ALKYL ROCKETS

Credit: EAA Museum Education program

Concepts Illustrated:

(1) Newton's 3rd Law and the concept of thrust.

Time Requirements: 40 Minutes

Grade Level of Audience: This activity is primarily suited for kids in grades K-8.

I. Materials and Equipment Utilized

(Materials needed for a group of 20 students)

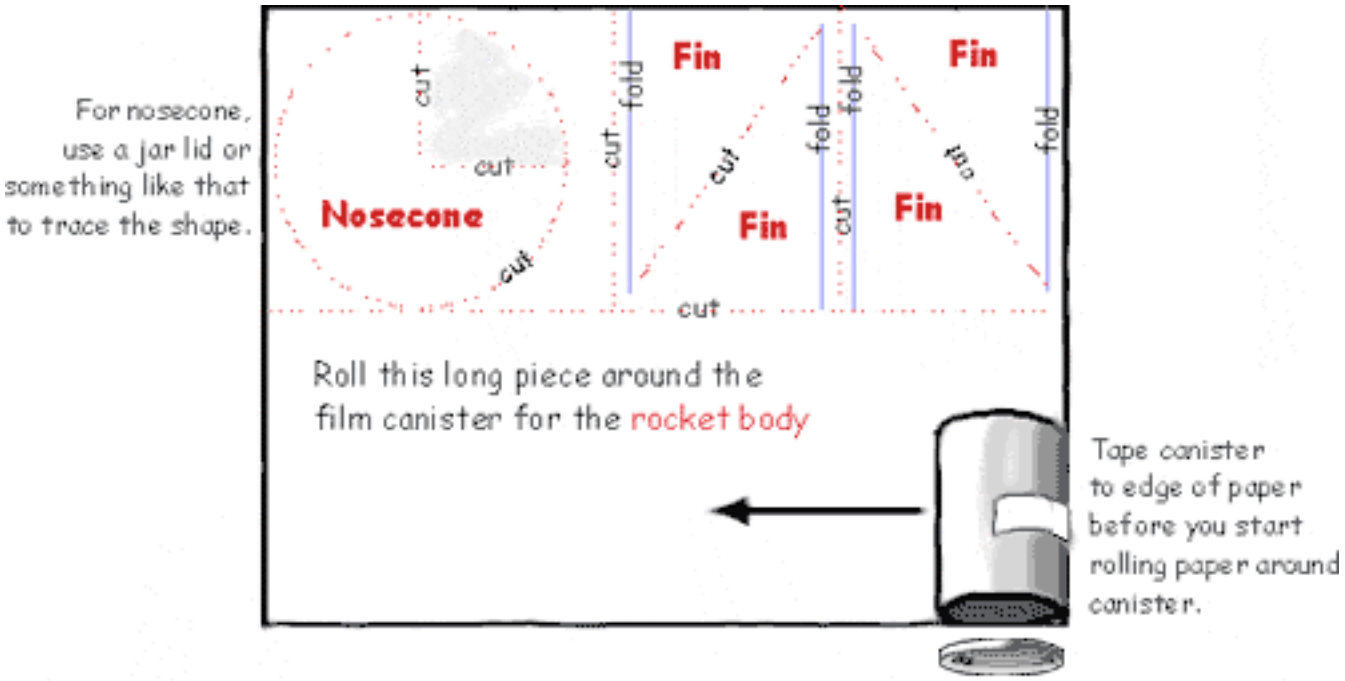
paper

1. 10 plastic 35 mm Fugi film canisters (the lid must have an internal-sealing lid)

2. scotch tape
3. effervescent antacid tables
4. 10 Scissors
5. paper towel
6. water
7. eye protection

II. Description of Set-up and/or Construction of Apparatus

1. Have samples of rockets in various stages of completion for students to study.
2. Give students the option of cutting the paper the short way or the long way for the body tube of the rocket. This makes for good comparisons.
3. Make sure students tape the film canister to the rocket body with the lid end down. In addition, the canister must extend far enough downward below the paper tube to make snapping the lid on easy.
4. To put a nose cone on the rocket, help students cut out one fourth of a circle and bend the remaining three fourths of a circle into the cone.



III. Details of Student Implementation

1. For best results have students work in pairs.
2. Make sure students wear safety goggles when they are actually doing the experiment.
3. When students are ready to launch, they should be provided with an antacid tablet and water. They should note launch parameters such as length of body, amount of water used, status of water (temperature), amount of antacid tablet used, and empty weight (if able to measure). If possible, the maximum altitude of the launch should be noted for comparison of launch parameters, if possible.
4. Ask students to explain how Newton's Laws of motion apply to this rocket.
5. Rockets that use excessive paper and tape are likely to be less efficient fliers.
6. This activity is a simple but exciting demonstration of Newton's Laws of Motion. The rocket lifts off because when it is acted upon by an unbalanced force (First Law). The unbalanced force is produced when the lid is pushed off by the gas formed in the canister. The rocket canister experiences a force which equal and opposite to the downward force propelling the water, gas, and lid (Third Law). The acceleration of the rocket is directly proportional to the unbalanced force acting on the rocket and is inversely proportional to the mass of the rocket (Second Law).