

Tessellations by Translation



Skills to have before this activity:

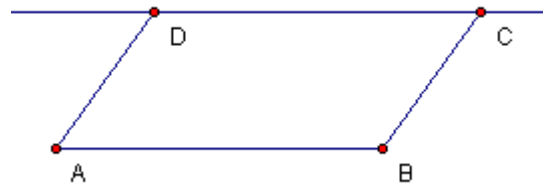
- Constructions: parallelogram, segments, polygon interiors
- Managing objects: select, de-select, hide

Terminology to know:

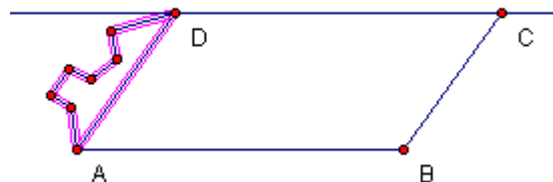
- Vector – a segment with a given length and direction

Follow these steps. Your design does not have to duplicate this sample; labeling may be different.

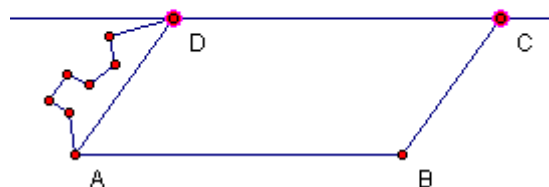
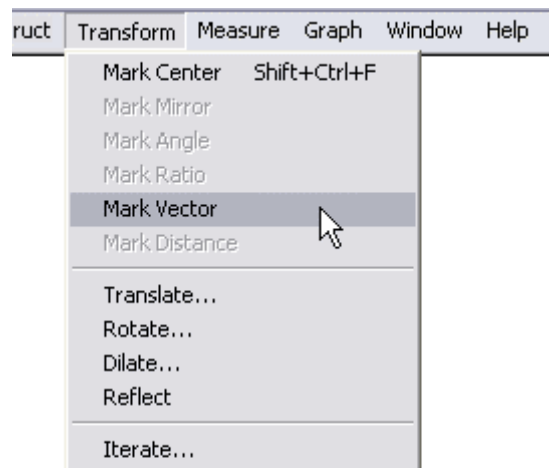
Construct a parallelogram.



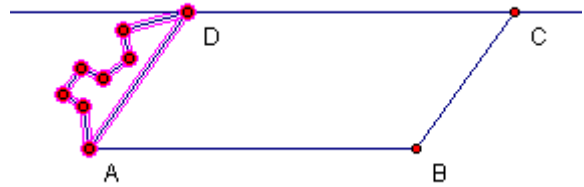
Construct a random shape on the left side of the parallelogram.



Select the top two points of your parallelogram; and “Mark Vector” in the Transform menu. You should see a series of black dashes travel from D to C, then disappear.



Select all of the random shape:
points and segments.

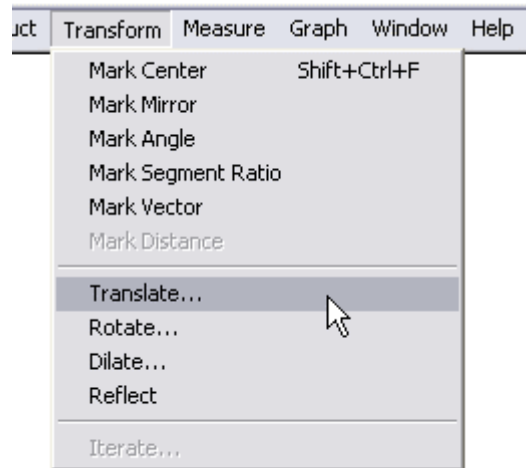


Translate the random shape
using the Transform menu.

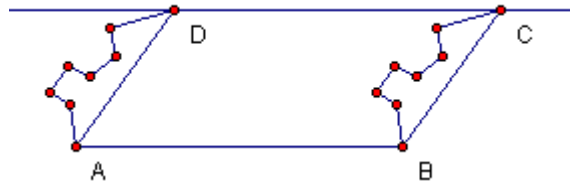
When you select Translate, a
pop-up box will appear. The
translation vector portion should
read “Marked”, and the two
points named should be the two
you marked earlier when you
marked your vector. Click the



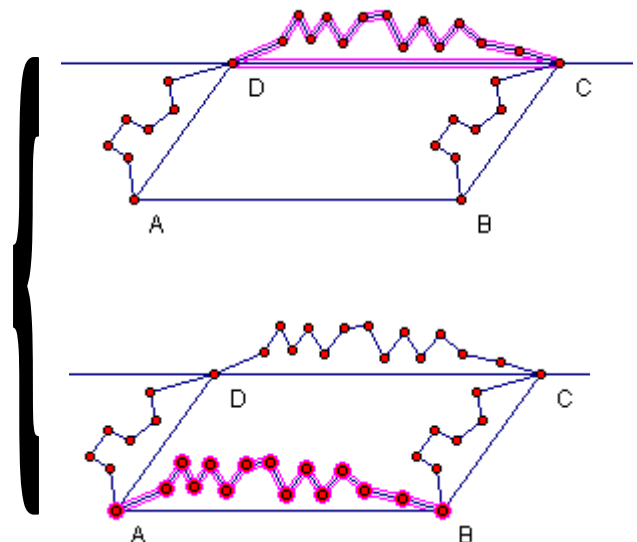
button.



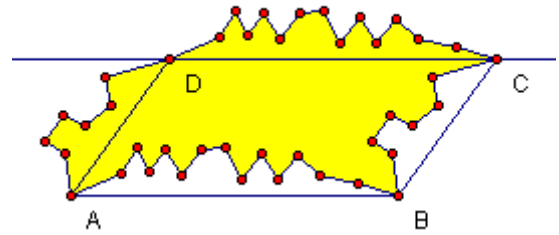
The completed translation:



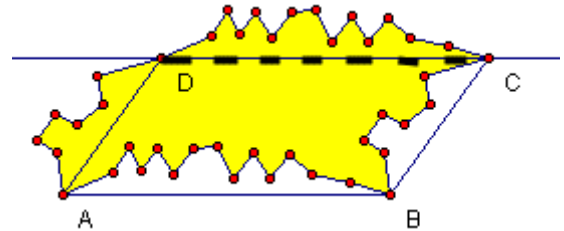
Repeat the above steps to
construct a 2nd random shape on
the top and bottom of the
parallelogram.



Select the vertices of your polygon in consecutive order; “Construct Polygon Interior”. You can right-click on the interior (while the color is cross-hatched) to change the color.

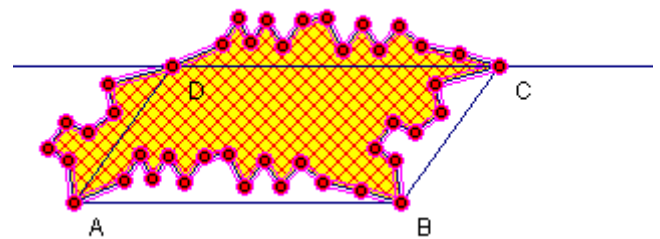


Mark D to C as a vector (You should see a series of black dashes travel from D to C, then disappear.)

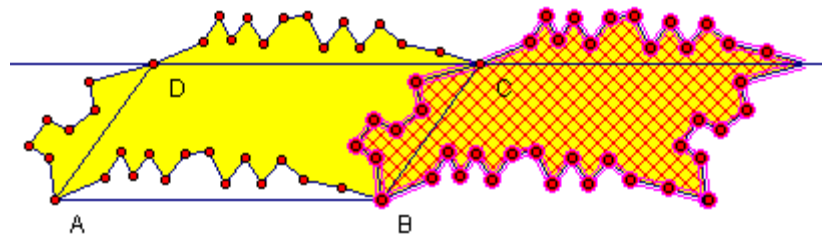


Click on the shape so that just the vertices, and segments are selected: none of the original parallelogram segments is selected.

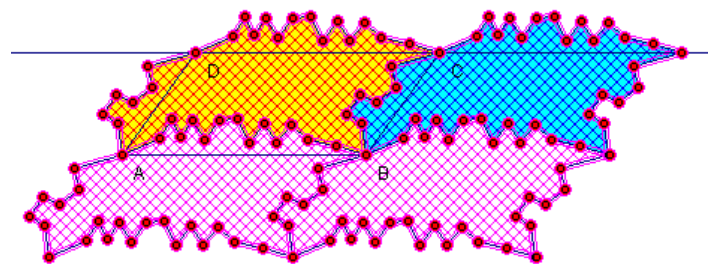
Hint: Select all, then de-select the interior, line, and segments of the original parallelogram.



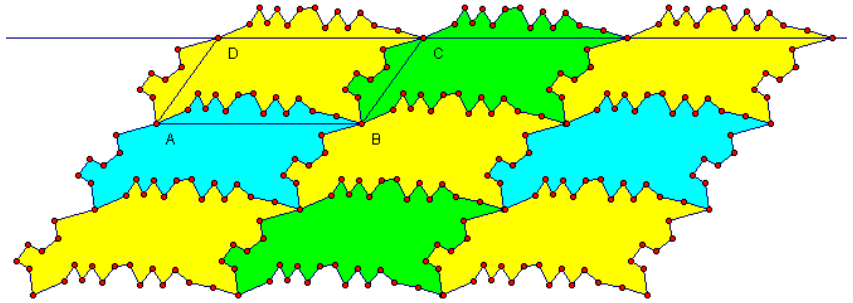
Translate the whole polygon by vector DC. Use different colors for adjacent polygons.



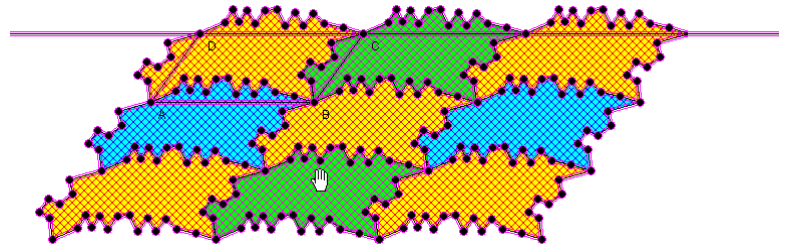
In the original shape, mark vector DA, select all vertices and segments, then translate the interior of the shape downwards. Adjust the colors to set the new shapes apart.



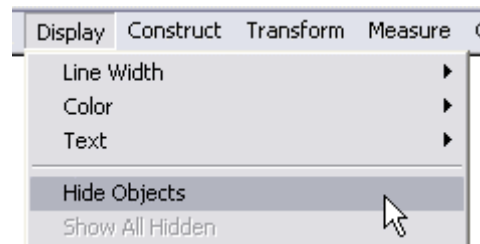
Continue the process of marking a vector, selecting shapes, and translating until you have the design you want. Adjust colors as you wish.



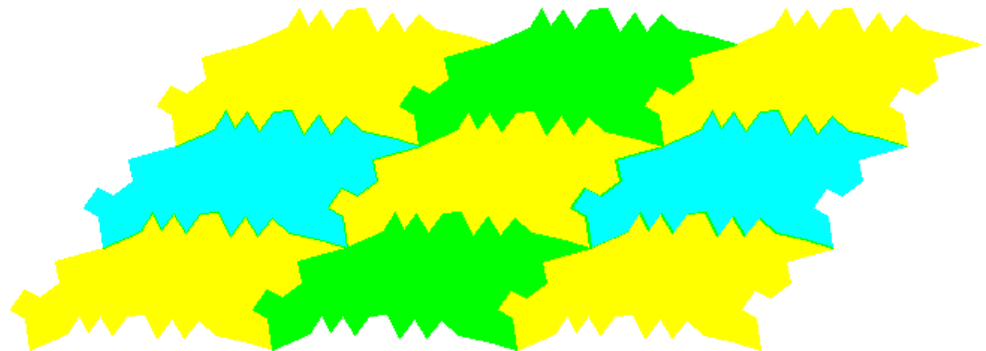
Select all, then de-select just the polygon interiors (*the interiors should be solid color, not cross-hatched like the sample at right*).



From the menubar, choose Display > Hide Objects



Your final tessellation:



Try this: Use Undo > Hide Objects, then drag any point to see how it affects your tessellation.

For some student work samples, see “Tesselations from Hawaii” at <http://mathforum.org/sum95/suzanne/hawaii.html>