



# BLUEBIRD MATH CIRCLE

## Alliance of Indigenous Math Circles

### Issue 6

Share your problems, solutions, models, stories, and art:  
<https://aimathcircles.org/Bluebird>

*Math is Indigenous. Math is natural. All peoples had to have some method for counting and for being able to measure.*

—Donna Fernandez  
Navajo Preparatory School and  
AIMC Regional Coordinator

Join LIVE Bluebird Math Circle to work on these activities together with friends and family.

#### NEWSFLASH

Monday June 7, 5-6 PM MDT online.

Sign up at <https://aimathcircles.org/Bluebird>

#### Math Riddle

I am a number that goes up but can never come down. Who am I?

## Family Game Time

Here's a fun game to play at home with your family. You'll need some game pieces, but those could be almost anything. Stones are shown in the picture here, but you could use coins, buttons, candy, or anything else that's convenient.

The game begins with two piles. The picture shows piles of 5 and 7 stones, but you can change the numbers in each pile when you play different games. For your turn, you can either:

- Take as many pieces from a single pile, or
- Take the same number of pieces from both piles.

The winner is the player who takes the last pieces.

Play a few games and then think about what's happening. Are there certain positions where you're guaranteed to win on your next move? Are there other positions where you're guaranteed to lose on your next move? If you start with piles of 2 and 3 pieces, can you find a winning strategy? How about if you begin with piles of 5 and 7 pieces?



#### FUN FACT OF THE FORTNIGHT

With over 7 billion people, the world can feel like a pretty big place and that our family and friends form only a small part of it. But there's another way in which the world is actually very interconnected. A recent study looked at how friendships are linked on Facebook. For instance, you have your group of friends, and they have their groups of friends, and so on. If person A is friends with person B, who is friends with C, who is friends with D, then A and D are joined by three links in a friendship chain. While there are over a billion people on Facebook, the study found that any two people are joined by an average of 4.7 links, which is remarkably small! Something similar happens if we look at actors that have appeared in the same movie or athletes who have played on the same team. Mathematicians Duncan Watts and Steven Strogatz developed a theory, called small-world networks, that explains why this happens and that even suggests that people unwittingly organize themselves so that it does!



## Pitcher Perfect!



You are visiting your grandmother and notice that she has two pitchers.

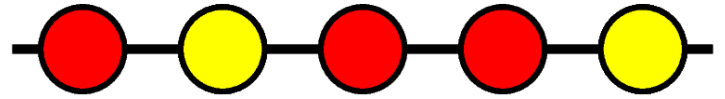


**Activity 1:** Your grandmother remembers that one of the pitchers holds 5 cups of water, and the second holds either 3 or 4 cups, but she's not sure which. By just using the two pitchers, how could you determine how much the second pitcher holds?

**Activity 2:** Suppose instead that one of the pitchers holds 5 cups of water and the other holds 12 cups. Your grandmother asks you to measure one cup of water for her. Can you do that? Could you measure one cup of water if instead one pitcher holds 4 cups and the other holds 12 cups?

## Crafty math

You find some red and yellow beads around your house and decide to make a gift for each of your friends by stringing the beads together into a necklace. You have more red beads than yellow so you decide to make each necklace with three red beads and two yellow. You also want each of your friends to have their own special necklace that is not like any of the others. How many different necklaces can you make like this?



Oops. With three red and two yellow beads, you can't make enough different necklaces for all of your friends. What if you make them instead with four red and two yellow? Or five red and two yellow?

## Ask Bluebird

**QUESTION**—*How can you connect math to art and creativity?* From Jade R.

**BLUEBIRD SAYS**—Bluebird likes this question because the more time people spend doing mathematics, the more they appreciate the connection between math and art. People often describe mathematical ideas as being "beautiful" or "elegant," words you may associate more with art than math.

Both math and art provide people with a way to express something that they see or want to understand. For instance, a painter may place characters in a painting to express some relationship between them just as mathematicians may use geometry or algebra to express relationships. Even more, much art, including Indigenous art such as weaving and sand painting, frequently uses patterns that lend themselves to precise mathematical descriptions.



Both art and math operate with certain rules that we can creatively bend for some larger purpose. While a painter uses perspective to realistically portray a scene, they may also change the perspective to make us think that the scene is being viewed from several different vantage points at the same time. Mathematically, we know how to count and add numbers, but sometimes we may want to consider  $7 + 8$  to equal 3, such as when we do arithmetic on a clock.



Everyone brings their own unique experiences and insights to art and to mathematics. Just as you may create a new and unique piece of art that helps others see the world in a different way, you may also find just the right way to look at a mathematical situation that helps everyone understand it better. Everyone can do art and math. You may need to practice, but everyone can learn to draw. In the same way, you'll need to spend time doing mathematics, but everyone can learn to think mathematically and enjoy it. That's one of the reasons Bluebird is so happy that you're here!

There's a lot more that we could say, and perhaps you have your own ideas about this question. Share them with Bluebird, and we will continue this discussion!