

# Balloon Powered Phoenix Mars Lander (simplified version) by Steve Widmark

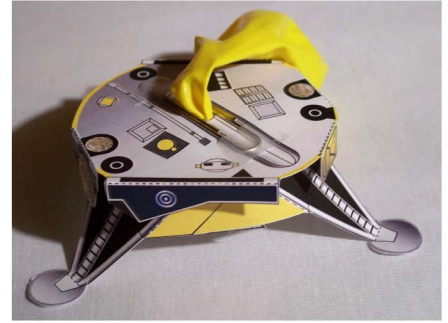
## Materials and tools:

1 parts sheet color printed on 110 lb (#110) card stock  
1 balloon (lander flies best with a 5" balloon)  
1 large paper clip  
glue stick or Elmer's glue  
transparent tape  
scissors  
Optional items:  
hobby knife

For more copies of this model, visit

[www.paleoneon.com](http://www.paleoneon.com) .

For information about the Phoenix Mars mission, visit <http://phoenix.lpl.arizona.edu> .



## Directions:

Note: If the directions tell you to bend a panel down, this means to bend the panel down along a dotted line with the printed portion of the part facing up. If the directions tell you to bend a panel up, this means to bend the panel up along a dotted line with the printed portion of the part facing up. The top side of a part is the side with the printing. The back side of a part is the side without any printing.

1. Cut out both parts. Do not cut along any dotted lines. Cut out the black circles in the center of each piece (a hobby knife works best).
2. Bend the five panels (two solar panels, two fuel tanks and the gold panel) on the outside of the science deck down at a 90° angle. On the base part, bend down along all dotted lines except for the circular landing pads. Bend these up along the dotted lines.
3. Put a dab of glue on each of the three gray triangles on the base. Glue these to the adjacent gold triangles so that the tips of the gold triangles overlap the gray triangles. This should hold the three landing legs downward at the proper angles.
4. Dab some glue on the large gray polygon in the middle of the base. Glue the base to the back of the science deck so that the holes in each piece are aligned.
5. With two small pieces of transparent tape, attach a large paper clip to the top of the science deck so that the middle of the paper clip is centered over the hole and does not obstruct it.
6. Poke the nozzle of the balloon through the hole on the top of the science deck.

## Flying the lander:

Inflate the balloon. Trial and error will determine how much air to put into the balloon. A well-stretched balloon inflated to maximum size seems to work the best. After inflating, pull the balloon out so the rubber ring on the nozzle of the balloon lies flat against the back of the science deck and then put your thumb over the nozzle to keep the air in. Hold the lander up over your head (or stand on a chair). Release the lander in a level attitude. Ideally, it should make a powered descent all the way to the ground and land upright on its landing gear. If it does not, try the following:

1. Put a different amount of air in the balloon
2. Release it from a different height
3. Add a small amount of weight (such as clay) to each landing gear pad.
4. Try a different sized balloon.

