

Hot Air Ballooning

Credit to the EAA Air Academy

Concepts Illustrated:

- 1) Buoyancy of fluids
- 2) Geometry of scales
- 3) Weight

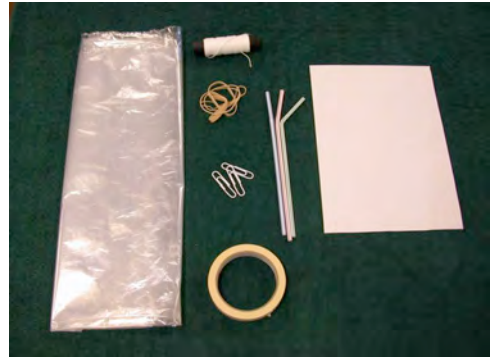
Time Requirements: 60 Minutes

Grade Level of Audience: This activity is primarily suited for kids in grades 5-9.

Challenge: Using safe household materials, the students will work together in small teams to design and build a hot air balloon that stays in the air for the longest period of time.

I. Materials and Equipment Utilized

1. dry cleaning bags
2. kite string
3. rubber bands
4. paper clips
5. masking tape
6. straws
7. typing paper
8. scissors
9. marker
10. glue
11. popcorn popper heater



II. Construction Details

1. 10 minutes is allowed for balloon design. Draw design on large paper. All changes must be added to original design on paper.



2. Have instructor approve design and wait until all designs are approved before beginning construction. Use only supplies provided
3. Construction and testing is only allowed during time specified by instructor
4. Balloons may be tested as many times as needed within allowed time
5. Flight tests are done in construction area.



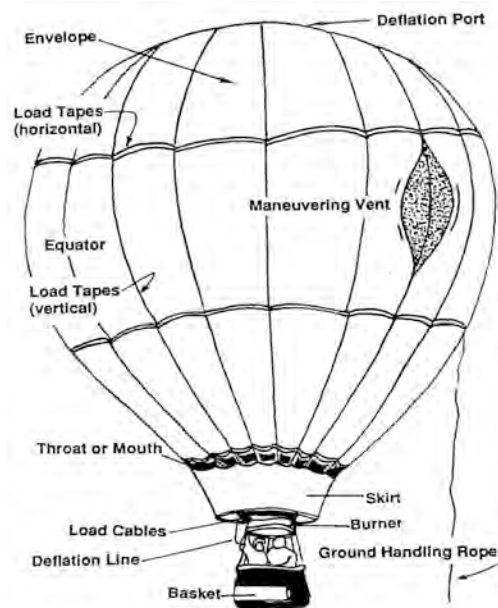
1. Each group will be given 5 minutes for flight preparation.
2. Each group will have one chance to fly their balloon.
3. Flight time is recorded and the longest flight wins.



III. Details of Student Implementation

Background Information

- How did people come up with hot air balloons? Back then they would use fires to cook food and get warmth. While they watched those fires, they saw smoke rising into the air. This caused them to think, “Hey, if we put smoke into a big balloon, we will be able to lift up!” So they tried it by burning wet grass and old rubber boots in a basket under the balloon. These caused a lot of smoke. Did they lift up? Not really. So they were watching this fire again and realized something else is also rising into the air. What is it? Hot air!
- A typical hot-air balloon consists of an envelope, which is commonly made of nylon or polyester.
- The envelope is made of a combination of sections, called “gores”. Balloons often have 8, 12, 18, 20, or 24 gores.
- Load tapes are sewn into the gores as they are manufactured. The load tapes are then connected to the attachment cables for the basket or gondola.
- Hot-air balloons have a deflation port at the top, and a maneuvering vent on the side.
- Propane is the most common fuel source for the burners.



- Demonstrate how the students will make hot air balloons; (hold the dry cleaner bag over the popcorn popper. Fill bag with hot air and let go).
- The students can decide how long they should hold the bag over the heat.
- Make sure not to hold the bag too close or you will melt it.