Science as Inquiry

I Rationale:

With a system as extensive as a rocket, engineers must be prepared to handle situations that could arise during a launch sequence. Simulations provide scientists and engineers the opportunity to test systems and new designs in a relatively safe and cost effective manner. The lessons suggested in this sequence will allow students to explore scientific inquiry with a variety of activities designed to challenge their thinking and creativity.

II Procedures:

1. Recommended Activities

   • “757-Glider Kit” (http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/757.Glider.Kit.htm) - This activity allows students to investigate the design parameters of the wing, tail, and nose of a glider as well as explore the forces of lift, drag, and weight on the flight of the glider.

III Content Standards Addressed:

National Science Education Standards:

- A.1.1 – Identify questions that can be answered through scientific investigations
- A.1.2 – Design and conduct a scientific investigation
- A.1.3 – Use appropriate tools and techniques to gather, analyze, and interpret data
- A.1.4 – Develop descriptions, explanations, predictions, and models using evidence
- A.1.5 – Think critically and logically to make the relationships between evidence and explanations
- A.1.6 – Recognize and analyze alternative explanations and predictions
- A.1.7 – Communicate scientific procedures and explanations
- A.1.8 – Use mathematics in all aspects of scientific inquiry
- B.2.1 – The motion of an object can be described by its position, direction of motion, and speed
- B.2.2 – An object that is not being subjected to a force will continue to move at a constant speed and in a straight line
- B.2.3 – Unbalanced forces will cause changes in the speed or direction of an object’s motion
- B.3.1 – Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways

National Council of Teachers of Mathematics:

- A.1.1 – Work flexibly with fractions, percents, and decimals to solve problems
- A.3.4 – Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios
- D.1.1 – Understand both metric and customary systems of measurement
- D.2.1 – Use common benchmarks to select appropriate methods for estimating measurements
• **D.2.2** – Select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision
• **E.4.2** – Use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations
• **F.1.2** – Solve problems that arise in mathematics and in other contexts
• **F.4.3** – Recognize and apply mathematics in contexts outside of mathematics

**National Education Technology Standards:**

• **A.2.3** – Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity
• **A.3.1** – Students use technology tools to enhance learning, increase productivity, and promote creativity