

NAVAJO MATH CIRCLE NEWS



Spotlight On People: Sally Fowler

Many people contribute time and effort to run the NNCM. We plan to describe one such person in each newsletter. Food plays an important part in most cultures and has been a part of our programming. In the first few years, Sally Fowler served as the caterer



weaving at age seven, since then, she continues to weave using the natural colors of her sheep wool and colors from the native plants of the Southwest. She has eight children, many grandchildren, and

for our program. Sally Fowler is a member of the Navajo Tribe. She is from Tonalea, Arizona. Sally speaks only in her native Navajo language. She has no formal education and the education she knows is her ancestor's knowledge. She started

raises livestock. Her clans are born for Bitter-water people and born into Manygoats people; her maternal grandparents are the Mexican people, and her paternal grandparents are the Edgewater people.

A Word From The Director

My Fall 2020 classes are coming to an end. This has been a difficult year for many people. It is often difficult to know what other people are going through (especially for a slightly awkward mathematician). We are able to bring mathematical outreach to the Navajo Nation under normal circumstances. At the moment there are more pressing issues, so I'll share some of my thoughts about the current situation before discussing the status of the Navajo Nation Math Circles.

Since I was not able to visit this past year, I rely on stories from people and occasional news articles to gain some understanding of the situation in the Navajo Nation. Courtney (CJ) is a Navajo girl on my daughter's soccer team. Her family is

from Crownpoint, NM. They relayed to me that something like half of the people in Crownpoint has had COVID-19 (Dikos Ntsaaígíí-19). They also described extensive curfews and large fines for traveling during the curfew without proper paperwork. My sister was working as a flight nurse. She described supply shortages in Tuba City and large numbers of patients. I read in Emergency Medicine News that as of August 31 there were 9820 cases and 503 deaths out of a population of about 173,000 on the reservation. This is tragic. I admire the Navajo Elders and Navajo government. It is very difficult to administer such a large community. Funding from the CARES act to the Navajo Nation was delayed by three months and generated court battles. From

what I have seen, the Navajo approach has been thoughtful and I think the rest of our country could learn from their example.

This year has also witnessed a large number of injustices in communities of color that have brought conversations about social justice to the fore. The phrase, "Black Lives Matter" will be listed in any summary of 2020. While some who reply, "All Lives Matter" may be well-intentioned, this is not a reply that encourages conversation, because it is changing the topic. Listening is always important. We at the Navajo Nations Math Circles project may not always understand the issues facing the community, and may not be able to help, but we are always willing to listen and wish to help however we can. We are going to put extra effort into communication in the future.

This newsletter is one attempt to increase our communications. As I assist in its preparation I can't help but notice that it is a bit skewed by articles about volunteers and people from outside of the Navajo community. I hope the next newsletter will include more stories from the Navajo community. We'd love to hear from you. Are you alumni of one of our programs? If so, which one, what are you doing now? Is there something we can do to help you? Do you have a story you would like to share?

There are many people that are willing to assist with Navajo Math Circles. This newsletter in-

cludes descriptions of some of the contributions of some of these people. We hope to highlight people from the community as well as volunteers in all of our future newsletters. In addition to spotlights on people, each newsletter will include a math puzzle or two, descriptions of some of our past activities as well as previews of future events.

In a typical year, we have a concentration of school visits, math festivals, and a teacher workshop in the Spring. This year we had to cancel all of our Spring activities. In addition, this was the first year since the launch of the program that we were not able to run an in-person Summer Math Camp. While we were not able to meet in person, there was some activity on-line. See the box on page 3 that describes the instagram math camp that Sophia and Alex Koss put together. You can still check out the puzzles and activities that they posted:

<https://www.instagram.com/navajomathcamp/>
A shout out also goes to Craig Young. He took the Tuba City math circle on-line this past Spring, see below. Since it is unlikely to be safe to run in-person math events this Spring, or even a Summer Math Camp for 2021, we are going to experiment with on-line programming. Our first attempt will be a Virtual Winter Teacher Workshop including stipends. See page 4.

Wishing everyone all the best for the new year,
Dave

Year in Review

It was a rough Spring, Summer, and Fall. We had to cancel all of our plans for Spring teacher workshops, math festivals, school visits as well as our beloved summer math camp. Kudos to Craig Young from Tuba City. Before the pandemic shut things down, he ran 27 math circle sessions. He managed to run a virtual version of his Thunderbird Academy Math Circle after the pandemic shut things down this past spring. This included 16 virtual sessions. He concentrated on content that would work for students that had no prior math circle experience such as a session on casino odds and sucker bets and a session on magic squares. Before the health crisis, Pam Smith was making numerous visits to schools in the Navajo Nation. She recently retired from her position at Ft. Lewis College and decided she wanted to spend more time working with Navajo students and teachers (lucky us!). Before in-person activities for the year came to an end she visited Monument Valley High School, Page High School, Many Farms Community School, Tse Ho Tso Primary Learning Center, Tsehootsoo Intermediate Learning Center, Ganado Middle School, Piñon Accelerated Middle School, Kayenta Boarding School, Kayenta Middle School, Wingate Elementary School, Borrego Pass School, Lake Valley Navajo School, Cove Day School, and Red Rock Day School. Pam also ran teacher workshops for us. Before the crisis, Duane Yazzie, Yolanda Yazza, Dwayne Chase, Berlinde Yazza, Elmer Williams, and Anna Wold all ran math circle sessions with their students, and we ran a teacher workshop featuring Mark Saul and Dana Nez.



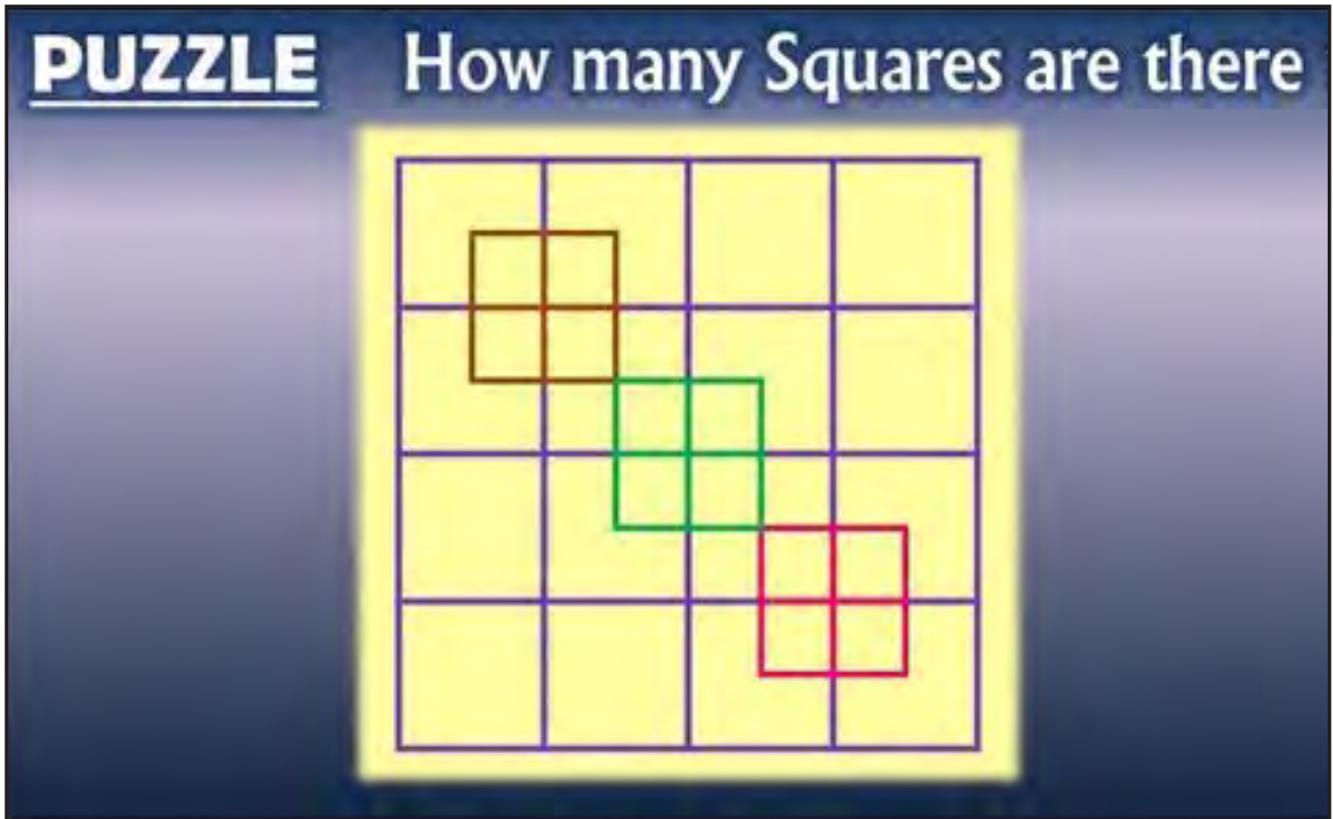
Craig Young



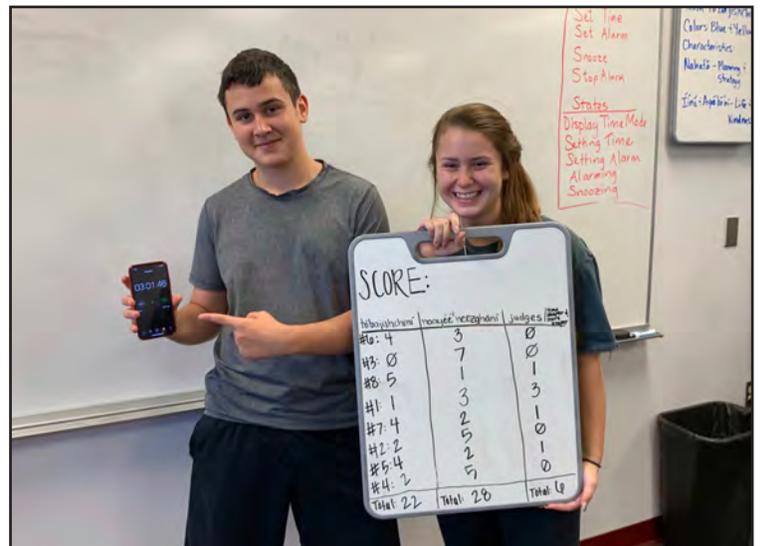
Pam Smith

Navajo Nation Math Circles on Instagram

In October of 2017, **Sophia Koss** found the Navajo Nation Math Circles Project on the internet and wrote to us because she wanted to help. That year she organized of classroom supply drive at her school and delivered the supplies to teachers in our network. She and her mother, **Diana** came up for the 2018 Math Camp. The Koss family has continued to support us with more supply drives and the entire family came up for the 2019 Math Camp. Like many, Sophia and her brother **Alex** were disappointed when the health crisis forced us to cancel the 2020 Math Camp. They decided to do something about it and created the Instagram account <https://www.instagram.com/navajomathcamp/> so folks could at least share some of the puzzles and math explorations that they might have seen at the Math Camp. A number of people submitted solutions and followed this site. We encourage anyone to check it out. Here is one puzzle from the site.



Sophia leading a session



Sophia and Alex displaying the results of a math wrangle

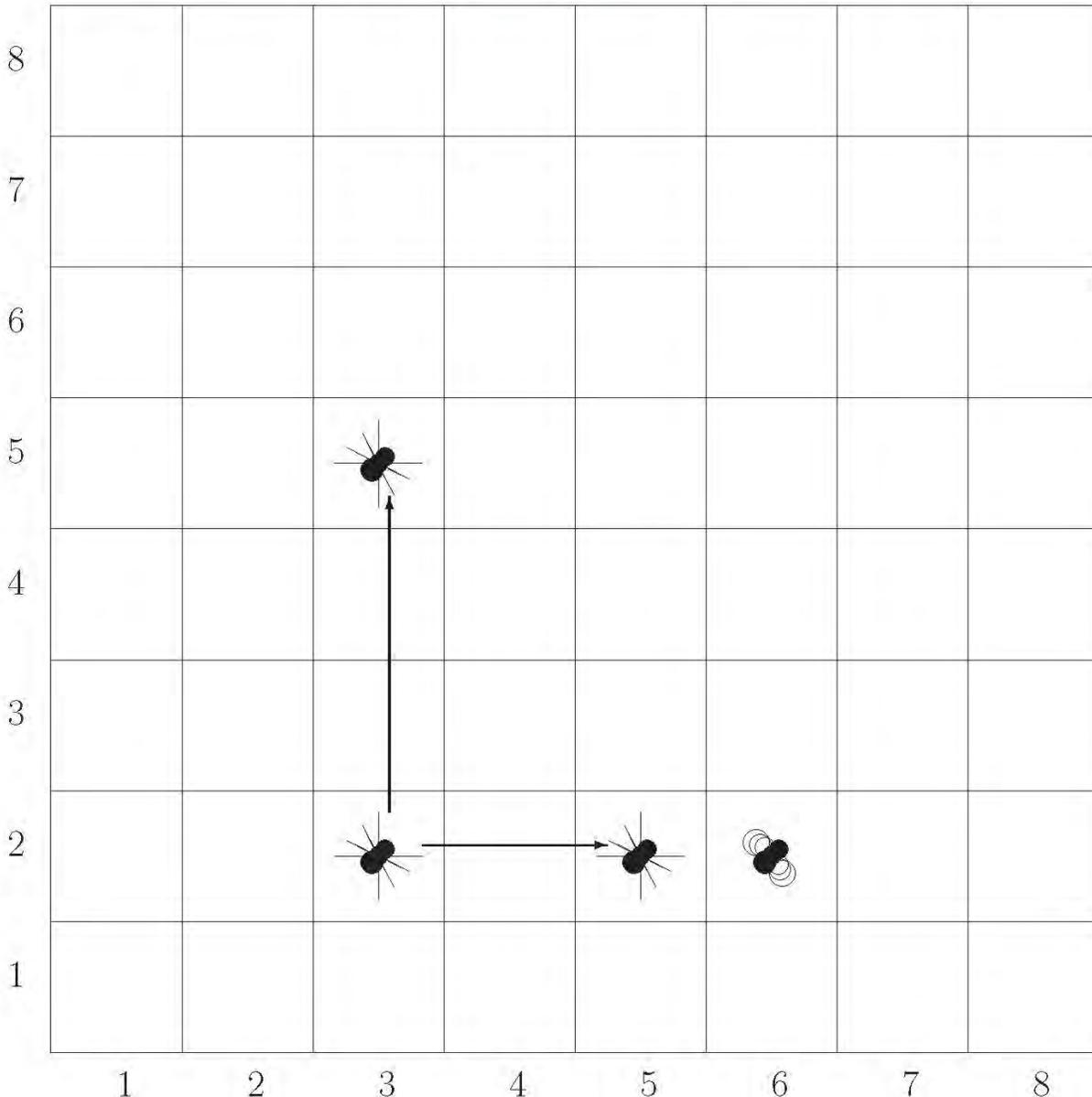
Forthcoming Events

The health crisis precludes in-person events for the time being. So we do not completely lose contact with members of the community, we are planning a teacher workshop for Saturday, January 23, 2021. We will offer stipends for participation in this workshop. The workshop will include time for discussion, descriptions of resources that may be helpful and math activities led by Dave Auckly, Gordon Hamilton, and Pam Smith. For more information about this workshop see <https://tinyurl.com/2021WinterNavajoTeachers> The below puzzles are activity previews. We hope to discuss other ways that we can help the community at this workshop. We are always open to suggestions/requests even if you can't attend the workshop.

The Spider and the Fly

On an $n \times n$ chess board we label the squares by pairs of numbers (a, b) . For example, the square labeled $(3, 2)$ is the square in the 3rd column, counting from the left, and the 2nd row, counting from the bottom. A spider sitting on the square (a, b) can jump either to square $(a + b, b)$ or to square $(a, a + b)$. The spider pictured below sits on the square $(3, 2)$. It can therefore move to $(5, 2)$ or $(3, 5)$.

Can the spider make it from $(1, 1)$ to the fly at $(6, 2)$? Can the spider make it from $(1, 1)$ to a fly at $(7, 8)$?



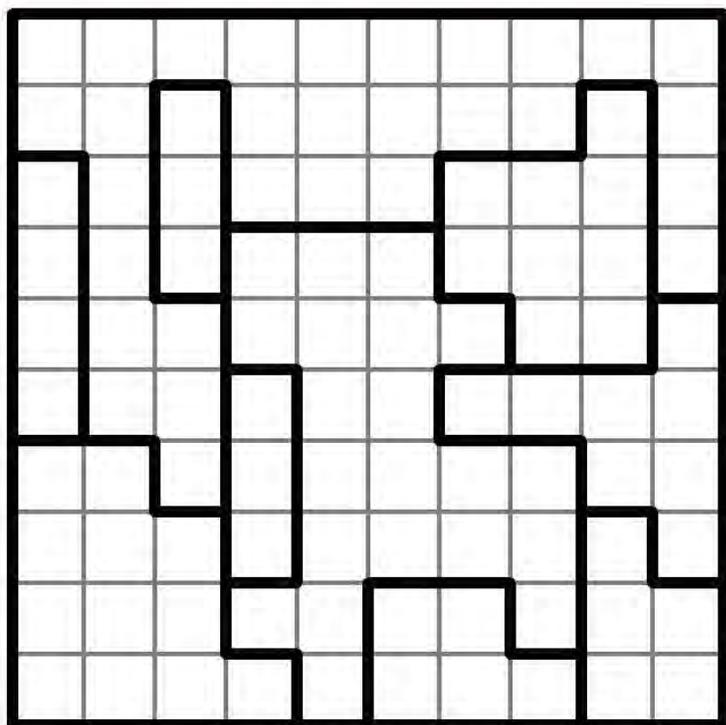
Star Battle

Each puzzle is divided into 10 different regions.

Each region, row and column contains exactly two stars.

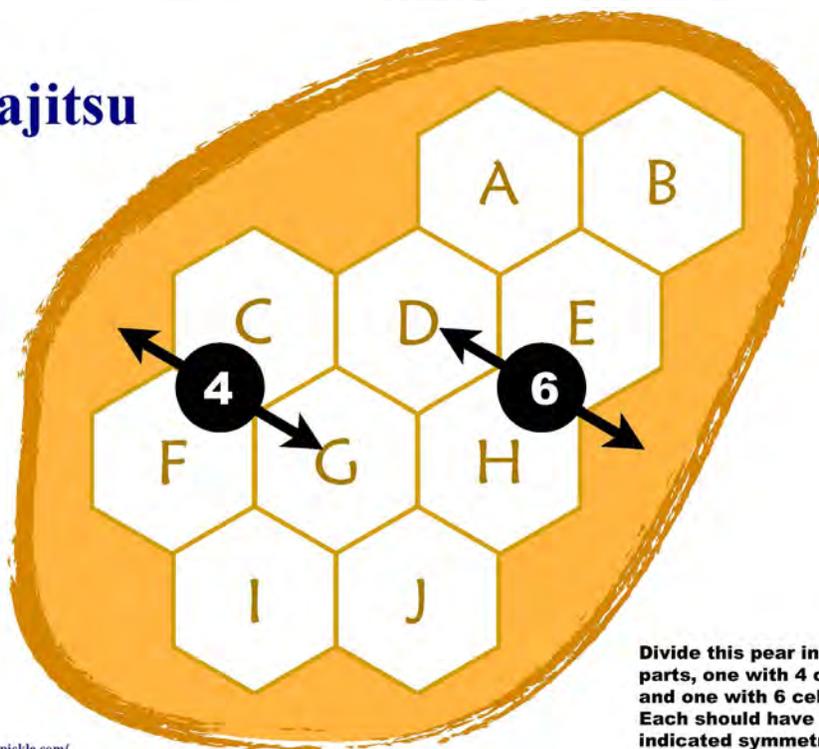
Stars may not be adjacent to each other (not even diagonally).

Hint: Mark places that can't have stars, too.



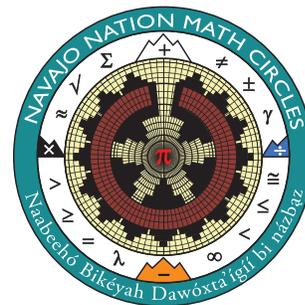
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Kajitsu



Divide this pear into two parts, one with 4 cells and one with 6 cells. Each should have the indicated symmetry.

<https://mathpickle.com/>



Contact Us!

We would love to hear from former student/teacher participants from our programs. If you have something you would like to share in a future newsletter, would like to assist with any of our future programs, have a suggestion, or have a request please reach out to us:

E-mail: navajomath@gmail.com

Website: <https://navajomathcircles.org/>

Opportunity

Art of Inquiry is an online science school. It is run by a long-time math circle leader. They offer a program on astro-biology for students aged 10 - 13 and would make it available to Navajo Students for free. They are also willing to make presentations in classrooms. Their web site is <https://www.artofinquiry.net/>

Credits

Articles: Dave Auckly
Layout: Milo Marsden

