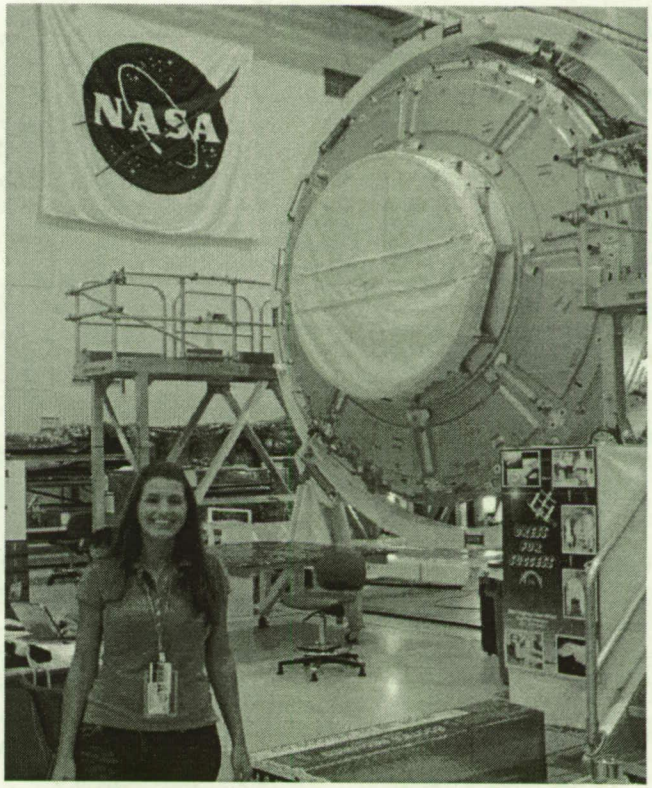
SIFT Summer Experience 2007



Lisa Kratz

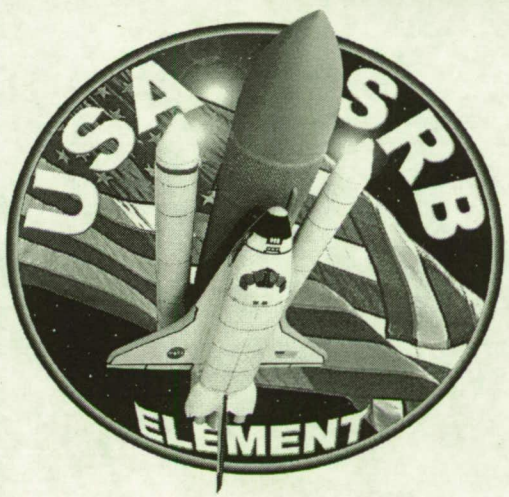
Overview

- My Summer Experience
- Motivational Activity
- Meet NASA People
- Group Lesson
- Extensions

Summer Experience

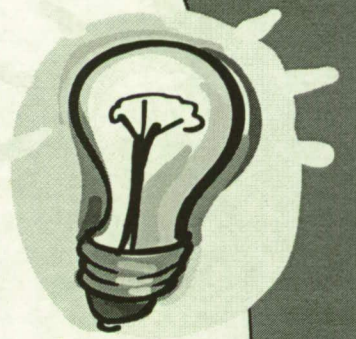
- Students will view a PowerPoint Presentation of my experience

- I worked in the Solid Rocket Booster Element in Test Engineering Operations



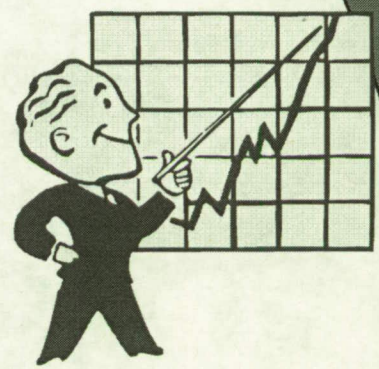
Objectives

- Students will work effectively in cooperative groups
- Students will be encouraged to learn more about the space program
- Students will use problem-solving strategies
- Students will learn about exciting career opportunities



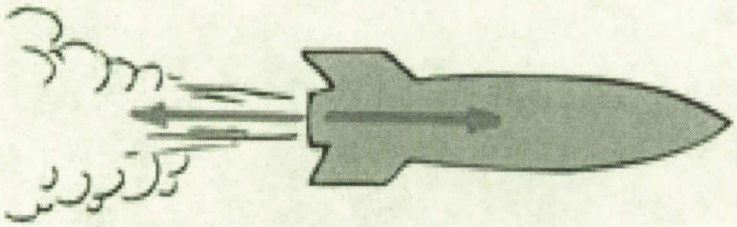
Objectives

- Use communication skills
- Use hands-on activities to arrive at outcomes
- View and work with practical mathematical applications in the workplace
- Collect, organize, and interpret data
- Be exposed to new technology



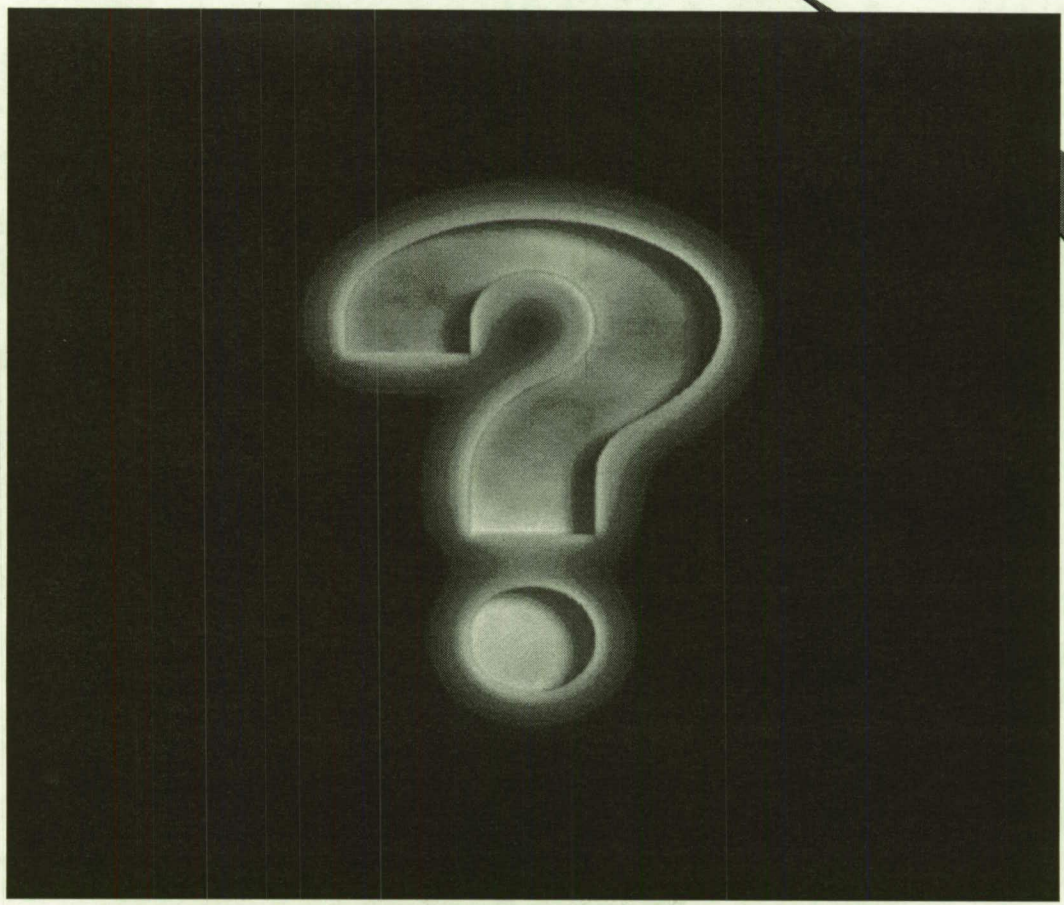
Motivational Activity

Students will perform an experiment to see how a rocket works by demonstrating Newton's Third Law of Motion



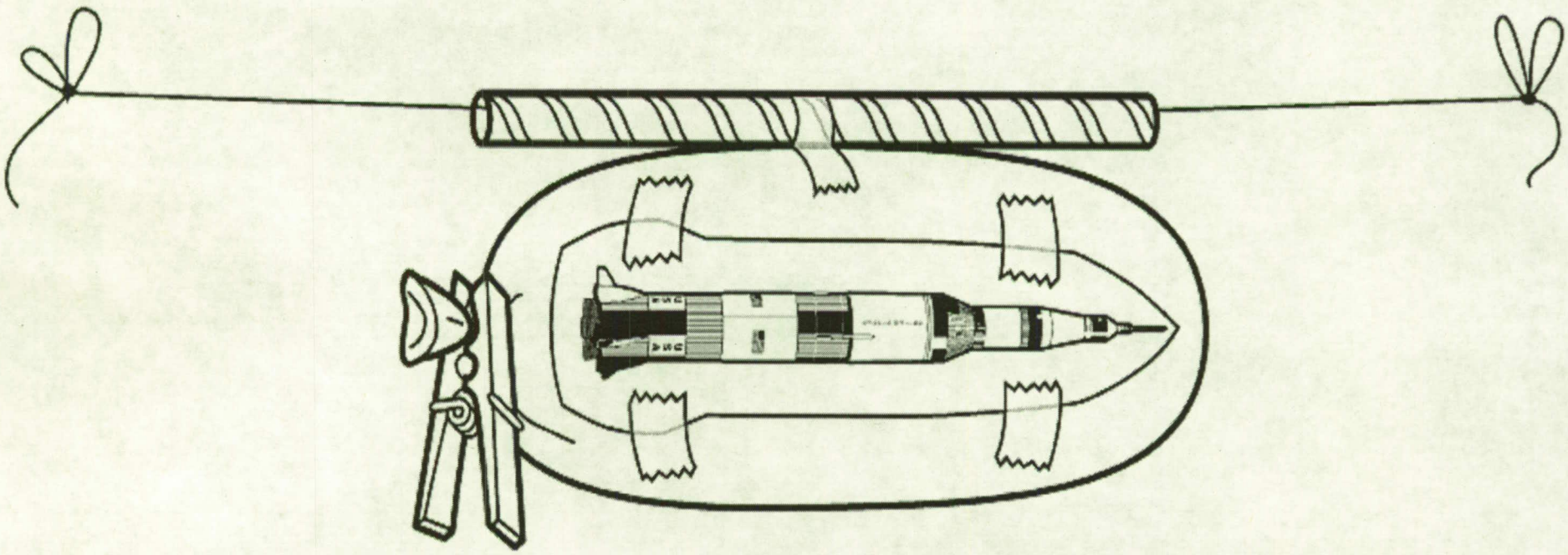
Action: rocket pushes on gas Reaction: gas pushes on rocket

How does a rocket work?



Let's see how a rocket lifts off the pad

- Students will construct a rocket using a balloon



Let's see how a rocket lifts off the pad

- They will **hypothesis**-what do they think will happen in the experiment
- Students will experiment using more or less air in the balloon
- Students will record data and observations
- Students will come to a conclusion

Assessment

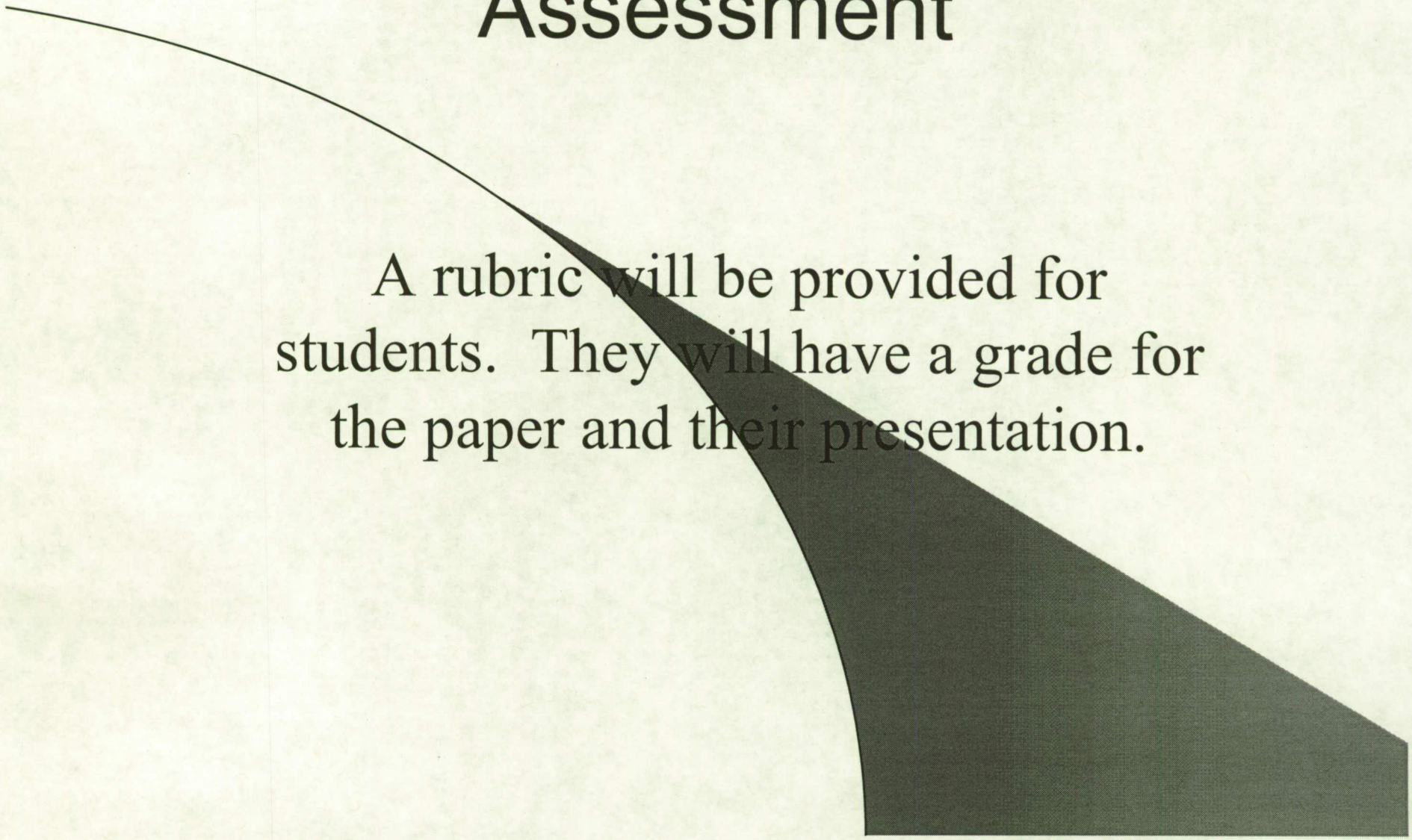
Students will record data and list observations in their to draw a journal. They will then be required to draw a picture of the experiment and describe how a rocket works (include Newton's Third Law in the description)

Meet NASA People

- A speaker form USA will come and discuss their job and answer questions
- Students will have time in the Media Center to research the vast careers at the space program http://quest.nasa.gov/services/people.html
- Students will write a one page paper on their career tops and present it to the class

Assessment

A rubric will be provided for students. They will have a grade for the paper and their presentation.



Group Lesson

Students will be placed in 4 groups

*Mechanical Engineer

*Electrical Engineer

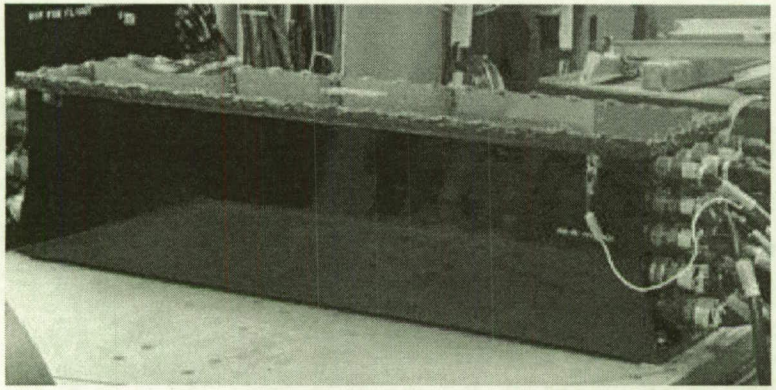
*Software Engineer

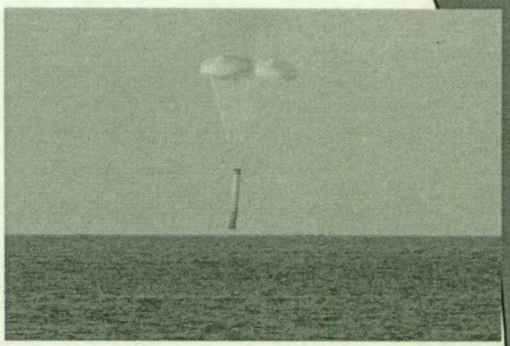
*Chemical engineer

Students will watch video interviews form each of these professions to learn more about their job

Group Lesson

- Students will have hands-on math projects that the actual engineers work with
- Materials, pictures, and worksheets will be provided
- Examples of math applications include IEA pressure, when to release the chute, and many more





Assessment

Students will be graded based on

1. Participation in experiments
2. Completion of worksheets
3. Journal checks of what they have learned

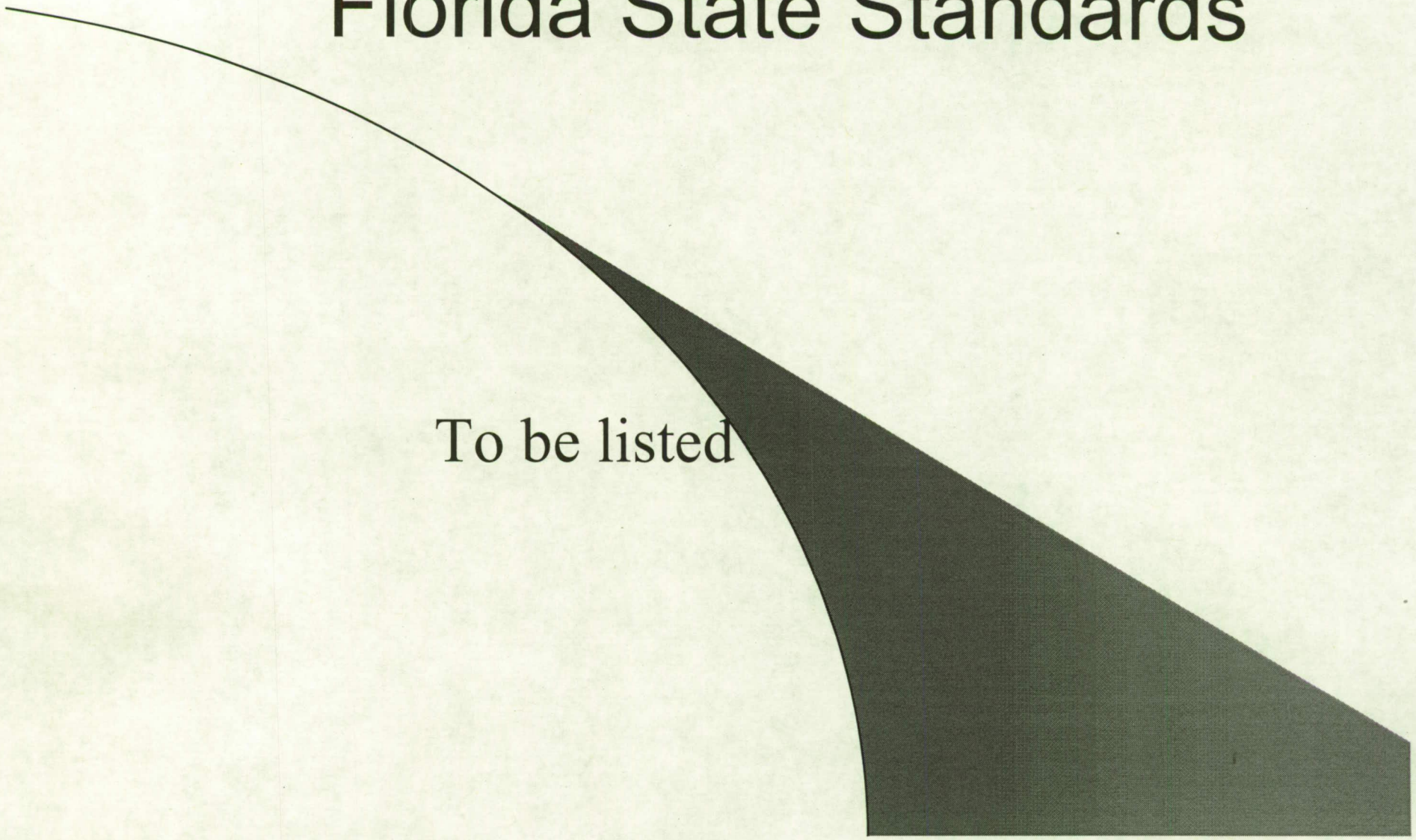
Extensions

- MATHCOUNTS
- RocketModeler
- Rocket Launch experience

Technology

- Students will use the internet to research
- Students will learn to input data into an excel sheet
- Students will use programs in their calculators

Florida State Standards



To be listed

"We cannot teach people anything; we can only help them discover it themselves"
Galileo Galilei

2007 Florida SIFT Action Plan

Name:	**Lisa Kratz**
School:	**Edgewood Jr./Sr. High School of Choice**
Grade(s) Taught:	**7th grade Pre-Algebra/8th Grade Algebra**
Applicable Subject(s):	**Math, Technology, Science, and English**
Company:	**United Space Alliance- SRB Element- Test Ops**

Overview

Proposal: This unit will address both math classes. Students will view an informative video on my educational experience at KSC. We will then do a hands-on activity that will reinforce what my team was in charge of. After an overview of my experience, students will be assigned to a cooperative group that will be in charge of a specific engineer job. They will individually research that engineering job and summarize what they learned to their group. There will be an oral presentation from each group that will allow all groups to hear about different areas of engineering. The groups will then work on practical math applications that deal with their particular job. These will relate to specific standards and problem-solving areas listed on the FCAT. After the groups are done with their activities, they will move on to the next group and repeat the process till they had a chance to experience a little bit what each specific engineer does. A guest speaker from USA will come into the class and explain what they do and answer questions that will further enrich the students' understanding. Finally, the students will participate in the MATHCOUNTS competition.

Signature- SIFT Employee: _____ Date: _____

Signature- Supervisor: _____ Date: _____

Table of Contents Page

Correlation to my summer experience:

During my SIFT experience with United Space Alliance, LLC (USA), I worked in the Solid Rocket Booster Element in Test Engineering Operations. Test Operations includes the managers, engineers, and technicians that run the tests on the aft skirt and forward assembly of the solid rocket booster including the electrical components of the IEA and the TVC system.

Because I am new to area, I knew little about the space program. I felt as though many of the students knew more about the space program than I did. I wanted to be able to have an understanding of what goes on at NASA and also get my students interested in the program. Thanks to the people at USA, I was able to have tours of the different facilities and see many operations and tests being run. I gained a valuable experience that I will be able to take back into my classroom and share with the students and help motivate them to learn.

First, I want to give my students an idea of what the solid rocket boosters are and how they work. We will be doing a group experiment to show how the rocket launches and use math to show what had to be done in order for the rocket to even be able to launch. Many students probably don't know about the long process that goes into preparing for a successful launch.

While at NASA, I became familiar with many different people with many different jobs. Because my students have to do a senior project on careers, I would like to involve my students in different careers at the space center. Not only will they research a career of their choice, they will also have an understanding of the specific careers I worked closely with during my fellowship.

Finally, I would like to incorporate teamwork into my lesson. I was able to participate in meetings with employees from different divisions and I watched how they problem-solved and worked together to hypothesis and come to conclusions on future projects. My students will have to work together on hands-on lessons that involve practical math applications that the actual engineers work with.

Expected Outcomes:

- Students will work effectively in cooperative learning groups
- Students will be encouraged to learn more about the space program
- Students will learn Problem-Solving strategies
- Students will learn about exciting career opportunities
- Use communication skills
- Use hands-on experiments to arrive at outcomes
- Learn about the aeronautics of the space shuttle
- View and work with practical applications of mathematics in the workplace
- Collect, organize, and interpret data
- Learn the importance of creative
- Be exposed to current technology

Implementation:

This project will be about three weeks long (students will not be working on it everyday in a row). Below is a timeline of events.

Week 1:

- Have a PowerPoint presentation on my summer experience and what I learned.
- Provide a hands-on activity for reinforcement.
  *Students will do an experiment with a balloon that shows how a rocket engine works
  *Students will record and use equations to see how a rocket would travel with different amounts of fuel (we will use air for the balloon)

Week 2:

- Invite guest speakers from USA to speak with students about the vast possibilities and opportunities of the space program.
- Allow students the opportunity in class to use the computer to "Meet NASA people" http://quest.nasa.gov/services/people.html
- Provide materials needed such as Internet and computer access.
- Provide students with the opportunity to research different careers at the NASA
- Students will write a one page paper on their selected career (rubric will be given)
- Students will present their paper to the rest of the class

Week 3:

- Student will be put into four groups
- Each group will be assigned and specific engineer (Mechanical, Electrical, Software, and Chemical) that I worked with
- Students will watch interviews from each type of engineers that discuss their job title, what they do, what education they have had and other interesting facts
- Students will then become that engineer
- In their groups they will work on hands-on math projects that the actual engineers do
- Materials, pictures of the actual engineers doing the same applications, and worksheets will be provided to the groups
- Students will have computers available to work on excel to organize their data
- The groups will work together to finish their project and move on to the next station that will be provided till they completed all four stations, thus experiencing each type of engineer

Extension:

- If groups move on too quickly, they can begin participation in MATHCOUNTS.
- This is a problem of the week given to students from all around the area. Available at www.mathcounts.org
- Students will work on the specific problem with their group when they are finished with their project
- This activity gives the students the opportunity to compete in a competition that rewards them for their achievements.

Assessment:

Student's grades will be based on the following scale

Individual paper: 20 points
Group paper/Presentation: 10 points
Math activities: 40 points
*These will be based on completion and being mostly correct
Participation: 30 points

Tools/Materials/Experiences Used:

*DVD
*PowerPoint presentation of what I learned
*Balloon
*String
*Drinking Straw
*Tape
*Worksheets
*Note cards with career jobs
*Internet, computer access and listed websites
*Include parameters, instructions, and rubrics for design.
*Pictures from my experience as a reference
*Teacher-generated instructions, problems, and rubrics for practical math use
*Contacts through USA
*MATHCOUNTS entrance sheet
*Knowledge gained through summer experience
*Include State Standard and Benchmarks

Standards

MA.A.1.2.1, MA.A.3.3.1, MA.B.2.3.2, MA.B.3.3.1, MA.E.1.3.1, MA.E.2.3.1, MA.E.3.3.1, MA.E.3.3.2, MA.E.3.3.3, MA.A.4.3.1, MA.D.1.3.1, MA.D.1.3.2, MA.D.2.3.1

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (From - To)
7-19-07	Presentation	6-1-07 - 7-20-07

4. TITLE AND SUBTITLE
Summer Industrial for Teachers Summer Experience 2007

5a. CONTRACT NUMBER
NNJ06VA01C

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Lisa Kratz

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
United Space Alliance
8550 Astronaut Blvd
Cape Canaveral, FL 32920

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITOR'S ACRONYM(S)

11. SPONSORING/MONITORING REPORT NUMBER

12. DISTRIBUTION/AVAILABILITY STATEMENT

13. SUPPLEMENTARY NOTES

14. ABSTRACT
Students will view a powerpoint presentation of my experience. I worked in the Solid Rocket Booster Element in the Test Engineering Operations. Students will become encouraged to learn more about the Space Program.

15. SUBJECT TERMS
Solid Rocket Booster - Test Operations

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19b. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Lisa Kratz
U	U	U	UU	26	19b. TELEPHONE NUMBER (Include area code) 321/264-7900