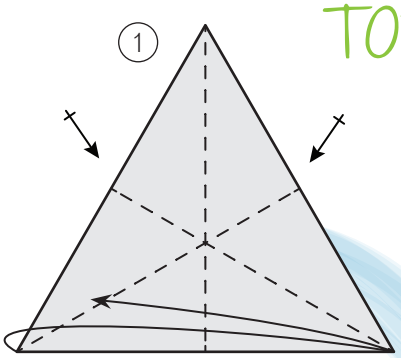
Triangular Diatom (Triceratium)

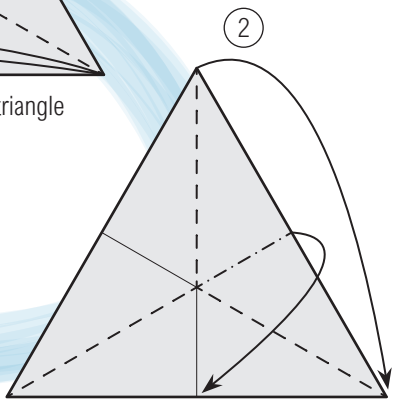
Diatoms are single-celled, plant-like organisms found throughout the world's oceans and freshwater. They form dense, short-lived blooms that the rest of the ocean food web depends on, like microscopic rainforests that come and go with the weather.

Their exoskeletons are made of silicate (glass) and can take a huge variety of geometric forms. *Triceratium* diatoms are often triangular, although they can take other shapes as nutrient conditions change. Like all diatoms, their exoskeletons are made of two halves that fit together like the lid and base of a traditional origami box (masu).

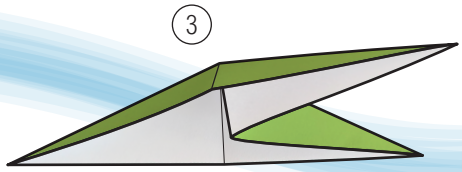
TOP PART



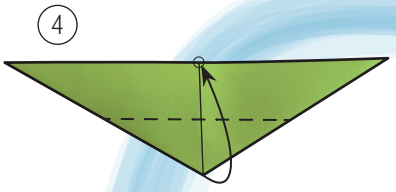
Start from an equilateral triangle (see page 4).



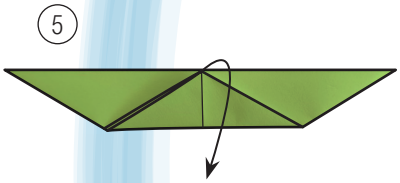
Collapse.

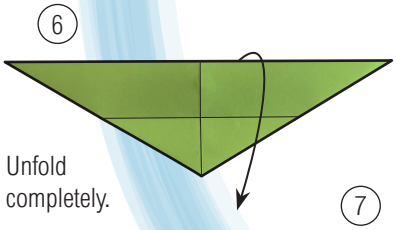


Flatten completely. Turn around.

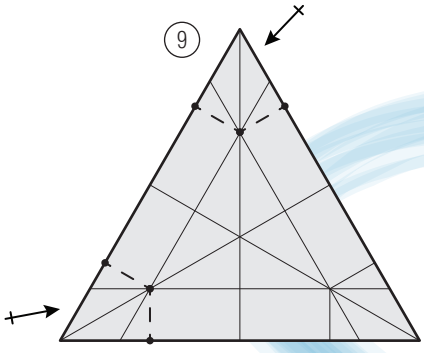


Fold in half. Make a sharp crease.

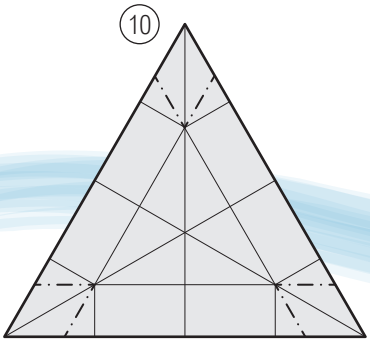




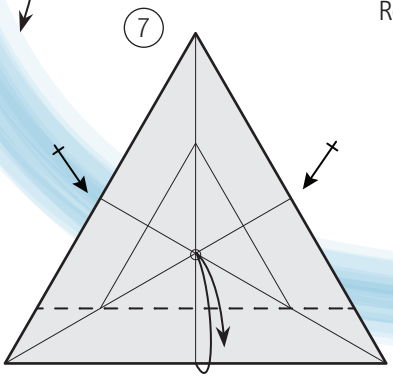
Unfold completely.



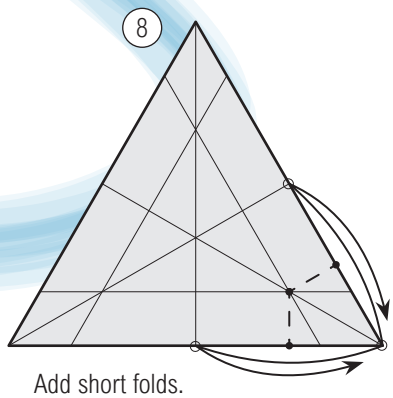
Repeat with other corners.



Reverse the orientation of shown creases. Turn around.



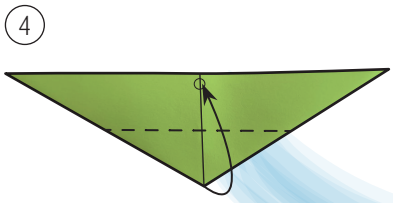
Prolong the folds till the edge. Repeat on the other sides.



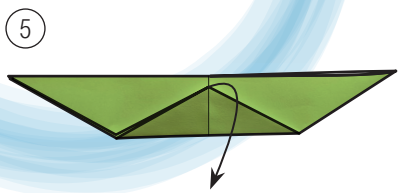
Add short folds.

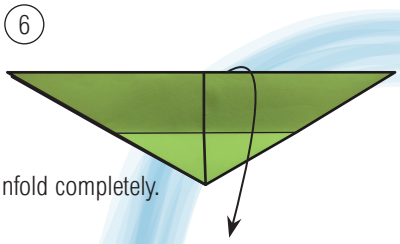
BOTTOM PART

The bottom half of the diatom must be smaller than the lid to fit inside. To do that we change slightly the fold in step 4. Instead of folding to the top, we fold a bit under. This defines the size of the bottom. You can experiment with the position to obtain boxes which are smaller and smaller.

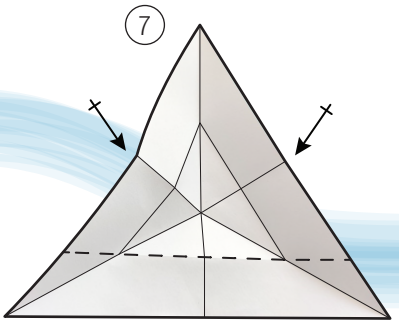


Fold slightly under the top.
Make a sharp crease.

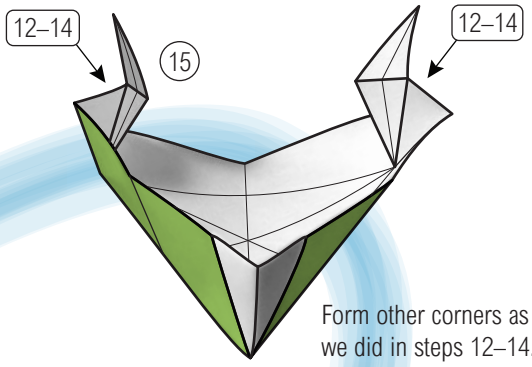




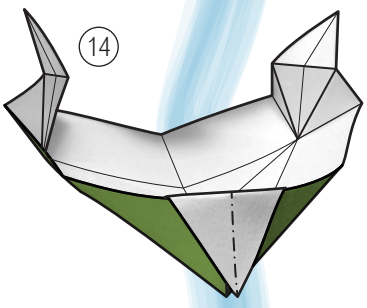
Unfold completely.



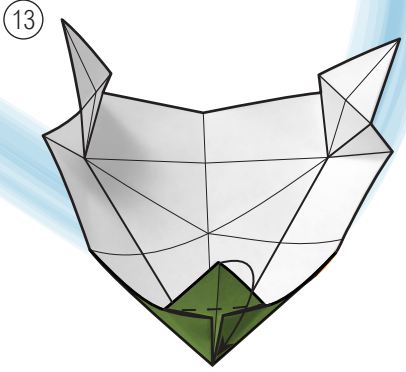
Prolong the folds till the edge.
Repeat on the other sides.



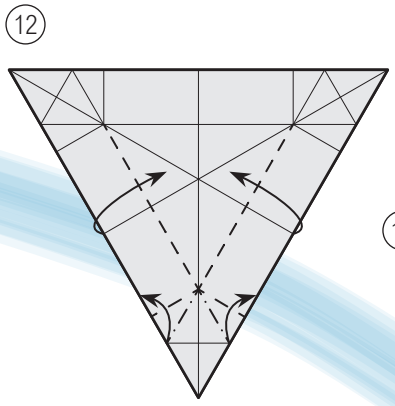
Form other corners as
we did in steps 12–14.



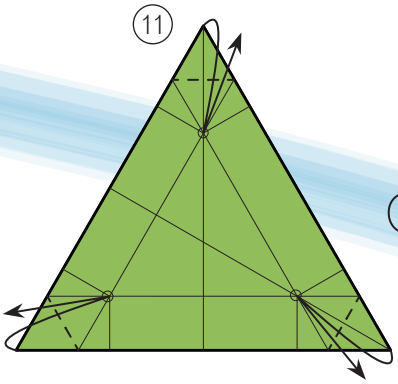
Pinch the corner to make it
sharp. It also prevents the
triangular flap from opening.

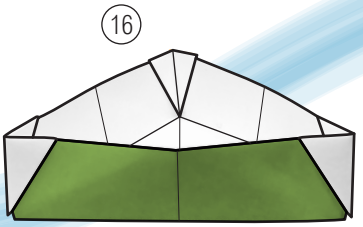


Lock the corner by folding
the flap over the layers.

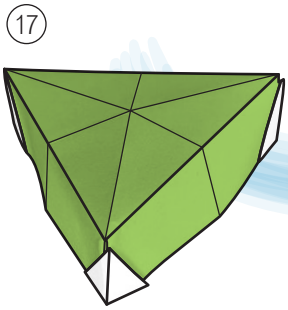


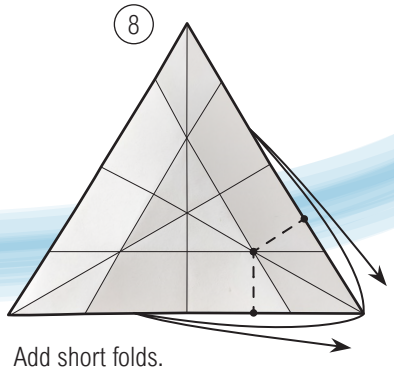
Start collapsing the corner.



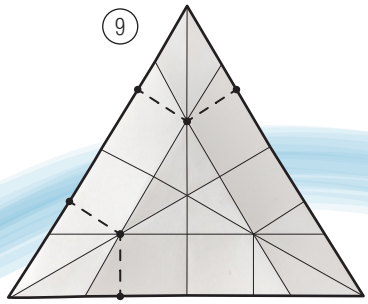


The top half of the shell is finished.

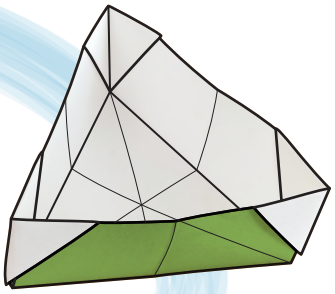




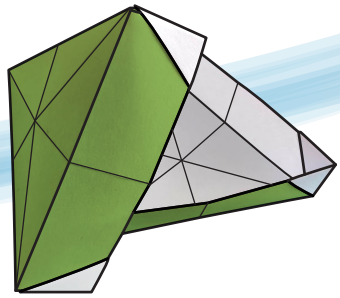
Add short folds.

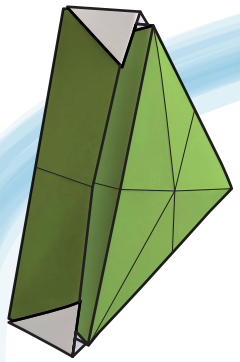


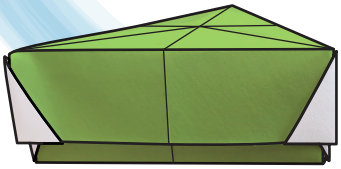
From here follow steps 10-16 to finish the bottom half of the shell.



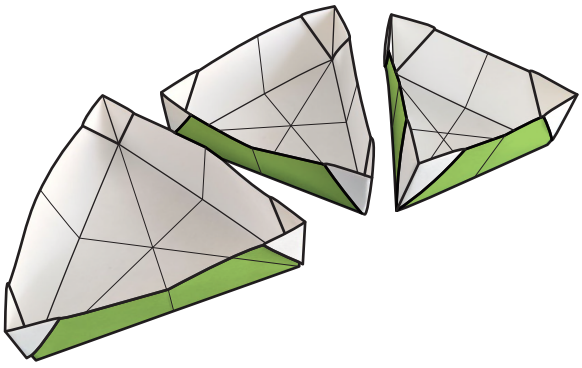
Combine the top and the bottom part to create a complete diatom shell.







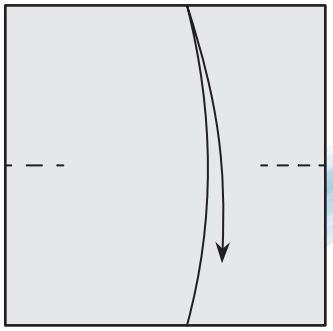
Diatoms normally reproduce by dividing in half. When they do, each half of the exoskeleton grows a new, smaller half, and over time the population of cells gets smaller and smaller. Every 100 generations or so, the diatoms mix their genes together (sexual reproduction) and restore themselves to full size.



Constructing an Equilateral Triangle

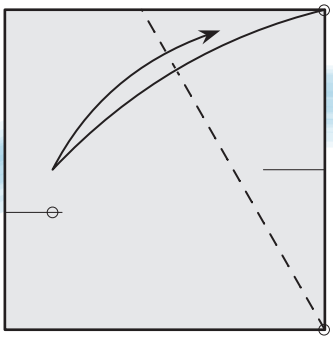
From a Square

1



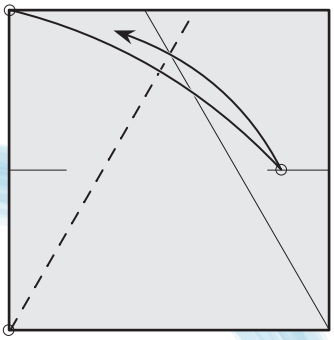
Pinch softly only on the sides.

2



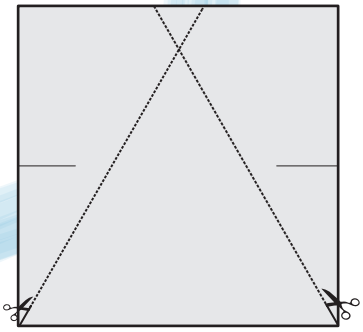
Bring the corner to the fold while keeping the bottom corner sharp.

3



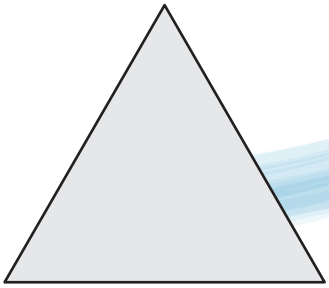
Repeat with the left corner.

4



Cut along the lines to obtain an equilateral triangle.

5

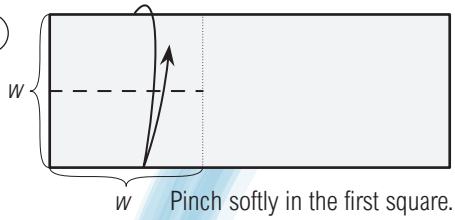


Ready to use.

From a Rectangle

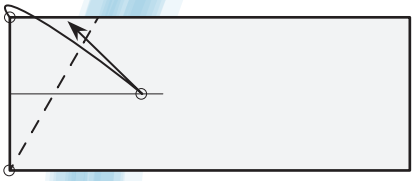
Ideal to obtain several triangles. If you use the long half of A4 (or letter format) paper, you can get three triangles.

1



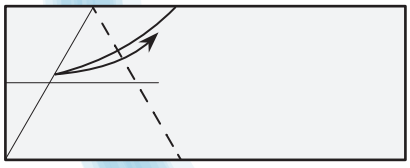
Pinch softly in the first square.

2

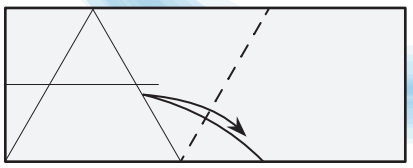


Bring the corner to the fold while keeping the bottom corner sharp.

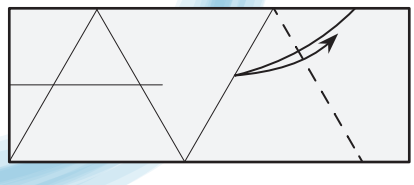
3



4

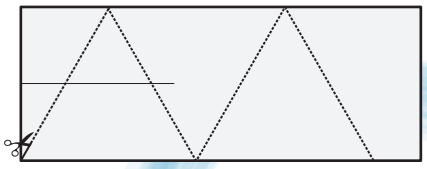


5



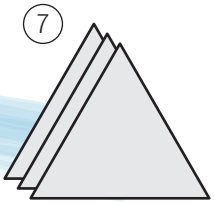
Continue repeating steps 4–5 till the end of a rectangle.

6

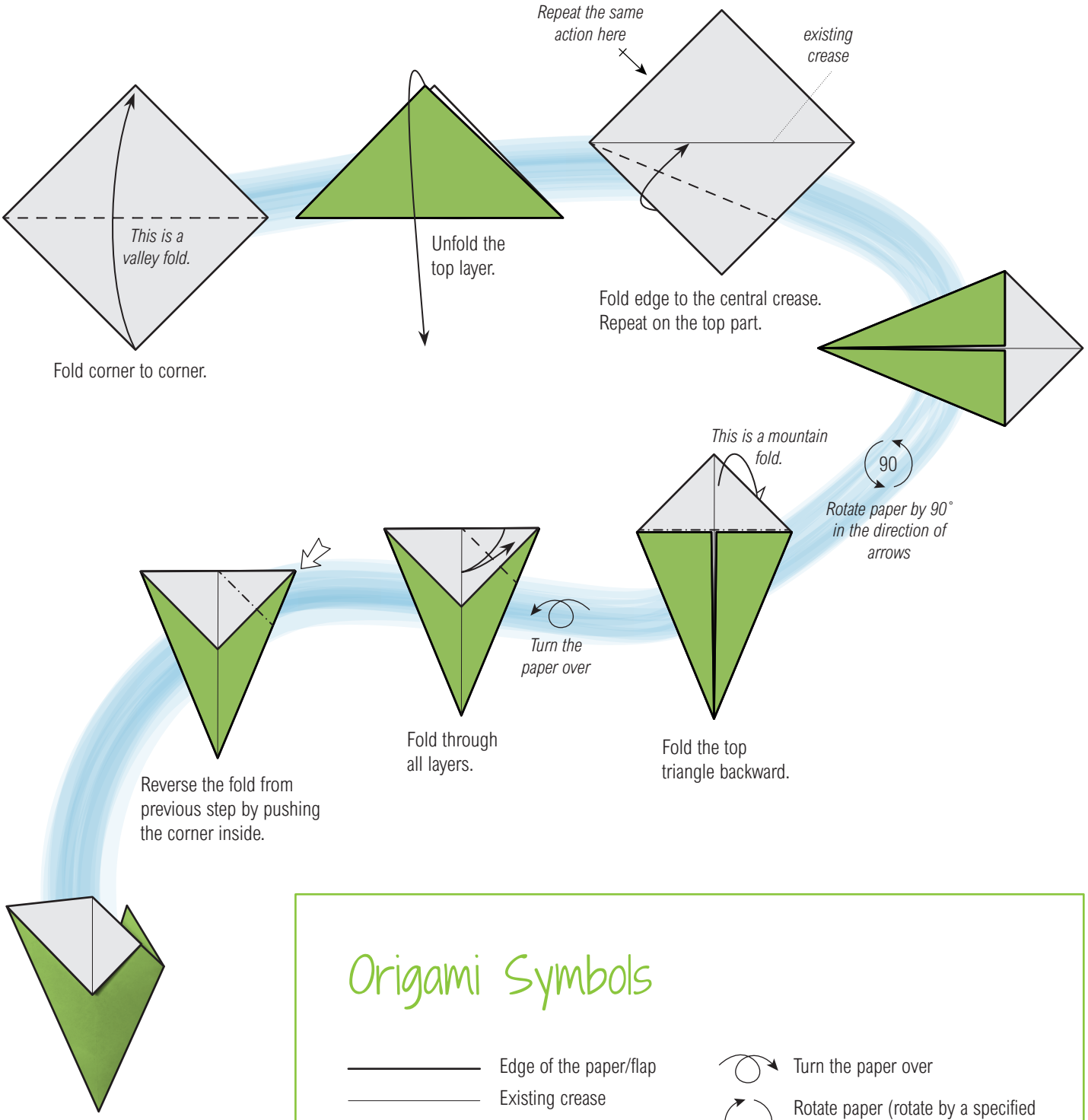


Cut along the lines to obtain equilateral triangles.

7



Origami Basics (commented diagram)



Origami Symbols

- Edge of the paper/flap
- Existing crease
- Invisible layers
- Valley fold
- Mountain fold
- Turn the paper over
- Rotate paper (rotate by a specified angle as in the example)
- Push in the direction of the arrow
- Repeat same step here
- 6–7 Repeat steps 6–7 here