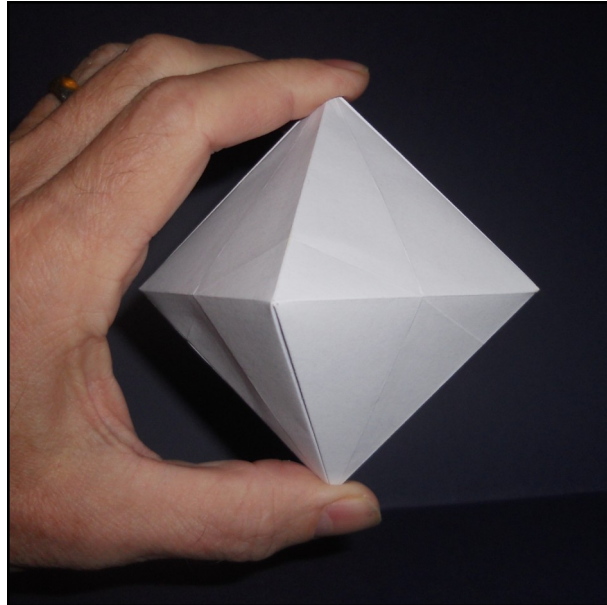# Pocket Octahedron

Designed by David Mitchell

In 2004 I was playing with my Pocket Tetrahedron design, experimenting to see what would happen if I added extra creases to it, when it unexpectedly collapsed into an octahedron.
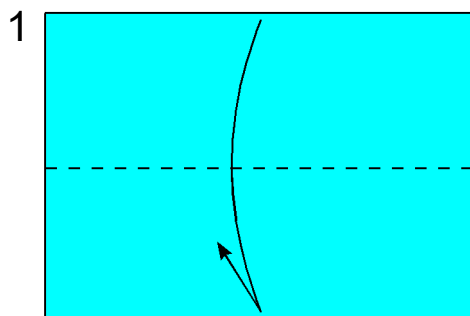
I call this design the Pocket Octahedron because it can be stored flat in a pocket, then brought out, formed into a square section tube and quickly collapsed into an octahedron. This process is magical to watch if you are not expecting it.
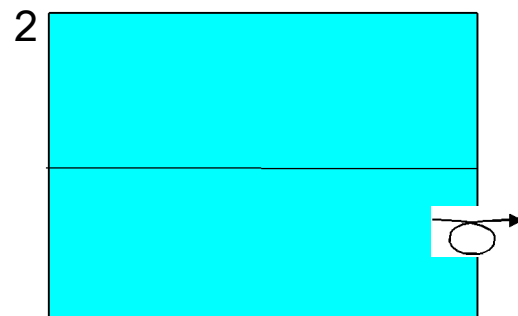
You can make the design from A4 or US letter size paper, or from either divided in half widthwise. For clarity the diagrams show you how to fold the design from irogami, paper that is white one side and coloured the other, but it can equally well be made from paper that is the same colour both sides.
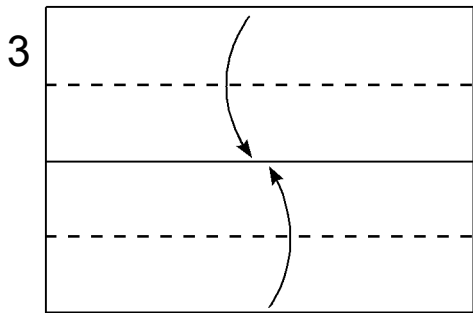
If you are using irogami begin with your paper arranged coloured side up.
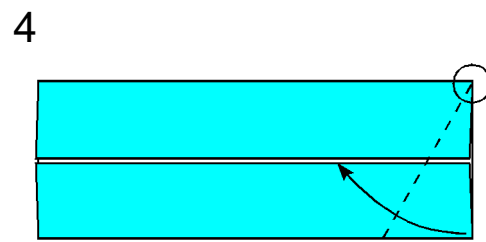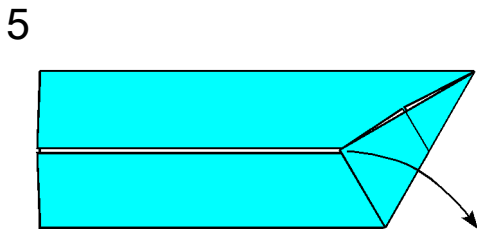
1. Fold in half downwards, then unfold.

2. Turn over sideways.

3

3. Fold both the top and bottom edges into the centre.

4

4. Fold the bottom right corner onto the line where the original top and bottom edges meet, making sure that the crease starts from the top right corner.
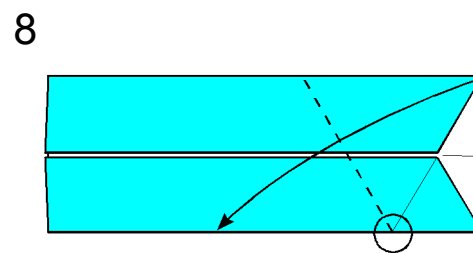
5

5. Check that the top right corner is sharp. Undo the fold made in step 4.

6

6. Make a small fold in just the front layer between the bottom right corner and the point where the crease made in step 4 intersects the line where the original top and bottom edges meet.
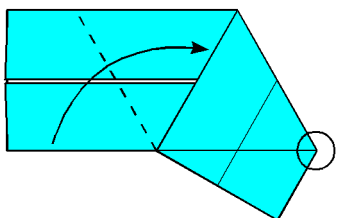
7

7. Fold these two small triangular flaps backwards in between the layers. Doing this makes it easier to carry out step 30.
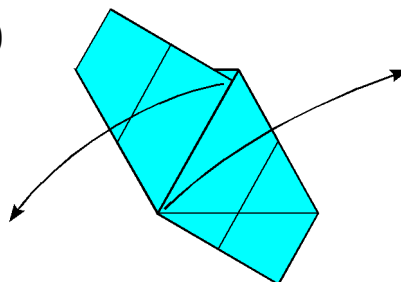
8

8. Fold the top right corner onto the bottom edge, making sure that the new crease starts from the point where the crease made in step 4 intersects the bottom edge.
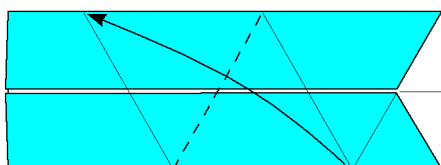
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9

9. Fold the left part of the bottom edge to lie along the sloping edge of the front layers.
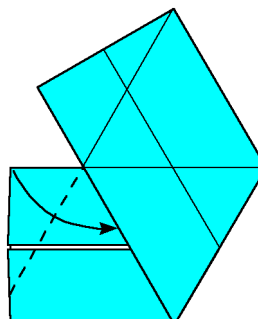
10
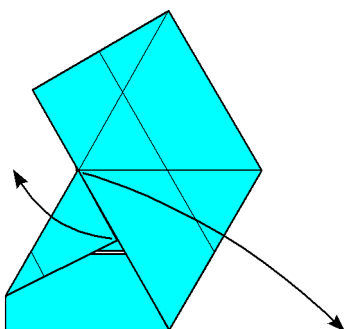
10. Undo the folds made in steps 8 and 9.

11

11. Fold the point where the crease made in step 8 intersects the bottom edge onto the point where the crease made in step 9 intersects the top edge.
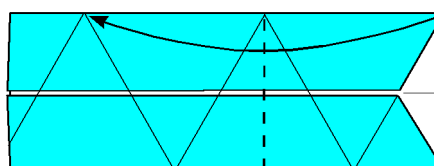
12

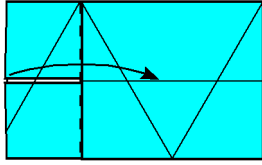**12.** Fold the left part of the top edge to lie along the sloping edge of the front layers.

13

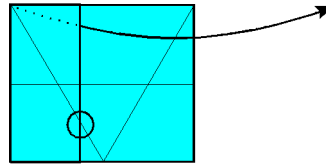**13.** Undo the fold made in step 12.

14

14. Fold the top right corner onto the point where the crease made in step 9 intersects the top edge.
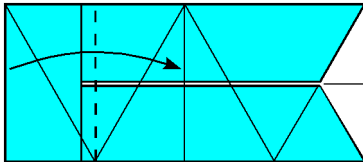
15

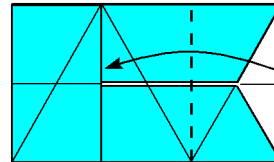15. Fold the left edge inwards along the line of the left edge of the front layers.

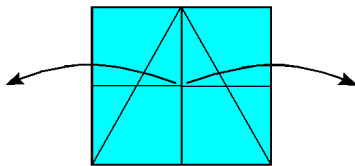**16**

16. Undo the fold made in step 14.

17

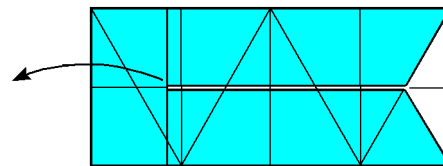17. Fold the left edge onto the vertical centre crease.

18

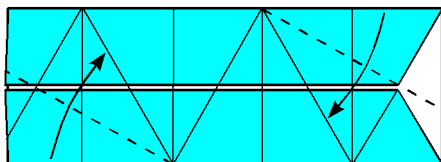18. Fold the right edge inwards so that it lies along the right edge of the front layers.

19

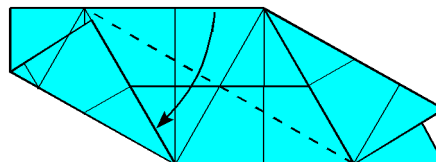19. Open out the folds made in steps 17 and 18.

20

20. Open out the fold made in step 15.
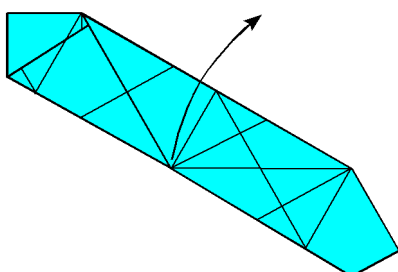
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21

22

21. Fold the top right and bottom left corners inwards as shown so that parts of the top and bottom edges lie along the diagonal creases.
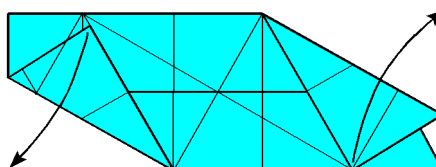
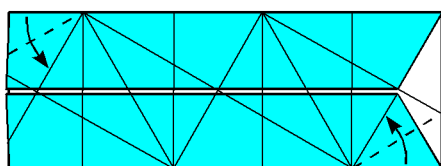22. Fold the central part of the top edge so that it lies along the sloping edge of the left front layers.
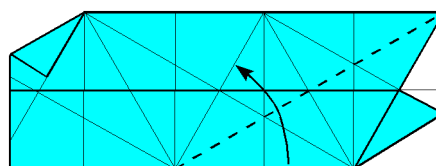
23

24

23. Undo the fold made in step 22.
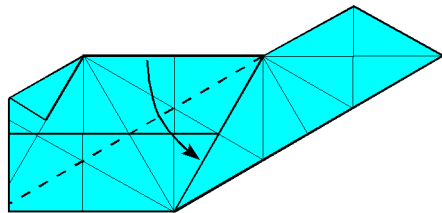
24. Undo the folds made in step 21.

25

26

25. Fold the top left and bottom right corners inwards as shown so that parts of the top and bottom edges lie along the diagonal creases.
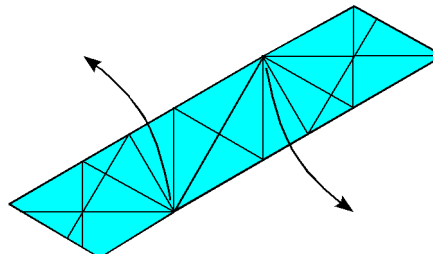
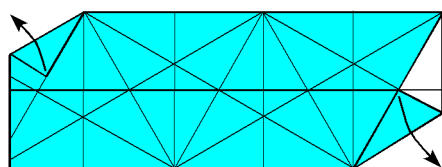26. Fold the right part of the bottom edge onto the diagonal crease as shown.

27

27. Fold the left part of the top edge inwards to lie along the sloping edge of the front layers.
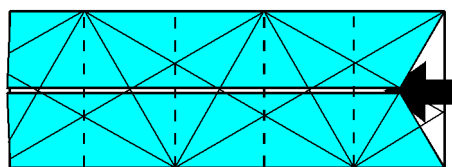
28

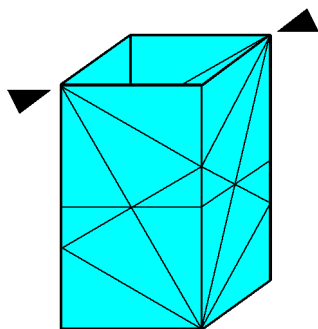28. Undo the folds made in steps 26 and 27.

29

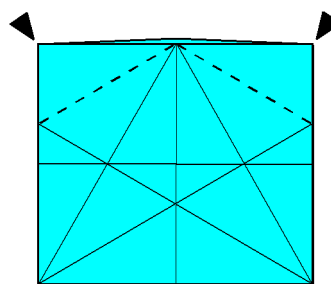29. Undo the folds made in step 25.

30

30. Form the paper into a square section tube by inserting the left section of the paper in between the layers at the right.
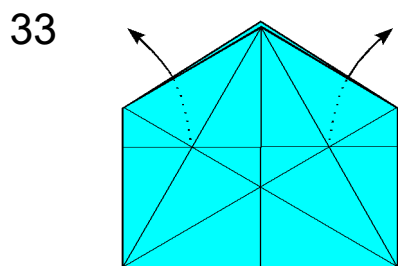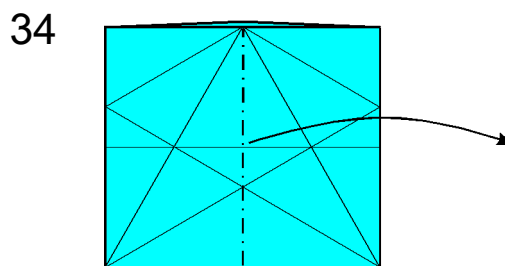
31

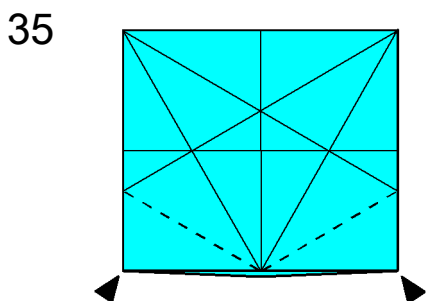31. Squash the tube flat like this.

32

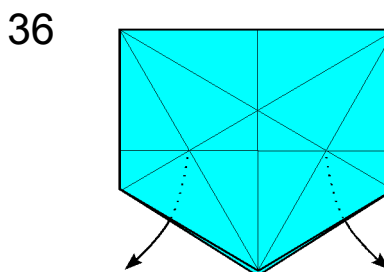32. Turn the top corners inside out in between the other layers.

33

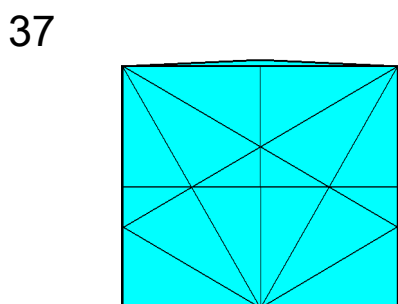33. Undo the folds made in step 32.

34

34. Open the tube up to the right and squash flat in the alternate position.
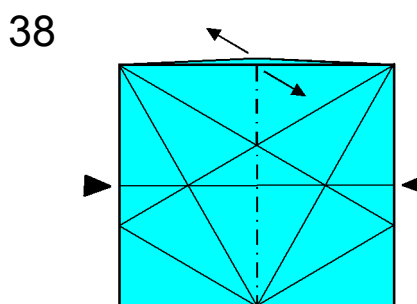
35

35. Turn the bottom corners inside out in between the other layers.

36

36. Undo the folds made in step 35.

37

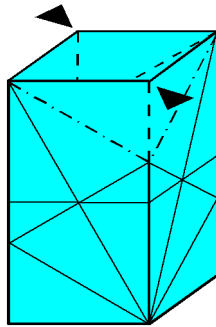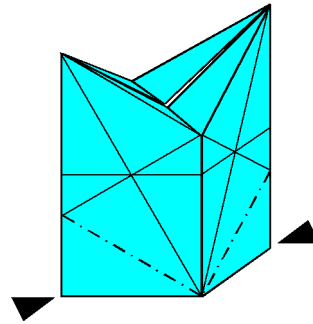37. The Pocket Octahedron can be stored flat in this position.

38

38. To form the octahedron first open out to a square section tube like this.
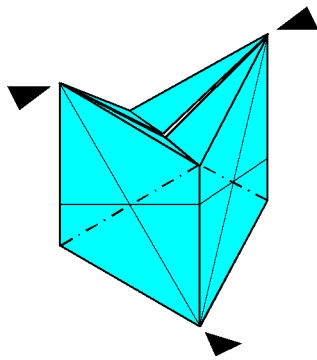
39

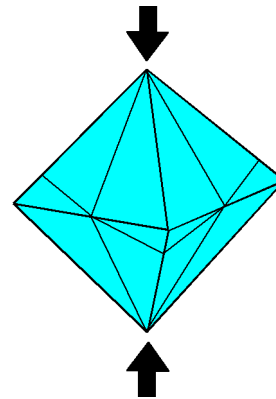39. Push in the corners at the top.

40

40. Then push in the corners at the bottom.

41

41. Simultaneously push the two top points and the two bottom points together like this.

42

42. Hold the top and bottom corners between thumb and second finger as shown in the photo on page 1. The Pocket Octahedron is finished.