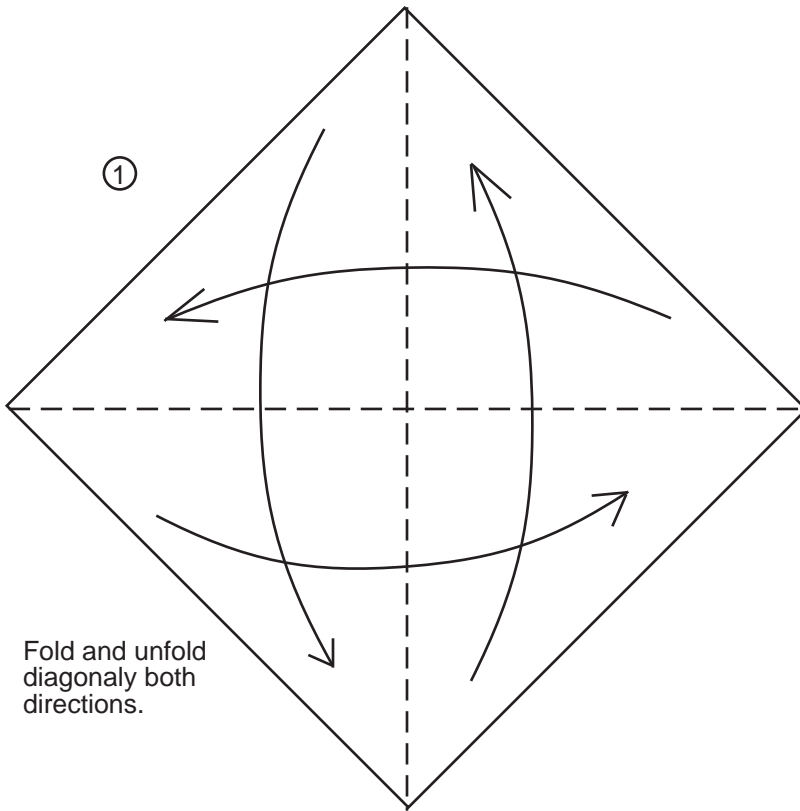


# Space Shuttle

## An example of a Lifting Body

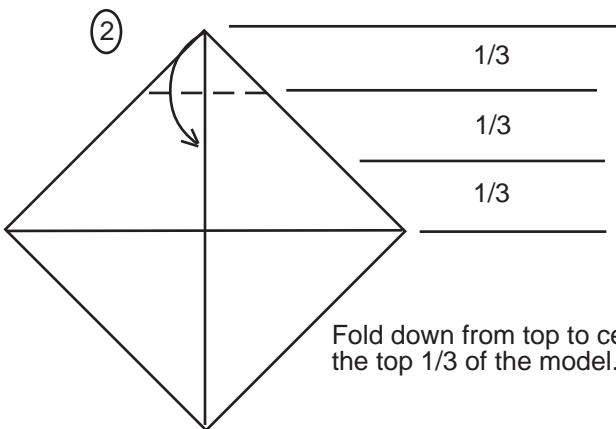
By Perry Bailey © 1998



Fold and unfold diagonally both directions.

A smidgen of science to go with this model. In a traditional airplane all of the lift, is supplied by the wings, but as speed increases this puts more and more stress on the wings, the answer as was determined years ago is to use a "lifting body". That is a plane or as in this case a space shuttle that maximizes the strength of structure by using the body of the shuttle itself as the wings. It has not been used heavily in the aviation world, due to politics, but it was the only chance for a ship that needed to re-enter an atmosphere from orbit. Unfortunately a true lifting body would by its nature be very stable as it comes down but not very manoeuvrable at high speed. NASA solved this problem but using a large rudder fin atop the vehicle this stabilized the side to side motion, making it as stable as the forwards and up and down motions. The only other problem was to find a long enough strip to land the shuttle because of the forward speed required to keep it aloft. The space Shuttle was the end of a long line of experiments in this type of flight. For those who have seen the old TV series the "Six Million Dollar Man" the scene in the beginning was a real crash of one of the early lifting bodies designed by NASA, they were flown up by airplane and then dropped, our current space shuttle design was the winner.

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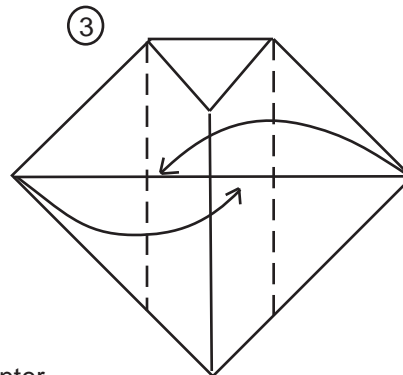


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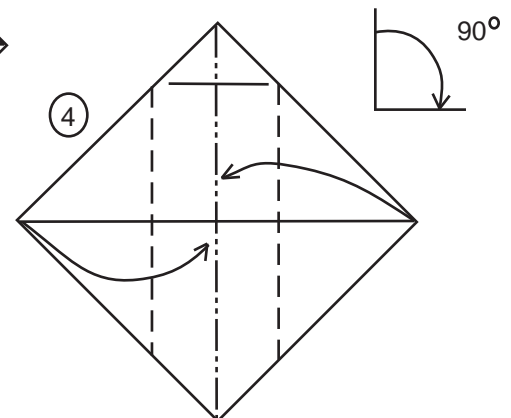
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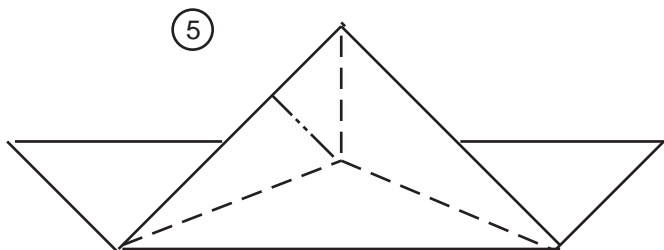
Fold down from top to center the top 1/3 of the model.



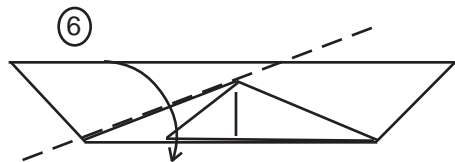
Now valley fold and unfold each side, then unfold the top.



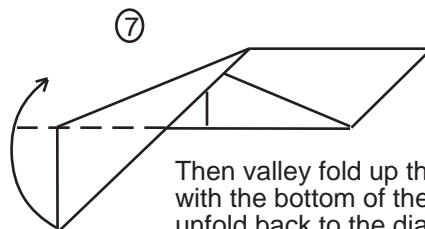
Mountain fold the middle and valley fold the 2 sides. then turn 90 degrees to the right.



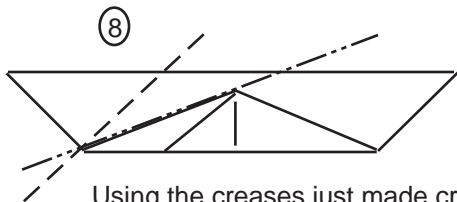
Fold the flap on each side into a rabbit's ear that points to the back of the model. The first crease in step 1 is the front.



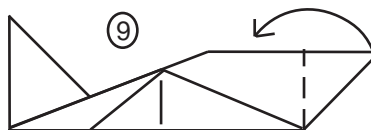
Valley fold the left side down along the line of the rabbits ear created in step 5.



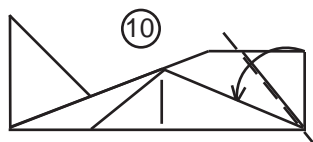
Then valley fold up the flap even with the bottom of the model then unfold back to the diagram at step 6.



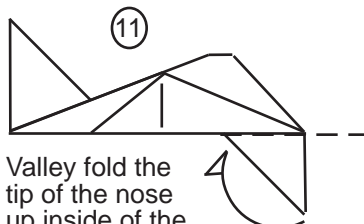
Using the creases just made crimp fold the tail section into place.



Valley fold the right flap to the left along the crease made in step 2.



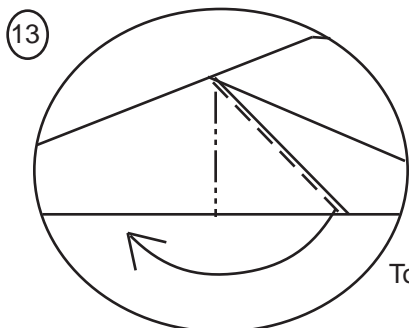
Valley fold the front over using the raw edge of the previous fold then unfold the front, then reverse fold the entire front end of the model down along the crease you just made.



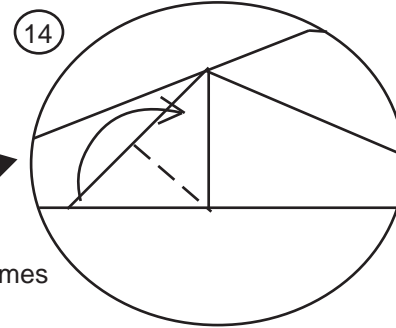
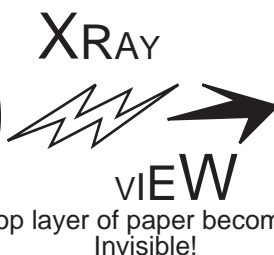
Valley fold the tip of the nose up inside of the model. This will lock the front end of the shuttle in place.



Fold the flap over to the right. the next view is enlarged.

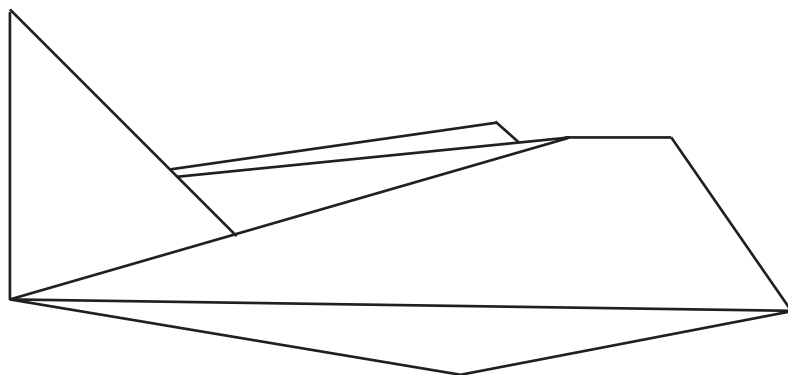


Reverse fold the flap under the top layer of paper.



Valley fold the flap up inside of the wing to lock it into place.

Repeat on other side making sure that it also points to the back and locks the same way.



Finished model.

Now that you have finished the model you get to test it. Hold it out at arms length and drop it. If you held it level or with the nose slightly downwards it will glide gently down to the floor in the same position as you dropped it (nearly). The design is very stable, if you could get 20 or 30 feet off the ground in a closed environment you could drop it upside down or backwards and it would right itself. Hold the model out at arms length again, tilt the model this time at a steep angle and you will see why it is so important to the space shuttle, that it enter the atmosphere at just the right angle. Too far either way and it would crash, instead of land. This model is just a toy. But the real life space shuttle, doesn't have the luxury of making mistakes. The people who work for NASA, the pilots, and crews, do a near impossible job, and do it so well it looks easy!  
PVB