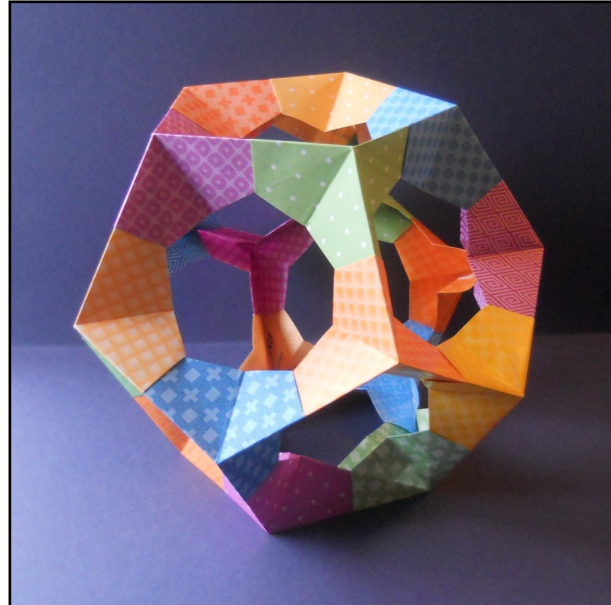# Apollo

Designed by David Mitchell

Apollo is a modular sculpture based on the form of the regular dodecahedron. It has sunken and pierced faces and is made using twenty modules, each of which contributes one vertex to the form. The modules are prepared in two sets of ten, one set having one tab and two pockets and the other two tabs and one pocket.

I first made Apollo in 1992 using modules folded from hexagons. Revisiting the design in 1996, I found that the 60/30 geometry of the original modules could easily be embedded in squares and other rectangles.

By omitting some of the configuring creases, it is possible that the module could also be used to make modular sculptures based on other polyhedra, such as the truncated icosahedron, which also have three of their edges meeting at each vertex. I have not experimented to see if this theoretical possibility works in practice.
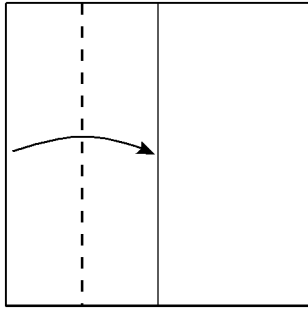
To make Apollo, you will need twenty squares of paper, four in each of five colours. Any kind of paper can be used.
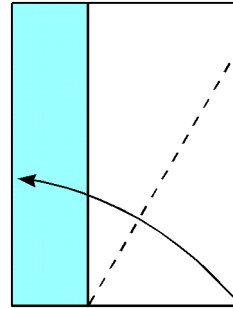
1
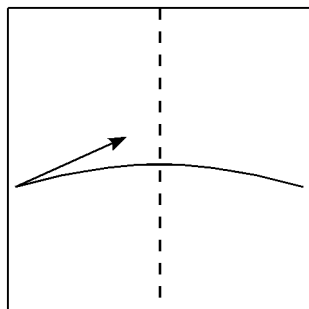
1. If you are using irogami begin with your paper arranged white side up. Fold in half edge to edge, then unfold.
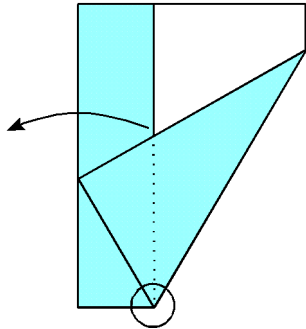
2

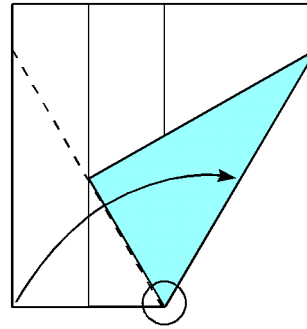2. Fold the left edge into the centre.

3

3. Fold the bottom right corner onto the left hand edge, making sure the crease begins at the centre of the bottom edge.
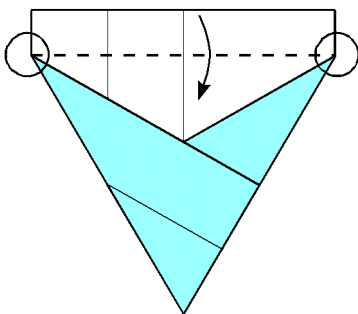
4

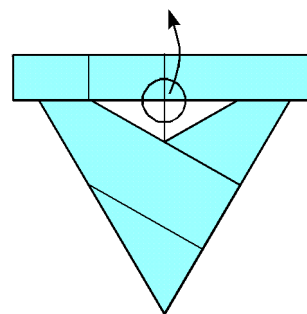4. Check that the crease you made in step 3 is accurately located. Undo the fold made in step 2.

5

5. Fold the bottom edge onto the lower, sloping, right edge.
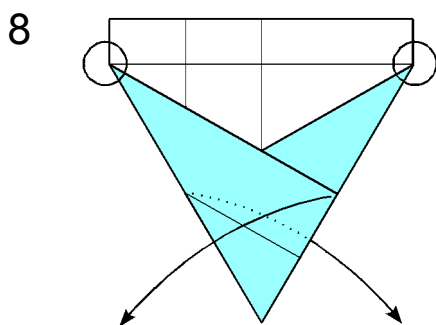
6

6. Fold the top edge downwards using the points marked with circles to locate the fold.
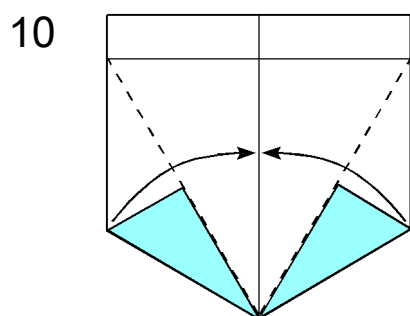
7

7. Check that the creases line up at the point marked with a circle, then unfold.
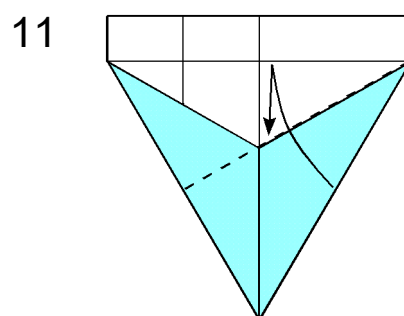
David Mitchell / Apollo

8

8. If you have folded accurately the horizontal crease should touch the top corners of the front and middle layers. If necessary, adjust your ceases at this point, then open out completely.
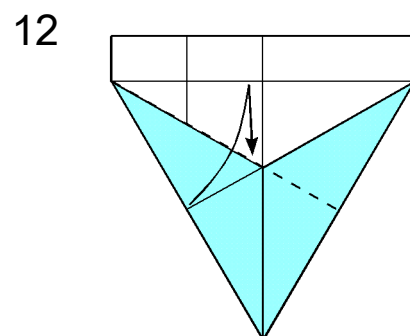
9
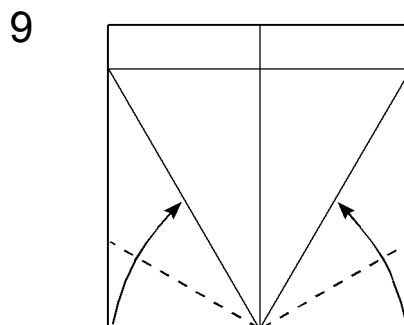
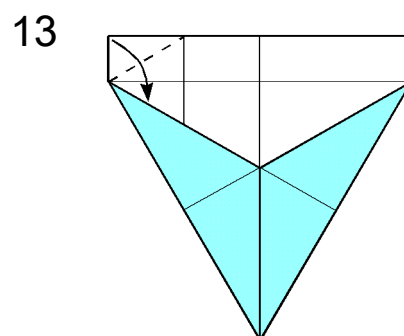**9.** Fold both halves of the bottom edge onto the diagonal creases.

10

10. Fold the bottom left and bottom right corners inwards using the existing creases.

11

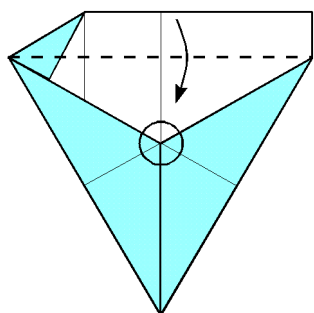**11.** Fold the sloping right edge onto the horizontal crease, then unfold.

12

12. Fold the sloping left edge onto the horizontal crease, then unfold.
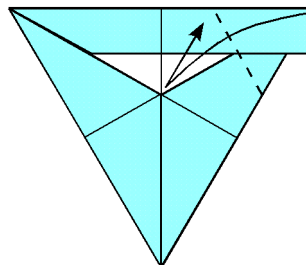
13

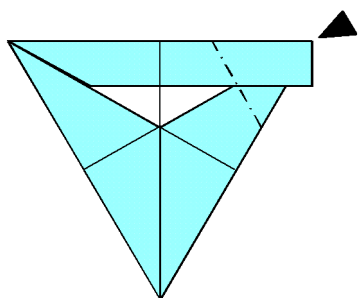**13.** Fold the top left corner inwards as shown.

14

14. Fold the top edge downwards using the existing crease. When you have done this the point marked with a circle will be the centre of the design.
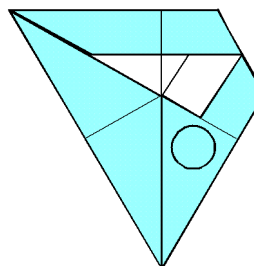
15

15. Fold the top right corner into the centre, then unfold.
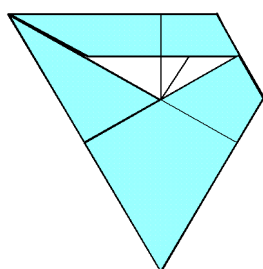
16

16. Turn the top right corner inside out in between the other layers so that the result looks like picture 17.
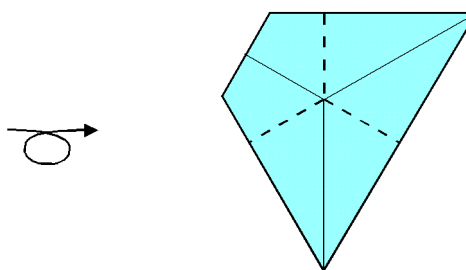
17

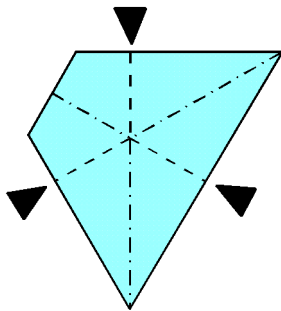17. Bring the flap marked with a circle to the front.

18

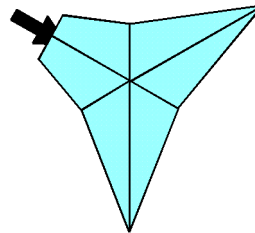18. Turn over sideways.

19

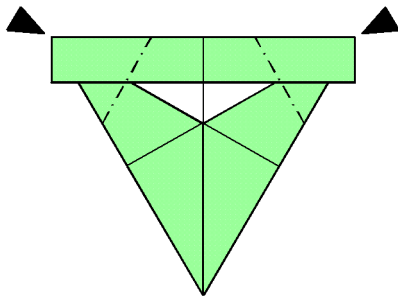19. Reverse the direction of the creases marked with dashed lines.

20

20. Push the sides inwards so that the centre rises up towards you.
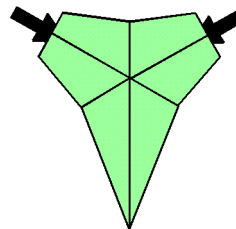
21

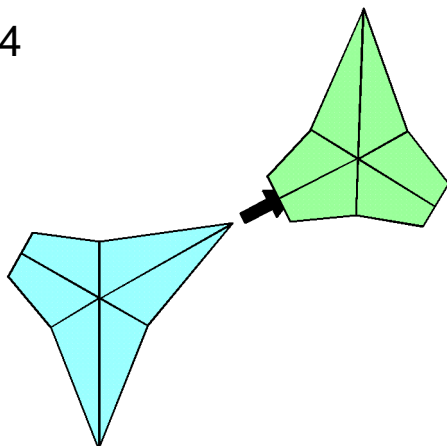21. The A module is finished. Make two in each of five colours.

22

22. The B modules are made in the same way except that you should omit step 13 and turn both top corners inside out in between the other layers.
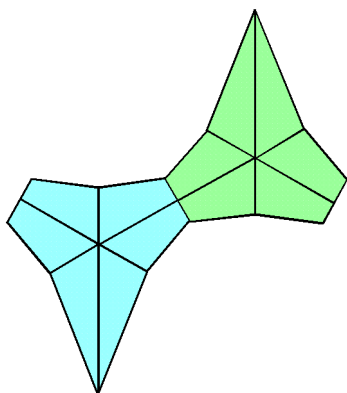
23

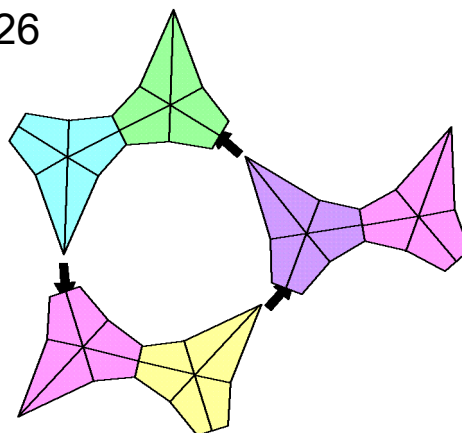23. The finished B module should look like this. Make two in each of five colours.

24

24. Put an A module and a B module together to form a sub-assembly.

25

25. The finished sub-assembly will look like this.

26

26. Apollo can be constructed by first building a pentagonal ring from three sub-assembles, in the way shown here, then using other sub-assembles to complete further pentagonal rings until the structure is complete.

You can also construct Apollo by adding modules individually, keeping a balance between the addition of A and B modules.

In both cases you will need to keep to the colour scheme shown in the photo on page 1 of these diagrams

It occurs to me to wonder if, when adding individual modules randomly, without keeping a deliberate balance between A and B modules, it is ever possible to arrive at a situation where the remaining modules cannot be added to complete the form. I have not been able to find such a situation, but equally I have not been able to prove this is impossible.