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11-7-13
P4

It Really Is Rocket Science

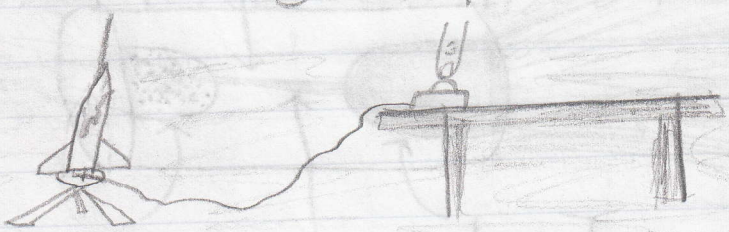
Purpose: Describe the flight of a rocket using forces and motion, forms of energy, and properties of matter

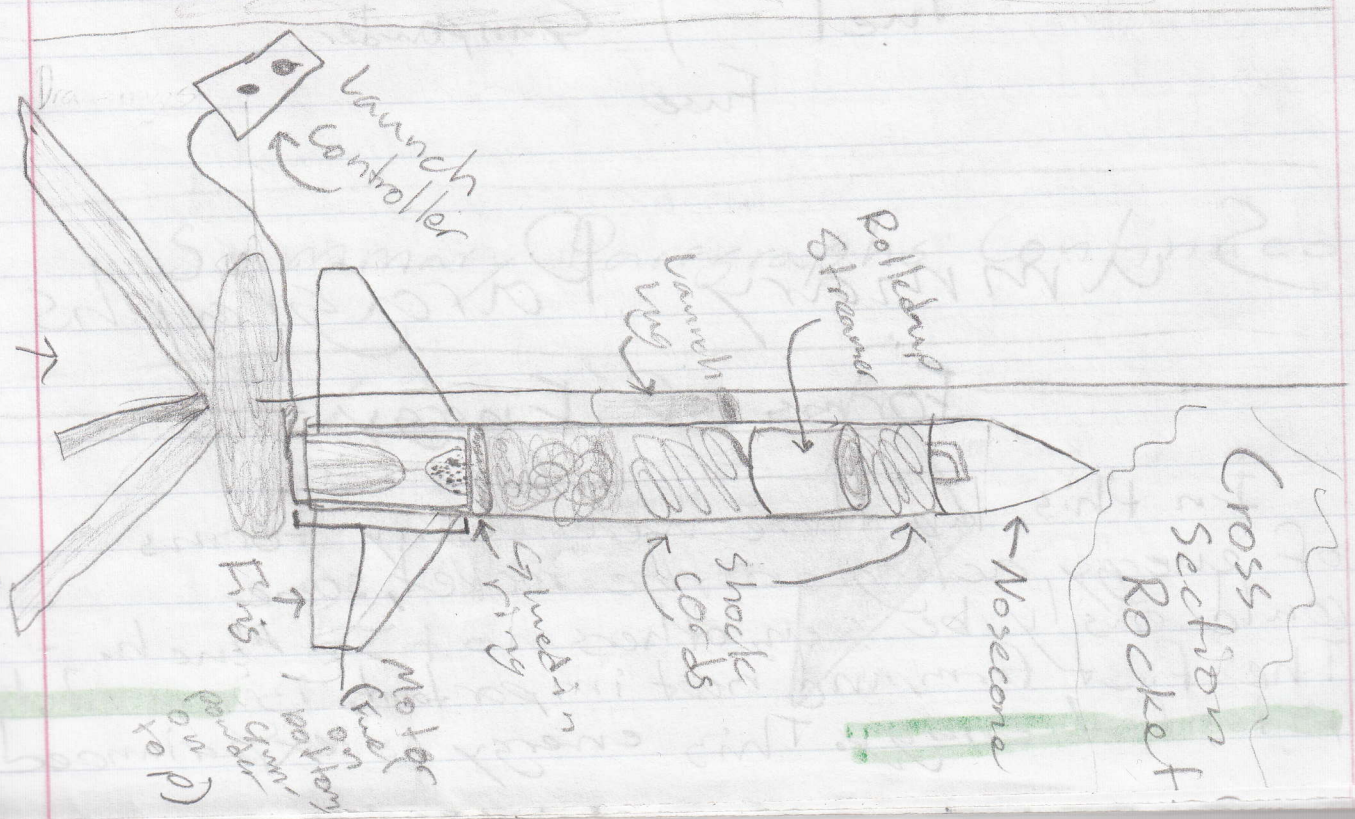
500ft for cheetahs

Materials:
- Assembled Cee-yah rocket
- Launch pad
- Launcher button controller
- Open area

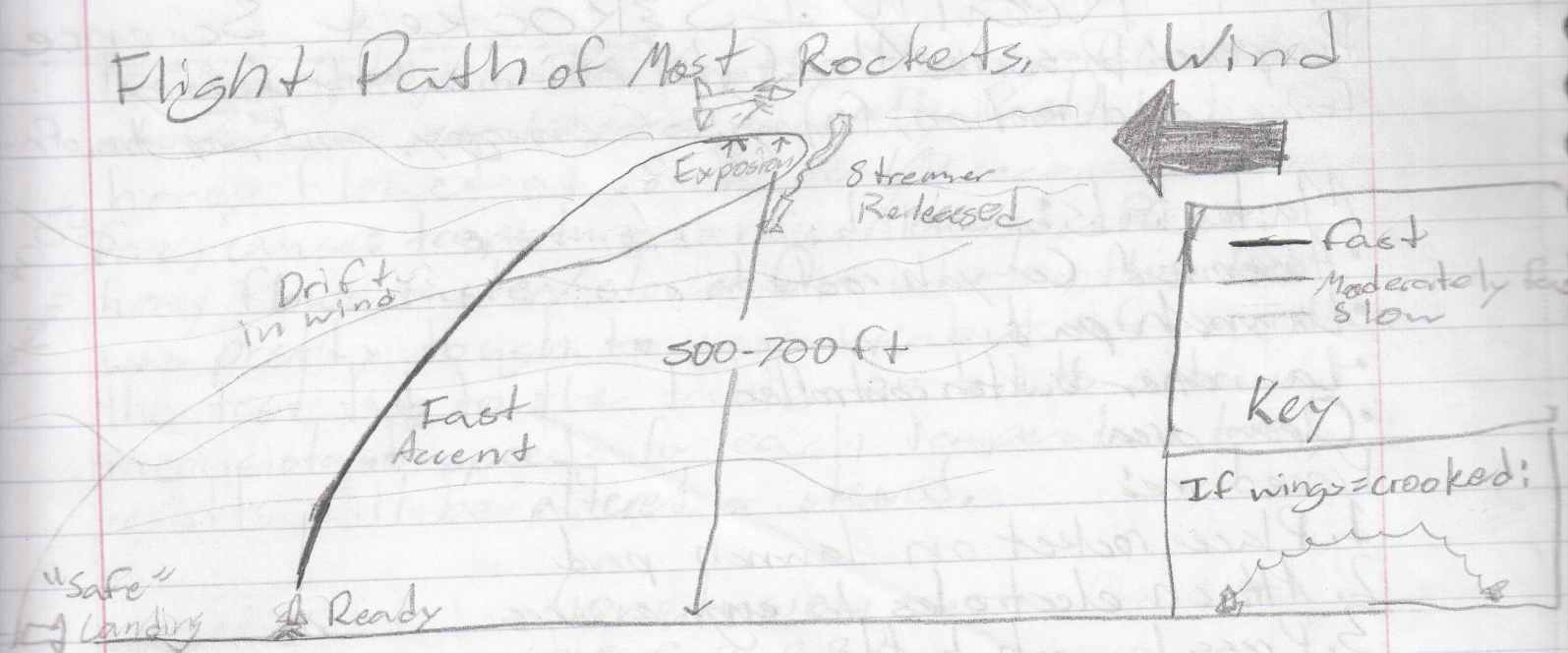
Procedure:
1. Place rocket on launch pad
2. Attach electrodes to engine wires
3. Press launch button
4. Observe

Setup:

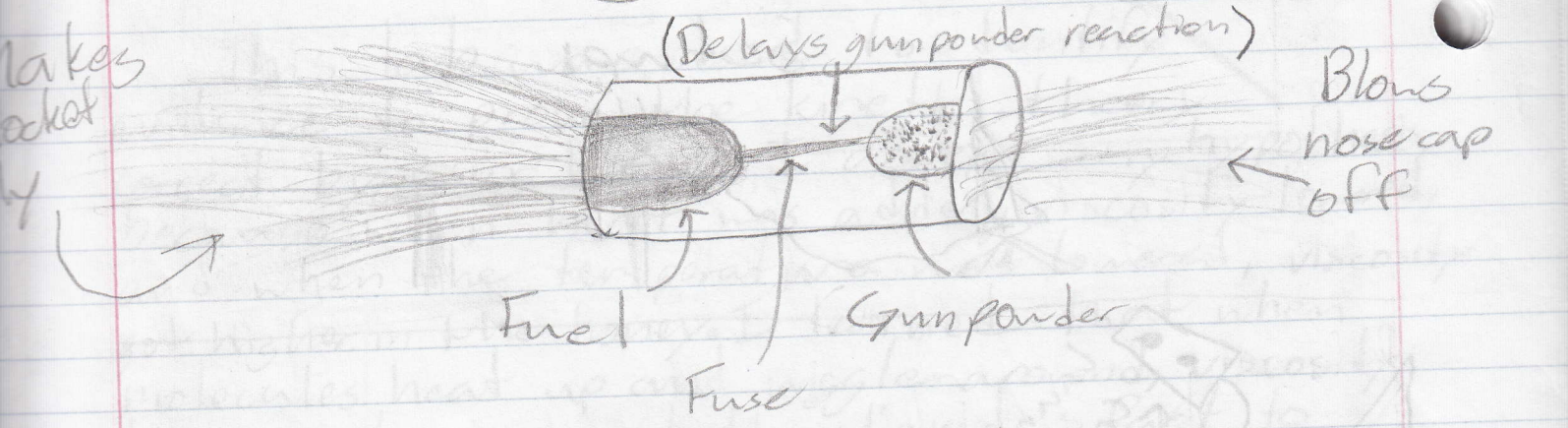




Flight Path of Most Rockets



Cross Section Motor



Summary Paragraphs

Forms of Energy

In this lab, there were many forms of energy acting on the rocket, some could easily be seen, others not so much. The first form, and most important, is gravitational potential energy. This energy is experienced

Summary Paragraphs

throughout the entire lab. When the rocket is on the launch pad, the rocket's GPE is very low, because it is essentially on the ground. However, when launched, the GPE rises as the rocket rises, also decreasing as the rocket falls. The rocket also experiences chemical potential energy. On the pad, it has maxi CPE, because the fuel has a high potent to burn. In the air, the rocket has perpetua decreasing CPE as the fuel burns, providing less useable energy. After the fuel has burned up, there is little to no CPE because there is no chemical reaction that can potentia occur. Kinetic energy is also in the equation. Like GPE, KE is very low or 0 on the launch pad, because it is not moving. When being propelled in to the air by the motor, kinetic energy is at maximum because it is being moved, fast. And everywhere the rocket is coasting or floating, KE is low. Mechanical energy is also present, because the GPE + KE = ME, and that energy turned in to not one. Alongside all of these examples, the most obvious forms of energy in this lab are heat (thermal) and light energy. Heat was definitely present because of while launching rockets, small explosions (controlled) occurred to be giving off light, but combustion always means heat as well as light. Furthermore, light is produced by the fuel's combustion based on the

encounters pulls it down while the thrust is trying to push it up. Drag exists because air has mass, and that means the only way to move it is to exert a force on it to push it out of the way. this force pushing through the air is the rocket. Another force that is being exerted on it is the ground or the launch pad (at launch). Just imagine trying to hold the rocket in the air, launch it, and drop your hand away so you don't get sliced by a fin, and then trying to dodge it as it flies in whatever direction it wants. Therefore, you need the help of the ground and launch pad to steer the rocket in the early stages. And finally, sunlight indirectly altered the flight path significantly by creating wind. Wind was such a large factor that the launch pad actually had to be tilted so the rocket would hopefully land somewhere in the vicinity of the launch site because it pulled the rocket so far off course.

Properties of Matter

Even though there are forces and energies being exerted on the rocket, the rocket has to be strong enough and tough enough to withstand those forces and fly away. First of all, the rocket needs to be made of something that will keep

its shape, can with stand heat from the engine, and is light enough to fly, but not to the point of weakness (tearing, melting, etc.). Therefore, the body tube was made of a strong cardboard-like material with a resin coating on the outside to protect it from shredding up. The nose was made of a hollow, but sturdy plastic to take the brunt of the wind. The fins were made of wood so the glue would seek into them to really stick to the body tube and because wood is lighter than and just as strong (tensile strength wise) as some metals. The streamer had to be a very flexible, "flowy" object to help slow the rocket's decent that is also non-flammable. If it was made of wood, it would actually promote crash landings. The cord is nylon because it is stretchy to absorb the shock of the nose being shot off. Cotton string would melt from the heat, and if it miraculously didn't melt or burn, it would snap or unwind. The rocket designers definitely thought this through, because everything always happens for a reason.