

Pattern Block Activities

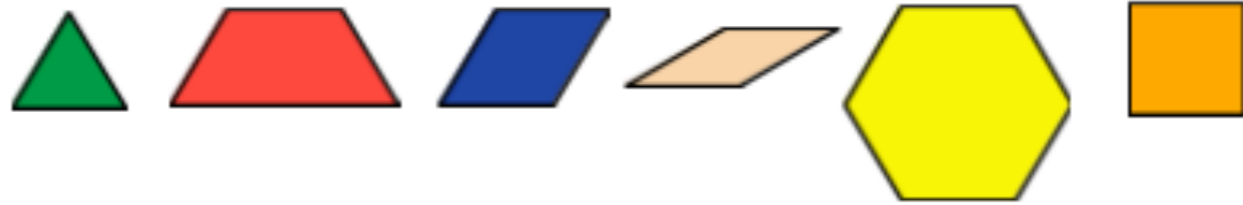


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Puzzles



Meet the pattern blocks

1. Make a red triangle.
2. The side lengths are all 1 inch (except the long side of the trapezoid, which is 2.) What is the area of the tan block?

More Puzzles

Make convex n-gons, with all different n's

(convex n-gon: every interior angle is $< 180^\circ$)

3



4



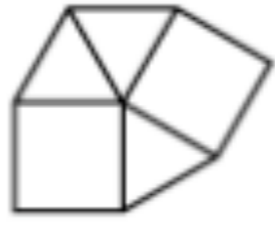
5



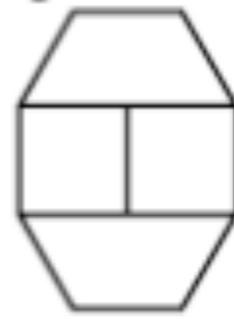
6



7



8



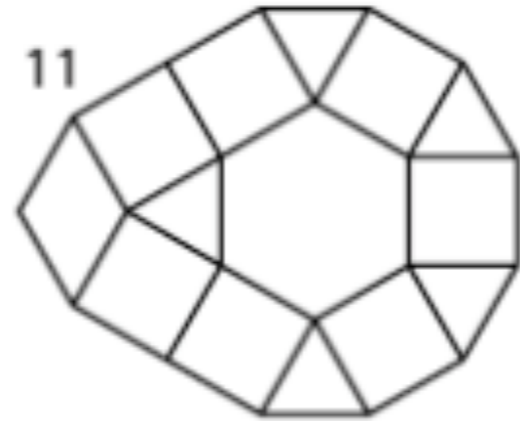
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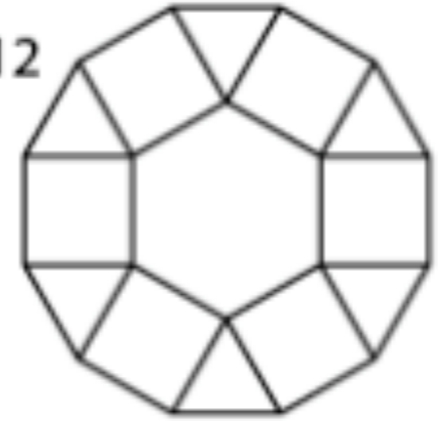
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11

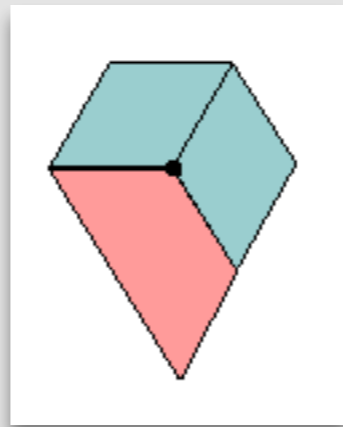


12



Angles Around a Point

Example: two colors, three blocks



Symmetry

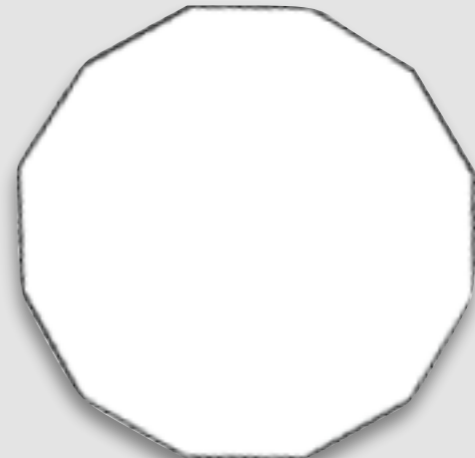
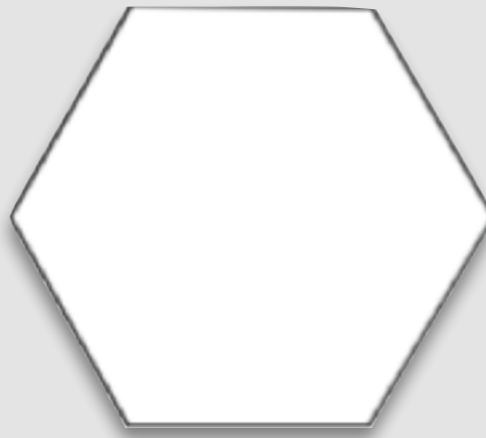
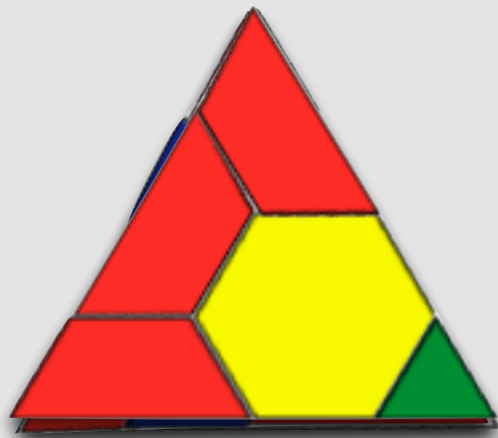
Have rotation symmetry

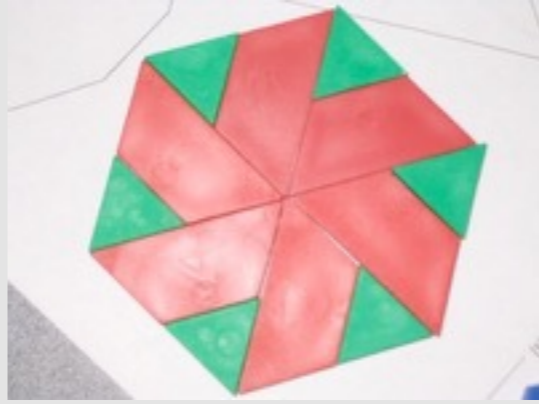
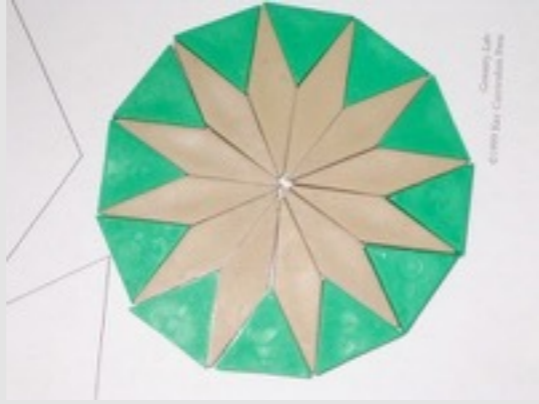
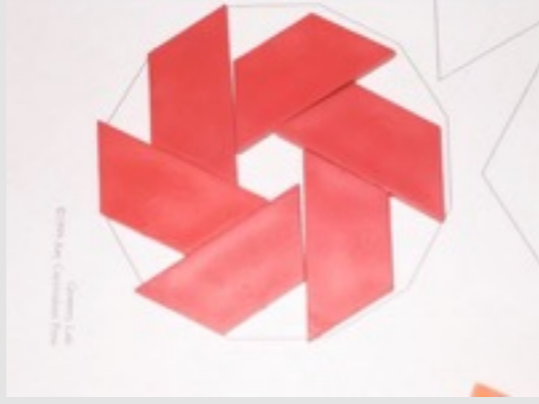


Do not have rotation symmetry



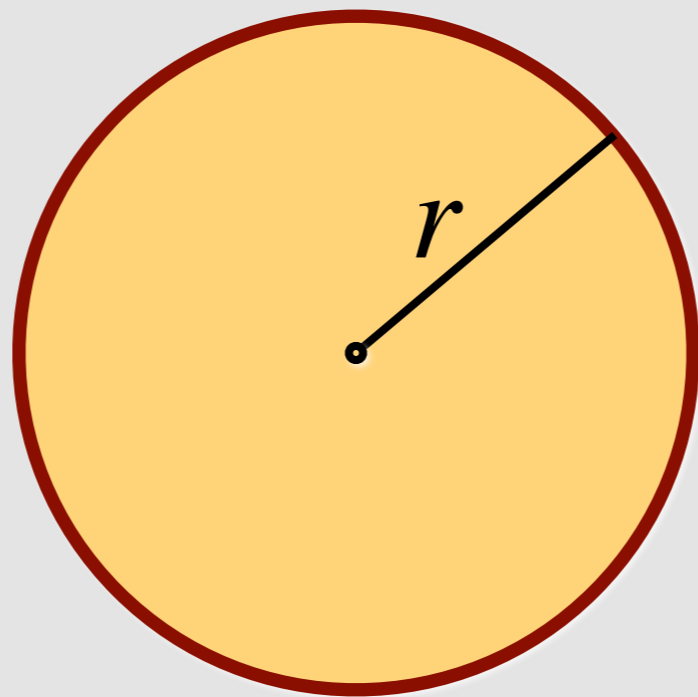
Pattern Block Symmetry





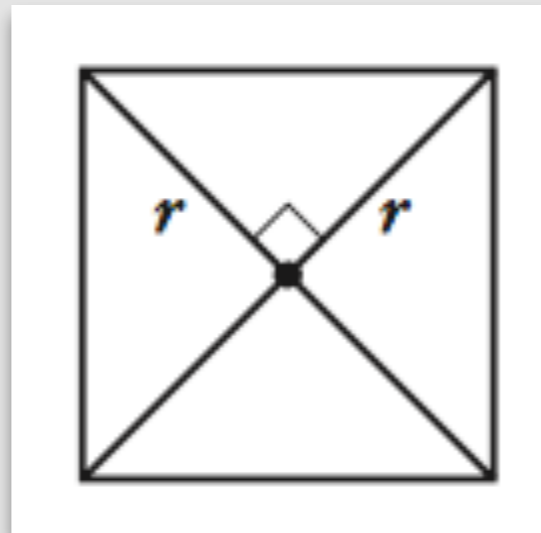
π

$$P = 2 \pi r$$



$$A = \pi r^2$$

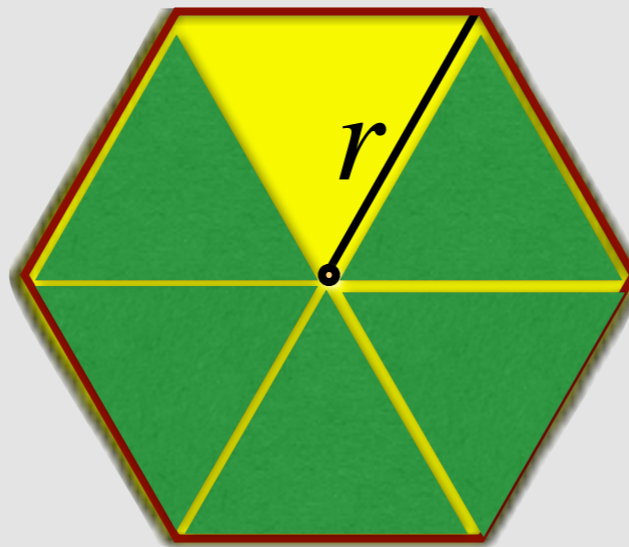
Is there a “ π ” for regular polygons?



For perimeter: $P = 2 \pi r = 2 \cdot 2\sqrt{2} \cdot r$

For area: $A = \pi r^2 = 2 \cdot r^2$

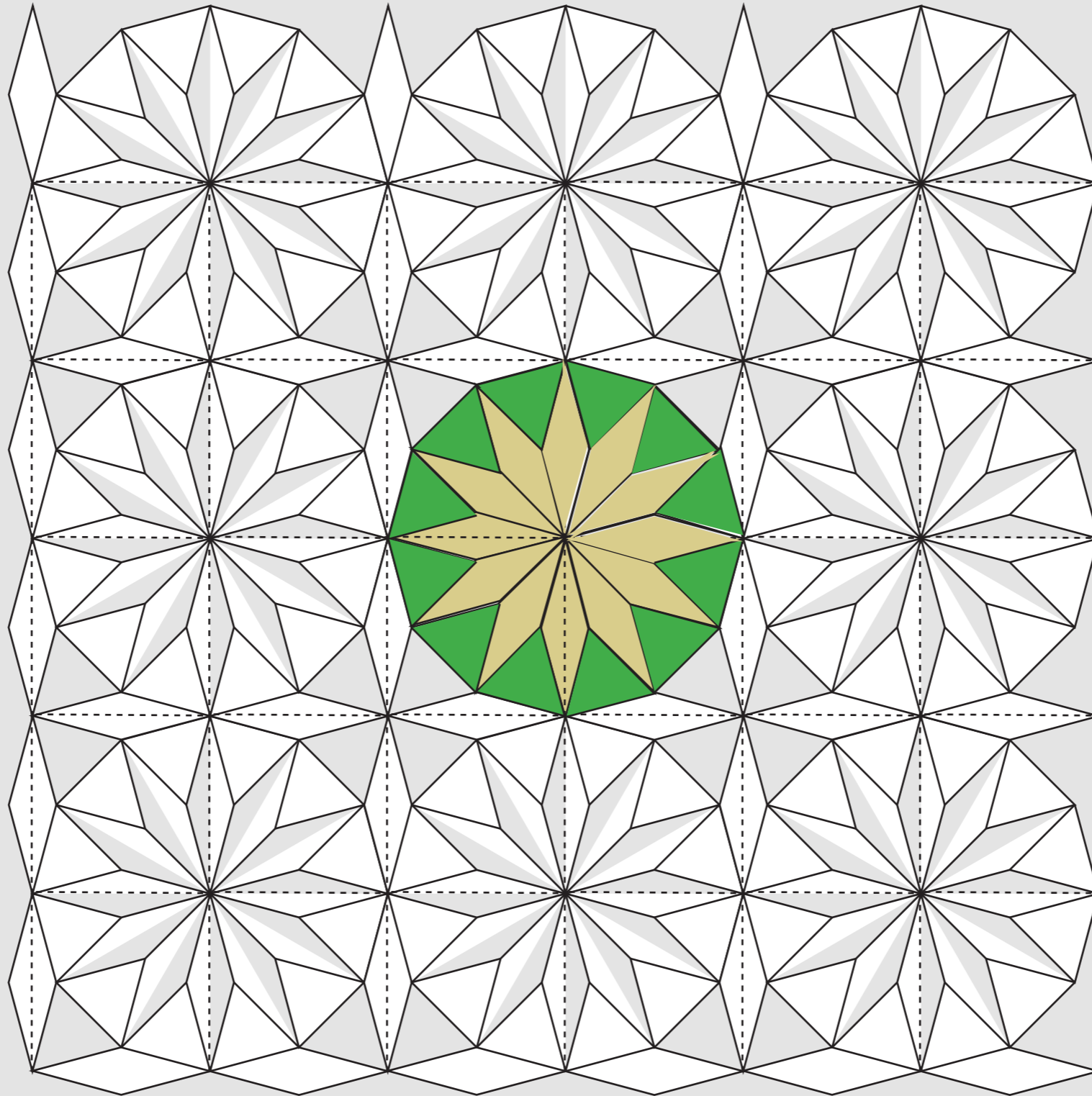
$$P = 2 \text{ “}\pi\text{” } r$$



$$\text{“}\pi\text{”} = 3$$

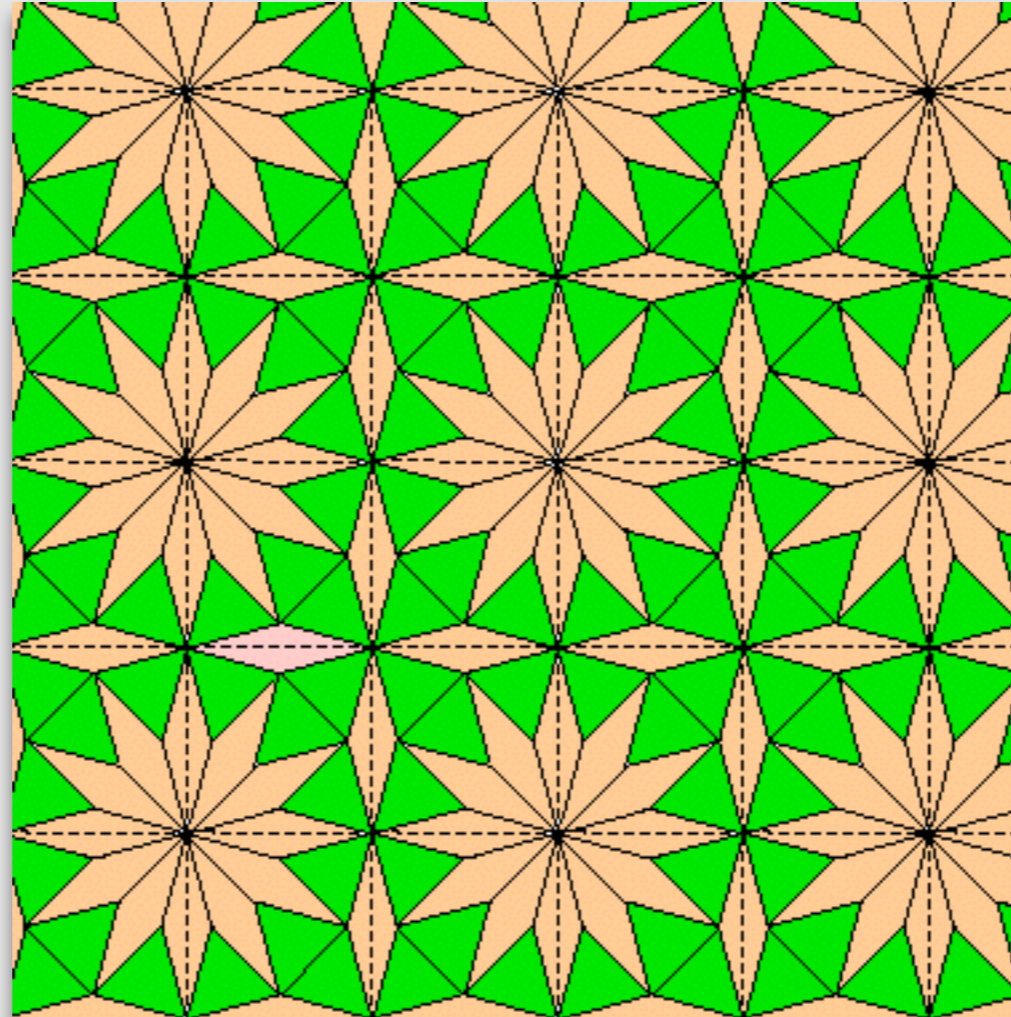
(for perimeter)

$$A = \text{“}\pi\text{”} r^2$$

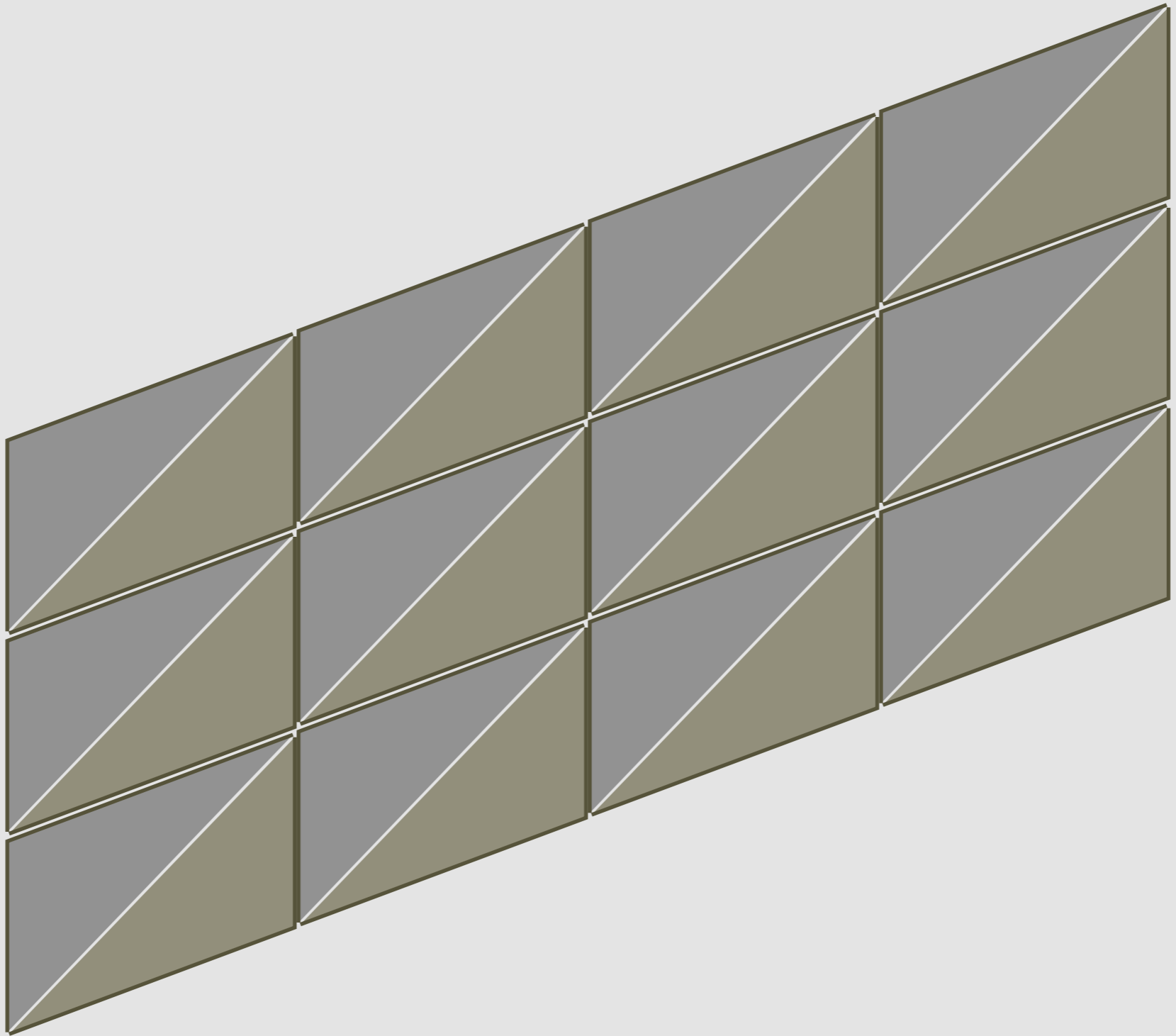


$$\text{“}\pi\text{”} = 3 \text{ (for area)}$$

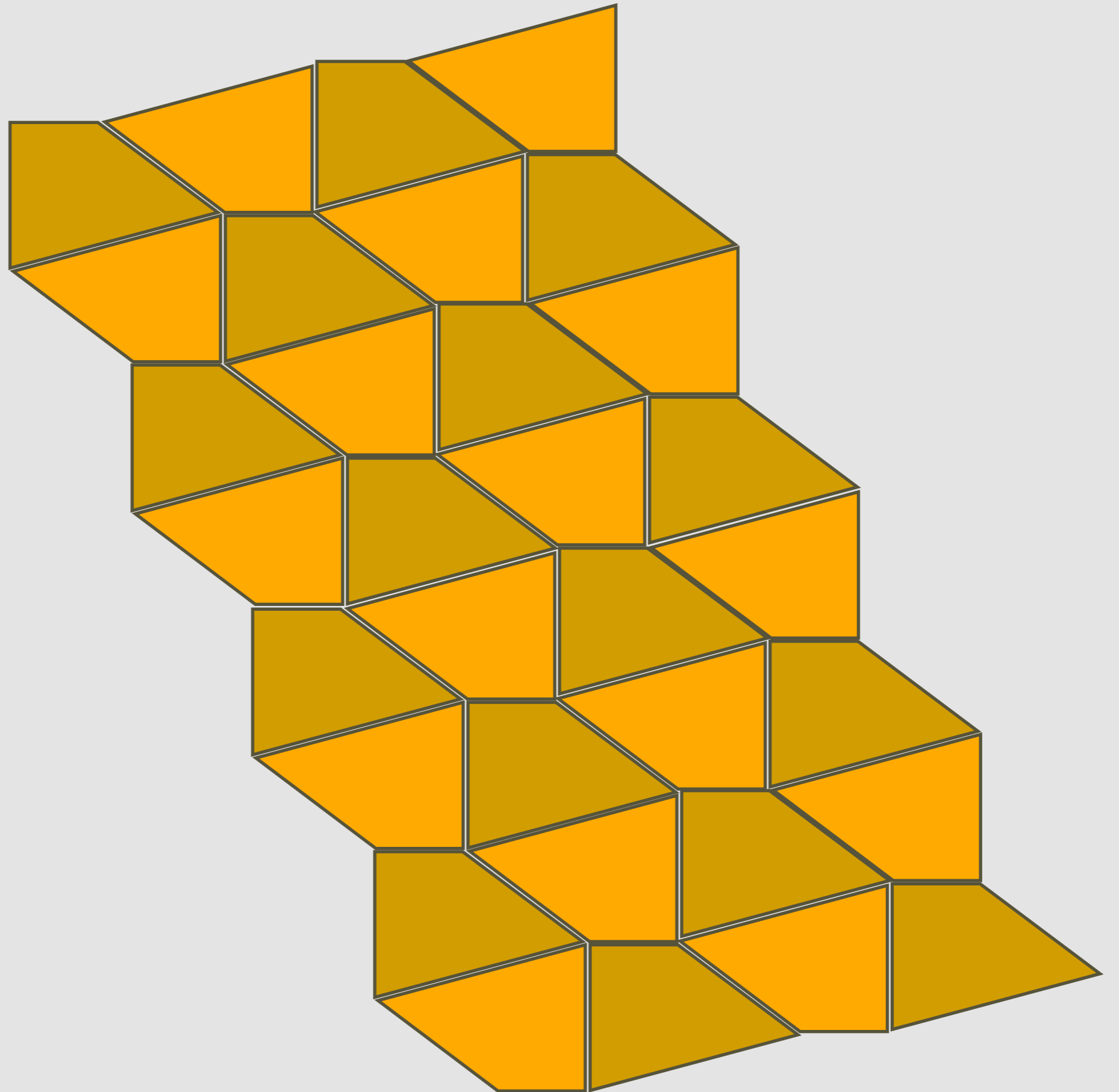
Tiling



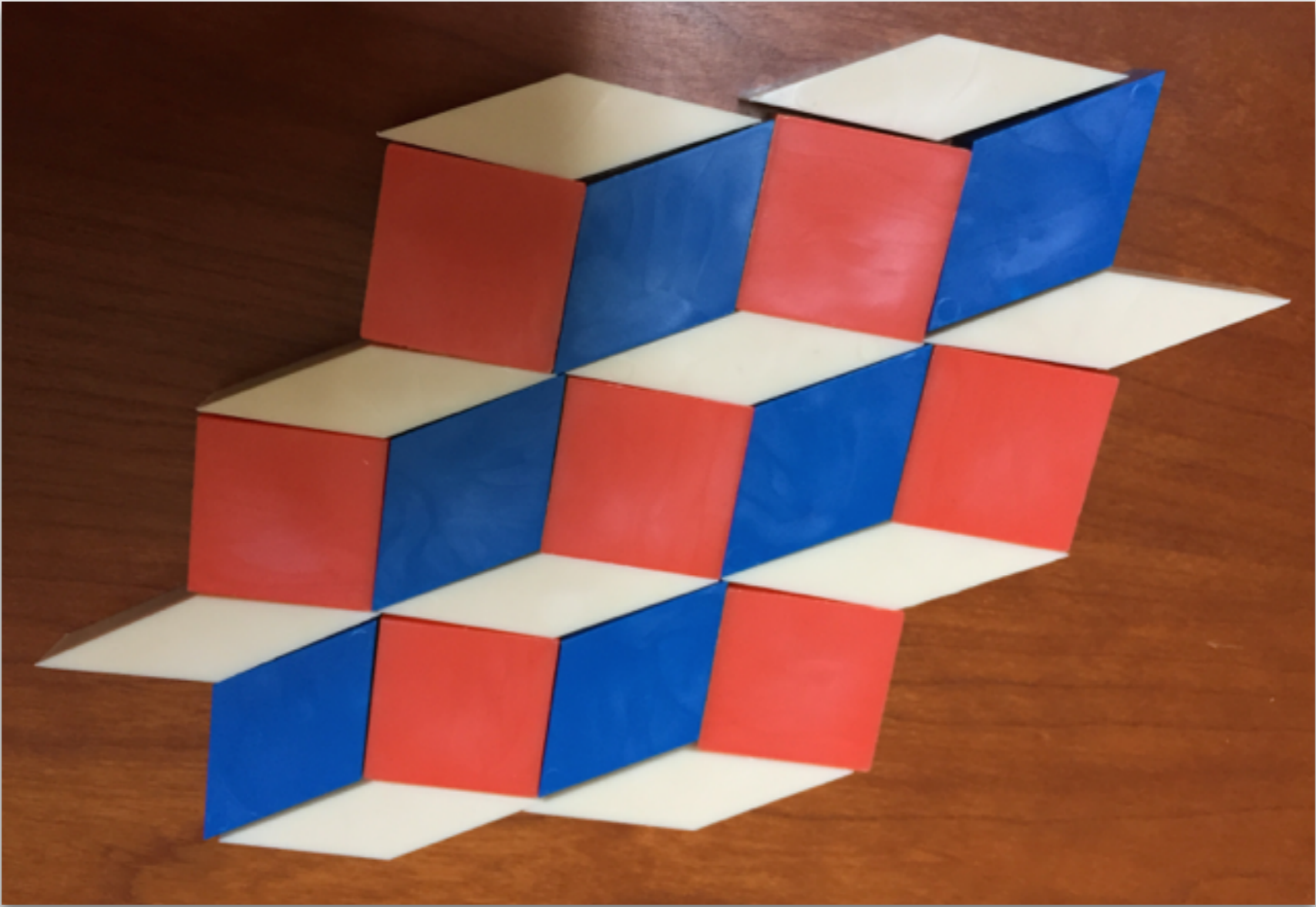
- ◇ Choose a triangle, different from your neighbors'
- ◇ Tile the plane with it



- ◇ Choose a quadrilateral, different from your neighbors'
- ◇ Tile the plane with it



Tiling with Pattern Blocks



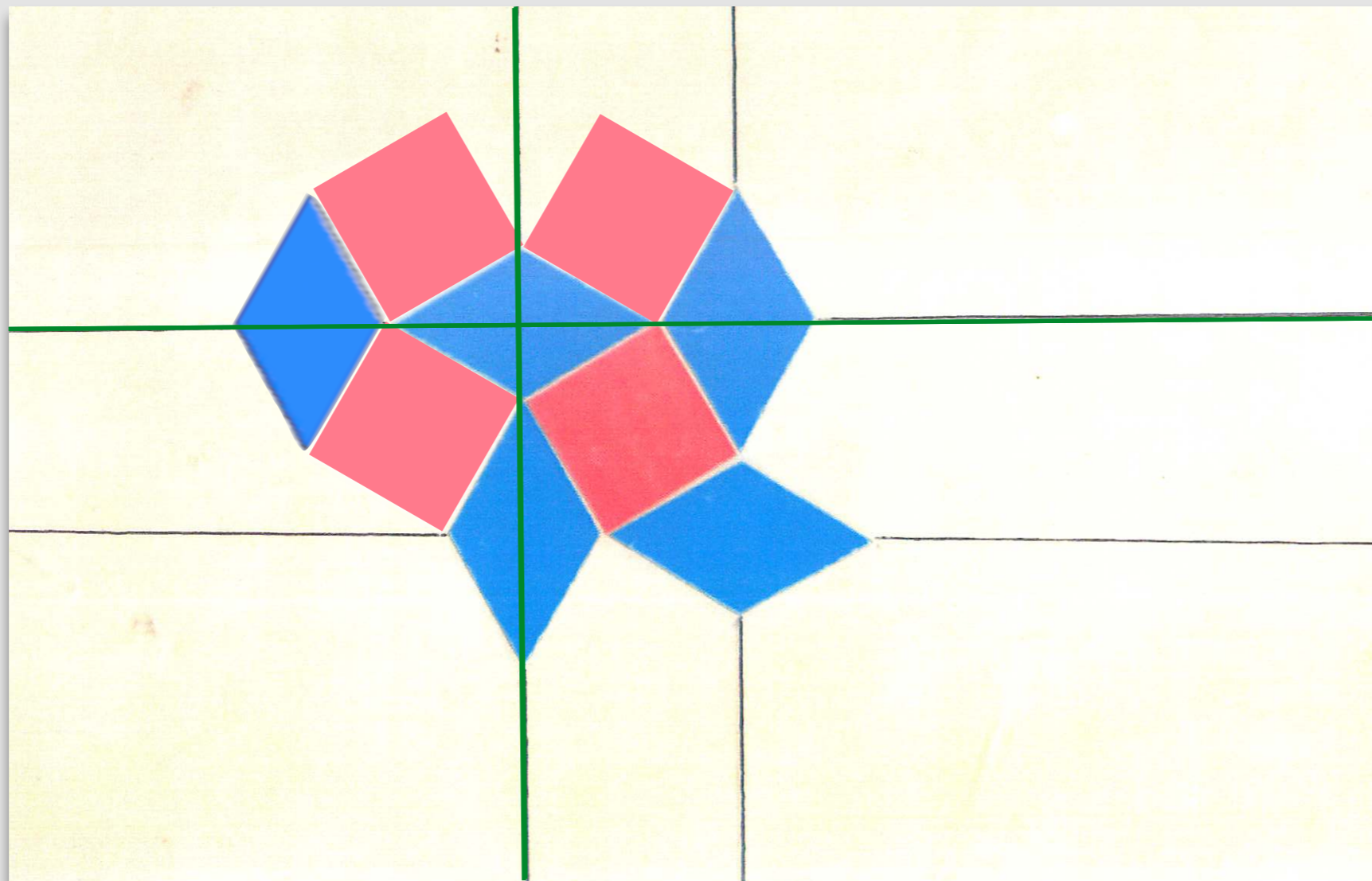
Tiling with regular polygons:
Archimedean tilings

- ◇ All congruent regular polygons
- ◇ Every vertex the same
- ◇ Edge-to-edge

3, 6, 3, 6

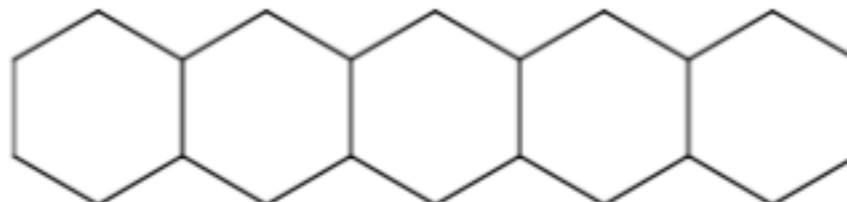
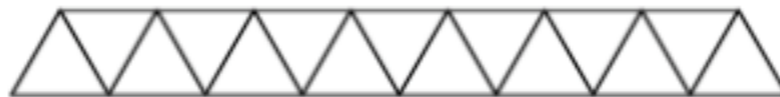


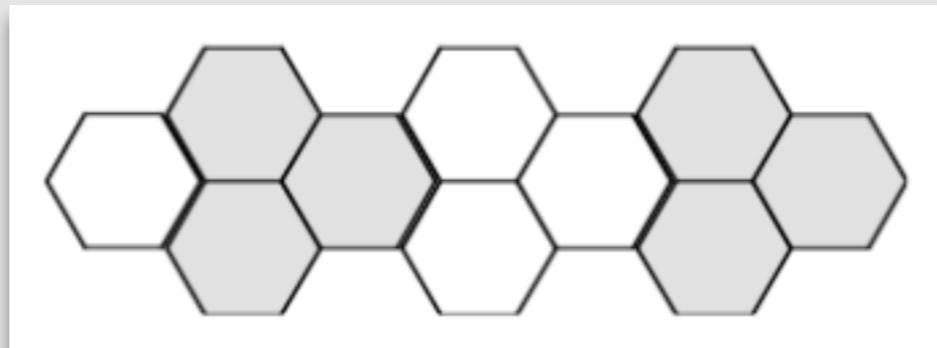
Tiling + Symmetry



Pattern Block Algebra!

Pattern block trains

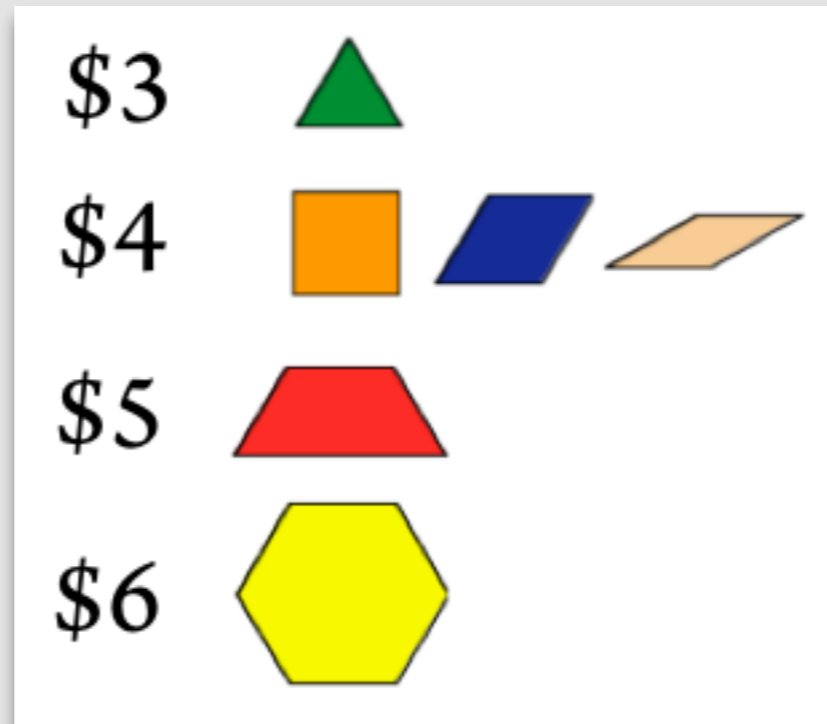




3 blocks contribute 8 units of perimeter,
so the rate of change is $8/3$

What rates of change are possible?

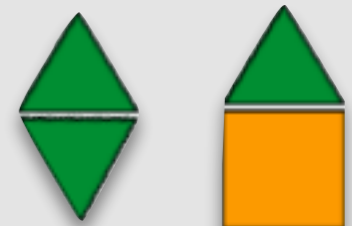
One Last Puzzle



For each price, what is the least possible perimeter for a pattern block figure?

Examples: for \$6, the least perimeter is 4

for \$7, the least perimeter is 5



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