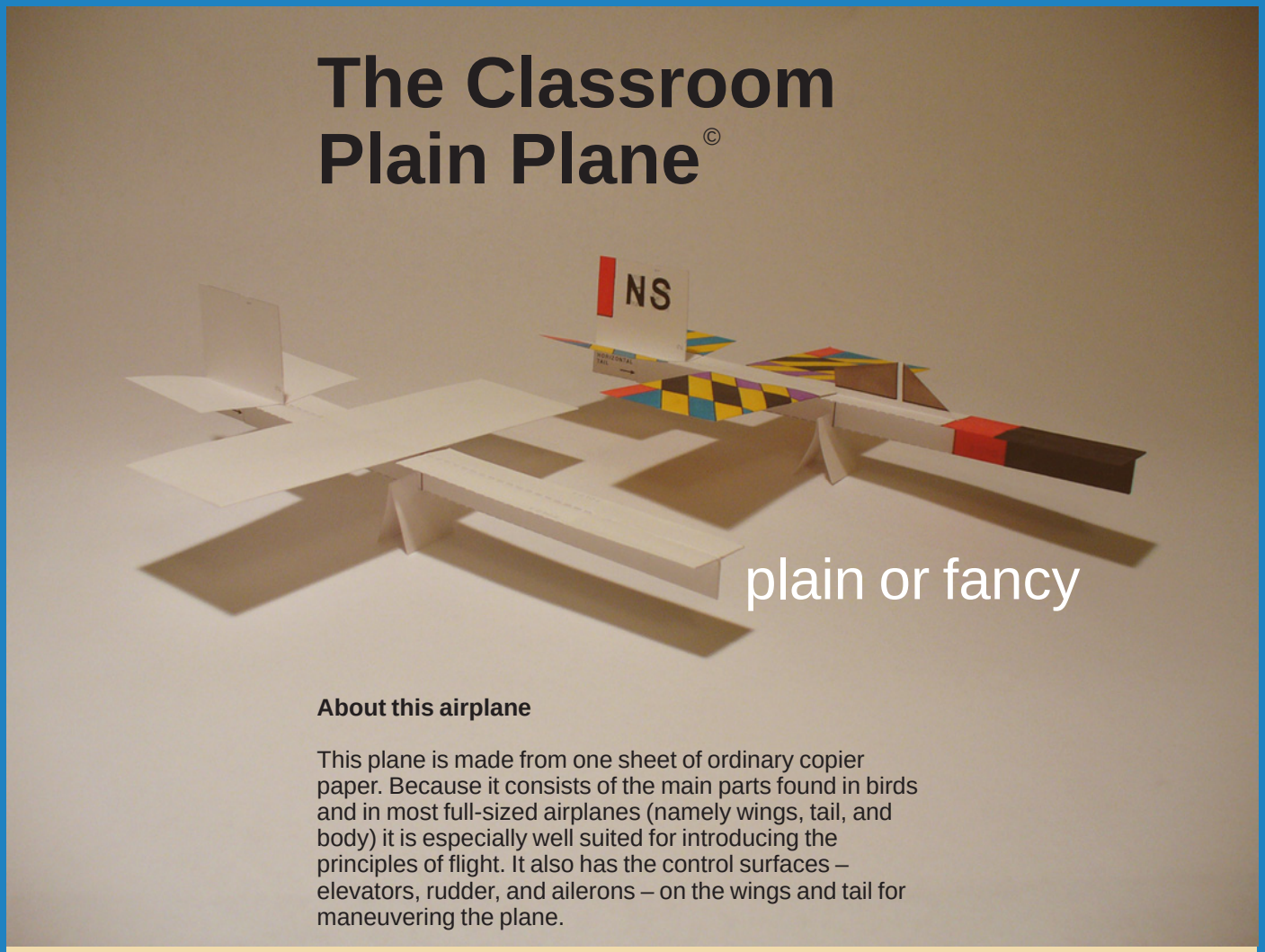
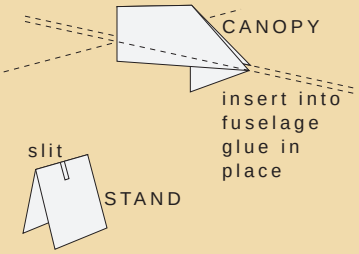
The Classroom Plain Plane©



About this airplane

This plane is made from one sheet of ordinary copier paper. Because it consists of the main parts found in birds and in most full-sized airplanes (namely wings, tail, and body) it is especially well suited for introducing the principles of flight. It also has the control surfaces – elevators, rudder, and ailerons – on the wings and tail for maneuvering the plane.

You can make this paper airplane as plain or as fancy as you like. If you decide to decorate it, do this after the fuselage, wings, and tail have been made but before the plane is assembled. Coloured markers are a good medium because they are bright and do not wrinkle the paper. The small extra piece of paper normally discarded can be used to add a cockpit canopy or a display stand (see photo).



When made accurately this paper airplane is an excellent flyer, indoors or out. Many hundreds have been made successfully in school flight workshops over the years. It has been known to fly the entire length of a school gym. The better the grade of paper used for construction, the better the resulting airplane. This plane is good for class competitions such as distance flown, duration of flight, spot landings, etc. Experiments can be conducted with it regarding weight and balance, weight and speed, symmetry, etc. But it is also just plain plane fun.

Norman Schmidt

INSTRUCTIONS

About Construction with paper

The better the grade of paper used the better the results will be. To cut the paper, use scissors or a craft knife on a suitable surface.

Folds should be neat and sharp. To keep paper from wrinkling, make folds while paper is lying flat on a table.

For convenience, folds may be described as follows:

paper unfolded

a valley fold

a mountain fold

Use stick glue. When dry, glue acts as a stiffener.

Once you understand how the pieces are shaped and how they go together, you will be able to make this plane quite easily. Don't rush. Make the first plane or two as test models. Learn from them. Thereafter planes made should be perfect.

Adjust dihedral angle and bend control surfaces (rudder, elevators, ailerons) for flight as needed. Small adjustments have a big effect. Do not throw the plane too hard or it will distort under the load.

THE PIECES

Step 1:

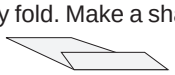
Make the **4 cuts** shown on the printed pattern, in sequence, to separate the pieces for: (A) fuselage (B) wings (C) horizontal tail, and (D) vertical tail.

Discard the one small piece (or use to make canopy or stand – see picture).

FUSELAGE

Step 2:

Find fuselage piece. With printed side up, make **fold 1**, folding nose ballast to the mark indicated, using a valley fold. Make a sharp fold.



Unfold. Apply glue to *entire* nose ballast surface and refold. Press.

Step 3:

To make **fold 2**, with printed side down, fold paper exactly in half lengthwise. Use a valley fold. Make a sharp fold. This is the fuselage centre line fold. Unfold. Keep printed side is down.

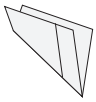
Step 4:

To make **folds 3L** & **3R**, fold both left and right hand edges to meet at the centre line. Use valley folds. Make sharp folds.

Unfold. Sparingly apply glue to *entire* unprinted surface and refold. Press.

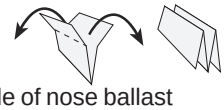
Step 5:

Refold the centre line. Make a sharp fold. Viewed from either end, fuselage now forms a V-shape.



Step 6:

Make **folds 4L** & **4R** using a valley fold. Fold both edges from open side of V to meet at the the centre line fold. Make sharp folds. When viewed from either end, the fuselage now forms an M-shape.



Step 7:

Apply glue to the inside of nose ballast section *only* and press together. Then shape the folds so that fuselage forms a T-shape when viewed from front.

NOSE BALLAST

This completes the fuselage.

WINGS

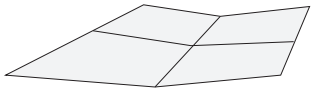
Step 8:

Find wings piece. With printed side up, make **fold 5**, fold piece exactly in half across its length, using a valley fold. This makes the wings' centre line. Unfold.

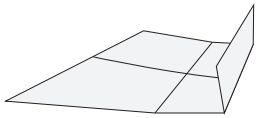
Step 9:

With printed side down, make **fold 6**. Fold piece exactly in half the long way, using a valley fold. Make a sharp fold. Unfold.

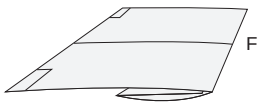
Step 10:



To make **fold 7**, printed side down, fold the long edge to meet fold line 6, using a valley fold.



Then refold fold 6. This folded edge becomes the FRONT edge of the wings. Sharpen folds. Flip over so that folds are on the bottom. Viewed from wingtip, it now looks like this.



FRONT

FOLDS ARE ON THE BOTTOM

Unfold. Apply glue to the *very* outer edges of the wings *only* so that when refolded the wingtips only are glued closed. Make sure wings are flat and the folds sharp. The folded surfaces are on the BOTTOM of the wings.

This completes the wings.

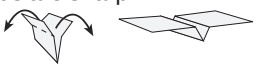
TAIL

Step 11:

Find horizontal tail piece. Printed side up. To make **fold 8**, fold paper in half, using a valley fold. Make a sharp fold. It now forms a V-shape.

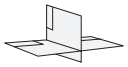
Step 12:

For **folds 9L** & **9R**, from the open side of V, fold both edges over along the lines. The horizontal tail now has a V-shaped centre, as shown. Make sure folds are sharp.



Step 13:

With rudder and elevators facing the same direction, apply glue to the inside of the V-shape of the horizontal tail piece and insert the vertical tail piece. Press closed. Viewed from the end, the tail assembly now makes a cross-shape, as shown.



This completes the tail.

FINAL ASSEMBLY

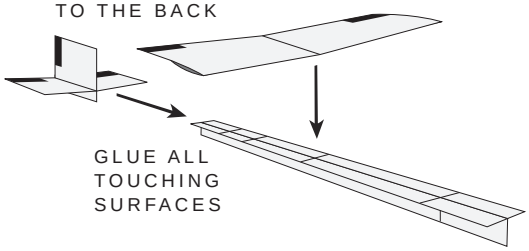
Step 14:

Applying glue to all touching surfaces, insert tail assembly STRAIGHT into the open back end of the fuselage to the guide mark, rudder and elevators to the BACK. Press glued surfaces.

Step 15:

Applying glue, fasten wings to the top of the fuselage with front edge at the guide mark, ensuring wings are ALIGHNED along the centre line and at right angles to the fuselage.

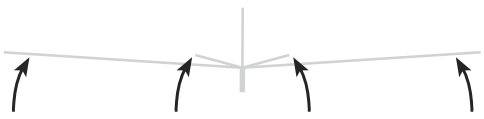
RUDDER, ELEVATORS, AILERONS TO THE BACK



GLUE ALL TOUCHING SURFACES

When the three main parts are fastened, bend the wings and horizontal tail upwards slightly at the tips, as shown, giving a dihedral angle. This helps flight stability.

VIEW OF PLANE FROM BACK



DIHEDRAL ANGLE

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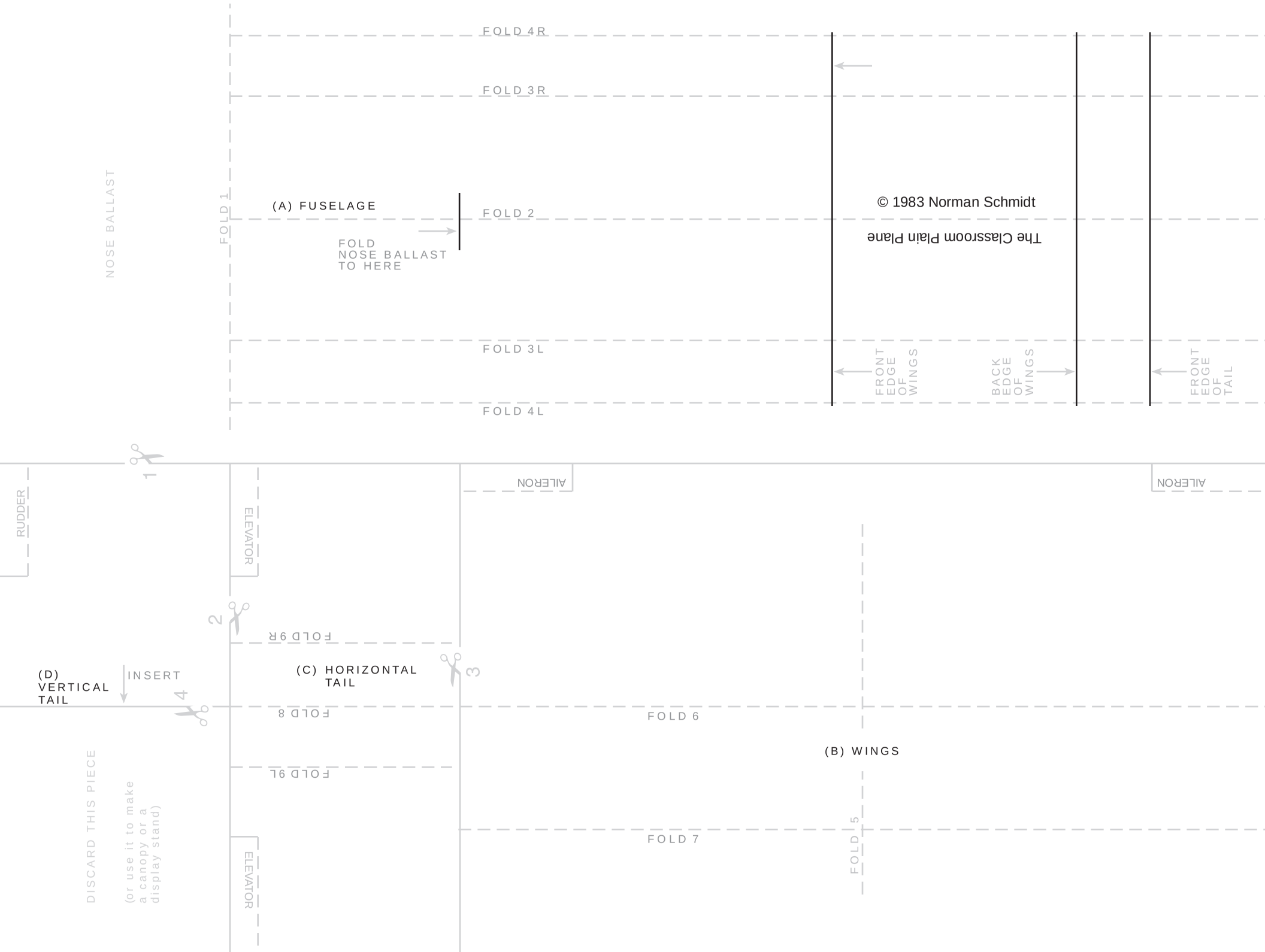
FOLD 4R
FOLD 3R
FOLD 1
NOSE BALLAST
(A) FUSELAGE
FOLD 2
FOLD
NOSE BALLAST
TO HERE
© 1983 Norman Schmidt
The Classroom Plain Plane
FOLD 3L
FRONT EDGE OF WINGS
BACK EDGE OF WINGS
FRONT EDGE OF TAIL
FOLD 4L
1
RUDDER
ELEVATOR
AILERON
AILERON
2
FOLD 9R
(D) VERTICAL TAIL
INSERT
4
(C) HORIZONTAL TAIL
3
FOLD 8
FOLD 6
(B) WINGS
FOLD 9L
DISCARD THIS PIECE
(or use it to make a canopy or a display stand)
FOLD 7
FOLD 5
ELEVATOR