Tiled Hexagon Tessellation

I called this fold a tiled hexagon, for lack of a better term. In essence it's just a folded demonstration of a pure hexagonal tessellation- hexagons are one of the three polygons that can fully tessellate a plane (triangles, quadrilaterals, and hexagons).

Squashed Twist Fold

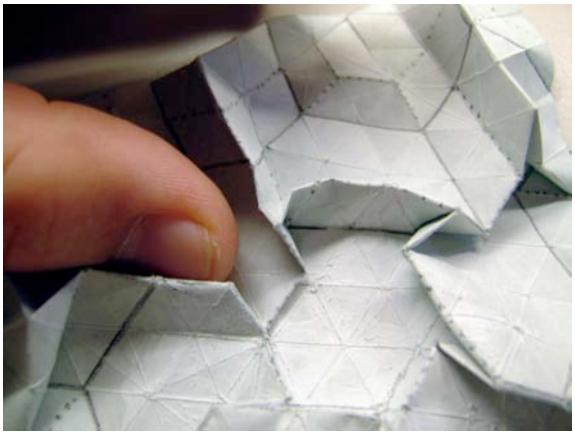
The actual "top" of this pattern forms a flat plane of hexagons; the really interesting part is the "bottom" which is made up of triangular squashed twist folds. This particular sort of fold is a basic element in many origami tessellation patterns, whether it be a triangle, square, hexagon, or other polygonal unit. It allows the excess material that builds up at crease intersections to be dispersed in a flat-foldable way which is also usually quite fun to fold. I think of it as something similar to popping bubble wrap.

While the crease pattern(s) for this fold are usable, the model usually folded initially from a standard precreased sheet of paper, using the 60 degree creasing method listed at the end of this document. Initial hexagonal shapes are roughed out from the precreased sheet, and the crease intersections are folded with the squashed twist. This becomes rather easy once you get the hang of it. I've included a simple single squashed twist fold to try out as an example.

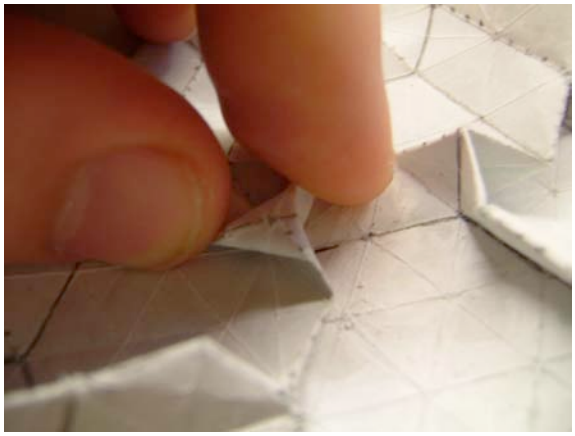
Everything I release is available online at http://www.origamitessellations.com.

-Eric Gjerde

Roughing out the initial hexagons

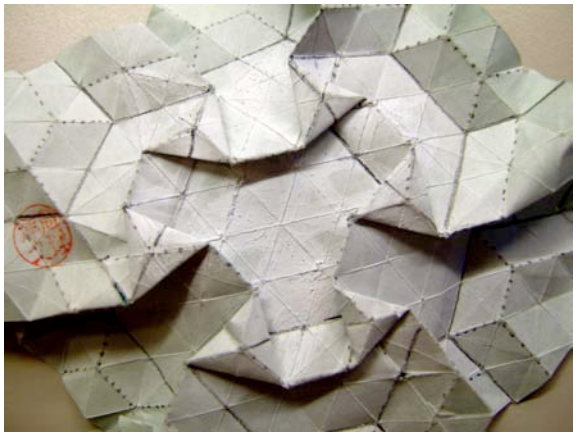


Shaping the first crease intersection for squashing.



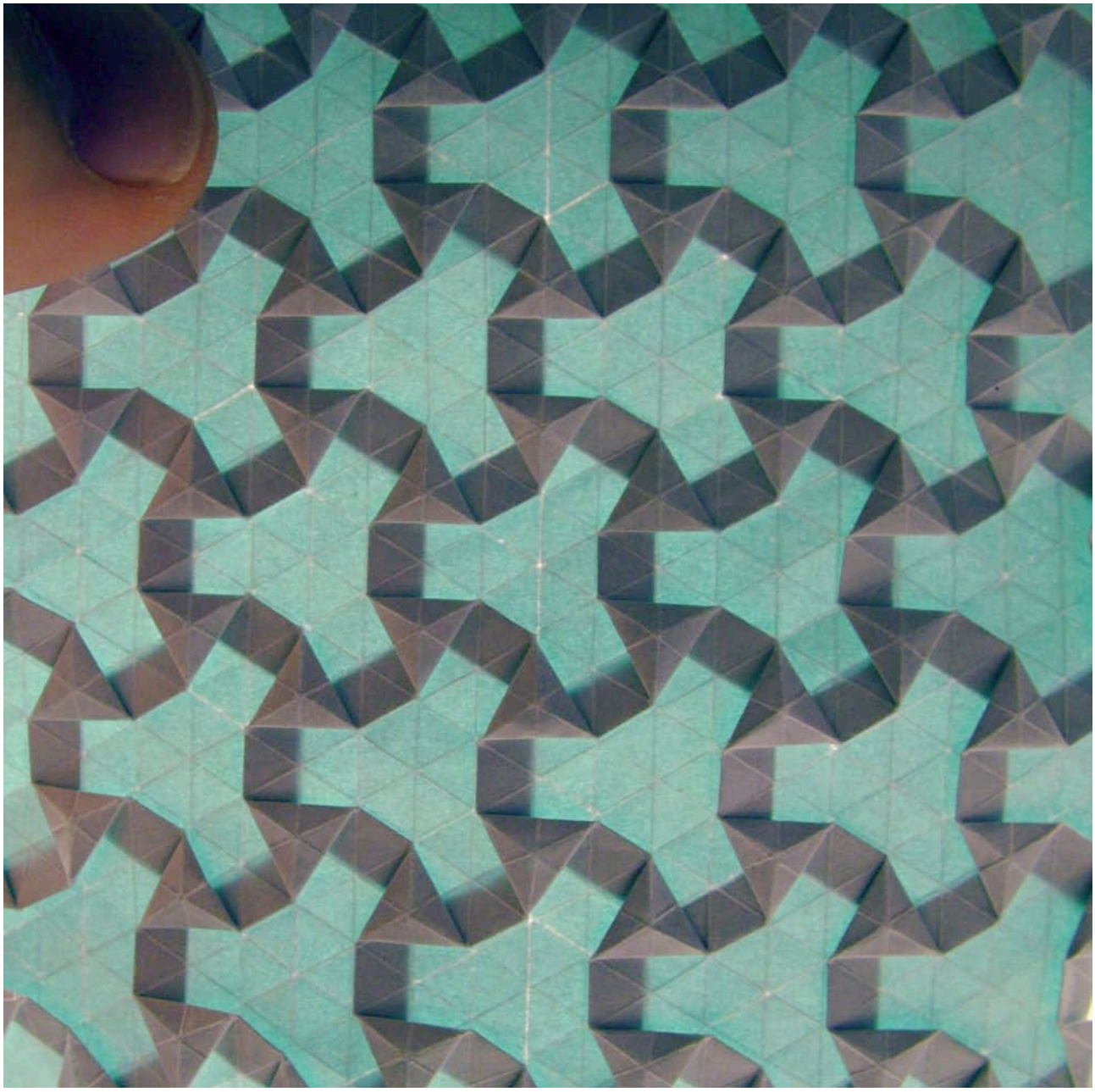
Squashing the crease intersection

Notice the orientation of the surrounding pleats.



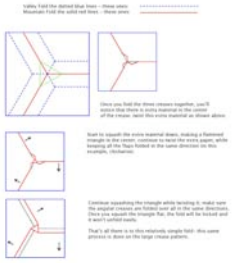
First ring of squashing and creasing complete. Just repeat the pattern from this point on.

The completed fold, fully tessellating the plane of this paper.

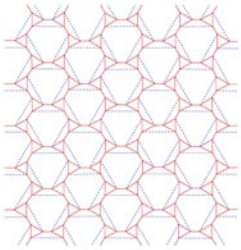


This tessellation makes a very attractive pattern when held up to a light. The folding structure locks the paper together, so you could fold additional things with a sheet of this tessellated pattern if you so desired. The squashed twist fold is a basic building block of folded tessellations, so it's a good fold to add to your repertoire.

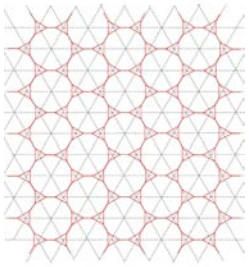
The Crease Patterns



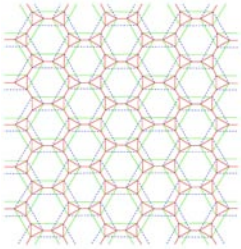
Sample squashed twist fold, diagram page 1:
This is a sample diagram of a single squashed twist. Try this one out first if you're wondering how it works, or would like something easier to practice with.



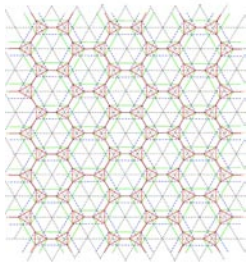
Main Precrease Pattern, diagram page 2:
This is what I would use to fold the tessellation, given a choice. It's a bit more simplistic in the number of lines shown to make folding easier. These are all the actual creases in the final model. Fold mountain folds on solid red lines, and valley folds on blue dotted lines.



Hex Grid Precrease Pattern, diagram page 3:
This has the full hexagonal grid lines for the fold, as well as the final squashed triangle creases. Mostly just shown here for informational purposes. Fold all the black dotted lines as mountain folds. (Yes, yes- I know the lines are misleading. Sorry!)



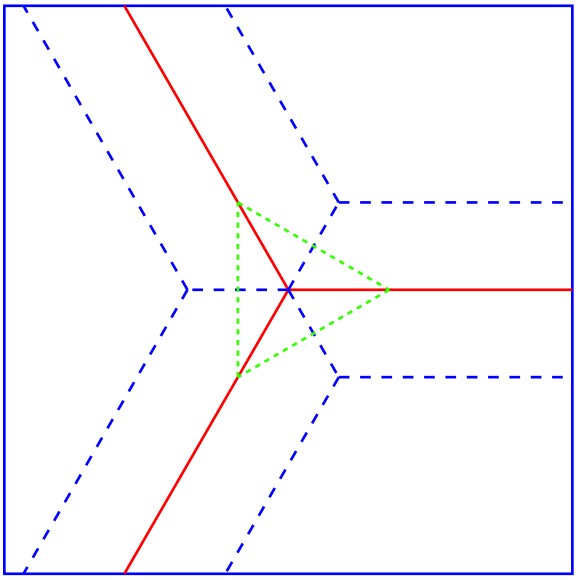
Hex Grid Precrease Pattern, diagram page 4:
This is very similar to the second page of the precrease diagrams, but it also has the mirror side of the blue line valley folds. If you're looking to fold this pattern from scratch, this is a good example of what it should look like. The green lines should be folded as valley folds.

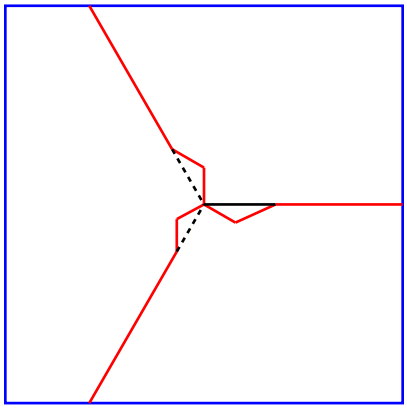


Hex Grid Precrease Pattern, diagram page 5:
This is all the previous lines on one big messy diagram. I don't know if I would use this to fold, but it does have all the creases you would possibly need to make shown on it. If you make all the creases on this paper, you can go on to make quite a few more models than just this one!

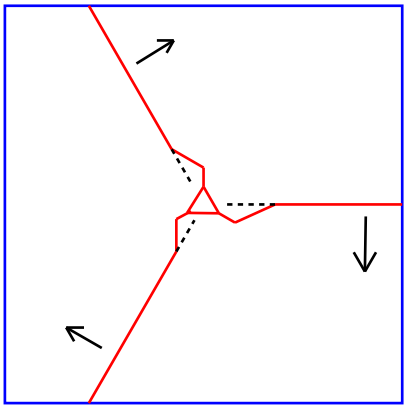
Valley Fold the dotted blue lines – these ones:

Mountain Fold the solid red lines – these ones:

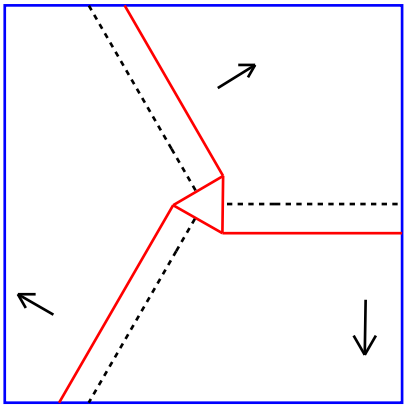




Once you fold the three creases together, you'll notice that there is extra material in the center of the crease. twist this extra material as shown above.

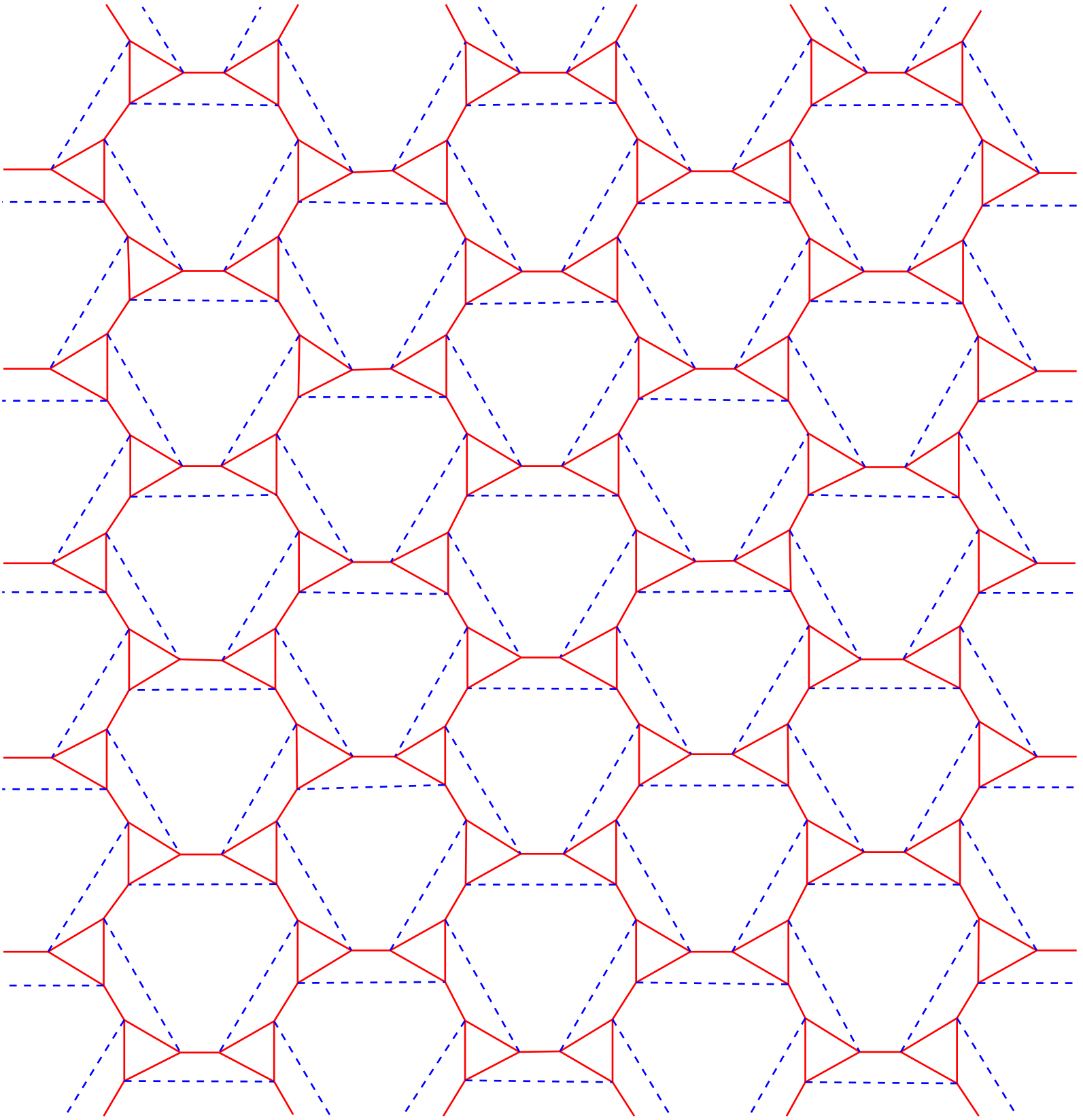


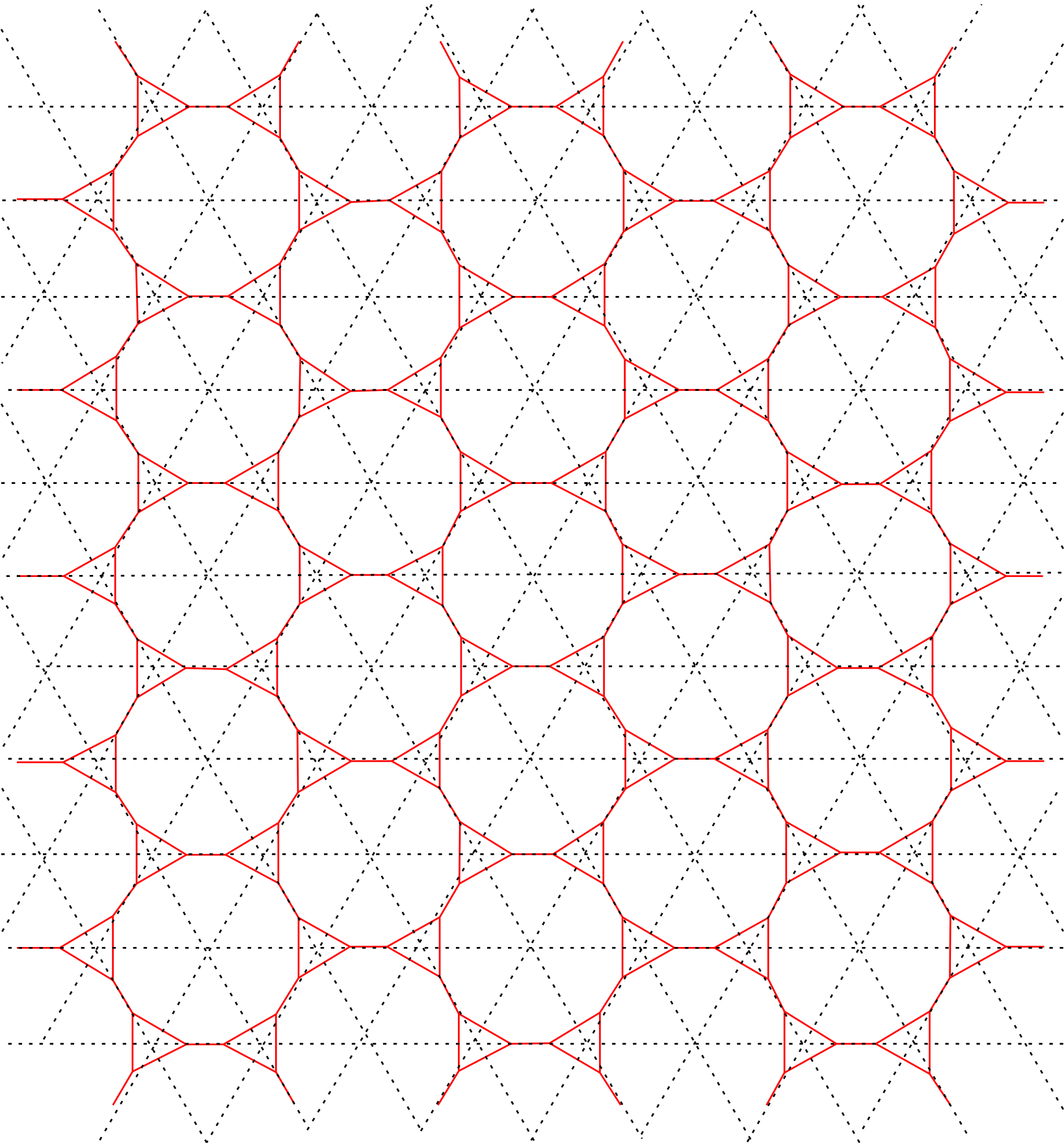
Start to squash the extra material down, making a flattened triangle in the center. continue to twist the extra paper, while keeping all the flaps folded in the same direction (in this example, clockwise).

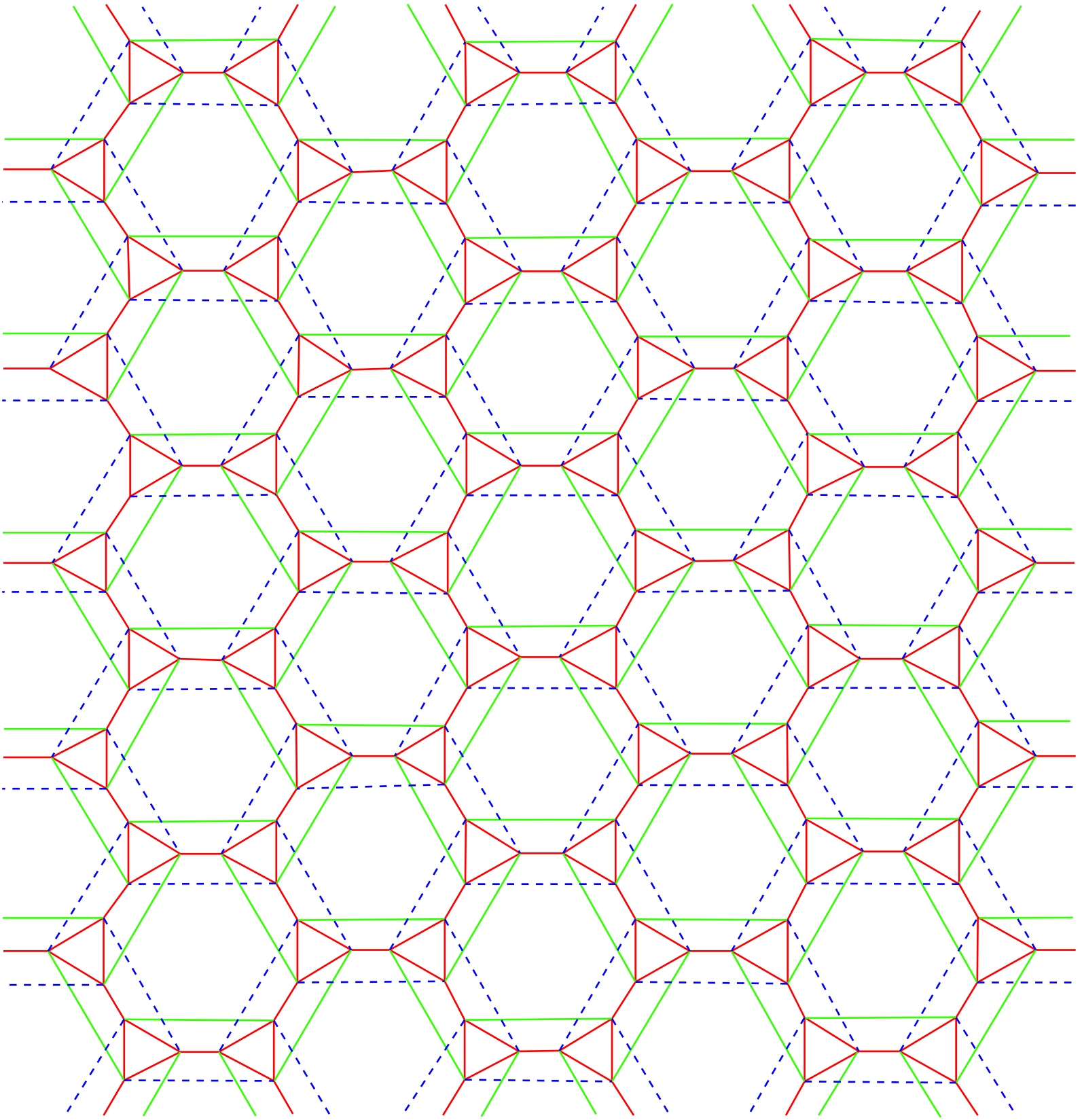


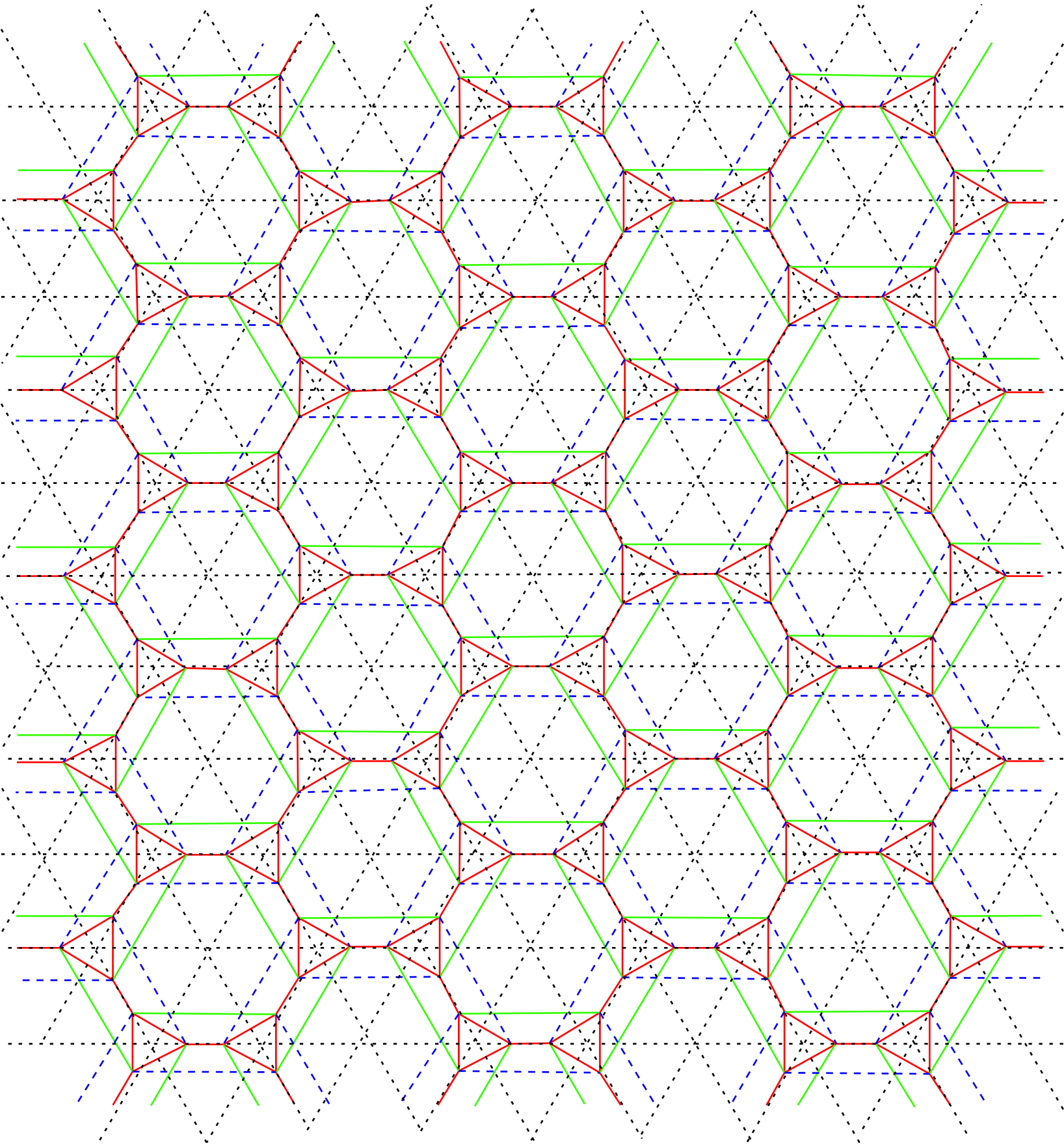
Continue squashing the triangle while twisting it; make sure the angular creases are folded over all in the same directions. Once you squash the triangle flat, the fold will be locked and it won't unfold easily.

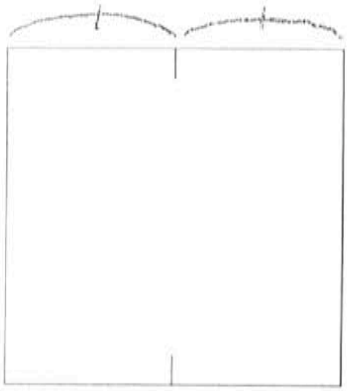
That's all there is to this relatively simple fold– this same process is done on the large crease pattern.



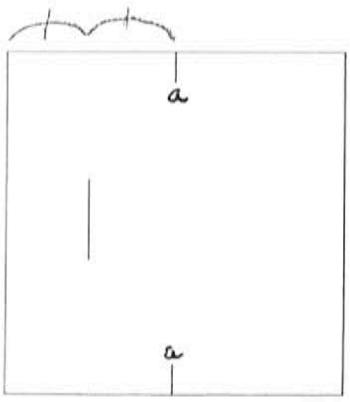




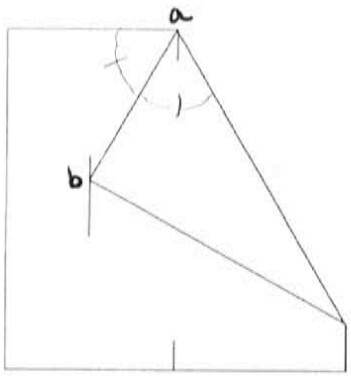




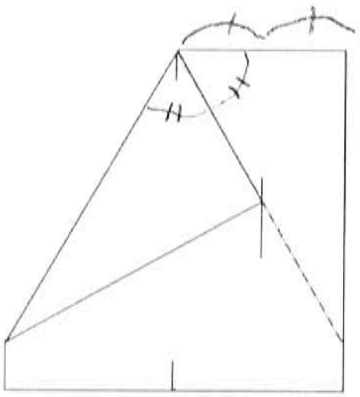
1. Book-fold center, crease ends only.



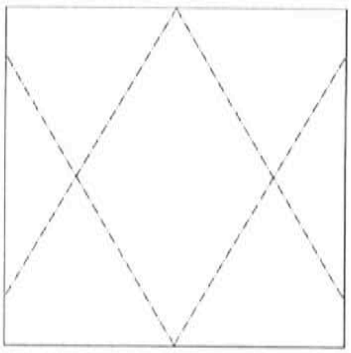
2. Valley fold to crease 'a', crease where indicated.



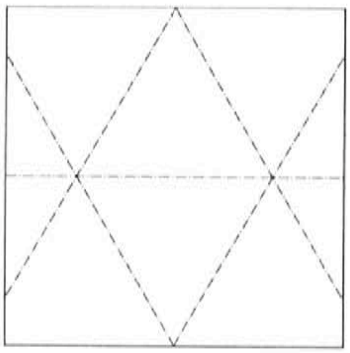
3. Fold corner to crease 'b' using crease 'a' as guide point.



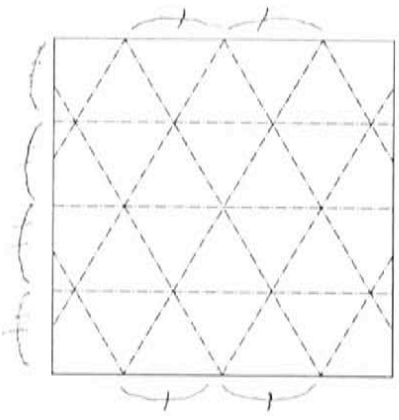
4. Repeat on other side use existing crease as guide or repeat step 2 on other side, folding opposite corner to



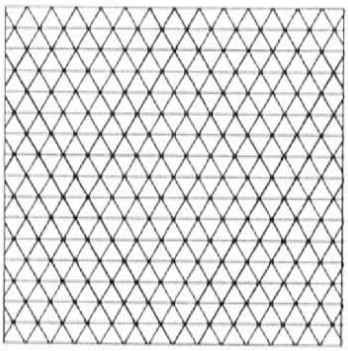
5. Rotate 180°, repeat steps 3 & 4.



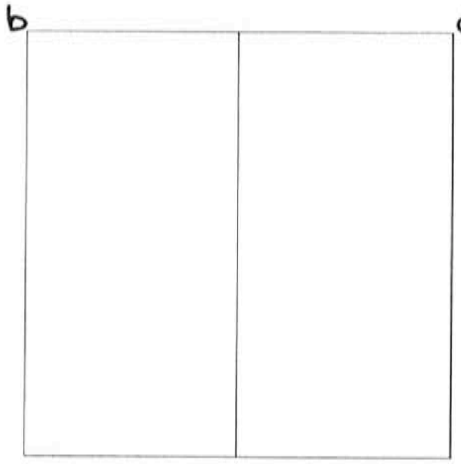
6. Fold in half. (Crease should fall on intersecting points of diagonals.)



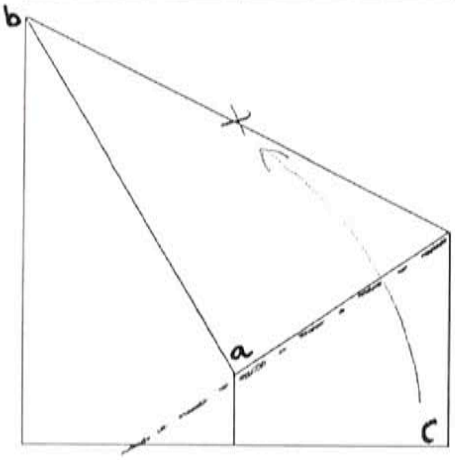
7. Fold in quarters horizontally; fold additional diagonals using existing creases as guideline.



8. Repeat till you can't stand it anymore.

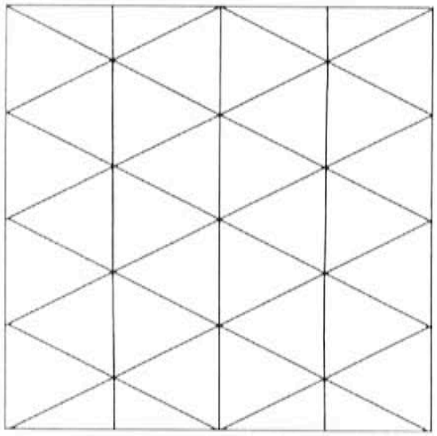


Book fold. (This can be done on any length of paper so long as the fold runs down the length and not across the width)



Fold point 'a' to center line using point 'b' as pivot . ~~Repeat using each of the four corners—once as a pivot point and once as a match to the center point.~~

Fold Corner C to diagonal crease using edge as a guide.



Repeat till you can't stand it anymore!