

Dreamcatcher Calculator

Learning Objectives

1. Understand the connection between math and art in the dreamcatcher.
2. Learn about the history of dreamcatchers as a cultural symbol.
3. Learn about prime and relatively prime numbers by using the dream catcher.

Introduction

Today we will learn about math through dreamcatchers. We will make “mathematical dreamcatchers” and traditional dreamcatchers. First, we will learn about dreamcatcher history.

The dreamcatcher story has been around before settlers came to Turtle Island. Although the dreamcatcher is used by many Indigenous communities (including Mi’kmaq), the dreamcatcher is thought (by many) to have come from the Ojibway nation.

Although we know that dreamcatchers are not traditionally Mi’kmaq, they have been embraced by Mi’kmaq people. They represent how culture can change over time.

Dreamcatchers are often used to protect people from bad dreams. More recently, they have been used by select local elders to honour murdered and missing Indigenous women. While good dreams travel freely through the hole in the middle of the dream catcher, bad ones get stuck in the web. Usually a dreamcatcher is hung in a window where light shines on it in the morning. As the sun’s rays hit the dreamcatcher in the morning, all the bad dreams will evaporate like morning dew (1).

Dreamcatcher Legend

Spider was quietly spinning his web in his own space. It was beside the sleeping space of Nokomis, the grandmother. Each Day, Nokomis watched the spider at work, quietly spinning away. One day as she was watching him, her grandson came in "Nokomis-iya!" he shouted, glancing at the spider. He stomped over to the spider, picked up a shoe and was about to hit it. "No-keegwa," the old lady whispered, "don't hurt him." When the boy left, the spider went to the old woman and thanked her for saving his life. He said to her, "For many days you have

watched me spin and weave my web. You have admired my work. In return for saving my life, I will give you a gift. "He smiled and moved away, spinning as he went. Soon the moon glistened on a magical silvery web moving gently in the window. "See how I spin?" he said. "See and learn, for each web will snare bad dreams. Only good dreams will go through the small hole. This is my gift to you. Use it so that only good dreams will be remembered. The bad dreams will become hopelessly entangled in the web." ~ Jasen Benwah, Cape St. George, NL

The dreamcatcher is a good example of how art and math can form a relationship. Art and math are usually thought about as being separate and unrelated; however they both can be connected.

For example, geometry is often only thought about as being a part of math. There are many aspects of geometry in art like patterns, shapes, symmetry, measurement and proportion.

Think about math and art as being threaded together, like a basket, a garment or a web. For instance, think of math as the circle or hoop, while art is the string or twine. In order to make a dreamcatcher we must combine both the hoop and the string (math and art) together.

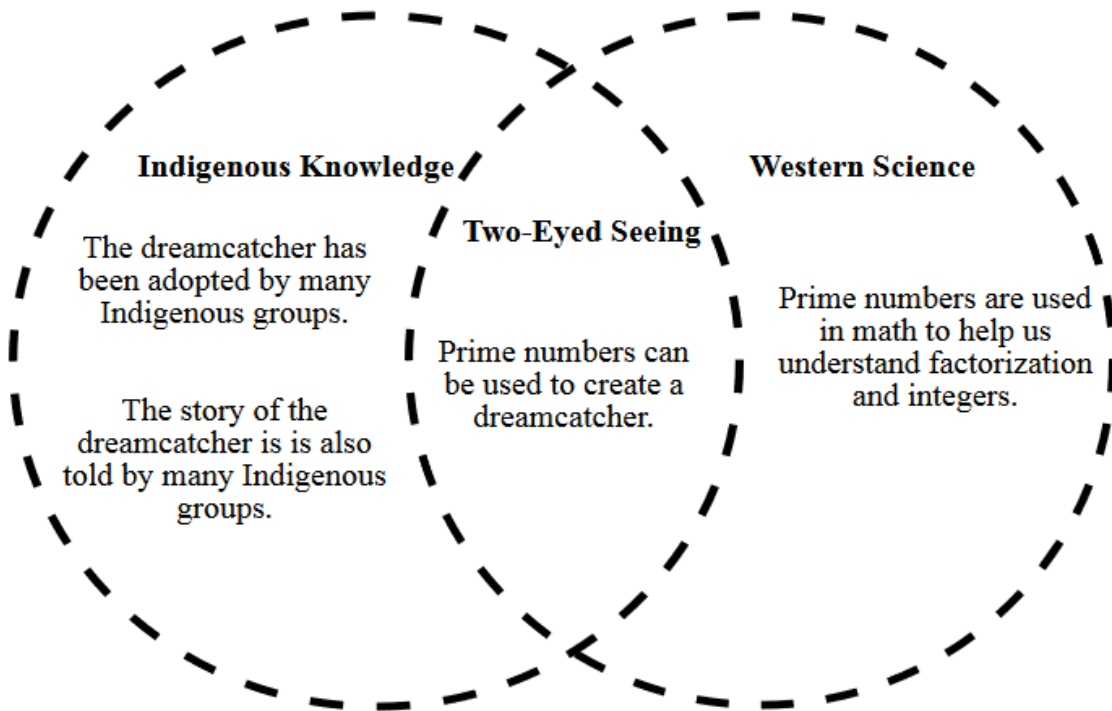


Figure 2. Two Eyed Seeing Diagram

Activity 1: Creating a Human Spider Web

For this activity you will discover a new way to think about math and dreamcatchers. We will work together as a group to construct a ‘human spider’s web’ just like the Dreamcatcher Legend. First, we must learn about “jump numbers”.

What you will need for our activity:

- 1 spool of yarn or string

What you will do, step by step:

Step 1: Review Jump Numbers

Listen to the camp counselor explain “jump numbers”.

- Review the explanation of jump numbers below.

A “jump number” is a specific number that we use to “jump” from one point on the circle to another, connecting them with a line. If we have a dreamcatcher with 10 points around a circle, some jump numbers will allow you to touch all 10 points on the circle. Some jump numbers will not.

Look at the image below. If we start at the number 1 on the dreamcatcher and chose the number 2 as our jump number, we will skip every second number until we complete the circle.

You can see below that by using 2 as our jump number we will *not* reach all 10 points on our dreamcatcher sketch since we got back to where we started before visiting all 10 points.

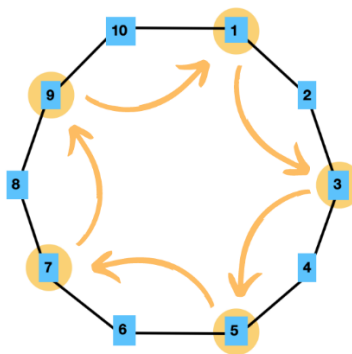


Figure 3: Jump Number Example

Step 2: Make a Human Mathematical Dreamcatcher

Now that we have reviewed jump numbers, we will make a human mathematical dreamcatcher. Use the directions below to for the activity:

- a) Gather in a large circle and stand arms-length away from your neighbor.
- b) The counsellor will pick a jump number.
- c) Using that jump number pass the yarn to your neighbors. The goal is for everyone to be holding a piece of yarn.
- d) Repeat the activity with a new jump number.

Activity 2: Creating the Mathematical Dreamcatchers Using Sketches

In this activity we will make the dreamcatchers using sketches.

We will find out which numbers between one and ten can be used to make hit all 10 points on the dreamcatcher.

What you will need for our activity:

- Two coloured pencils

What you will do, step by step:

Step 1: Draw the mathematical dreamcatchers

- Use the dreamcatcher sketches below and test each jump number to see if you can visit all 10 points.
- Use one coloured pencil to draw the jumps. Use the second coloured pencil to circle the points you land on.
- Circle “yes” or “no” under the sketch once you have discovered the answer.

Step 2: Finding the pattern in the mathematical dreamcatcher

Fill in the table below with your jump number answers.

The answer for number 2 has been filled already to get you started.

Try Jump Number 1:

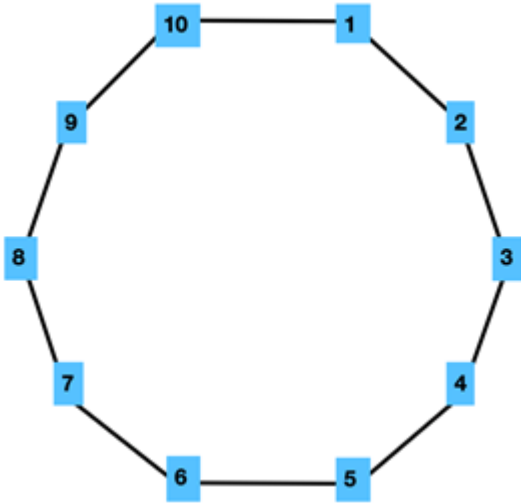


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 2:

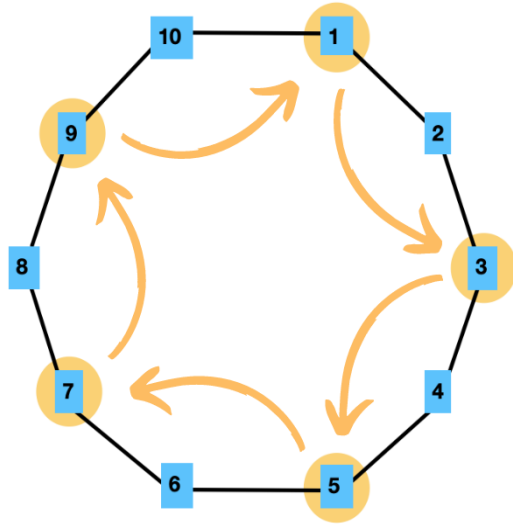


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 3:

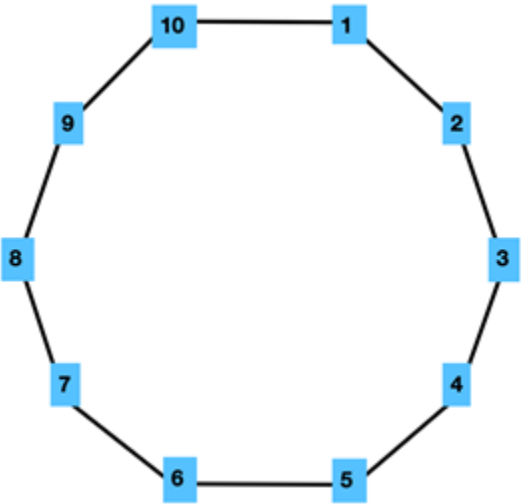


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 4:

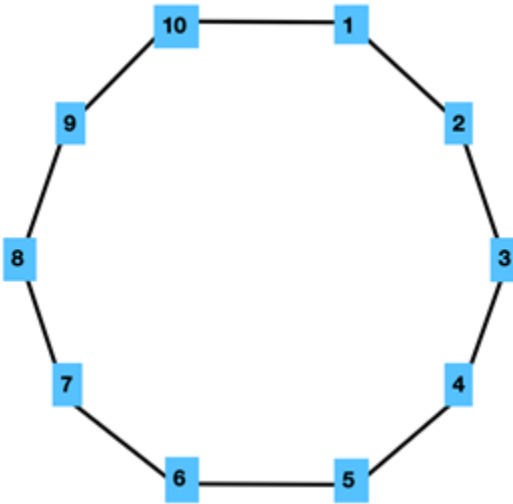


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 5:

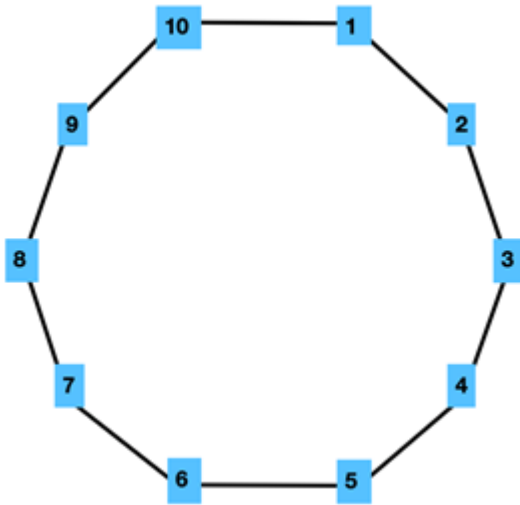


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 6:

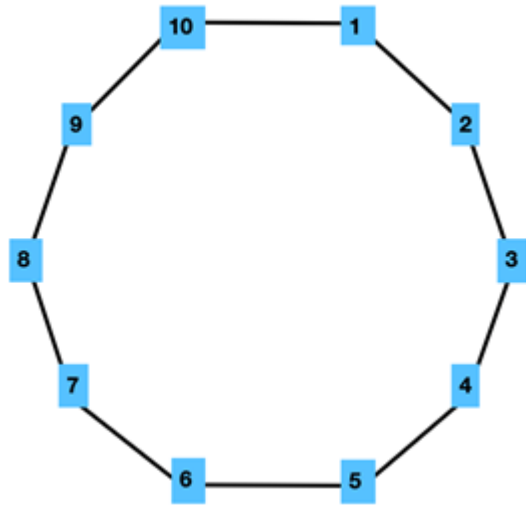


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 7:

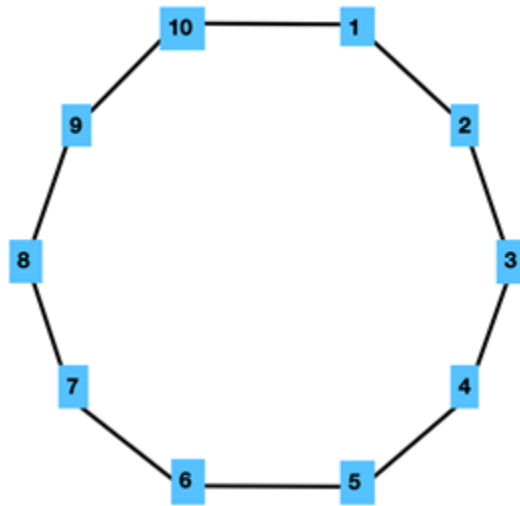


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 8:

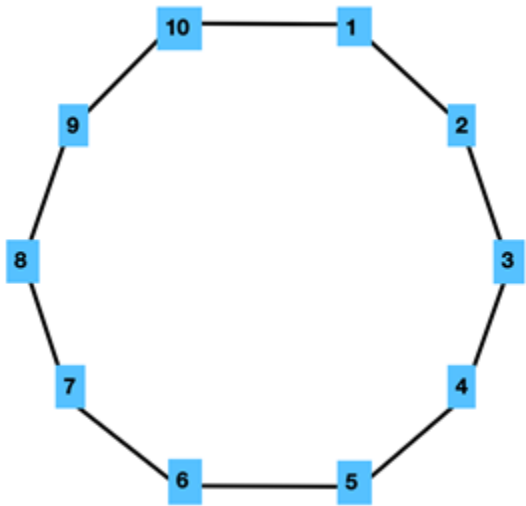


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 9:

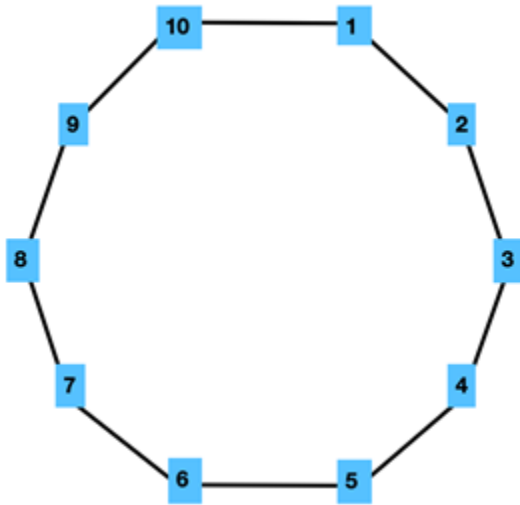


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Try Jump Number 10:

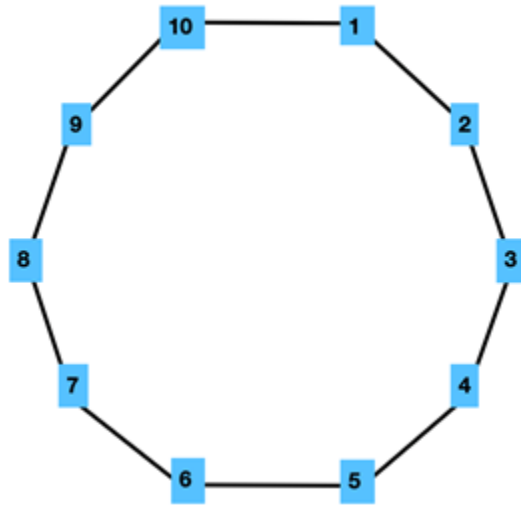


Figure 4. Dreamcatcher Sketch

Visit all 10 points? Yes or No

Fill in the table below for each jump number. Use what you found in the dreamcatcher sketches above to answer. The answer for number two has been filled in already from the example above. If you recall, using the jump number two did not allow you to touch all points. The length of the longest circle was five. This is because you only touched five points before starting over.

Table 1: Jump Numbers for 10-point Dreamcatcher

Jump Number	Visit all 10 points?	Length of Longest Circle
1		
2	No	5 points
3		
4		
5		
6		
7		
8		
9		
10		

Step 3: Answer the questions

After you complete the table, answer the questions below.

1. Which jump numbers have us visit every point? List them below.

2. What do these numbers have in common with the number 10? Think about factors.

Activity 3: Creating Mathematical Dreamcatchers Using Boards

In this activity we will be using jump number again to make dreamcatchers on a board. Using the wooden dreamcatcher boards, we will find out which jump numbers allow us to visit all 12 points of the dreamcatcher.

What you will need

- Dreamcatcher Board
- Yarn or leather lace

What you will do

Step 1: Review the dreamcatcher boards

- Listen to the camp counselor explain the dreamcatcher boards.

The dreamcatcher board has 12 nails. Each nail represents one point of the mathematical dreamcatcher. Find the START point (the yarn is tied to it).

Step 2: Use the jump numbers on the dreamcatcher boards

- Pick a jump number.
- Wrap the yarn around the point where the jump number lands.
- Continue trying different jump numbers until all the points on the mathematical dreamcatcher are wrapped with yarn.
- Try jump numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 to see if you can visit all 12 points of the dreamcatcher.

Step 3: Answer the Questions

- Answer the questions on the next page when you have figured out which jump numbers have you visit all 12 points on the dreamcatcher boards.

1. What jump numbers have us visit every point?

2. What do these numbers have in common with the number 12?

Step 4: Debrief

You have discovered prime numbers! Prime numbers are important in our everyday lives because they play a role in data safety. Prime numbers are used to encrypt data like credit card numbers, bank accounts, online purchases and secret military messages, etc.

Big prime numbers (numbers up to 100 digits long!) are multiplied together to make gigantic numbers that are *really hard* to factor. Because it is so difficult to find the factors for these gigantic numbers, it allows them to be used for encryption. Even super computers can't crack the code! (4)

Activity 4: Traditional Dreamcatcher Making

Dreamcatchers are traditionally made from natural materials, such as round basket weaving reeds, red willows or soaked grapevines (7,8). Traditionally, they are small in diameter, around the width of an adult's hand (7,8). Usually dreamcatchers range between three to eight inches wide; today we will make dreamcatchers approximately seven inches wide.

What you will need

- Dreamcatcher Take-Home Kit
- Instruction pages in take home kit

What you will do

Step 1: Introduction to making a dreamcatcher

- Gather in a circle around the counsellor.
- Listen to the camp counsellor as they show and explain how to tie the hitch knots on the dreamcatcher.

Step 2: Group Learning

- Pass the dreamcatcher around the in a circle and you will have a turn to tie two hitch knots.
- After everyone has tied one knot, the counsellor will demonstrate how to begin the next row (7,8).

Step 3: Individual Learning

Although we are going to start our own dreamcatchers there will not be enough time to finish them during the activity. You will get to take home your own dreamcatcher kit. Use the directions below to make your dreamcatcher at home.

- a) Find your dreamcatcher take home kit. Take out the metal hoop and the leather lace. Start by knotting a loop in one end of the lace. Then tie the hanging loop around the top of the dreamcatcher hoop. This will allow you to hang your dreamcatcher when it is done (7,8).
- b) Tie approximately nine hitch knots around the metal hoop. Each one should be approximately two inches apart (7,8). Continue to the next row.
- c) If there is time, add a bead to one of the inner rows to represent the spider.

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This activity was inspired by Dr. Keith Taylor from the Mathematics & Statistics Department at Dalhousie University, Halifax, Nova Scotia.

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