

ROCKET SCIENCE 101 worksheet

Procedure

1. Following your group leader's direction, tie one end of the nylon string to an anchored object at the front or back of the room at least 4 or 5 feet off the floor. Then stretch the string out across the room being careful not to cross another team's string.
2. Thread a plastic straw onto the nylon string.
3. Blow up one of the balloons, filling it about one third full of air ("fuel"!) while carefully holding the nozzle end tight (but not tying it) so that air will not escape.
4. Carefully and securely tape the plastic straw to the top of the balloon so that the straw is parallel to the long axis of the balloon and the head of the balloon is pointed toward the anchored end of the nylon string.
5. Have one member of your team hold the other end of the nylon string high off the floor (so both ends are at the same height) while making the string tight.
6. Hold a "Countdown"—"10, 9, etc. BLAST-OFF!"—and let the nozzle end of the balloon go and watch the balloon rocket fly along the string across the room. Use the stopwatch to record time. Measure the distance the balloon traveled along string.

Repeat three times. For each trial, record distance and time. Average your team's results and record on the group Data Table.

7. Repeat STEPS 1-6, modifying the procedure in the following ways:
Fill the balloon two thirds full of air.
Fill the balloon completely completely full of air.

DATA SHEET

Experiment 1 (balloon 1/3 inflated)

Distance (m)

Time (sec.)

TRIAL 1

TRIAL 2

TRIAL 3

Average:

Experiment 2 (balloon 2/3 inflated)

Distance (m)

Time (sec.)

TRIAL 1

TRIAL 2

TRIAL 3

Average:

Experiment 3 (balloon fully inflated)

Distance (m)

Time (sec.)

TRIAL 1

TRIAL 2

TRIAL 3

Average:

Observations/Conclusions

Discuss the following questions and prepare responses which represent the consensus for your team.

When did the balloon rockets go the farthest? What caused this? How could you test your ideas?

Why did the balloon rockets stop?

If there was no friction between the straw and the nylon string, and no wall in the way, how would the balloon rockets have behaved up until the time the rockets ran out of fuel?

If there was no friction between the straw and the nylon string, and no wall in the way, how would the balloon rockets have behaved after they ran out of fuel?

Which of Newton's "Law(s) of Motion" does this activity illustrate and why?