

Name _____

Hot Air
Balloons

Extra
Credit
Opportunity

Topic Area Buoyancy

Materials

- tissue paper - approximately 20" x 30" (7 sheets per balloon)
- rubber cement, glue sticks or white glue
- scissors and tape
- paper clips or pennies (for ballast)
- marking pens (optional)
- propane camp stove
- large cans with tops and bottoms cut out

Key Question What causes a hot air balloon to rise?

Background Information

Hot air balloons are a rich part of aviation history and are as fascinating today as they were two hundred years ago. The first successful manned flight carried two Frenchmen aloft on November 21, 1783, in a hot air balloon constructed of paper and linen. Hot air balloons demonstrate Archimedes' principle. A hot air balloon rises because of the buoyancy imparted by the surrounding air which is more dense than the hot air inside the balloon. This buoyant force is equal to the weight of the air displaced by the balloon. If the weight of the air displaced by the hot air balloon is greater than the total weight of the balloon and its cargo, the balloon will rise. The greater the temperature difference between the inside air and the surrounding air, the greater the difference in their densities, which produces more lift. Hot air balloons work best on cool, still days.

Discussion Questions

1. Why does a hot air balloon rise?
2. Why is it better to launch a hot air balloon on a cold day than on a warm day?
3. Why is hot air less dense than cold air?
4. Why does the hot air balloon fly differently with ballast added?
5. Why do hot air balloon pilots avoid windy days?

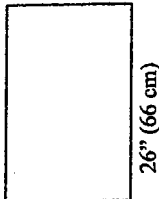
Hot Air Balloons

Make one square:



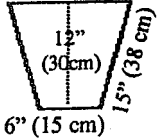
20" (51 cm)

Make four rectangles:



20" (51 cm)

Make four trapezoids:



6" (15 cm)

Materials:

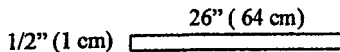
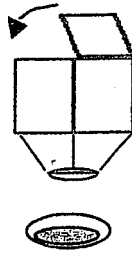
- tissue paper (9 sheets)
- construction paper strip
- glue stick, scissors, ruler, pencil
- hot air popcorn popper (~1440 watts)

Glue the rectangles and trapezoids into panels. Glue the panels together.



Glue the square on top.

Make a construction paper ring. Glue it on to the bottom edge of the balloon.



Hold the balloon over the hot air popper.

How high does the balloon go when it is filled with hot air for a short time? a long time?

How can you tell when it's ready to fly?

Many things influence how well a balloon floats: the temperature and density of the air (both inside and outside the balloon), the mass of the balloon materials, and the distribution of weight.

To learn more, check out *Air Travelers*, <http://www.oms.edu/sln/air>

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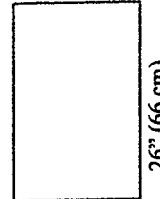
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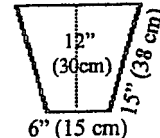
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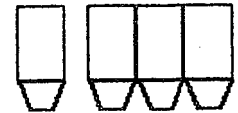


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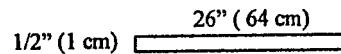
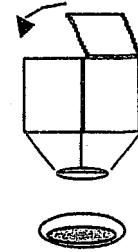
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