Paper Rockets

Estimated Time: 40-60 minutes

SUMMARY

Learners will construct paper rockets from a pattern to experiment with thrust. Measurements of distance will be recorded and averaged. For those who like to compete, the persons with the farthest launch and the best average distance will be rewarded.

WHAT YOU'LL LEARN
- The best ways to construct a rocket to launch it well.
- How to measure and test flights to determine the best design.

| Materials Used	
• Pencils • Two sheets of paper (8.5" x 11") for each learner (more if you want multiple designs) • Straws	• Something to measure distance (meter stick, measuring tape, ruler, etc) • Scissors • Tape • Target (whatever you like!)

WHAT TO DO
1. Cut one piece of paper into strips 4-5 cm wide and 15 cm long.

2. Roll the paper strip lengthwise around the pencil and tape it. The paper tube should slide easily off the pencil, but not be too loose.

3. Make several pointed cuts at one end of the tube. See Figure A below.


Fig. A   Fig. B
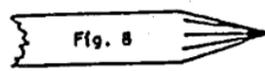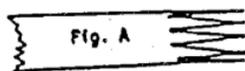
4. Slide the sharpened end of the pencil toward the pointed cuts. Fold the points around the sharpened end of the pencil and tape to form the nose cone. See Figure B above.

5. Cut out two sets of fins using the pattern in Figure C below. Fold the fins on the dashed lines as shown.

Fig. C
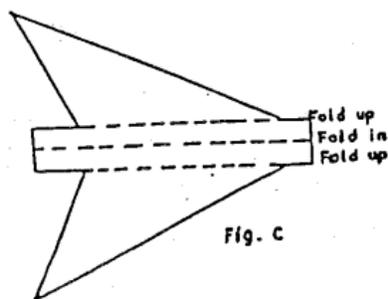
6. Using two pieces of tape, affix the fins to the opposite end of the tube from the nose cone. Insert the pencil for support in taping. See Figure D below.

Fig. D
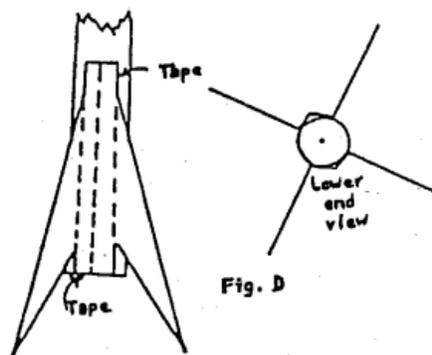
7. Place the rocket over the soda straw as shown in Figure E below.

Fig. E
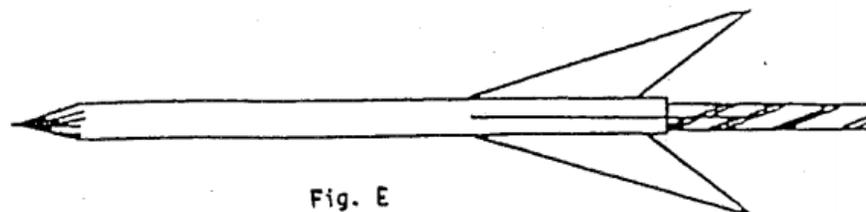
8. Select a "firing range" to launch the rocket, such as one side of the room or a hallway. A room with a high ceiling works best. This could also be done outside.

9. Launch the rocket by blowing sharply on the straw. Be sure to aim the rockets in the desired direction. Measure the distance that the rocket flew to compare flights and see which was the best design.

TIPS
- Take some time afterwards to discuss how the rockets performed. Why did some rockets travel farther than others? What's the difference between launching upwards and launching forwards?
- After the launches, do some redesigns to see how you can improve the rockets' performance.
- Younger students can do a lot of the same trials and design with paper airplanes (find a design you like from the internet). This can be easier to fold and involve slower projectiles.