

**University of Florida SPS chapter
2004-05 Marsh W. White Award Final Report**

Discovery: Rockets in Honor of Columbia and with Hope for Discovery

Members of the University of Florida chapter of the Society of Physics Students journeyed to the Girls' Club of Alachua county to carry out our Marsh W. White Award project: "Discovery: Rockets in Honor of Columbia and with Hope for Discovery." Having used about two-thirds of our funds purchasing two kit model rockets and all the amenities (budget report presented at the end of this report), we arrived at the Girls' Club at 1 PM with a rocket in tote. Our main audience was a group of 25 middle and early high school girls.

We believe that the most important part of our presentation was to emphasize that we were launching rockets in memory of the tragic loss of the space shuttle Columbia and her crew, and the future launch of Discovery in mid to late July. Therefore, we began the presentation asking the group of girls "How many of you remember when Columbia broke up over Texas?" Two of the girls firmly raised their hands. After a reminder that the Columbia space shuttle was lost on February 1, 2003 after it re-entered the Earth's atmosphere, there were a few exclamations of "Oh, I remember now." We went on to read the names of the crew members lost and pass around handouts picturing each of the crew. Giving some background on the achievements completed using Columbia, we moved on to the Discovery section of our presentation. Polling the girls on how many of them knew that the space shuttle was to go up in July, many more hands shot up in the air. We explained the importance of this launch by informing the girls that the shuttle's mission is to test new heat-protection systems and to deliver supplies to the International Space Station. Finally, we highlighted previous accomplishments of Discovery.

We then gave a brief introduction to the basics of our model rocket as we placed wadding into the body tube and showed them how to correctly insert the parachute. Part of the presentation involved an explanation of how to measure the height of the rockets using the most basic instrument: a homemade altimeter, which consisted of a protractor and hanging string and weight taped firmly to a ruler. By measuring the distance from the point of observation to the launch pad and the angle of inclination, θ , we would be able to use the fact:

$$\tan\theta = \text{opposite} / \text{adjacent}$$
$$\text{adjacent} * \tan\theta = \text{opposite} = \text{height}$$

At around 1:45 PM, 80-90 girls gathered outside around the baseball diamond to watch us set up the rocket. Looking at the sky and wary of the wet Floridian summer weather, we hoped we wouldn't have to abort the launch. Grey clouds loomed and soon enough, it began to drizzle. However, the little girls' spirits weren't dampened. On the contrary, they began a chant of "Rocket! Rocket! Rocket!" Finally, the rocket was ready and we commenced the countdown. "10! 9! 8! ... 3! 2! 1! Lift off! ...?" Nothing. We replaced the igniter and the second time around, the rocket lifted off. The parachute deployed beautifully to the sound of cheering little girls. As for ourselves, we breathed a

deep sigh of relief and made a mental note to buy plenty of extra igniters for future launches. The group of 25 girls all measured an angle of approximately 50° on their altiscopes. Encouraged by the good results, we began to prepare for a second launch when we were cut short by heavy rain. After retreating back indoors, we explained how to calculate the height the rocket had reached using their measurement. It turned out that the rocket flew up about 150 feet. We congratulated them on their results and passed out candy to commend them for their efforts.

Budget Report:

\$10.37 glue, sand paper, spray paint, prizes for interactive model rocket presentation
\$31.84 labels, protractors, batteries, envelopes
\$64.77 Aspire rocket kit, Dynastar Rising Star rocket kit, recovery wadding
\$67.95 launch pad, launch controller, rocket motors

\$174.93 Total

With the remaining funds, we will repair the rocket we launched with the Girls' Club and purchase more C-type motors and igniters for further launchings. In addition, we plan to verge away from the kit-based model rockets and venture into building a rocket from more every-day materials such as Styrofoam and cardboard. The presentation can be given to more groups, with additions or cuts depending on the age of our audience.

Report prepared by Linda Watson (2004-05 secretary) and Catherine Yeh (2004-05 vice president).



Preparing to launch the Rising Star rocket.



Model rocket building session #1 – assembled the rockets. We painted them in session #2.



Presenting background information on the Columbia and Discovery space shuttles.



Our Rising Star rocket had a successful launch and landing!