Chapter 8
The Great Race:
Using Air to Move Paper Airplanes and Balloon Rockets

Jena Valdiviezo
Long Branch School District, USA

Letitia Graybill
Monmouth University, USA

EXECUTIVE SUMMARY

This is a case in which students build paper airplanes from templates provided by the instructor as well as those which they can design themselves. They extend their ideas on flight in by using the principles developed in the paper airplane race to power simulated rockets made out of balloons. They consider such variables as materials, mass, and design to see which combination of material design and mass are most effective in constructing an airplane or a rocket that flies the fastest and the furthest in a competition. Contestants are rated on team consideration of variables needing to be controlled in order to have a fair assessment of the designs. When the designs are agreed upon and constructed, a race is conducted. The ideas developed in the paper airplane competition are then used to design a rocket carrying a paper airplane capable of flying across the classroom in the fastest time with the most direct route. This is a simulation of the space shuttle flights. The parameters of the races are developed by the participants.

LITERATURE REVIEW

Humans have yearned to fly like birds for eons. Many designs were created through the ages that had some disastrous results. However, because of the desire, inventive attitudes, and almost fanatic devotion to the creation of new knowledge, the pursuit of flight went on and on and on. It took until 1903 in Kitty Hawk, North Carolina (Shapell & Willen, 2012) for Wilbur and Orville Wright to produce the first sustained flight. Engineering took over after that and resulted in a revolution in travel by air. The history of the saga has been well documented in literature. We have learned through experiment and engineering principles to develop crafts that can fly supersonically and transport people and material around the earth in increasingly shorter times. We have revolutionized travel to the point that travel beyond the Earth is within possibility and may even be accessible for the average human. Those who were alive in 1969 to see Neil Armstrong walk on the moon were enthralled by the vision. What an exciting moment that was! This initiated a series of flights in which more and more powerful rockets were used to launch these spacecrafts beyond the Earth's gravitational field. More extensive interplanetary flight has already been accomplished by non-manned space flights. Two Voyager crafts were launched in September of 1977. These Voyagers spent eleven years exploring Jupiter, Saturn, Uranus and Neptune before escaping the gravitational pull of the sun in 2012 to begin interstellar explorations (NASA). The Voyager space crafts are the third and fourth human creations to fly beyond all the planets in our solar system. They were preceded by Pioneers 10 and 11 in escaping the gravitational pull of the sun. This was accomplished in 1998. Voyager 1 passed Pioneer 10 to become, as far as we know, the most distant human-made object in space. As of September 2013, Voyager 1 was at a distance of 18.7 billion kilometers from the Sun while Voyager 2 was at a distance of 15.3 billion kilometers. All of this has been achieved in a mere one hundred and eleven years. Imagine what is possible in the future. This review of the literature is sufficient for a basic understanding of flight mechanics. There are many other books that can give a deeper understanding. The Completer History by R. G. Grant is a well-received source that gives additional technical detail. This could serve as a reference for teachers.

What a wonderful history of flight we can discuss in our classrooms! Students can become excited by the prospect of future developments. How many of them might become space travelers of the future? How many of them might become part of interplanetary missions that are now being planned? If teachers can "touch the future," as the first teacher in space, Christa McAuliffe, said (brainyquote.com/quotes/christa_mcauliffe_134582), how many science teachers can actually affect the future of space flight through the students that they teach? It is an awesome responsibility that most teachers, especially science teachers, should gladly accept. It could be

Related Content