

S T E A M

SCIENCE - TECHNOLOGY - ENGINEERING - ART - MATHEMATICS



Sierpinski Pyramid Collaborative Project



FamilyMathNight™
discover the wonders of math...together

Sierpinski Pyramid Collaborative Project



For the video version of this lesson, visit: <https://youtu.be/I7DFhDdDXBA>

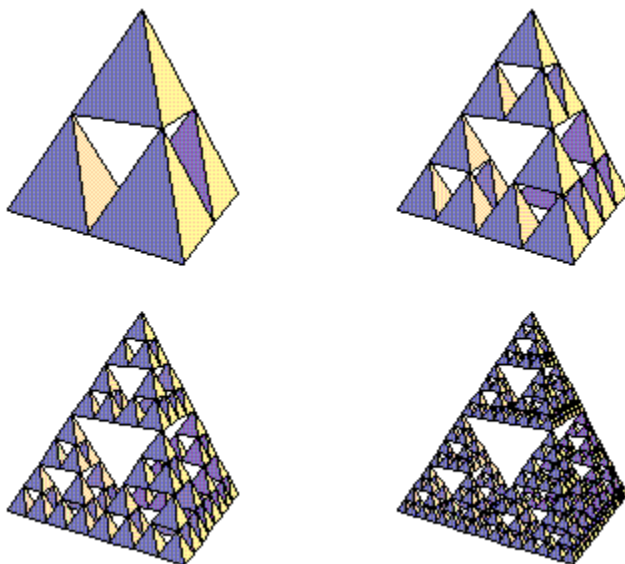
Materials Needed

- tetrahedron net, copied onto cardstock and cut in half
- colored pens/sharpiers
- hot glue gun
- glue for glue gun
- extension cord, optional
- waxed paper
- transparent tape, 10-15 dispensers
- straight edges, 10-15
- ball point pens, 10-15
- scissors, 10-15
- Sierpinski Pyramid table tents, 5-6 copies onto cardstock
- sample tetrahedron, optional

Mathematical Background

The Sierpinski pyramid is the 3-dimensional version of the Sierpinski triangle, named after the Polish mathematician Waclaw Sierpinski. Based on the equilateral triangle, the Sierpinski triangle is a fractal - a geometric construction made up of patterns that are self-similar - smaller replicas of the larger version.

For the Sierpinski pyramid, the first iteration is simply one tetrahedron. The second iteration is made up of 4 tetrahedrons; the third is made up of 4 of the second iteration tetrahedrons, and so forth. The iterations 2-5 are shown in the picture below.



Vocabulary

3-dimensional: an object having length, width, and depth

fractal: a geometric construction made up of patterns that are self-similar - smaller replicas of the larger version

net: a 2-dimensional representation of a 3-dimensional object

polygon: a 2-dimensional figure made up of three or more line segments

polyhedron: a 3-dimensional object (solid) with faces that are polygons

pyramid: a polyhedron with a polygonal base and triangles for sides

tetrahedron: a solid having four plane triangular faces; a triangular pyramid

Station Table Set-Up

Evenly spread out the Sierpinski table tents, tetrahedron nets, colored pens, scissors, transparent tape, ballpoint pens, and straight edges. Place 1-2 garbage cans/recycling bins near the station for scraps.

Near the station table set up a smaller table where the Station Facilitator will put together the pyramid. Make sure it is near an outlet for the hot glue gun. If using an extension cord, be sure the cord is not in the way of participants.

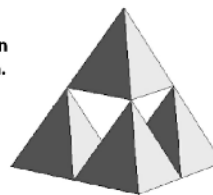
Directions

Participants follow the steps outlined in the table tents to make their pyramid.

Collaborative Sierpinski Pyramid

The Sierpinski pyramid is the 3-dimensional version of the Sierpinski triangle, named after the Polish mathematician Wacław Sierpinski. Based on the equilateral triangle, the Sierpinski triangle is a fractal - a geometric construction made up of patterns that are self-similar - smaller replicas of the larger version.

1. Color your tetrahedron (triangular pyramid) net.
2. Cut out along the perimeter (outside) of the net.
3. To make it easier to fold, use a pen and straight edge to trace over the tab lines.
4. Fold and tape together. (Tabs on the inside.)
5. Give to the Station Facilitator who will add it to our Sierpinski Pyramid.



Thank you for helping!

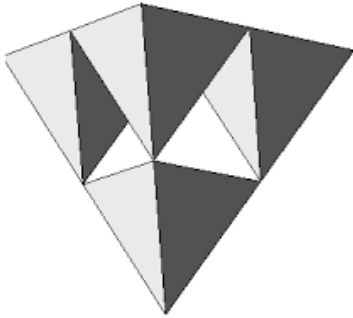
The Station Facilitator will collect the pyramids throughout the event and begin to put together the pyramid using the waxed paper to protect the surface of the table. The waxed paper is easily removed once the glue dries.

To put the tetrahedrons together, follow the iterations in the picture on the previous page.

Notes: Not all tetrahedrons will be “perfectly” made. That’s okay. It will just require a little finessing as the tetrahedrons get glued together. The Station Facilitator will need to exercise patience as the corners of the tetrahedrons are glued - holding them in place as the glue dries.

Thank you for helping!

5. Give to the Station Facilitator who will add it to our Sierpinski Pyramid.
4. Fold and tape together. (Tabs on the inside.)
3. To make it easier to fold, use a pen and straight edge to trace over the tab lines.



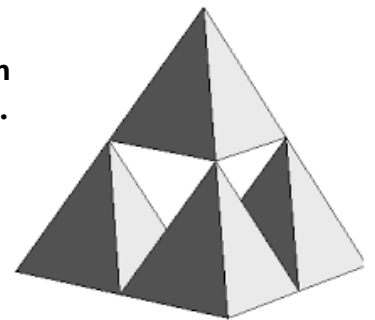
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Collaborative Sierpinski Pyramid

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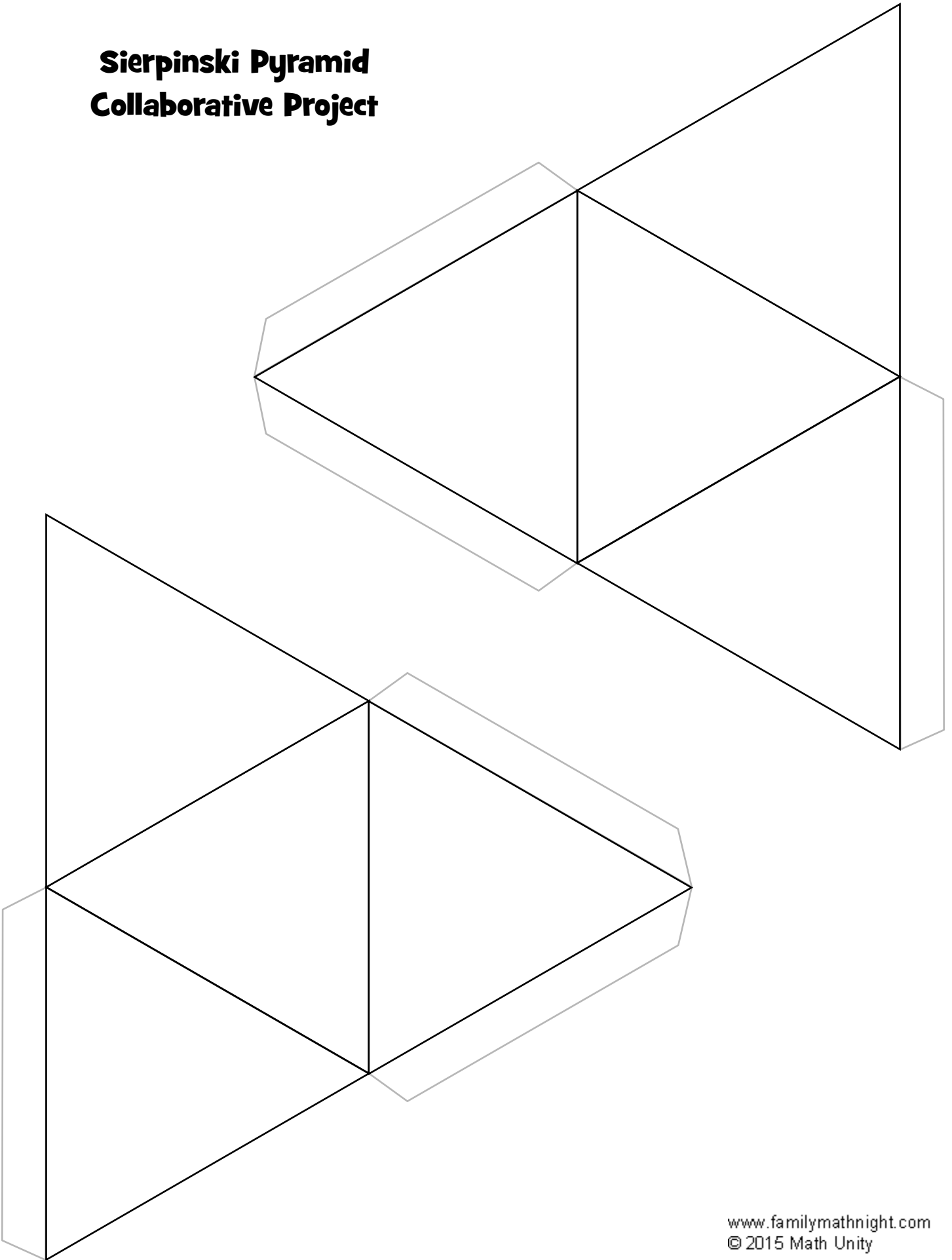
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Thank you for helping!

Sierpinski Pyramid Collaborative Project



Thank you!

Thank you for purchasing this STEAM Collaborative Project! This project (and all my other STEAM projects) are such a great way to involve families in a fun, engaging, and academic (!) way! You'll end up with a beautiful product that can be displayed for all to see and admire.

A little background on the projects

Our company sells K-5 Family Math Night kits to help make it easy for schools and organizations to host a fabulous event. As we were beta testing the kits at different schools I wanted to give them a gift for allowing us to use their school site and community. That's when I came up with the idea of these collaborative projects. If I could get all the participants involved in making a small piece of a project that, when combined with all the other pieces, would create a fabulous product - well, that would be the perfect gift. It turned out to be such a huge success that I now try to include a collaborative project in each event that I do.

To help make it easier for others to also include these collaborative projects, in addition to the written lesson plans, I've put together a video of each one. The link to this video is on page 1 of this packet. If you watch it and like it, an easy way to let me know is by subscribing to my Family Math Night YouTube channel.

Although these projects were designed to be done during a Family Math Night event, they work just as well in the classroom. If you have younger students, consider working with a buddy class of older students who can help the younger ones. It's such a wonderful way to build positive relationships while getting in some great math work!

Connect with me

And, finally, I'd love to know how your project turned out and if you've learned anything along the way that I can pass on to others. So, please feel free to connect with me. I truly enjoy hearing from you and respond to every question and comment that I receive!

Happy Counting!

Karyn

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