GEOTRICITY 3.0

BRINGING GEOMETRY, GEOGRAPHY and TECHNOLOGY TO OUR WORLD

This program is brought to you by your Robert Service Geotricity 3.0 Team.

GEOTRICITY 3.0

By being stewards and agents of change, we can create liveable and sustainable communities.

GEOTRICITY 3.0

A week-long special LEARNING event!

Let's celebrate our neighbourhood, evaluate and analyze its geometric properties, and explore complementary land use.

So get out YOUR:

- **Geometry and measurement tools and knowledge**
- **Geographic inquiry skills**
- **STEM Skills/21st Century Competencies**
- **Technology**
- **Learning Skills**

OVERVIEW OF THE DAY

Day 1

- Activation- explore our neighbourhood with a community walk- investigate angles, diagonals and 2D shapes, investigate land use
- During- a Venn diagram activity
- Consolidation- Sharing of student work
    - Creation of Highlights and Summary

QUESTIONS?

Monday, May 14th PM Timeline

12:45-1:15

- Go over summary of events per day
- Introduce first activity

1:15-2:00

- Community walk- Journal Activity

2:00-2:45

- Math 3 Part Problem Solving Lesson- Geometry Focus

2:45-3:03

- Summarize/review the day
- Hand in Venn Diagrams

Community Walk

Let's take a look at our community.

Learning Goals:

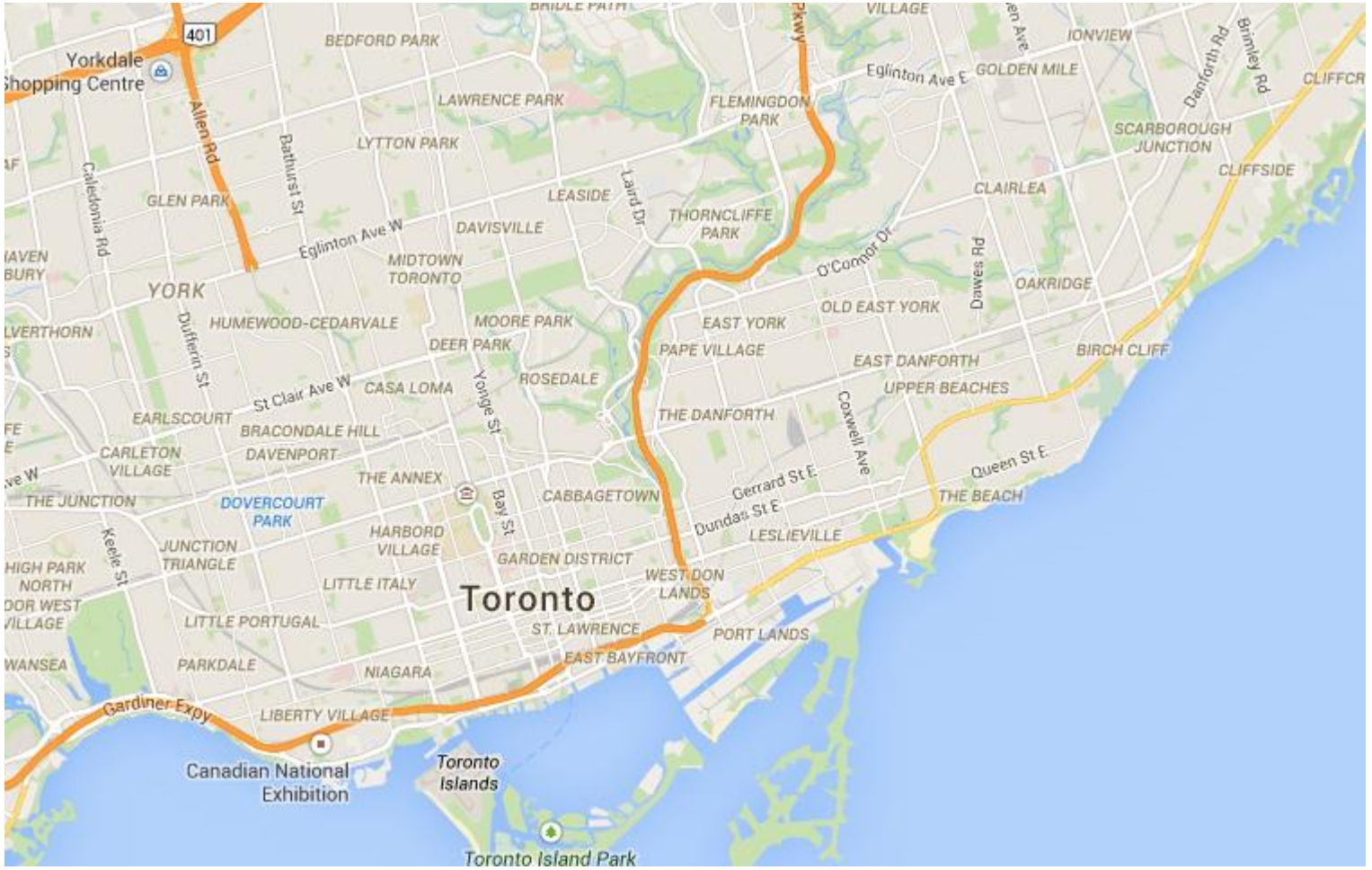
We will learn how geometric properties of quadrilaterals and circles create our community.

We will use the geographic inquiry process to investigate issues related to the interrelationship between human settlement and sustainability from a geographic perspective.

We will learn about geometric relationships involving lines and triangles, and how they create our community.

Our City of Toronto

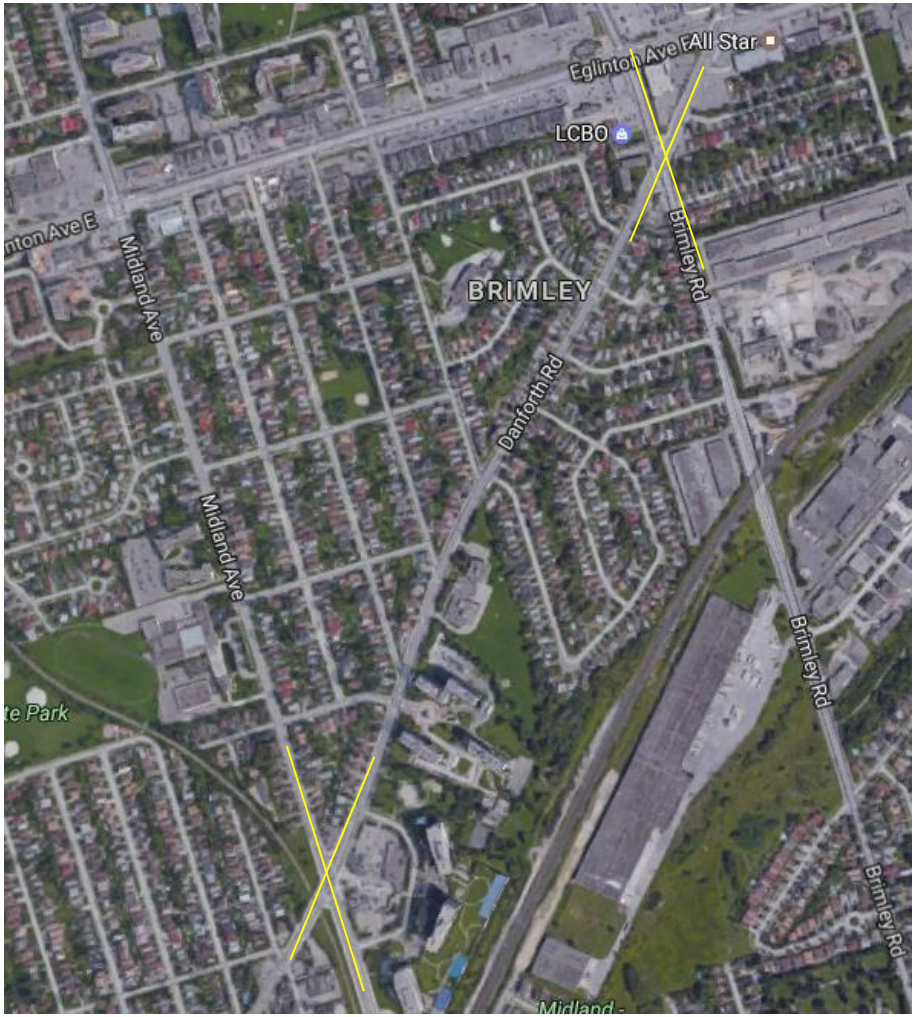
What geometric ideas do you notice about the road system in Toronto?



Accessed from: https://www.google.ca/maps/@43.6792927,-79.369975,12z (March 27th, 2015 at 9:40am)

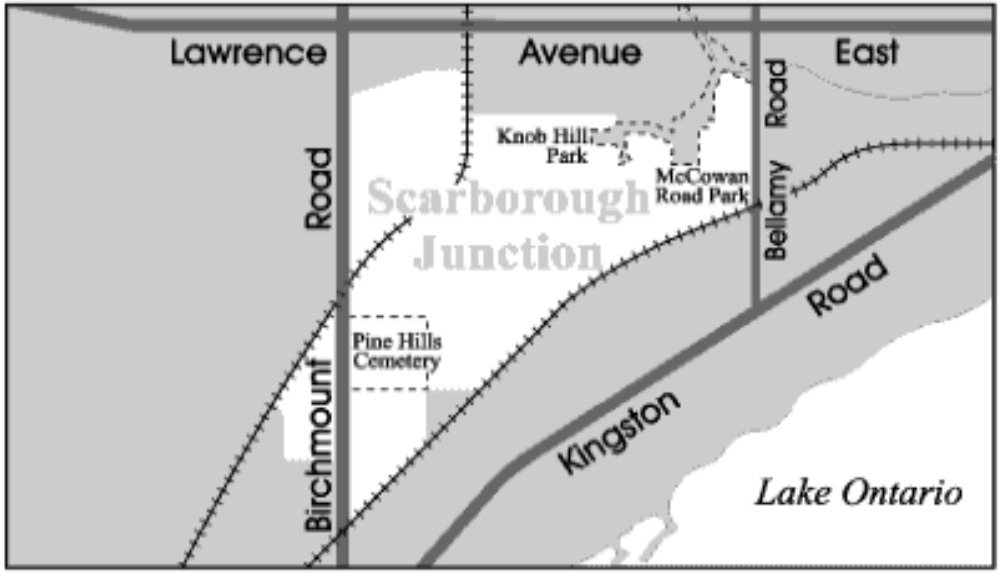
Our Community of Scarborough Junction

What geometric ideas do you notice about the intersections at Danforth and Midland and Danforth and Brimley? Why might those intersections have different properties than many in Toronto?



Accessed from: https://www.google.ca/maps/@43.7297126,-79.245243,2199m/data=!3m1!1e3
(April 24th, 2017. 2.36pm)

Welcome to Scarborough Junction



Accessed from: http://www.torontoneighbourhoods.net/neighbourhoods/scarborough/scarborough-junction (March 27th, 2015. 10:00am)

The History of our Community: “Scarborough Junction”

Scarborough Junction received its name in 1873, when a post office using this name was opened in the Bell General Store which stood on the south-west corner of Kennedy Road and St. Clair Avenue. The Junction part of this name referred to the two railways - the Grand Trunk and the Toronto-Nippising - which crossed paths at the south end of this neighbourhood.

In 1896, Scarborough Junction was the most heavily populated village in the former Township of Scarborough. It had its own school, general store, and the Bethel Methodist Church. The historic Bethel Church Cemetery is quietly tucked away off Kennedy Road, south of Eglinton Avenue.

The urbanization of Scarborough Junction took place in the late 1940's and the 1950's when farm fields were replaced with rows of war veterans' housing and cosy little bungalows. These houses sold very quickly to young families that were looking for affordable houses in what was then the outskirts of Toronto.

Accessed from: http://www.torontoneighbourhoods.net/neighbourhoods/scarborough/scarborough-junction/history (March 27, 2015. 10:00am)

Jane Jacobs- Jane's Walk

Legendary urban thinker, writer, and activist

Jane Jacobs (1916-2006) was an urbanist and activist whose writings championed a community-based approach to city building. She had no formal training as a planner, and yet her 1961 treatise, *The Death and Life of Great American Cities*, introduced ground-breaking ideas about how cities function, evolve, and fail that have become commonsense cannon for today's architects, planners, policymakers, activists, and other city builders.

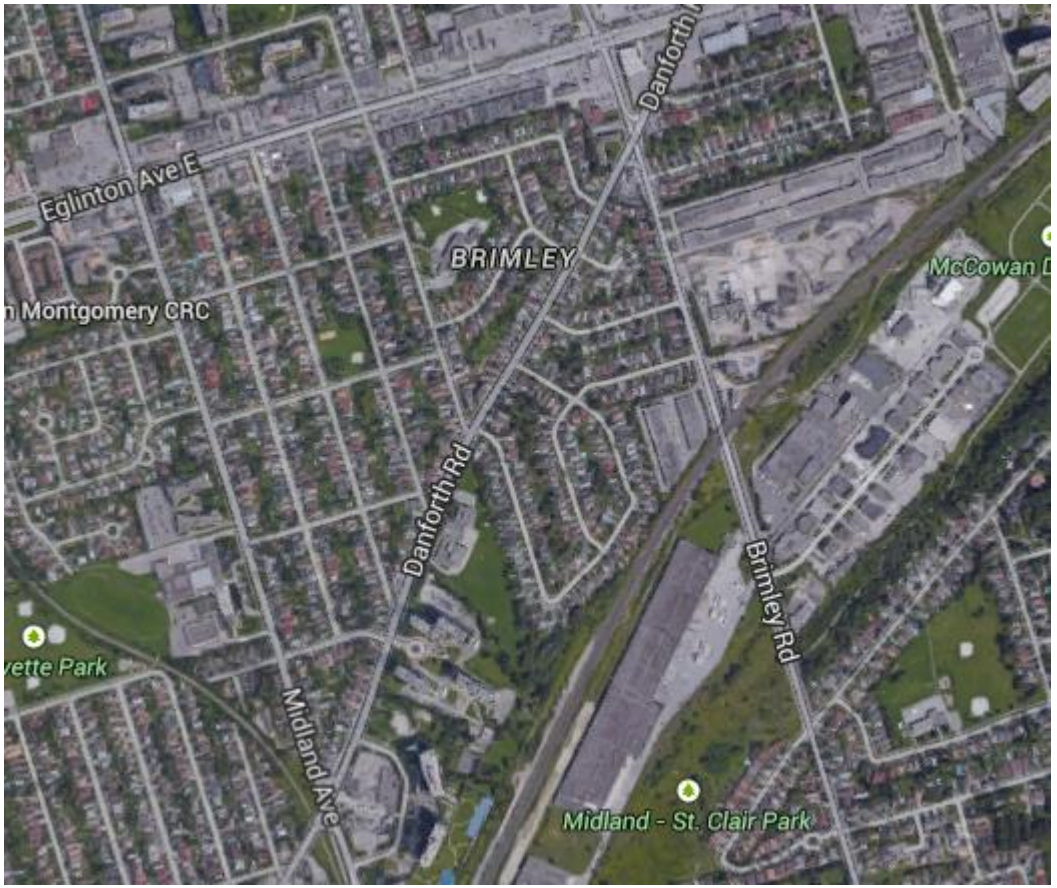
A firm believer in the importance of local residents having input on how their neighbourhoods develop, Jacobs encouraged people to familiarize themselves with the places where they live, work, and play.

Accessed from: http://janeswalk.org/about/about-jane-jacobs/ (April 16th, 2018, 11:00am)

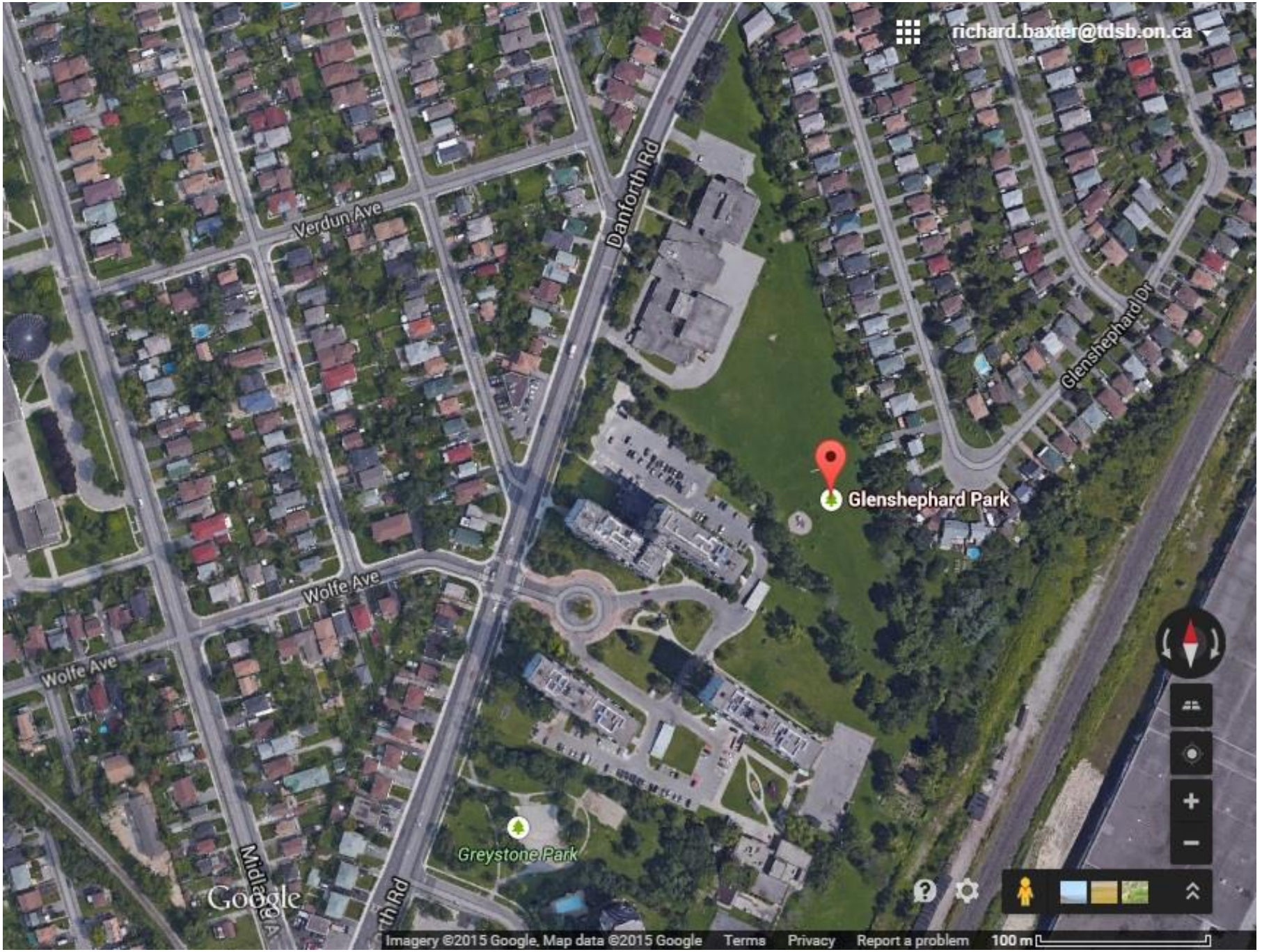
Image Accessed from: http://janeswalk.org/wp-content/uploads/2017/12/Jane_Jacobs_One_Pager_1.pdf April 16th, 2018, 11:00am)

Our Community Walk

Group #1: Midland and Danforth
Group #2: Danforth and Brimley



Accessed from Google Maps (March 26, 2015. 11:54am)

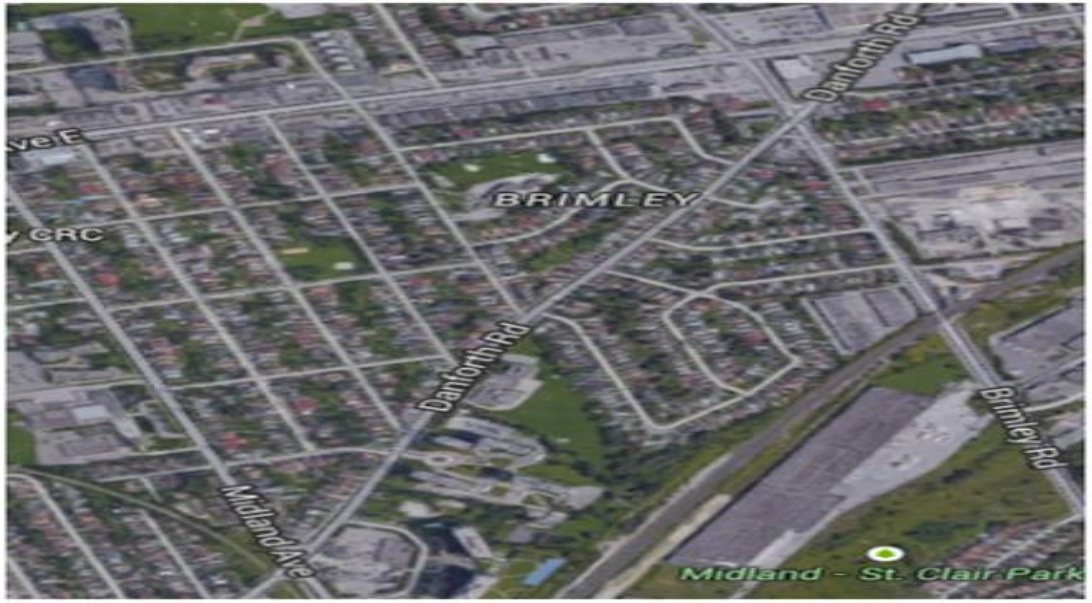

richard.baxter@tdsb.on.ca
Verdun Ave
Danforth Rd
Glenshephard Dr
Glenshephard Park
Wolfe Ave
Wolfe Ave
Greystone Park
Midland Ave
Google
Imagery ©2015 Google, Map data ©2015 Google
Terms
Privacy
Report a problem
100 m

Time for Our Community Walk!
Let's Review our Community Walk Journal

Community Walk Journal

Name(s):_____

Community Map



Accessed from: https://www.google.ca/maps/@43.7303968,-79.2571601,1952m/data=!3m1!1e3 (March 27,2015. 10:25am)

Learning Goals:

We will learn how geometric properties of quadrilaterals and circles create our community.

We will learn about geometric relationships involving lines and triangles, and how they create our community.

We will investigate issues related to the interrelationships between human settlement and sustainability from a geographic perspective.

MATH CONNECTIONS

1. What geometry ideas do you see based on the maps shown and our community walk? (E.g. What types of shapes and lines do you mostly notice?)

GEOTRICITY 3.0 OBSERVATIONS FROM OUR COMMUNITY WALK

-irregular/different polygons and angles; circles, triangles, square, trapezoids
-some of the intersections had congruent rectangle; similarity, congruency
-bisecting diagonal lines on the roads
-perpendicular way that angles meet; 90 degrees
-acute angle at Midland and Danforth
-complementary and supplementary angles
-Brimley and Danforth have acute angles
-community stays connected with circular pathways; easier to move in and out; make it difficult to enter and exit
-community has a lot of the geometric properties; math connected to our Robert Service community
-roads connect and have things built
-Eglinton and Brimley make an obtuse angle

GEOMETRIC OBSERVATIONS FROM OUR COMMUNITY WALK

** TIME TO COMPLETE COMMUNITY WALK ACTIVITY

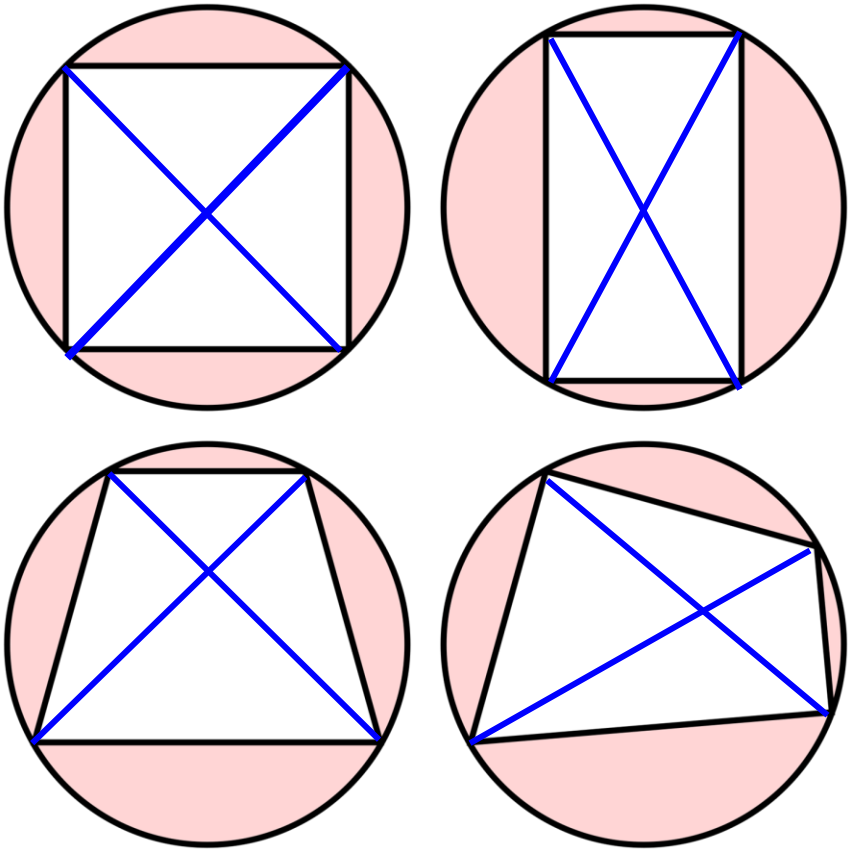
** Ideas from 2015
-acute angles by McD's
-opposite angles are equal
-adjacent angles
-transversals
-acute plus obtuse = 180 degrees-straight angle-supplementary
-perpendicular intersecting lines----90 degrees
-intersecting lines, no line segments
-railroad tracks...parallel
-bisecting lines; cutting each other in half...2 equal pieces?
-need to know length to know if it is a bisector
-Pythagorean theorem
-complementary angles
-diagonal transversals take longer to travel? a grid is easiest and quicker
-physical geography; previous roadways then as city grew, streets added

Math 3 Part Problem Solving Lesson
Part 1- Activation/ Minds On

Lesson Learning Goal: We are learning to sort quadrilaterals by geometric properties, including diagonals

Math Inquiry: How might we sort a variety of quadrilaterals by their geometric properties, (including diagonals)?

Math 3 Part Problem Solving Lesson
Part 1- Activation/ Minds On



Think Pair Square Strategy:

Think:
Which quadrilateral is unique?

Pair:
Pair up with a partner and explain your thinking.

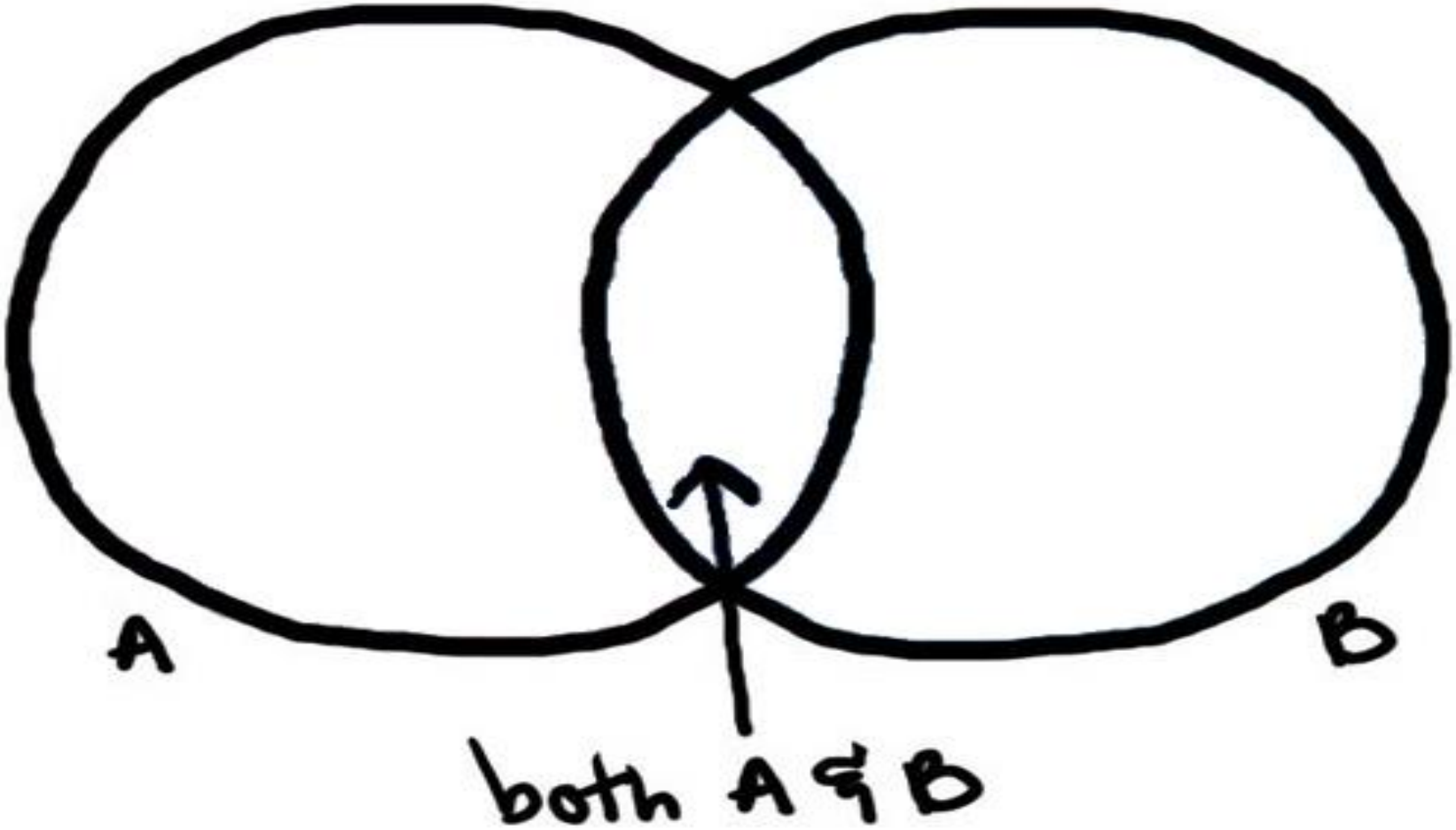
Square:
Join with another set of partners and share your ideas.

Math 3 Part Problem Solving Lesson
Part 2- During/ Working on It

Math Inquiry: How might we sort a variety of quadrilaterals by their geometric properties, (including diagonals)?

- Sort and organize the quadrilaterals with a partner/small group
- Show your thinking on one of the organizers
- Be prepared to share your thinking to build our collective math knowledge

SAMPLE VENN DIAGRAM



SORTING AND CLASSIFYING

ACTIVATION FOR OUR VENN DIAGRAM…
FIRST-

- PICK A PROPERTY OF QUADRILATERALS
- ORGANIZE A TABLE AND SORT QUADRILATERALS INTO THE TWO GROUPS

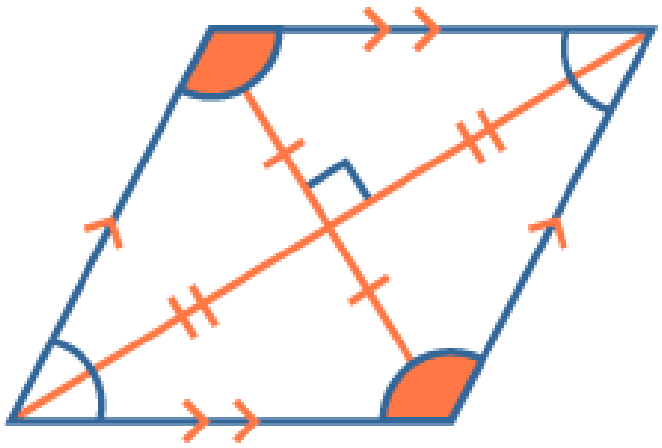
PROPERTY 1	PROPERTY 1 AND 2 (Complete Last)	PROPERTY 2

THEN-

- ARE THERE ANY PROPERTIES THAT OVERLAP BETWEEN THE TWO PROPERTIES?
- IF NOT, RESORT
- ARE THERE POLYGONS IN ALL AREAS?
- ARE THERE SOME POLYGONS THAT DO NOT BELONG IN THE VENN DIAGRAM?

Annotating Mathematical Thinking

Rhombus



Diagonally opposite angles are equal. All of its sides are of equal length. Opposite sides are parallel. Diagonals bisect each other at 90°. It has 2 lines of symmetry. Order of rotational symmetry: 2.

Accessed from: http://www.bbc.co.uk/schools/gcsebitesize/maths/geometry/polygonsrev2.shtml (May 8th @10pm)

Math 3 Part Problem Solving Lesson
Part 3- Consolidating

3A Student Sharing- Gallery Walk
3B Highlights/Summary
3C Individual Practice (back in classrooms)

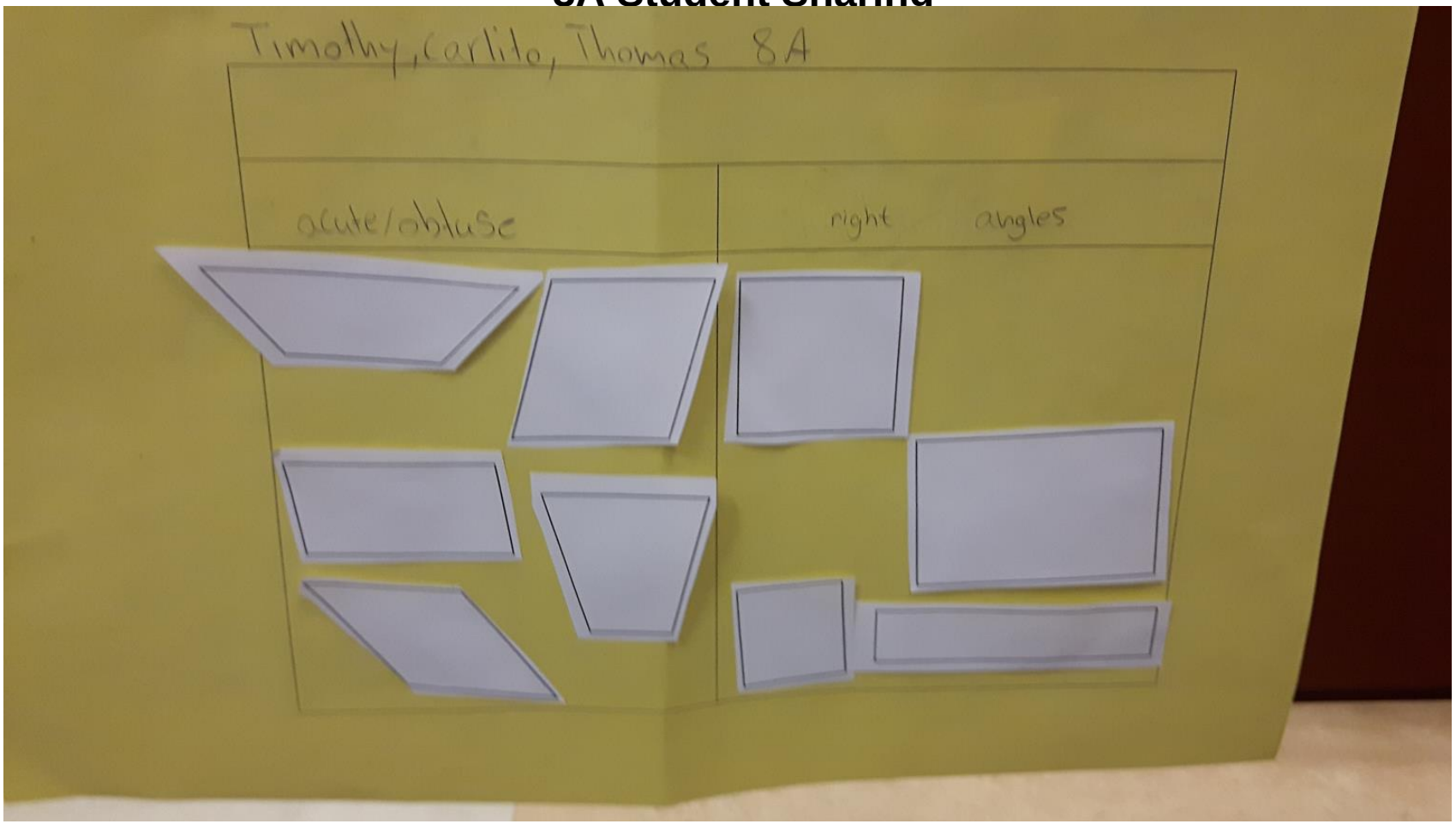
Gallery Walk Framing Questions:

- Compare and contrast the organizing structures.
- What properties did groups use the most to sort the quadrilaterals?
- What does sorting and classifying quadrilaterals allow us to do as mathematicians?

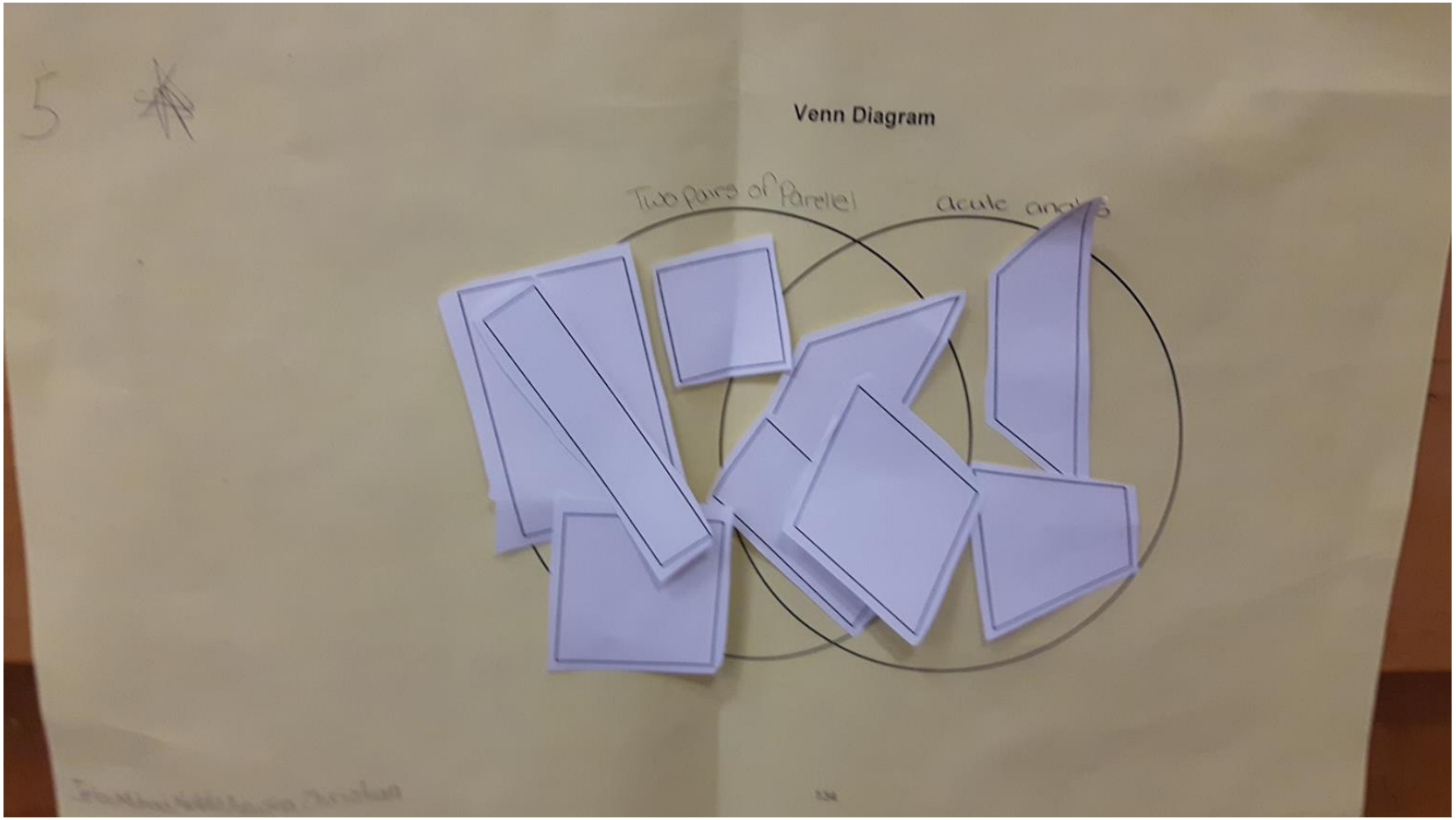
Math 3 Part Problem Solving Lesson

Part 3- Consolidating

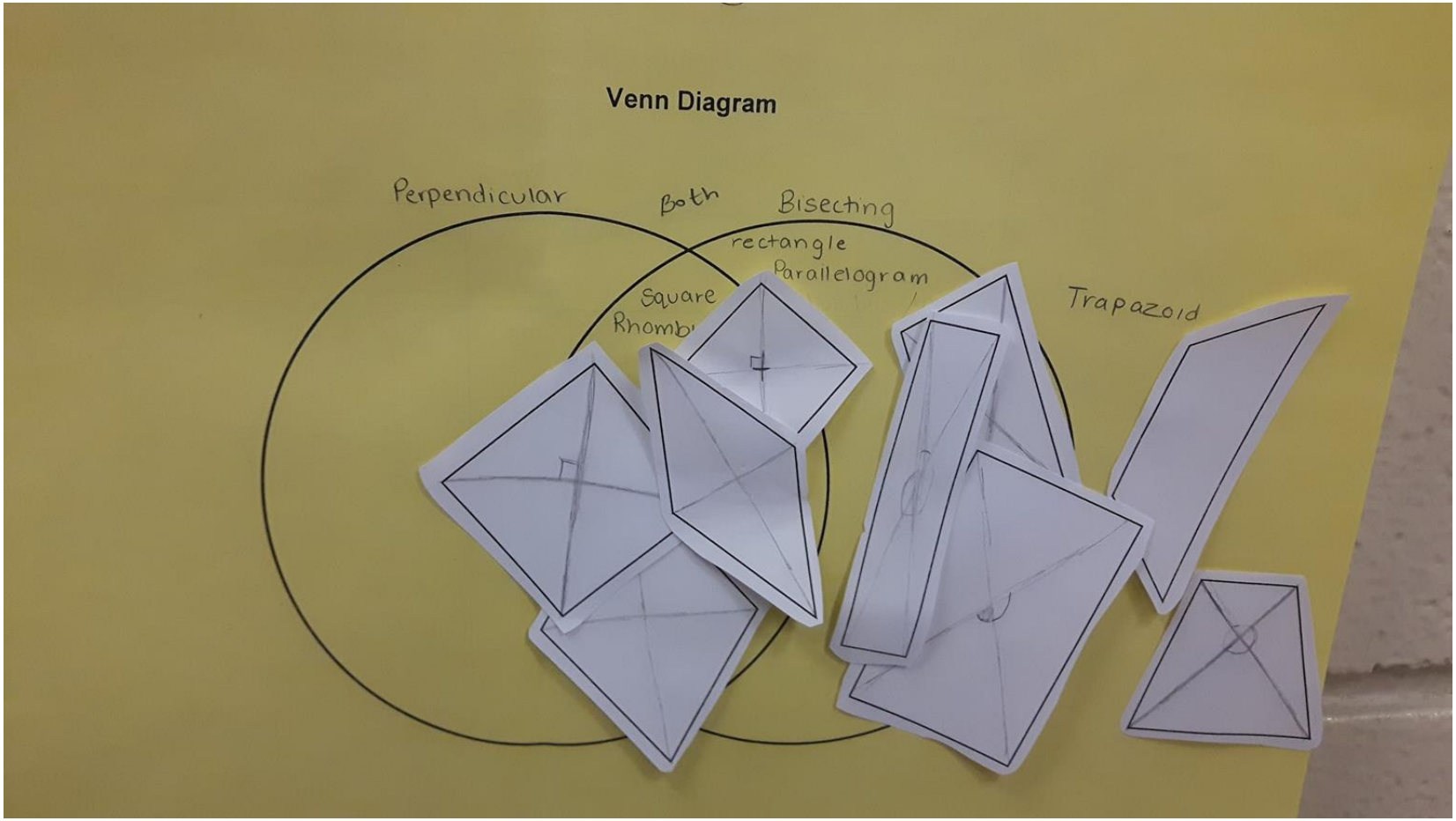
3A Student Sharing



Math 3 Part Problem Solving Lesson
Part 3- Consolidating
3A Student Sharing



Math 3 Part Problem Solving Lesson
Part 3- Consolidating
3A Student Sharing



Highlights and Summary of our Mathematical Thinking

Geometric shapes can be described quantitatively (quadrilateral)

Geometric shapes can be described qualitatively (perpendicular)

Some geometric properties are:

- angles
- number of sides and side length
- vertices and their angles
- diagonals (perpendicular and/or bisecting)
- parallel lines
- line of symmetry

Highlights and Summary Part 2

Question 1 on geometry

-Eiman and Ella described the map as having grids. This is great to notice from the north west area of the schoo-

- interesting to note what happens south. The lake to the south and then the railway tracks adds different geometric shapes and lines. Hence the triangles in our school yard.

Question 2 on Robert Service's **property.** M

-rectangular prism- think they were referring to the school building.

-Danforth is one side, the tree line by the building is another and then the third line where trees are as another.

-Kyle and Anghya noticed the triangle. C

-Chris and Mridul said it was a triangle with a right angle

-hypotenuse and Pythagorean theorem? t

-obtuse triangle which I can understand

Highlights and Summary of our Mathematical Thinking

** needs to be co-created with students depending on their learning
** this is the learning from 2015

SHAPES/POLYGONS ARE CLOSED FIGURE WITH 3 OR MORE SIDES

FOR A POLYGON TO HAVE DIAGONALS THEY NEED TO HAVE 4 OR MORE SIDES

DIAGONALS ARE LINE SEGMENTS THAT JOIN TWO VERTICES THAT AREN'T CONNECTED TO ONE ANOTHER

VENN DIAGRAM: SAME AND DIFFERENT- GEOMETRIC PROPERTIES
FEATURE AND SOMETHING THAT STAYS THE SAME FOR THAT POLYGON OR SHAPE

DAY 2 OVERVIEW

- welcome
- review agenda
- introduction of task/timeline
- visit the outdoor spaces

Lunch

- meet in cafe to go over afternoon activity and success criteria/voting criteria
- rotate through spaces to access materials/manipulatives

Tuesday, May 15th Timeline

8:45-9:00

- **Entry and attendance by class in cafeteria**

9:00-9:15

- **Agenda**

9:15-9:45

- **Introduction to Culminating Task and Success Criteria**

9:45-10:15

- **Rotations to view the outdoor spaces/environmental scan and Eco-Schools (School Ground Greening)**

10:15-11:25

- **Team selections**

12:45-1:15

- **Attendance and review agenda**
- **Introduce first activity**

1:15-2:55

- **Apply STEM skills**

2:55-3:03

- **Highlights/Summary of our learning, Review and clean-up**

Environmental Scan

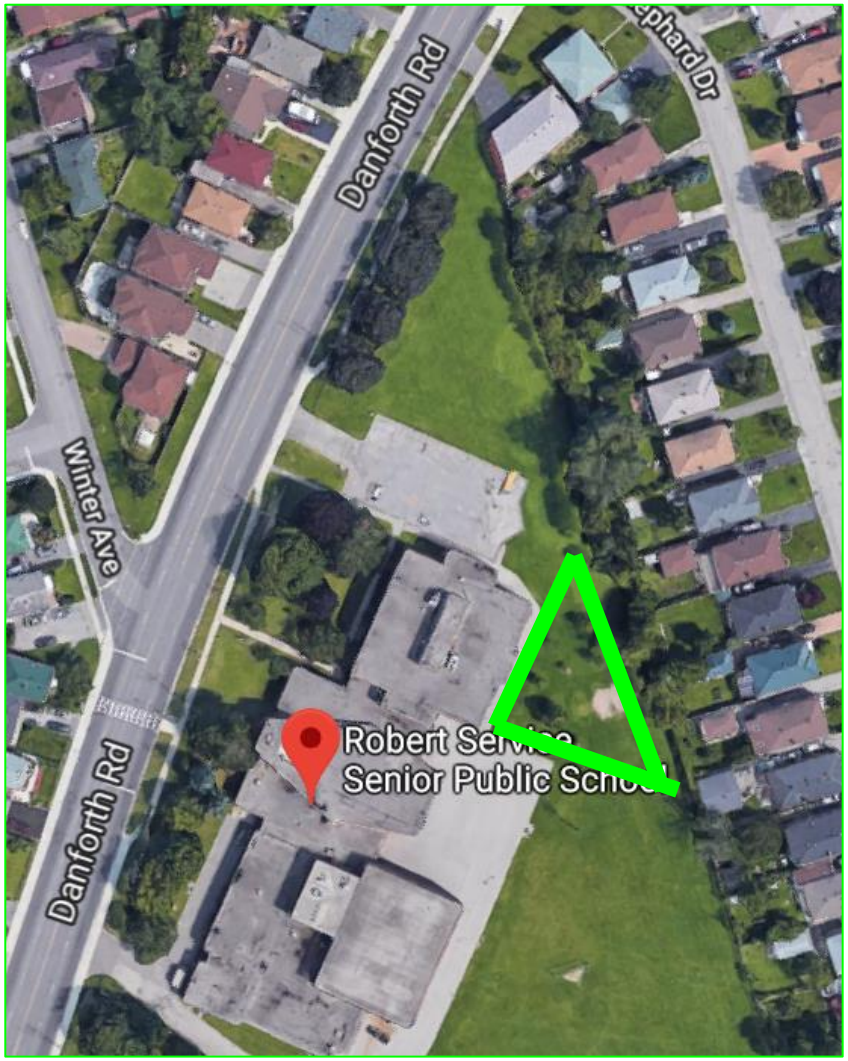
Considering your goals:

What factors need to be considered when trying to find a balance between accommodating the needs of the school population and practising sustainable development?

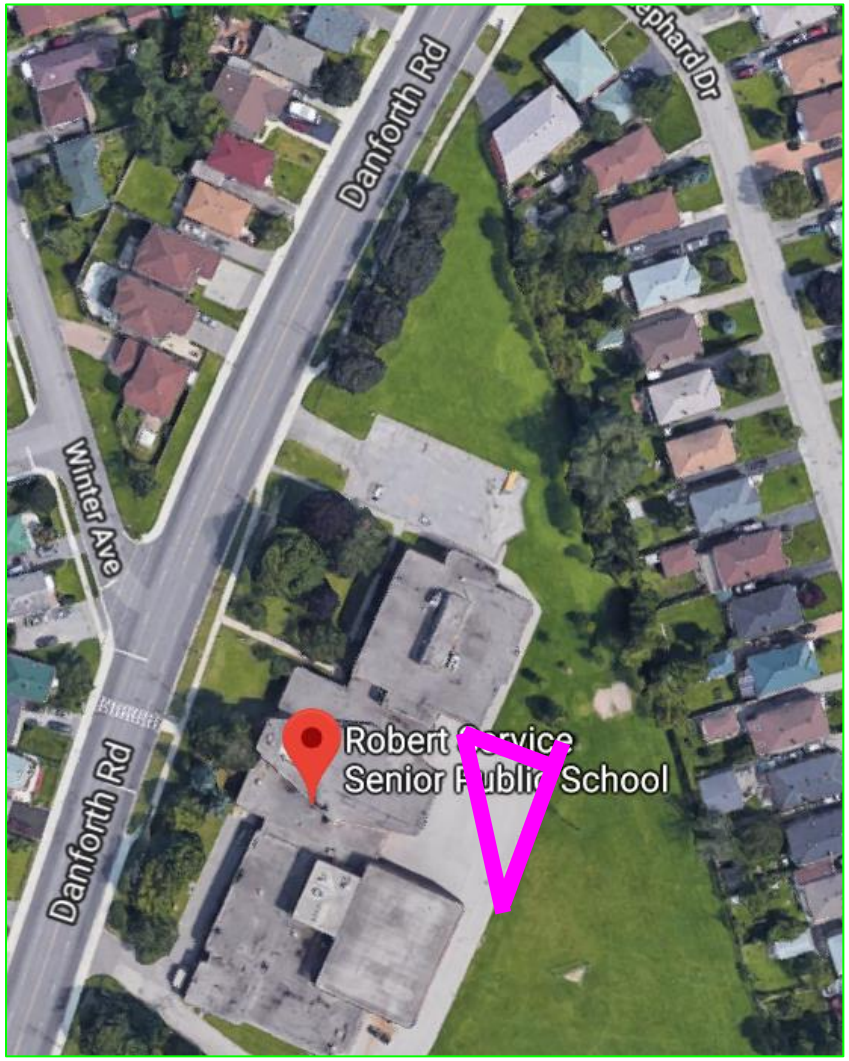
Why is it essential to consider all accurate measurements of the physical space and the items that you plan to integrate?

How is the space currently being used in our school? What is working well in this space, what are the challenges?

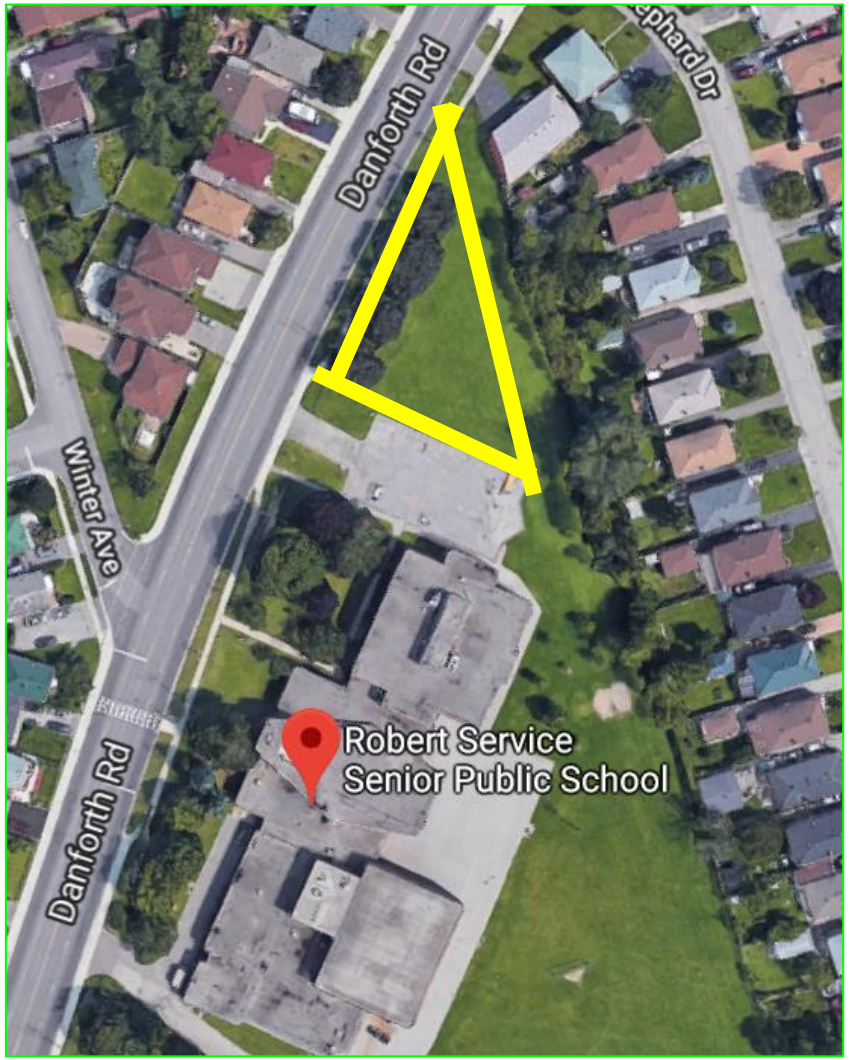
TRIANGULAR OUTDOOR SPACE #1



TRIANGULAR OUTDOOR SPACE #2



TRIANGULAR OUTDOOR SPACE #3



Highlights and Summary based on Mathematical Learning

DAY 3 OVERVIEW

- welcome
- review agenda
- 3 rotations
  - STEM building material (safety and strategies)-lab
  - Google Sketch-up (in library)
  - Scale drawing
- review

QUESTIONS?

Wednesday, May 16th AM Timeline

8:45-9:00

- entry and attendance by class in cafeteria

9:00-9:15

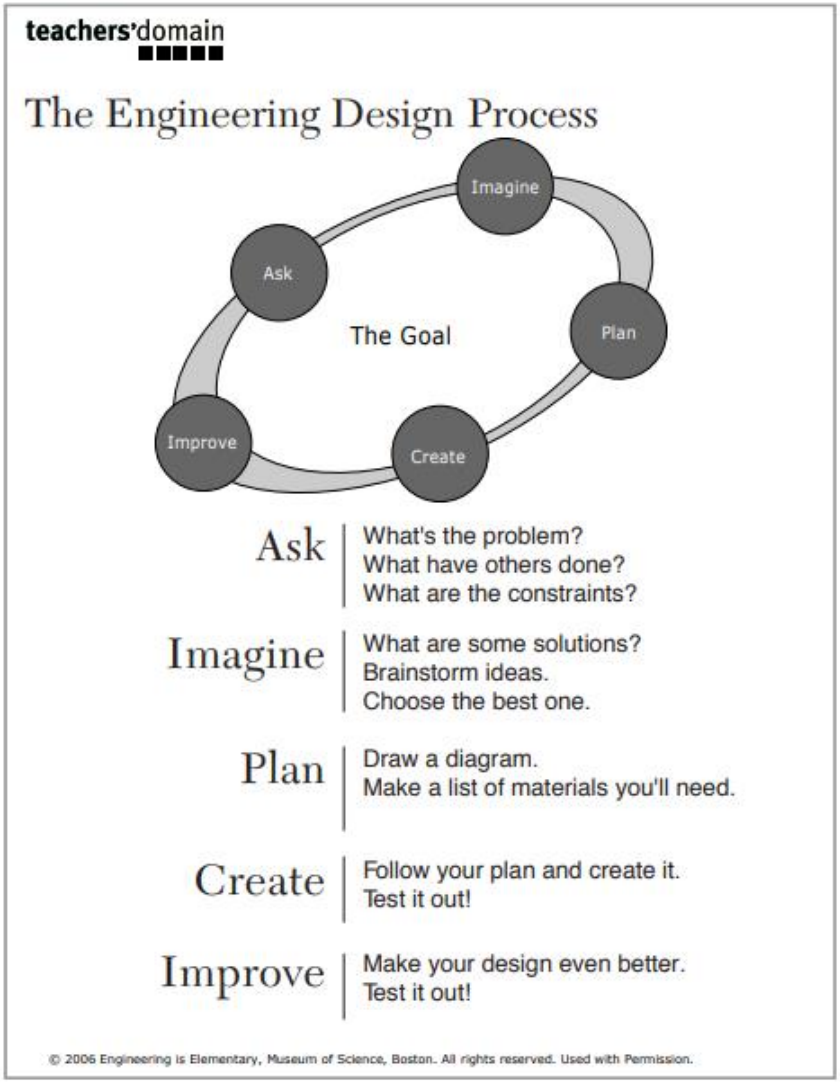
- Agenda

9:15-9:45

- Review of timelines/success criteria

9:45-11:25

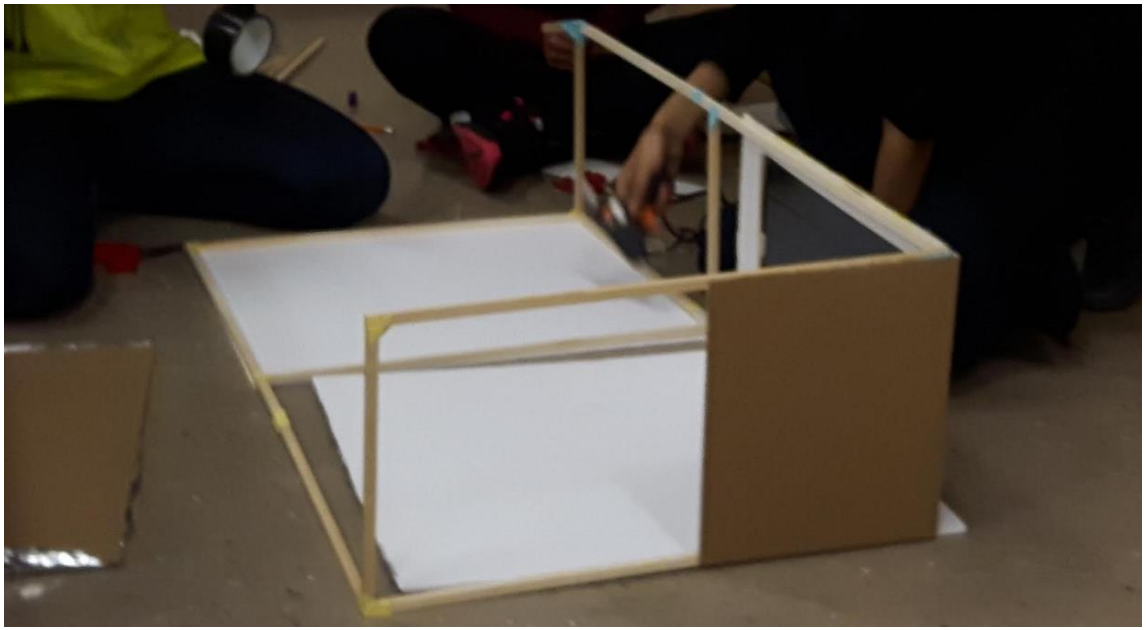
- 3 rotations - 25 minutes each
  - STEM building material (safety and strategies)-lab
  - Google Sketch-up (in library)
  - Scale drawing



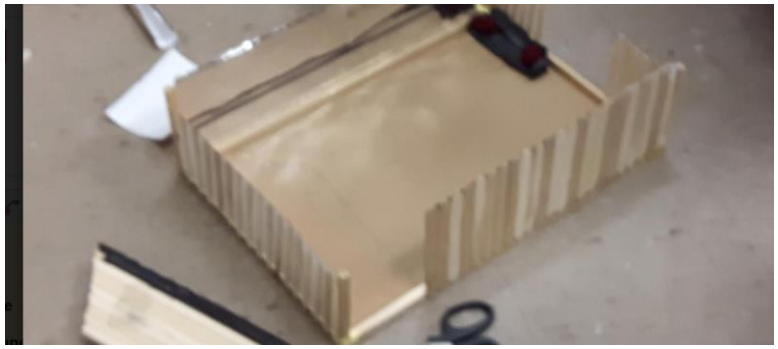
Design and Engineering Process

Mathematics: Scale

Proportional Relationships By the end of Grade 8, students will:
– identify and describe real-life situations involving two quantities that are directly proportional

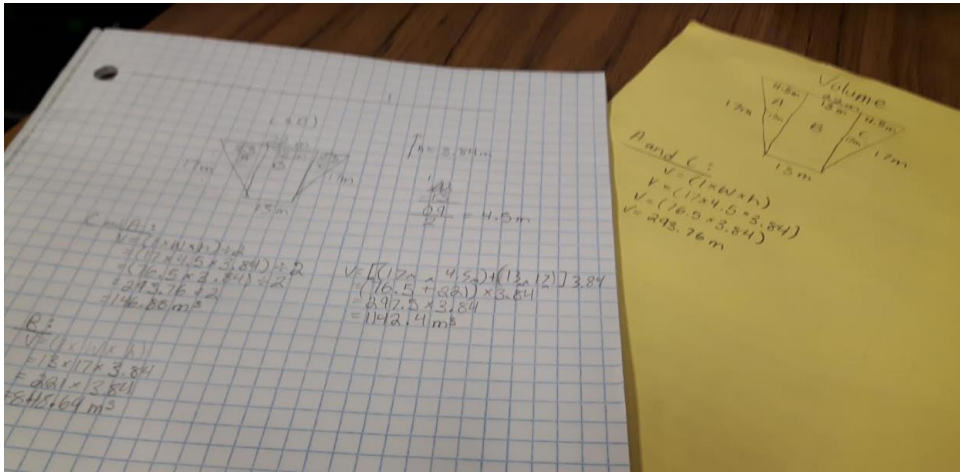


Mathematics: Scale



Mathematics: Geometry/Measurement

Attributes, Units, and Measurement Sense By the end of Grade 8, students will:
– research, describe, and report on applications of volume and capacity measurement

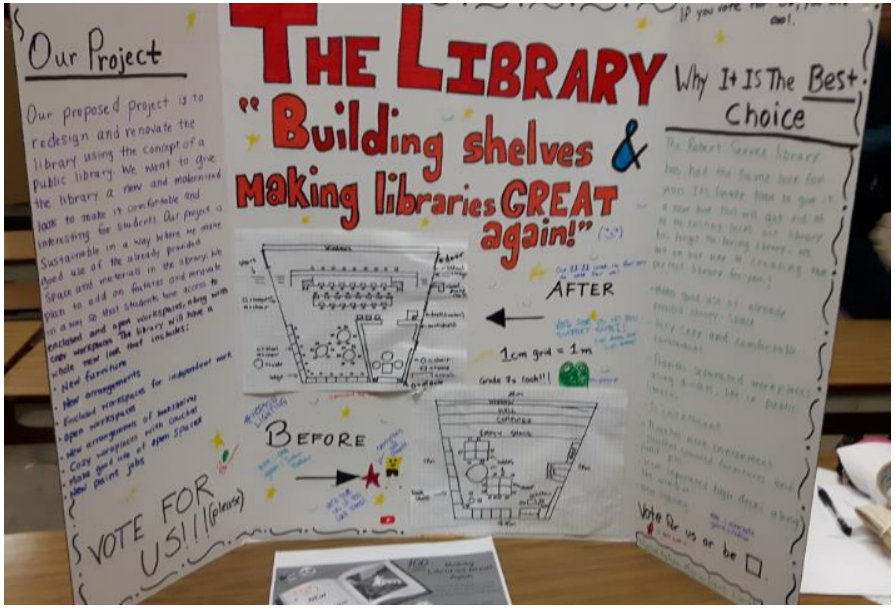


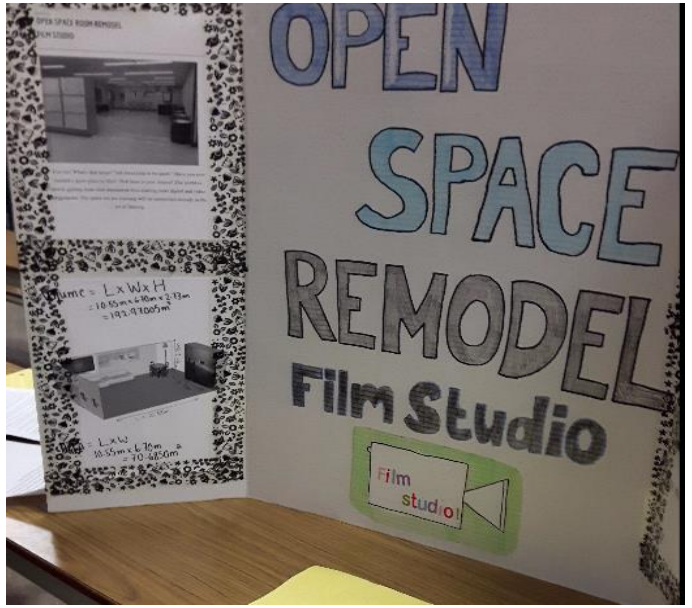
Geography

Grade 8: GLOBAL SETTLEMENT: PATTERNS AND SUSTAINABILITY

A2: Students will use the geographic inquiry process to investigate issues related to the interrelationship between human settlement and sustainability from a geographic perspective.

-looking at the map of the history of this area and how it was changed/used
-comparing the original map to now and noting how it has changed
-investigating how it has changed and why
-letting that guide the development of a new piece of land that fits within the environment/community, is sustainable.





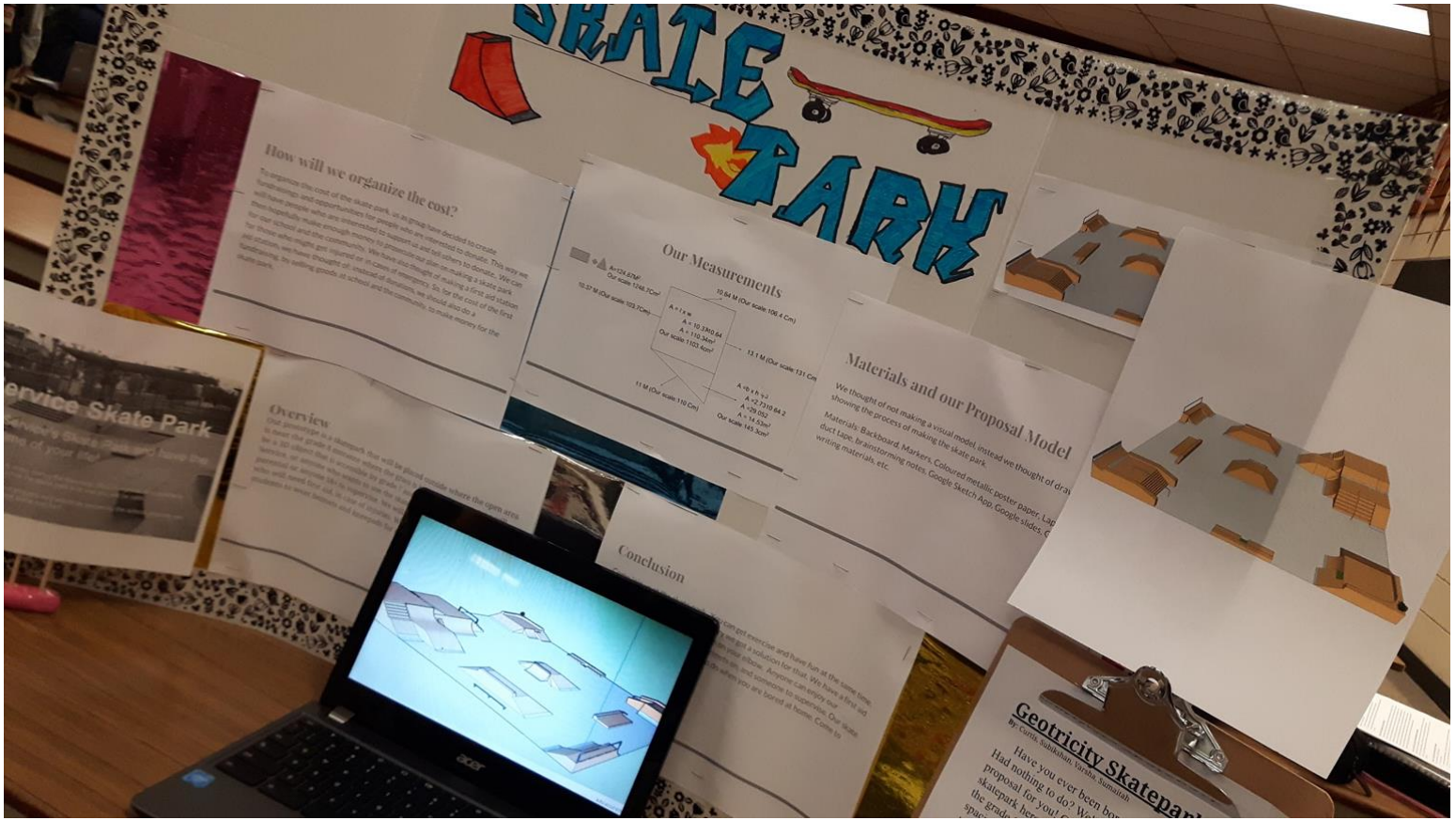
Geography

Grade 8: UNDERSTANDING STRUCTURES AND MECHANISMS: Systems in Action

1. Students will assess the personal, social, and/or environmental impacts of a system, and evaluate improvements to a system and/or alternative ways of meeting the same needs.

Media Literacy

Students will create a media text of some technical complexity for a specific purpose and audience, using appropriate forms, conventions, and techniques.
Grade 8 examples: an advertising video, a website, multimedia presentation, PSA



Learning Skills and 21st Century Competencies

Learning Skills and Work Habits	Sample Behaviours
Responsibility	The student: • fulfils responsibilities and commitments within the learning environment; • completes and submits class work, homework, and assignments according to agreed-upon timelines; • takes responsibility for and manages own behaviour.
Organization	The student: • devises and follows a plan and process for completing work and tasks; • establishes priorities and manages time to complete tasks and achieve goals; • identifies, gathers, evaluates, and uses information, technology, and resources to complete tasks.
Independent Work	The student: • independently monitors, assesses, and revises plans to complete tasks and meet goals; • uses class time appropriately to complete tasks; • follows instructions with minimal supervision.
Collaboration	The student: • accepts various roles and an equitable share of work in a group; • responds positively to the ideas, opinions, values, and traditions of others; • builds healthy peer-to-peer relationships through personal and media-assisted interactions; • works with others to resolve conflicts and build consensus to achieve group goals; • shares information, resources, and expertise and promotes critical thinking to solve problems and make decisions.
Initiative	The student: • looks for and acts on new ideas and opportunities for learning; • demonstrates the capacity for innovation and a willingness to take risks; • demonstrates curiosity and interest in learning; • approaches new tasks with a positive attitude; • recognizes and advocates appropriately for the rights of self and others.
Self-regulation	The student: • sets own individual goals and monitors progress towards achieving them; • seeks clarification or assistance when needed; • assesses and reflects critically on own strengths, needs, and interests; • identifies learning opportunities, choices, and strategies to meet personal needs and achieve goals; • perseveres and makes an effort when responding to challenges.

Character

Citizenship

Communication

Critical Thinking

Collaboration

Creativity

Highlights and Summary based on Learning

DAY 4 OVERVIEW

- welcome
- review agenda
- continue with building and creating media ad

Lunch

- meet in cafe to go over afternoon activity and success criteria/voting criteria
- rotate through spaces to access materials/manipulatives

Thursday, May 17th Timeline

8:45-9:00

- **Entry and attendance by class in cafeteria**

9:00-9:15

- **Agenda**

9:15-9:45

- **Review Culminating Task and Success Criteria**

9:45-11:25

- **Group work: building, collaborating, creating media**

LUNCH

12:45-1:15

- **Attendance and review agenda**

1:15-2:55

- **Group work: building, collaborating, creating media**

2:55-3:03

- **Review and clean-up**

DAY 5 OVERVIEW

- welcome
- review agenda
- review/last minute prep
- gallery walk with judges and grade 7s
- voting
- announce winners

QUESTIONS?

Friday, May 18th AM Timeline

8:45-9:00

- **Entry and attendance by class in cafeteria**

9:00-9:15

- **Agenda**

9:15-9:45

- **Review of timelines/success criteria**

9:45-11:10

- **Culminating task: Displays and media ad**

11:10-11:25

- **Thank you's and clean up**

THANK YOUs

- Grade 8 students of Robert Service
- Ms. Murray
- The Geotricity Team: Ms. Timbury, Ms. Schoenfeld, Ms. Kuma, Mr. Chan, Ms. Moll
- All staff

Have a safe walk home Robert Service;)