

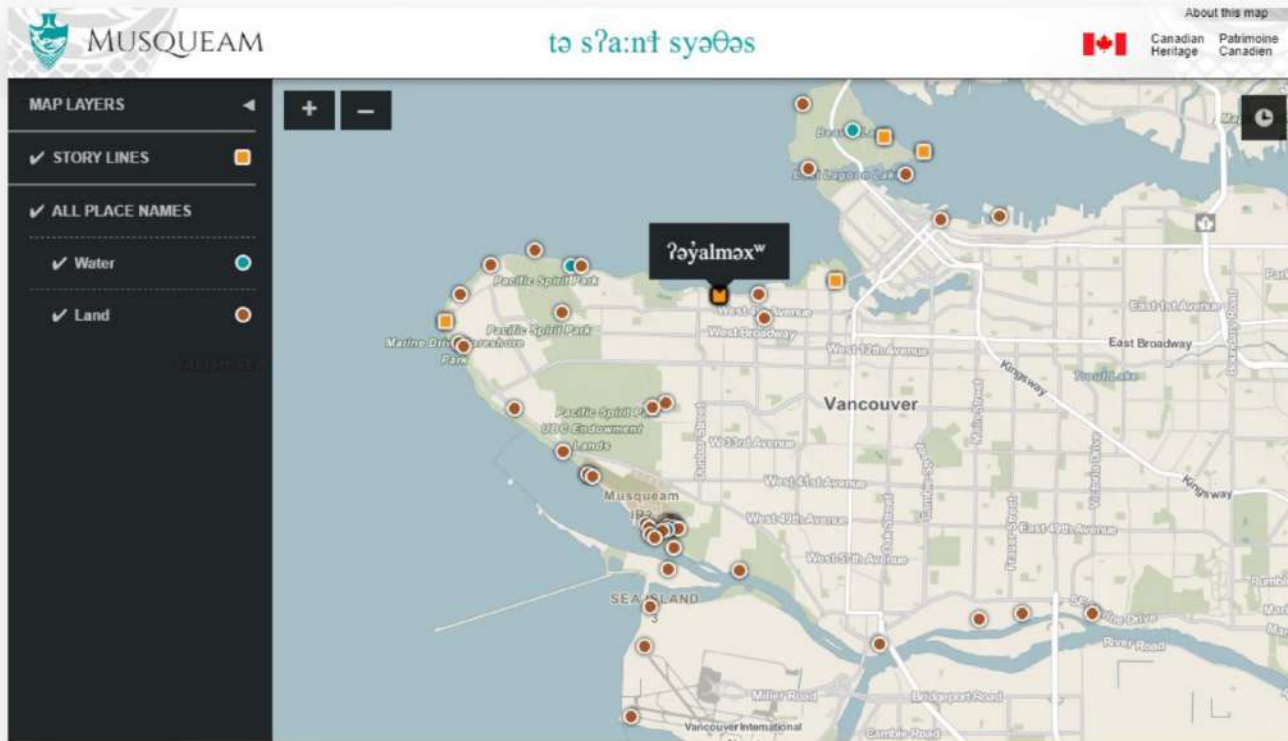


Non-Linear Storytelling Through Rotational Symmetry

A Grade 7 Project

By Janelle Findlay

<https://canadianart.ca/news/susan-point-wins-30k-audain-prize/>



I would like to acknowledge that the work I did for this project was situated on the unceded traditional territories of the x^wməθk^wəy^{əm} (Musqueam), Sk^wx^wú7mesh (Squamish), and səliłwətał (Tsleil-Waututh) Nations.

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- In 2004, Vancouverites were invited to design the city's storm sewer covers.

The competition invited anyone who lived, worked, or went to school in Vancouver to submit design ideas for new storm sewer covers, the lids that mark the entrances to our underground network of sewers.

The Public Art Program received more than 640 entries from Vancouverites of all walks of life and ages.

These were the top 36 entries.

- <http://former.vancouver.ca/commsvcs/oca/publicart/artunderfoot/index.htm>



Picture taken from: <https://pricetags.ca/2018/07/24/protected-view-cones-are-who-we-are-vancouver-protected-views-should-not-be-for-sale-by-city-council-to-developers/>

THE VANCOUVER SUN

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FINAL EDITION

Finally, art you can drive over

Council to debate beautifying city's manhole covers

BY AMY O'BRIAN
VANCOUVER SUN

Vancouver's dirtiest, dankest places may have a little beautification in their future.

Following the lead of cities such as Seattle, Calgary and Kyoto, Vancouver's city council will vote Tuesday on whether to put in motion a plan to decorate

the city's sewer access covers.

It's too early to know how the heavy lids that separate pedestrians from the underworld will be decorated, but Bryan Newson, manager of the city's public art program, said the chosen designs will likely have an aspect of environmental awareness to them.

In addition to increasing the "interest and esthetic of the city in a small and subtle way," the sewer access covers — often called manhole covers — will likely be incorporated into a public awareness campaign about fish habitats and water pollution,

Newson said.

The project is expected to have a one-time design cost of \$20,000, which awaits council's approval on Tuesday and will come out of a \$250,000 public arts fund and possibly the city's sewer capital.

Once the metal covers are designed and cast, it is projected to cost an additional \$9,000 per year to include artwork on the lids.

The city's engineering department already spends about \$94,000 per year buying new and

See SEWER COVER A2

Sewer cover designs could be around into the next century

From A1

replacement covers, lids and grates, and the additional cost would be covered by sewer capital, which Newson described as "millions and millions of dollars."

"So this seems to us like a modest expenditure. We think it'll go a fair way and it is good value," he said.

Most engineering projects, including sewer access covers, have about a 100-year lifespan, and Newson said the idea that these artworks might be around in

the next century is part of the appeal of the project.

Councillor Tim Louis is enthusiastic about the idea of decorating the sewer lids, even if it may sound a bit odd to some members of the public.

"I cannot think of a better use of sewer money than to create a bit of art. It's kind of ironic, isn't it?" Louis said.

"This is a very creative way — at no expense to the taxpayer — of putting a little bit of colour, a little bit of art into our world."

It's unlikely any vibrant reds or blues

will be incorporated into the designs, but Newson said nothing is finalized yet.

It's not yet decided whether the covers will be designed by professional artists, amateurs or students, and Newson said the number of different designs that will be accepted by the city is still up in the air.

He noted that winning design(s) will have to meet certain engineering and technical requirements to ensure they are safe for pedestrians and vehicles.

Councillor Peter Ladner, who sits on council's minority Non-Partisan Associ-

ation slate, supports the idea, but said the timing of the report is a bit inappropriate. On Tuesday, property-tax increases of up to 5.3 per cent are on the same agenda as the sewer lids.

"In theory I don't have a problem with it, but I just find the timing is awkward given that we're wrestling over this budget," Ladner said.

"I've always

admired the manhole covers in Seattle that are decorated."

Ellen Woodsworth, a councillor with the Coalition of Progressive Electors, said she believes the project will prove to be money well spent.

"I think we're trying to make Vancouver a fun, artistic city," she said.

"This is just one way to liven up the city."

Calgary sewer access cover. Vancouver may do something similar.



Wait a minute, what is a manhole cover?

Manhole cover

From Wikipedia, the free encyclopedia

A **manhole cover** or **maintenance hole cover** is a removable plate forming the lid over the opening of a [manhole](#), an opening large enough for a person to pass through that is used as an access point for an underground vault or pipe. It is designed to prevent anyone or anything from falling in, and to keep out unauthorized persons and material.

Manhole covers date back at least to the era of ancient Rome, which had [sewer](#) grates made from stone.



https://en.wikipedia.org/wiki/Manhole_cover

The Public Art Program received more than 640 entries from Vancouverites of all walks of life and ages.

These were the top 36 entries.

Look closely, what stories do you hear?

Where do we see math in these designs?

<https://www.ironcladart.ca/competition/examples.php>



If we were to take a pin and place it in the center of these designs, can we see rotational symmetry in these?

Which designs stand out for you?

How might artists use rotational symmetry to tell a story?

Which designs might share similar properties?

<https://www.ironcladart.ca/competition/examples.php>



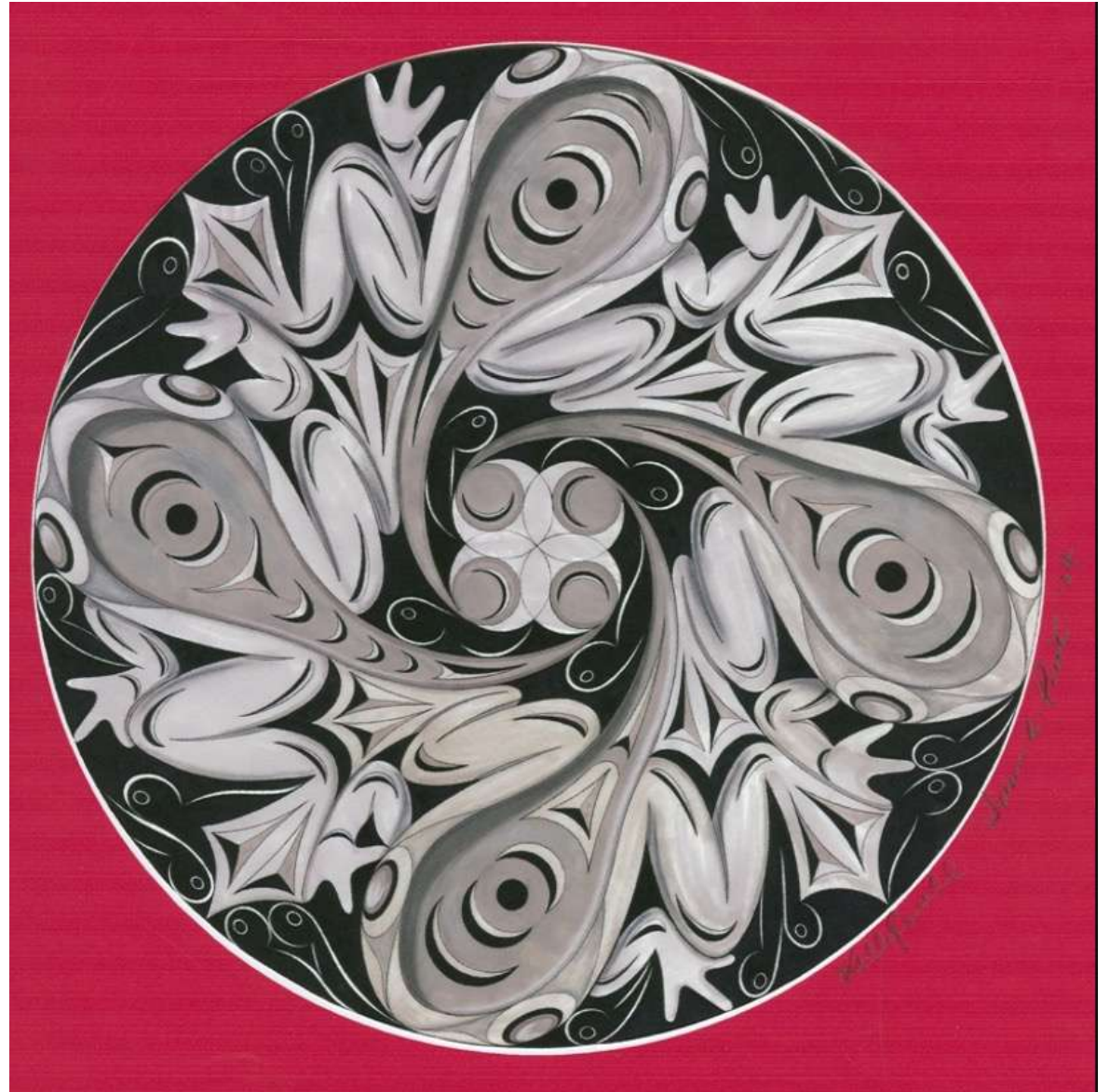
Coast Salish (Musqueam) artist Susan Point and her daughter Kelly Cannell were one of the winners of the contest.

What story might Susan Point and her daughter be sharing through this design?

Why four frogs? Why include the eggs, tadpoles, and adults?

Choosing a design that is from the natural world highlights that the industrial world and the natural world can live in synergy.

<https://www.ironcladart.ca/competition/examples.php>



susanpoint



Susan Point is a Coast Salish artist from Musqueam, a First Nation in Vancouver, British Columbia.

Let's visit two websites to admire her work.

<https://susanpoint.com>

<https://www.alcheringa-gallery.com/index.php/susan-point.html>

Susan's distinct style has stimulated a movement in Coast Salish art. She draws inspiration from the stories of her ancestors and commences the use of non-traditional materials and techniques, therefore inspiring a whole new generation of artists.

“When I design and work on a piece, regardless of medium, there are countless stories, thoughts and memories that go through my mind,”



“I feel it is important to re-establish our Salish footprint upon our lands, to create a visual expression of the link between the past and the present that is both accessible and people-friendly. I create unique original artworks that honour my own people as well as the diverse groups of people from around the world who have come to live upon our lands in the Northwest Coast. My hope is that my art leaves a lasting impression on locals, visitors and surrounding communities.”

Image and quotation taken from:
<https://www.criticsatlarge.ca/2019/07/people-among-people-public-art-of-susan.html>



How does her Spindle Whorl Tell a Story?



Flight (Spindle Whorl)

Year: 1995

Artist: Susan Point

Dimensions and materials: Red cedar | 4.8 m in diameter

Terminal: International

Level: Level 3

Security Access: After Security

"Flight" is the world's largest Coast Salish Spindle Whorl and relates to the large-scale weavings included in this contemporary art installation. The artwork is presented in a setting of water and stone, symbolic of this land. The spindle whorl uses traditional images to depict the theme of flight. The eagle, which is considered a symbol of power, is designed around the image of a man whose arms are raised, welcoming visitors and also gesturing flight. On the chests of the men are salmon motifs to represent the Coast Salish people, who still live and fish along these shores.

<https://www.yvr.ca/en/about-yvr/art/musqueam-welcome-area>



Coast Salish Artist Dylan
Thomas
from Lykson First Nation
and Rotational Symmetry

Play video:

https://www.youtube.com/watch?v=Nd_ZXEZY30I&feature=youtu.be&ab_channel=BurnabyArtGallery

CANADIAN
Geographic

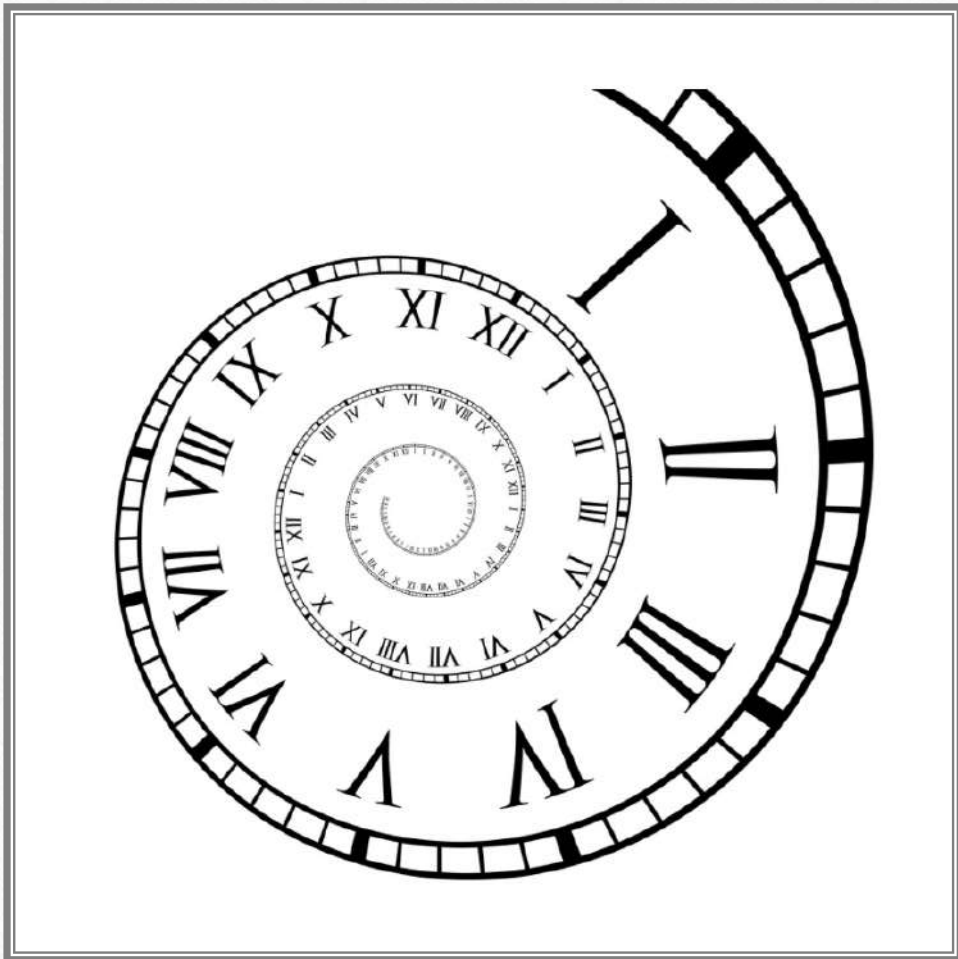


Canadian Geographic
Indigenous Peoples
Atlas of Canada

Non-Linear Narratives

- Traditional Indigenous stories, including Métis ones, generally have non-linear narratives and, unlike European stories, many of them have no real beginning, middle or end.
- Métis stories are often ongoing and can be carried over through time.
- The stories are layered and have multiple meanings, so people of varying ages will be left with different interpretations.

<https://indigenouspeoplesatlasofcanada.ca/article/oral-tradition/>



Task:

Let's Time Travel back to 2004 and Enter the
Storm Sewer Cover Contest.
Let's use Rotational Symmetry.

We will learn a technique on the next slide to
guide our Rotational Symmetry design.

How will you tell a story with your design?

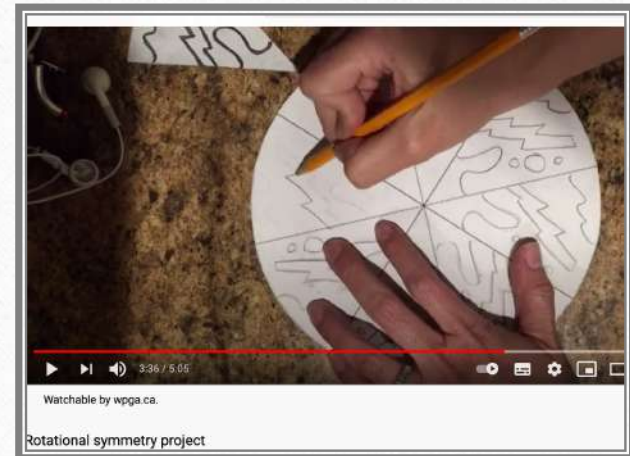
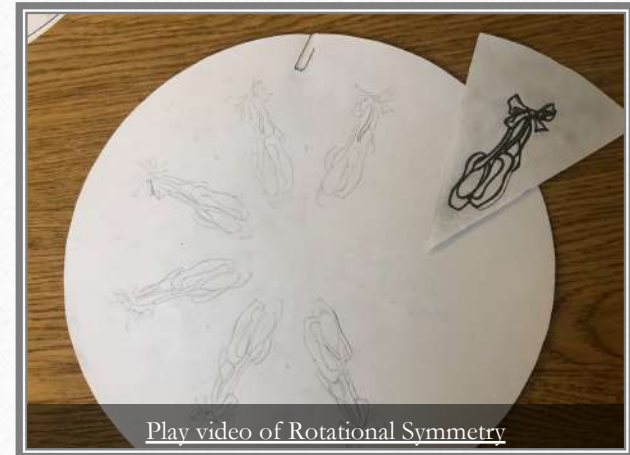
Let's watch this video.

This is how you will create your rotation symmetry.

The artist here is using eight slices.

How many slices will you need to tell your story?

Play video: https://www.youtube.com/watch?v=DrOJtPK4zGE&ab_channel=i%E3%80%83math



Questions






Choose how many times you would like your core slice to rotate around the circle.
Perhaps it is intentional—eg) four slices for four seasons,

What options do we have for how many even slices may go into a circle?

What do we already know about degrees in a circle?

Are some amounts of slices “friendlier” than other amounts?

Together, let's explore circle properties...

Number of Slices or Rotations in the Circle	Calculation	Let's Slice Up the Circle Together	Each Slice will be: (in degrees)
4 Slices	$360 \text{ degrees} / 4$		
5 Slices	$360 \text{ degrees} / 5$		
6 Slices	$360 \text{ degrees} / 6$		
8 Slices	$360 \text{ degrees} / 8$		
10 Slices	$360 \text{ degrees} / 10$		

Is there an amount of slices that may be trickier?

Materials



PROTRACTOR AND
PREVIOUS
PROTRACTOR SKILLS



RULER



2 CIRCLE SHEETS



SCISSORS



PENCIL

Procedure

- Decide how many slices in your circle.
- Calculate the angle of one slice.
- Use one of the circle sheets and your protractor to measure the one prototype slice. Cut it out.
- Take time to plan your design. Do you have a story to tell? How do you connect with the city of Vancouver? Design with pencil.
- Use the carbon transfer technique to design the rest of the circle or manhole cover on the second circle sheet.
- Color
- Notice symmetry and rotations
- Write an artist statement of minimum 4 sentences long. See next slide.

And Math Artist Statement

- Minimum 4 sentences long.
- Give your design a Title.
- Include one sentence about how you chose the design that you did, or its meaning.
- Include two sentences about how math guided your process. How did your understanding of circle geometry allow you to create your image (include words such as angles, clockwise or counter-clockwise and symmetry).
- Finally, include one sentence about what emerged for you in your art, or what stands out as neat, noteworthy, or significant. Alternatively, you may reflect on what you may do differently next time.

Student Exemplars



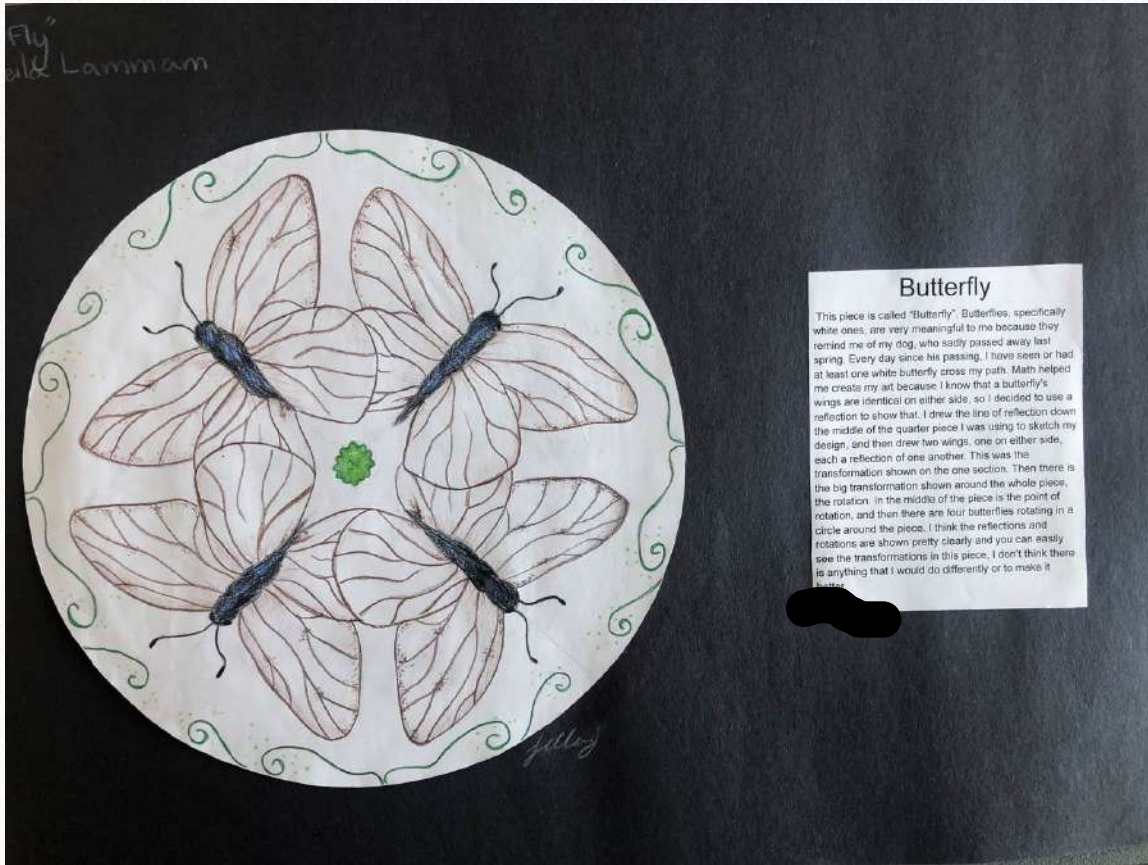
"Collection"

This is my take on transformation art. Each aspect of the piece represents something that's been in my life, either currently or in the past. The two green circles, for example, are a simplification of rhythmic gymnastic apparatus, specifically the ball, which was what I enjoyed using the most during my six years of gymnastics. There's also eight number three's in each section. Three is my favourite number, and '8888' is also an angel number. For the black triangles, it was a vague recreation of the very triangular drawings I made when I was younger. Above that, two dark blue wavy shapes appear. This is actually a modified version of my zodiac sign, the Aries. Above these, is a lighter blue wave design. I've also enjoyed water and the ocean, so I decided including it would be a good idea. Lastly, there's two crowns being reflected across an invisible line of reflection. As a child, being royalty was something I fantasized about, much like every other child. Including these crowns remind me of the yellow paper crowns I made back then. Overall, there are many transformations here. The two circles, for example, are translations. The numerous threes can also be seen as a translation, as they move to the right. The two wavy symbols are reflected across the plate, and so are the waves using the same or similar lines of reflections. The two yellow crowns are reflections as well, but with a different line of reflections going the opposite way of our other two reflections. This whole piece is a collection of my understanding of transformations, and of my hobbies and personality.



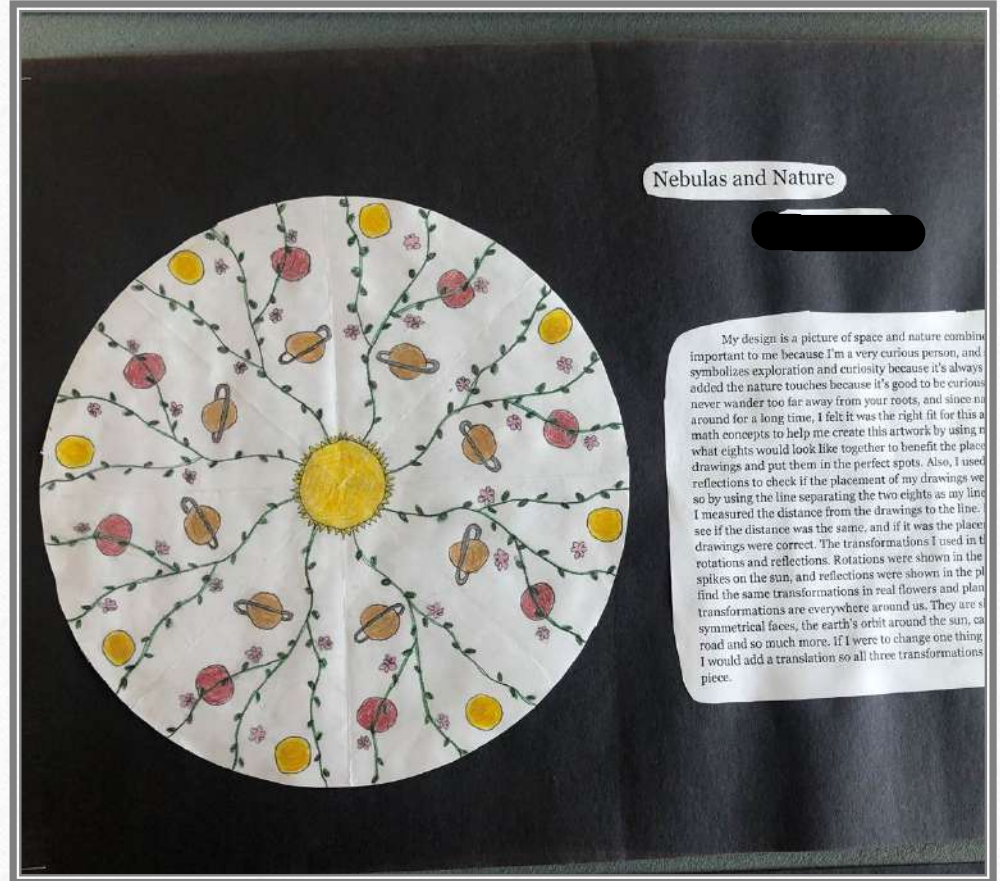
Leaping Salmon

The main reason I chose to create a piece showcasing the life of a salmon in a rotational degree of 90° was because there are four seasons in a year and on average a Salmon lives four years. The cause behind the name leaping salmon is that when you hold your finger down on the point of origin then repeatedly rotate 360° clockwise it creates an illusion that the fish are leaping. This is of cultural importance to me because I am Canadian, and one of the most recognised natural resources is the salmon. Within my art there is an obvious rotation when each quarter of the image is rotated by 90°. Also there is a more discrete translation when you look closer at the eggs you can see that within each quarter the top two eggs furthest from the point of origin are translated.



Butterfly

This piece is called "Butterfly". Butterflies, specifically white ones, are very meaningful to me because they remind me of my dog, who sadly passed away last spring. Every day since his passing, I have seen or had at least one white butterfly cross my path. Math helped me create my art because I know that a butterfly's wings are identical on either side, so I decided to use a reflection to show that. I drew the top of reflection down the middle of the quarter piece I was using to sketch my design, and then drew two wings, one on either side, each a reflection of one another. This was the transformation shown on the one section. Then there is the big transformation shown around the whole piece, the rotation. In the middle of the piece is the point of rotation, and then there are four butterflies rotating in a circle around the piece. I think the reflections and rotations are shown pretty clearly and you can easily see the transformations in this piece. I don't think there is anything that I would do differently or to make it better.



Nebulas and Nature

My design is a picture of space and nature combined important to me because I'm a very curious person, and symbolizes exploration and curiosity because it's always added the nature touches because it's good to be curious never wander too far away from your roots, and since I'm around for a long time, I felt it was the right fit for this math concepts to help me create this artwork by using what eight's would look like together to benefit the piece drawings and put them in the perfect spots. Also, I used reflections to check if the placement of my drawings were so by using the line separating the two eight's as my line. I measured the distance from the drawings to the line. I see if the distance was the same, and if it was the place drawings were correct. The transformations I used in the rotations and reflections. Rotations were shown in the spikes on the sun, and reflections were shown in the plants. I find the same transformations in real flowers and planets transformations are everywhere around us. They are symmetrical faces, the earth's orbit around the sun, car road and so much more. If I were to change one thing I would add a translation so all three transformations piece.



my Life's Tapestry

My Life's Tapestry - Reflections Rotations & Translations

When creating my design, I attempted to incorporate aspects of my life that have a significant meaning to me. For example I incorporated the Star of David which represents my religion. Interestingly, in addition to the Star of David's that I placed based on the point of reflection, each Star of David is created by taking a triangle, and inverting a copy of the triangle over the original (a 180 degree rotation). I also chose to include the cherry blossoms in my project, because I always see them around my neighborhood this time of year, and they remind me of home. Additionally, I decided to draw a continuous open road along the edges of my design, due to my love of travel, and drew waves, to show my love of swimming. As you can see, the design has a point of reflection, which guided my process, and allowed me to rotate my original triangle seamlessly along the circle. In addition, as you can see above the cherry blossoms, the heart is translated on each triangle. Due to my knowledge of transformations, I knew that if I created a design that went horizontally, it would appear continuous, and carry throughout the piece. In this case, I attempted to make the road, waves, and the gold pattern flow along each section. When drawing my design on the final copy, I made sure to move clockwise each time I added a new section, so that I would know where to place my next triangle. Lastly, I decided to use gel pens to bring out the sparkle in the art, and to highlight the color. Perhaps next time, I wouldn't make as many different sections (8), as my hand started to get extremely tired due to the repetition.