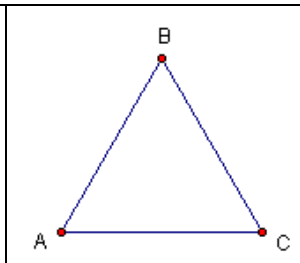
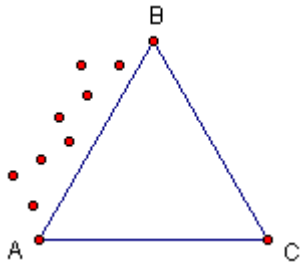
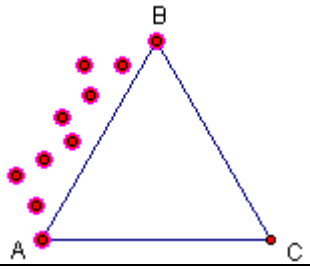
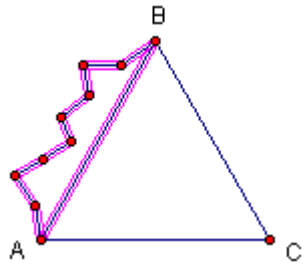
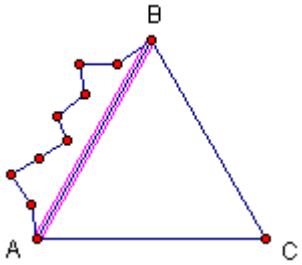
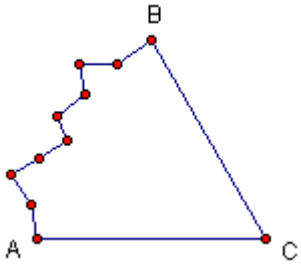
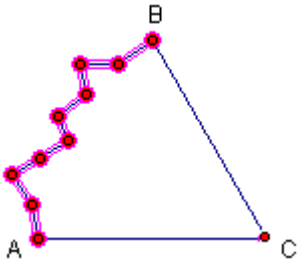
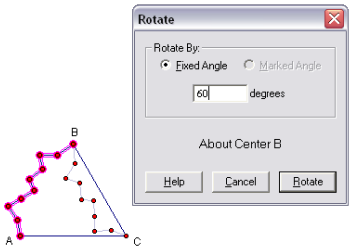
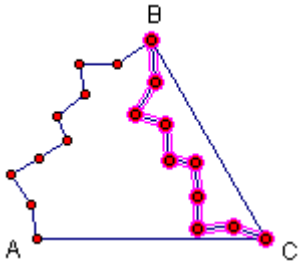
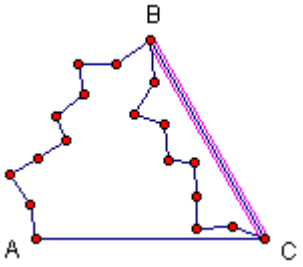
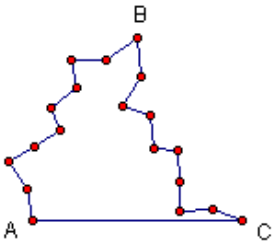
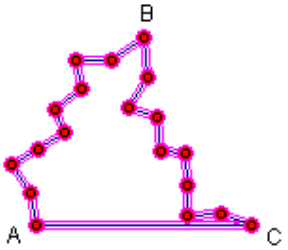
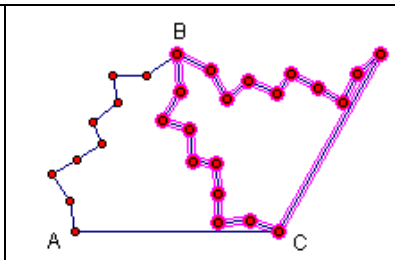
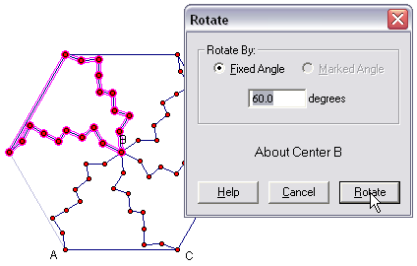
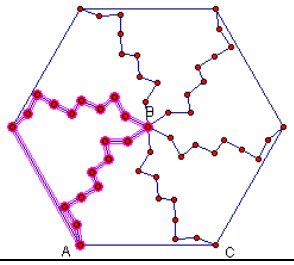
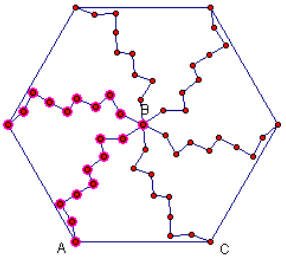
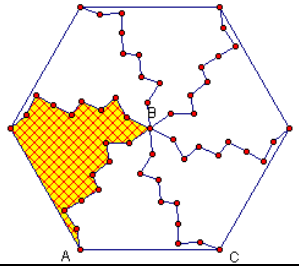
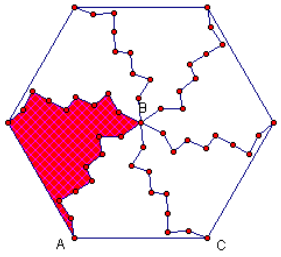
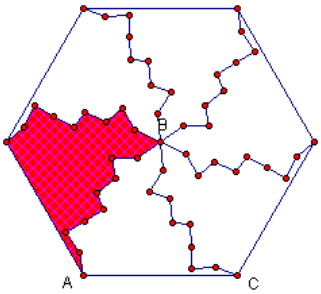
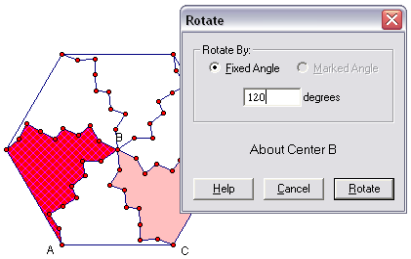
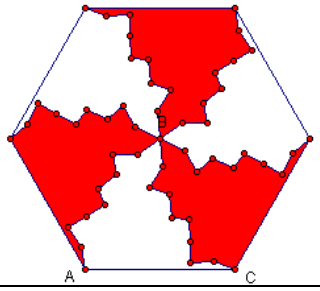
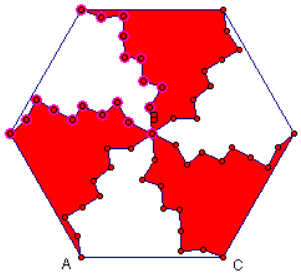
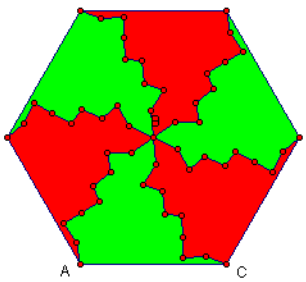
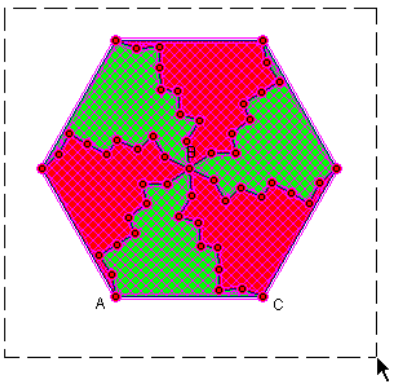
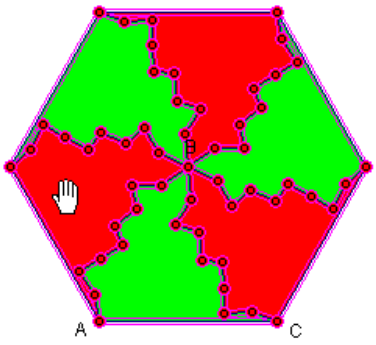
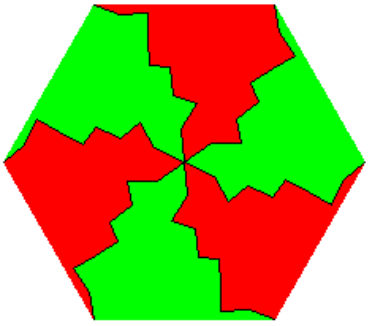
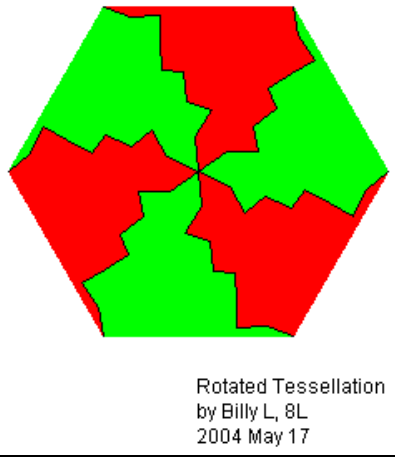
Rotated Tessellations

1: Start with a constructed equilateral triangle		**2:** Alter the shape of side AB by constructing a series of points in a wavy pattern	
3: Select all of the points, including A and B		**4:** **Construct > Segments**	
5: De-select all, then select the original side AB		**6:** Delete original side AB	
7: Select all points and segments for the new side along AB; Double-click on B ("starburst" will appear then disappear)		**8:** **Transform > Rotate**; Enter 60 in the degrees box; click "**Rotate**"	
9: After the rotation		**10:** De-select all, then select the original side BC	
11: Delete original side BC		**12:** Select the entire shape (**Edit > Select all**) (or, use the keyboard shortcut, CTRL + A)	

13: **Transform > Rotate**; degrees box should still have 60 º in it; DO NOT de-select once the rotation has happened		**14:** **Transform > Rotate** 4 more times	
15: Appearance after the final rotation has happened		**16:** De-select all; choose one sector and select the points that mark it (no sides)	
17: **Construct > Polygon interior**; DO NOT de-select the interior once it is done		**18:** RIGHT-click on the interior; **Color > choose color** from the pop-up menu	
19: DO NOT DE-SELECT the interior		**20:** **Transform > Rotate**; type 120 into the degrees box; click "**Rotate**"(you'll see a "shadow" of where it will go)	
21: Rotate again; finished should look like this – DO NOT DE-SELECT the rotation.		**22:** Rotate the region by 60 degrees; change the color of this rotation: choose a contrasting color (see steps 17 and 18)	
23: Rotate this region twice, by 120 degrees each time (see steps 19-21); this is a sample of the almost-finished product		**24:** At this point, SAVE your sketch as "rotated_tess1"	**File > Save As** (choose the correct drive and folder)

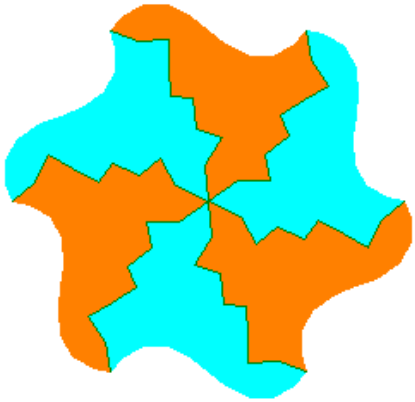
25. Choose the entire sketch (**Edit > Select all**; or use Marquee tool as shown here)		**26.** De-select all interiors (sides and points must stay selected)	
27. **Display > Hide Objects** will cause the sides and points to "disappear", leaving you with the final design		**28.** To see the lines and points again, **Display > Show All Hidden**; Save your completed sketch; Use a text box to add a title and your name; Print it	

Points to Ponder:

1. What would have happened if you had rotated around points A or C, instead of B? Try a second rotation, using another vertex, to test your conjecture.
2. Why were 60 degrees chosen for the rotation of the shape? Would another angle have produced the same result? Why or why not? Investigate using other angles of rotation.
3. Why were 120 degrees chosen for the color rotation?
4. On your completed sketch, unhide the points and lines (see step 28) – de-select everything, then click on ONE point anywhere inside the sketch and drag it. What effect does this have on the entire sketch? Why?

If you're brave…

1. Follow steps 1 through 11 above.
2. Select segment AC and construct the mid-point of the segment (Construct > Midpoint)
3. Alter the left half of the segment, similarly to steps 4 through 6; double-click on the mid-point (you'll see a "starburst" for a moment), then rotate the half through 180 degrees. De-select all.
4. Select then hide original segment AC.
5. Now continue from step 12 onwards.



If you're looking for a challenge or two, try using a different type of triangle to start.