

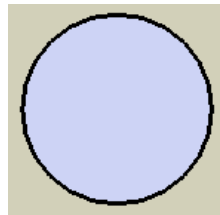
SketchUp Math Project: Grades 1 - 5

This project works in any version of SketchUp.

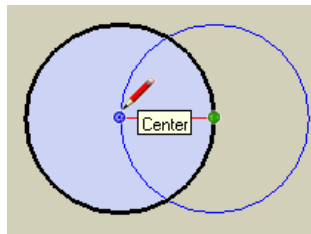
In this project, you will create some interesting patterns, starting with just a basic circle. The number 6 is used throughout this project.

For basic information on downloading SketchUp, as well as its user interface and basic tools, please see our printable "Intro to SketchUp" PDF: www.3dvinci.net/SketchUp_Intro.pdf.

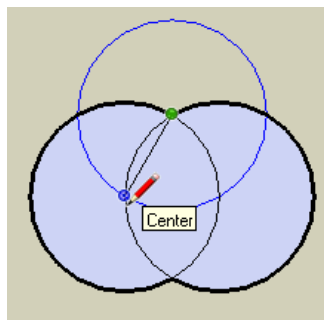
1. This project is all done in **Top** view (**Camera / Standard Views / Top**).
2. Draw a circle.



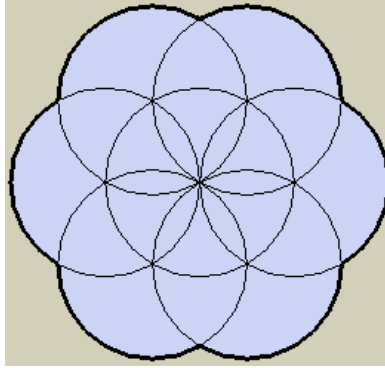
3. Make the second circle like this: with its center at a circumference point on the first circle, and ending at the center of the first circle.



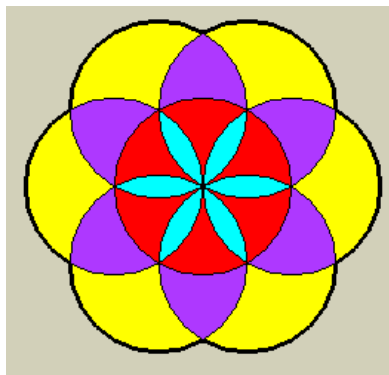
4. Make the third circle like this: with its center at the intersection of the first two circles, and ending at the center of the first circle.



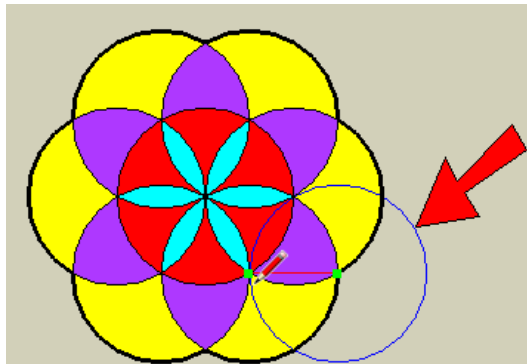
5. Keep making circles like that last one, until you have six circles surrounding the center one.



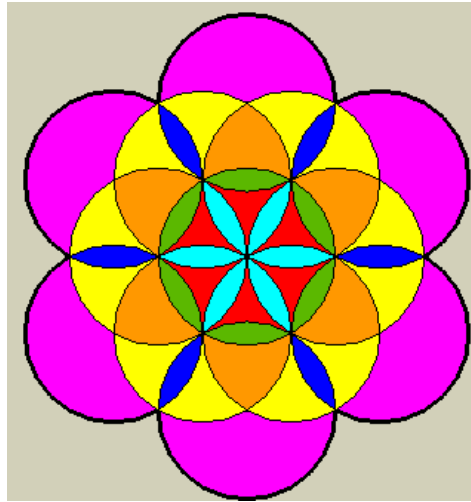
6. Click the **Paint Bucket** tool to open the **Materials** window (**Colors** on the Mac), and paint the faces in a pattern.



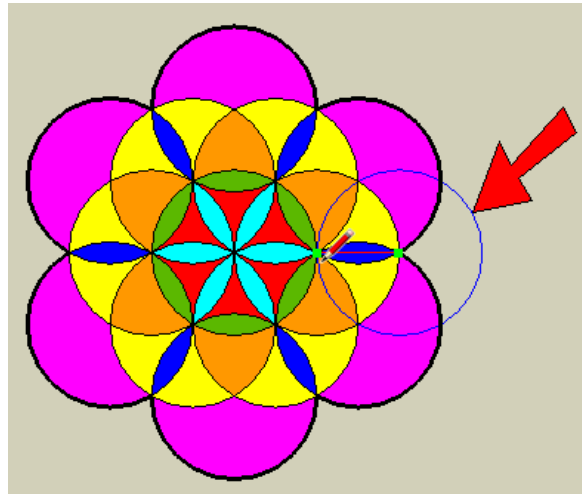
7. To start the next set of circles, make the first circle using these points.



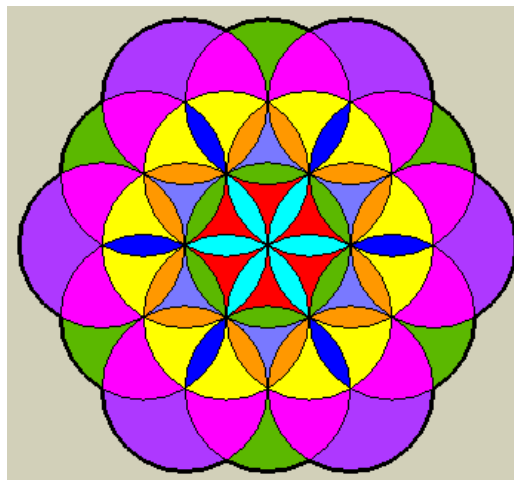
8. Again, there are six circles that fill the pattern all the way around. And all of the circles are the same size. Color the faces.



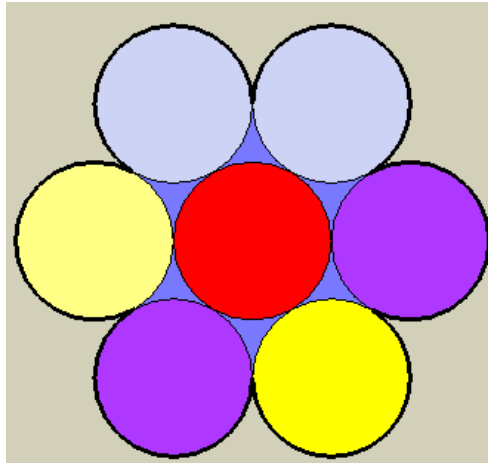
9. One more set of circles! Start with this one:



10. And make the same circle all the way around (again, there are six).

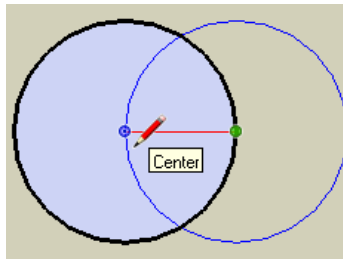


11. Here's something neat about this pattern. If you use the **Eraser** tool to remove some of the inside edges, you can get this pattern: one circle with six identical circles around it. (You can try this with coins or cups, too.)

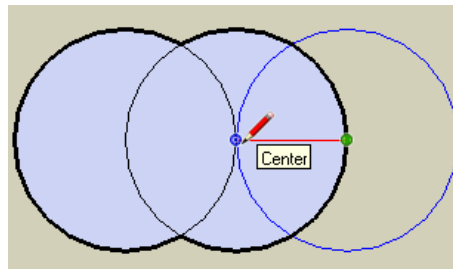


Here's another way circles are related to the number six.

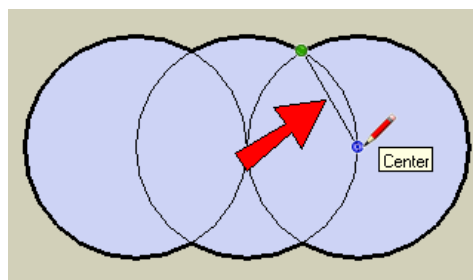
1. In the same SketchUp file, or in a new one, draw a circle. Then draw a second circle like this:



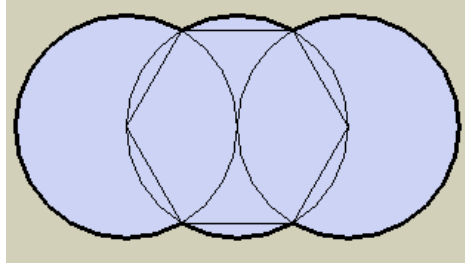
2. Then make a third circle like this:



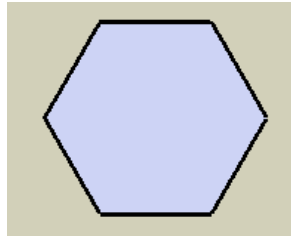
3. Click the **Line** tool, and draw this line, from the center of the third circle, to the point where it meets the second circle.



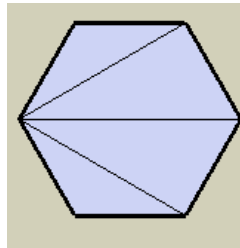
4. Make five more lines within the middle circle.



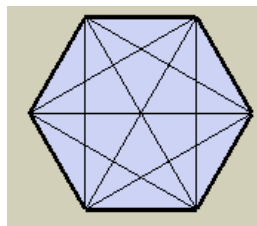
5. Erase all of the circle, and you're left with a perfect hexagon.



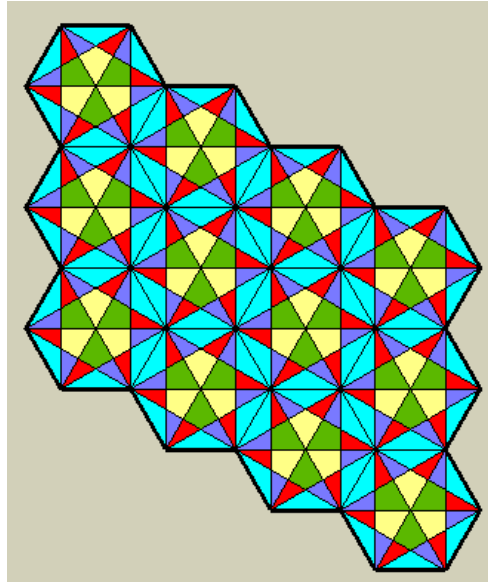
6. Hexagons can also be used to make great patterns. From one corner, draw three lines to the other corners.



7. Make similar lines from other corners.

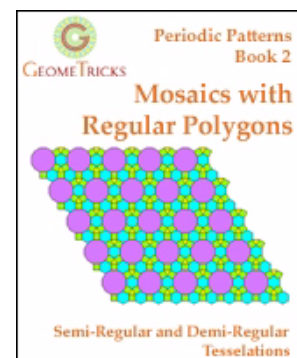
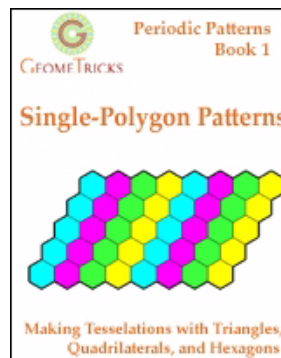
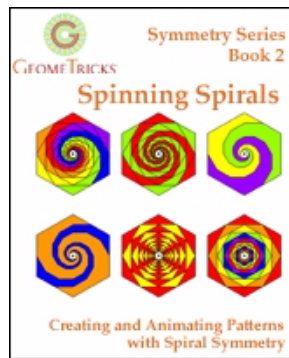
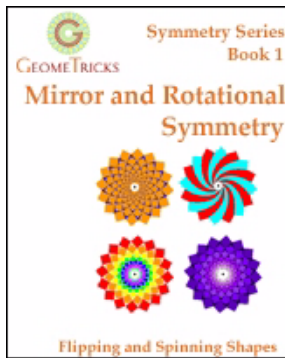


8. Color the faces inside the hexagon however you like. Hexagons tessellate perfectly - we can make several rows of them with no gaps. (The **Move** tool is used to make copies, just press the Ctrl/Option key.) So you can start with just one circle, and get an entire mosaic!



In addition to using SketchUp to teach math, it's also a great tool in art class!

If you like this project, please check out 3DVinci's GeomeTricks Series (<http://www.3dvinci.net/ccp0-catshow/GM.html>). The books shown below are appropriate for this age group, and teach concepts such as polygons, symmetry, and tessellation.



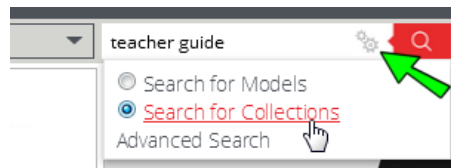
All of the models in the Teacher Guide can be downloaded from Google's 3D Warehouse:

<https://3dwarehouse.sketchup.com>.

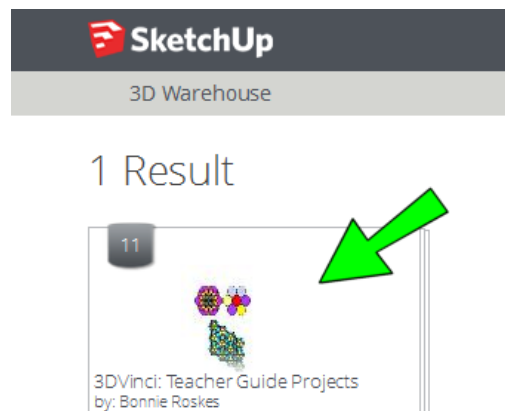
- Click [this link](#) to see the entire Warehouse collection of models used in the Teacher Guide.
- Click [this link](#) to locate this exact house model in the Warehouse.

If you're reading this as a printed PDF and can't click on the links, here's how to find the Teacher Guide models:

1. Open the 3D Warehouse.
2. In the **Search** field, type "teacher guide" then click the gear icon and click "Search for collections." Press Enter or click the **Search** button.



3. Open this collection:



4. In the collection, find the model you want, and open or download it.