or a fatal accident can occur. Like in 1983 when the Challenger 1 exploded because if a faulty O-ring. Since that there has never been a crash or disaster because of faulty installation or wiring.

B. Experimental Design

Purpose: The purpose of this lab is to find out if the shape of a rocket and the shape of its fins effect its flight time.

Hypothesis: If the rocket has a wider body then the rocket will fly longer and if the fins are larger I think the rocket will fly longer.

Materials:

10 Estes rockets and necessary parts in the kits

Scissors

Glue

20 Estes C-stage engines and 20 igniters

Stop watch

Launch pad

Balsa wood (or card board)

Procedure: First you will need to buy 10 Estes rocket kits. Then you will connect 4 6-in. fins to the 1st rocket and build it as the directions say. then for the second rocket you will put 4 fins about 4 and one half inches long onto the body and follow the necessary building directions. For the third rocket you will have to cut the body down to 8 inches in length. Then you need to put on the regular size fins that come with the kit. For the fourth rocket you will have to attach 2 small cardboard tubes (about 2 cm in diameter and about 6 inches in length) to the sides of the rocket and build the rest of the rocket according to the directions. For the 5th and final rocket you will need to connect 2 rocket bodies together (one on top of the other). Then put 4 fins on the bottom of the rocket(the size that came in the kit) and 4 on the place where you joined the 2 rockets together. Then follow the rest of the directions that came with the kit. Then after all the rockets are constructed you need to launch them on the launch pad. As soon as they are launched you need to start the stopwatch. When the rocket hits the ground you need to stop the stopwatch. Then record your data.

Independent Variable: The flight time of the 5 rockets

Treatment I.V.:

# of Trials: 2 launches for each rocket

Dependant Variable: Flight time in seconds from launch until the rocket hits the ground.

Constants: Same parachute design, same rocket engines,

Also here is a data table I could use to collect data.

Launch # 1 Launch # 2

Rocket 1 Flight time in second

Rocket 2

Rocket 3

Rocket 4

Rocket 5

C. Reflective Analysis

The original Bottle Rocket lab was very interesting for me. I liked it so much because it was a hands on experiment. The lab was very interesting in the way that it grabbed my attention and kept it. Once I decided to do my Laboratory Reflection and Analysis on this lab I had to get lots of background on rockets and the way that they fly. I used many sources to find information, including Internet, library, talking to people, and personal knowledge. It wasn t very hard for me to find information on rockets. It is a pretty wide spread topic, and lots of people are interested in rockets. On the Internet I found lots and lots of information on model rockets, but it was hard to find info on real rockets. In the library it was the exact opposite, I found lots of information on real rockets and very little on model rockets. I decided to design my experiment around the background that I collected. I had to think a while but I finally came up with what I thought was an original and very good experiment.

This experiment could help current issues in rocket engineering in many ways. The data from this lab could show if maybe some other designs for rockets could be more useful. Or maybe one of my rockets that I designed uses less fuel to gain more altitude, therefore saving the rocket companies millions of dollars.

I think that this experiment would be very good for a science fair project. This would be a project that I could get all the materials to and all of the supplies that I would need to complete this experiment. This would be allot of fun for me to conduct also. Therefore I think that this experiment has a very high chance of being used as a science fair project.

D. Bibliography

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