When the Stars Came Home
Additional Resources

Travelling the World

Level	K – 8, see specific activities for each grade level
Student Groupings	individual or small groups
Length	30 – 60 minutes

Brief Description: In the book Ojiig moved with his family to a new city. In this activity students will investigate and discuss the math behind travelling between various locations and the different forms of travel involved.

Materials: Whiteboard/writing surface, computer

Preamble: When our book starts, we find Ojiig heading to a new city. His family drives there by car. In this activity, we are going to think about times when you travelled away from home, whether for a vacation or to move and how you got there. We'll be comparing different distances you can travel and ways to get there.

Preparation: Students should have read the book and been asked to think in advance about a trip they've taken or a place they've moved.

Procedure:

Grades K - 2: ask each student in the class to describe a vacation they took or a time they moved somewhere new, or even a place they like to go (it can be local or far away). They should describe how they got there or would get there and how long it took/would take. The teacher can write the information in a table on the board with the following headings: location, mode, and time. Once all students have shared a story, they can discuss different modes of travel and compare distances they and their classmates have gone.

Prompting Questions:

- Who do you think went the furthest? Why?
- What is the difference between different modes of travel? Which ones go the fastest?
- If a mode of transport goes faster than another one, what can we guess about the distance travelled? What about the time it takes to get there? (ex: a plane vs a car vs a bike vs walking)
- Are there some places you can only get to via certain forms of transportation (ex: Europe by plane or boat - you couldn't drive there; or the middle of a forest by walking or bike or ATV)

Additional Activities:

- Students can look up places they'd like to go and find out how far away they are and decide what form of transportation would be best to get there and how long it might take. (Google Maps can help with this)
- As a class you can enter different destinations in Google Maps and look at the different options to travel there.

Grades 3 - 5: same as K - 2 activity but add recording the distance into the chart (Google Maps can help find this information). Students can then compare distance travelled with time and mode of transportation. They can compare walking to a location with biking or driving. Students can also investigate public transit options where available.
Group Investigation: have the students break up into small groups and choose a place they would like to travel to. They will then use Google Maps to plan their route and their modes of transportation. Encourage students to be creative (ex: camping in Algonquin park would require driving and then walking). Students will then describe to the class where they went, how far they went, and how long it took.

Grades 6 - 8: students will describe a place they have travelled to or would like to travel to and create a chart including location, mode of travel, distance travelled and time. As a class, discuss the different locations and how different modes of travel will take different amounts of time depending on the speed travelled.

In small groups have students choose a location they would like to travel to and break the route into various sections, describing the mode of transportation through each section, the speed they travel in each section, and then compare how different speeds affect the time of travel (ex: if I was going between two cities and travelled for 1 hour on the highway at 110km/hr and then for 1 hour in the new city at 40km/hr what distance did I cover on the highway vs in the town? Why is there a difference in the distance travelled if the time is the same? What about if I took a bike in the new city for an hour at 15km/hr?

Extension Activities:

- Have students calculate the exact distance travelled based on various travel times at specific speeds, or calculate time to go between locations given different speeds and distances.
- Have students plot a route to unique locations (ex: middle of a forest, a special event in the middle of a big city, a trip to Europe with multiple stops) and use multiple forms of transportation (including public transit where available)
- Have students plot a 'secret route' to a location and give it to another student to follow the route to see where they end up (ex: travel for 20 minutes east on this road at 40km/hr, then turn north and travel for another 15 minutes at 50 km/hr, etc…)

Indigenous Connections:

- Look up various reserves in Northern Ontario and Northern Quebec and see how to travel to them.
    - Fort Severn is a good choice. Typing it into Google Maps will show where it is located. Clicking on Directions will tell you that it can't be calculated. You can discuss with the students why this might be. Fort Severn is only accessible via non-traditional routes including unpaved roads, boats, and, in the winter, ice roads. You can discuss with students the issues being in this location might cause (like getting supplies there - meaning things cost more) and emergency care is harder to get. In the winter, if the ice roads don't freeze, there is no access in or out of the reserve. What issues could this cause?

Student Handout (Grades K -2)

Introduction: In the book we're reading, Ojiig moves with his family to a new city. They travel there by car. Today, we're going to think about our own travels and explore the math behind getting from one place to another!

Part 1: My Travel Story

- Think about a time you traveled away from home. It could be for a vacation, to move, or even just a place you like to visit. Where did you go?

  _____

- How did you get there? (Car, plane, train, bus, bike, walking, etc.)

  _____

- How long did it take to get there?

  _____

Part 2: Class Travel Stories

- Who do you think went the furthest? Why?

  _____

- What is the difference between different modes of travel? Which ones go the fastest?

  _____

- If a mode of transport goes faster than another one, what can we guess about the distance travelled? What about the time it takes to get there? (Example: a plane vs a car vs a bike vs walking)

  _____

- Are there some places you can only get to via certain forms of transportation? (Example: Europe by plane or boat; the middle of a forest by walking or bike or ATV)?

  _____

Student Handout (Grades 3 - 5)

Introduction: In the book we're reading, Ojiig moves with his family to a new city. They travel there by car. Today, we're going to think about our own travels and explore the math behind getting from one place to another!

Part 1: My Travel Story

- Think about a time you traveled away from home. It could be for a vacation, to move, or even just a place you like to visit. Where did you go?

  _____

- How did you get there? (Car, plane, train, bus, bike, walking, etc.)

  _____

- How long did it take to get there?

  _____

- Using Google Maps, find out how far away your travel destination is

  _____

- Using Google Maps compare different modes of transit to get to the destination and compare travel times and distances

  _____

- Are there any public transit options available to get to your destination?

  _____

Part 2: Class Travel Stories

- Who went the furthest?

  _____

- What is the difference between different modes of travel? Which ones go the fastest?

  _____

- If a mode of transport goes faster than another one, what can we guess about the distance travelled? What about the time it takes to get there? (Example: a plane vs a car vs a bike vs walking)

  _____

- Are there some places you can only get to via certain forms of transportation? (Example: Europe by plane or boat; the middle of a forest by walking or bike or ATV)

  _____

Part 3: Group Investigation

- In small groups, choose a place you would like to travel to.
- Use Google Maps to plan your route and your modes of transportation. (Be creative!)
- Describe to the class:
  - Where you want to go?

    _____

  - How far away is it?

    _____

  - What modes of travel would you use to get there?

    _____

  - How long would it take to get there?.

    _____

Student Handout (Grades 6 - 8)

Introduction: In the book we're reading, Ojiig moves with his family to a new city. They travel there by car. Today, we're going to think about our own travels and explore the math behind getting from one place to another!

Part 1: My Travel Story

- Think about a time you traveled away from home. It could be for a vacation, to move, or even just a place you like to visit. Where did you go?

  _____

- How did you get there? (Car, plane, train, bus, bike, walking, etc.)

  _____

- How long did it take to get there?

  _____

- Using Google Maps, find out how far away your travel destination is

  _____

- Using Google Maps compare different modes of transit to get to the destination and compare travel times and distances

  _____

- Are there any public transit options available to get to your destination?

  _____

Part 2: Class Travel Stories

- In small groups, choose a location and break the route into sections.
- For each section, describe:
  - Mode of transportation.
  - Speed traveled.
- Compare how different speeds affect travel time. (Example: 1 hour at 110km/hr vs. 1 hour at 40km/hr)

Share your destination with the rest of the class and discuss:

- Who went the furthest?

  _____

- What is the difference between different modes of travel? Which ones go the fastest?

  _____

- If a mode of transport goes faster than another one, what can we guess about the distance travelled? What about the time it takes to get there? (Example: a plane vs a car vs a bike vs walking)

  _____

- Are there some places you can only get to via certain forms of transportation? (Example: Europe by plane or boat; the middle of a forest by walking or bike or ATV)

  _____

Part 3: Group Investigation

- In small groups, choose a place you would like to travel to.
- Use Google Maps to plan your route and your modes of transportation. (Be creative!)
- Describe to the class:
  - Where you want to go

    _____

  - How far away is it?

    _____

  - What modes of travel would you use to get there?

    _____

  - How long would it take to get there?.

    _____

When the Stars Came Home
Additional Resources

Buckets of Blueberries

Level	K – 8, see specific activities for each grade level
Number of Students	individual or small groups
Length	30 – 60 minutes

Brief Description: One of the things Ojiig noticed when moving to the city was the fact that his family now bought blueberries and marvelled at the size of them. This activity will look at the differences between wild grown blueberries and mass produced/farmed blueberries and investigate them mathematically.

Materials: two boxes per student/group; two differently sized round objects (the smaller represents wild blueberries, the larger, cultivated); whiteboard/writing surface

Preamble: When Ojiig moves to the city he says "His family no longer picked blueberries; they bought those too— some as big as coins—frozen in a bag." There is actually a big difference between the size of wild picked blueberries and farmed blueberries. In this activity students will compare these differences and discuss some of the potential reasons behind these differences.

Background Information: Farmed or cultivated blueberries are often larger than wild blueberries due to how they are farmed. Often the berries are specifically bred over years to produce larger and larger berries. Pesticides and fertilizers are also often used to encourage growth and prevent disease and being eaten by bugs. Crops are also often closely monitored in terms of temperature, humidity, and other growing conditions to maximize size. They will also tend to have a very consistent taste due to the strictly controlled growing conditions (including soil composition).

Wild blueberries on the other hand are not kept in controlled environments and are subject to weather changes and things like insects and animals. In a good year the berries might grow quite large, in a poor year they might be very small. Their taste will also vary depending on the soil they were grown in, what types of animals live in the area (as animal droppings are a good source of natural fertilizer), and what is going on in nearby environments (forest fires can cause ash to travel long distances or be dropped by rain clouds and can change the soil consistency and make-up.

Some people prefer the taste of wild blueberries over farmed, and some people like the consistency of farmed; it's often a matter of personal choice and preference.

Preparation: set up two same-sized baskets for each student or student group; one basket will be filled with small rocks/pebbles/marbles (or other round objects), the other will be filled with larger round objects. There should be a noticeable difference in size between the round objects used to fill each basket. (Note: you can also use real blueberries to do this activity if you like)

Procedure:

Grades K-2: provide each student or group of students with a basket and ask them to guess how many blueberries they think are in each basket? Ask them to take a "berry" out of each basket and compare them.

Prompting Questions:

- Which one is bigger or smaller?
- Which one takes up more space?
- Which basket do you think has more berries in it? Why?

Next, have them count the berries in each basket.

Prompting Questions:

- Which basket had more in it?
- Which basket do you think is wild blueberries (the kind Ojiig and his family would have picked) and which are the cultivated or farmed (the ones he'd buy frozen)? Why?

Grades 3 - 5: same initial idea (you can use significantly more berries in each basket for this age group), you can also use smaller, more blueberry sized items (or blueberries themselves)..

Additional Prompting Questions:

- What effect have things like pesticides and industrial farming practices had on the size of things like berries? Could this explain why one is bigger than the other?

Grades 6 - 8: same as grade 3-5 but have students calculate the volume of the basket and the volume of the different types of blueberries and then discuss why more of the smaller berries fit into the basket using mathematical language. You can also have them calculate the surface area of the two types of berries and compare them.

Additional Prompting Questions:

- How do volume and surface area relate to one another (use the berries and the baskets to explain your answers)?
- What effect have things like pesticides and selective growing practices (including Genetic Modifications) had on the size of things like berries? Could this explain why one is bigger than the other?

Extension Activities:

- Have students research the differences between wild fruits, vegetables, berries, and animals and farmed or cultivated ones. How are the practices similar, how are they different? Students could present findings to the class.
- Students could go to their local grocery store and farmers market and compare an identical item from each (say local potatoes vs industrially grown), or farmed fish vs wild caught (in this case the wild might be bigger or smaller depending on the state of the habitat at the time when they were caught),
- What benefits has modern farming had on our world? What drawbacks or harms has it caused?
- How does this relate to the farming of animals vs hunting or catching wild (will they always be bigger or smaller or does it depend on their environment)?

Indigenous Connections: have students research indigenous farming practices and compare them to industrial farming practices. Discuss connections between single farms (ones that only grow one thing) and multi-species farms (ones that rotate crops or gardens that grow multiple different things in one space). A good example of this is the "Three Sisters" where you grow corn, beans, and squash together. The corn gives shade to the beans and squash along with a place for the beans to grow, and the squash has large leaves which protect the base of the corn (https://seeds.ca/schoolfoodgardens/the-three-sisters/). The three plants work together in harmony to support each other and ensure each one grows better than any one on their own.

Student Handout (Grades K - 2)

Introduction:

In the story, Ojiig notices a difference between the blueberries his family used to pick and the ones they buy in the city. City blueberries are much bigger! Today, we're going to explore this difference between wild and farmed blueberries.

Part 1: Guessing and Comparing

- Look at the two baskets. One has smaller "berries" and one has larger "berries."
- Guess: How many "berries" do you think are in each basket? Write your guesses below.
  - Basket with smaller "berries": _____
  - Basket with larger "berries": _____
- Take one "berry" out of each basket. Compare them.
  - Which one is bigger? _____
  - Which one takes up more space? _____
- Guess: Which basket do you think has more "berries" in it? _____
  - Why do you think that? _____

Part 2: Counting and Thinking

- Count the "berries" in each basket. Write the actual number below.
  - Basket with smaller "berries": _____
  - Basket with larger "berries": _____
- Which basket had more "berries" in it? _____
- Think: Which basket do you think has wild blueberries (the kind Ojiig and his family would have picked)? Which basket do you think has cultivated or farmed blueberries (the ones he'd buy frozen)? _____
- Why do you think so?_____

Student Handout (Grades 3 - 5)

Introduction:

In the story, Ojiig notices a difference between the blueberries his family used to pick and the ones they buy in the city. City blueberries are much bigger! Today, we're going to explore this difference between wild and farmed blueberries.

Part 1: Guessing and Comparing

- Look at the two baskets. One has smaller "berries" and one has larger "berries."
- Guess: How many "berries" do you think are in each basket? Write your guesses below.
    - Basket with smaller "berries": _____
    - Basket with larger "berries": _____
- Take one "berry" out of each basket. Compare them.
    - Which one is bigger? _____
    - Which one takes up more space? _____
- Guess: Which basket do you think has more "berries" in it? Why? _____

Part 2: Counting and Thinking

- Count the "berries" in each basket. Write the actual number below.
    - Basket with smaller "berries": _____
- Basket with larger "berries": _____
- Which basket had more "berries" in it? _____
- Think: Which basket do you think has wild blueberries (the kind Ojiig and his family would have picked)? Which basket do you think has cultivated or farmed blueberries (the ones he'd buy frozen)? _____
    - Why do you think so?_____

Part 3: Deeper Thinking

- What effect might things like pesticides and industrial farming practices have on the size of berries?

  _____

  _____

  _____

  _____

  _____

- Could this explain why one type is bigger than the other?

  _____

  _____

  _____

  _____

  _____

Student Handout (Grades 6 - 8)

Introduction:

In the story, Ojiig notices a difference between the blueberries his family used to pick and the ones they buy in the city. City blueberries are much bigger! Today, we're going to explore this difference between wild and farmed blueberries.

Part 1: Guessing and Comparing

- Look at the two baskets. One has smaller "berries" and one has larger "berries."
- Guess: How many "berries" do you think are in each basket? Write your guesses below.
    - Basket with smaller "berries": _____
    - Basket with larger "berries": _____
- Take one "berry" out of each basket. Compare them.
    - Which one is bigger? _____
    - Which one takes up more space? _____
- Guess: Which basket do you think has more "berries" in it? _____
    - Why? _____

Part 2: Counting and Thinking

- Count the "berries" in each basket. Write the actual number below.
    - Basket with smaller "berries": _____
    - Basket with larger "berries": _____
    - Which basket had more "berries" in it? _____
- Think: Which basket do you think has wild blueberries (the kind Ojiig and his family would have picked)? _____
- Which basket do you think has cultivated or farmed blueberries (the ones he'd buy frozen)? _____
    - Why do you think so?_____

Part 3: Deeper Thinking

- What effect might things like pesticides and selective growing practices (including Genetic Modifications) have on the size of berries? Could this explain why one type is bigger than the other?

  _____

  _____

  _____

  _____

  _____

- Could this explain why one type is bigger than the other?

  _____

  _____

  _____

  _____

  _____

Part 4: Volume and Surface Area

- How do volume and surface area relate to one another? (Use the "berries" and baskets to explain your answers.)

  _____

  _____

  _____

  _____

  _____

  _____

When the Stars Came Home
Additional Resources

Seeing Patterns and Tessellations

Level	K – 8, see specific activities for each grade level
Number of Students	individual or small groups
Length	30 – 60 minutes

Brief Description: Ojiig's quilt contains a series of repeated shapes and patterns in various colours. The floor of the First Nations University in Regina, Saskatchewan also contains such patterns. In this activity students will investigate the patterns found in both shapes and compare them. They will then create their own patterns using tangram tiles.

Materials: copy of the book, images of the floor pattern (see below), physical tessellation/tangram tiles or access to PolyPad or a similar online tessellation tool

Preamble: Ojiig's blanket consisted of a series of shapes (mostly triangles) intricately woven together to form the star blanket. The main lobby of the First Nations University in Saskatchewan (FNU) also has a similar pattern. Both patterns make use of shapes and colours to make their designs. These patterns are called tessellations and you are going to make some of your own today.

Procedure

Grades K - 2: have students turn to the page in the book with the finished quilt and describe the shapes, colours and patterns they see. Then have them look at the FNU floor and describe what they see there. Are there similarities or differences between the two?

Next, using physical manipulatives or an online tool and have students make their own tessellation patterns (being careful to inform students that they are not making a star blanket but instead are making a pattern of significance to themselves). There are also pre-set tangram puzzles that students can use as well. Ask students to describe why they chose a specific pattern or shape.

Grades 3 - 5: same as K - 2 but have them measure the various shapes, identifying the different triangles used (are they equilateral, isosceles, scalene, right)? And then discussing how the shapes fit together. They can also count the number of tiles used in the FNU floor and make an estimate of how large the pattern must be in terms of area and perimeter/circumference. Ask also about the difference in the blanket (a square pattern) and the floor (a circular pattern) and what differences this makes in terms of the shapes that can be used.

Grades 6 - 8: same as 3 - 5 but have students now calculate the area of the various shapes and put them together to determine the area of the blanket and also of their own shapes they create. Students can also use graph paper to create their own patterns and describe the significance of what they have chosen. They can also calculate the amount of thread that would be required to create the star pattern by making an estimate of how big each shape is and how much string would be required to attach each piece to another.

Information: tessellations are abundant in mathematics, in nature, and in the world we as humans create. There are many different types of tessellations (and there are 17 tiling patterns, you can learn about each of them here: https://www.math.utoronto.ca/~drorbn/Talks/Treehouse-1410/index.html). The way that various shapes fit together and the patterns they create (and whether they fit snugly together or if there are gaps) are well studied in math. Shapes with straight edges can more easily be placed together snugly/tightly than those with rounded edges (and in fact there are only a handful of curved patterns that can be fit together with no gaps). Hexagons, or the shapes that make up bees' honeycombs, are a perfect example of a shape that fits together snugly with no gaps and optimizes the area of each part of the shape.

Additional Activities:

- You can discuss concepts of symmetry found in the various shapes and patterns (both the quilt/floor and in the student created designs)
- Students can discuss if there are any patterns or symbols of significance to them or their families or cultures.
- See if your students can find tessellations and patterns out 'in the wild'. They can often be found in bathroom tiles, mosaics, graffiti, building structures, and more. Students can take pictures of these patterns and bring them back to the class to discuss. They can also perform measurements on the patterns and look for how they relate to one another.

Indigenous Connections: as we saw from the book the star blanket holds a special place in Anishinabia and other indigenous cultures. The pattern and the individual shapes mean something to the creators and receivers. In this activity it is very important to recognize that the shapes we are analyzing have significance to indigenous culture and we need to be respectful of that. We also can't just create our own star blankets, but we can create something meaningful to ourselves and our family/culture. You can learn more about the significance of Indigenous blankets, including the star quilt here: https://thediscoverblog.com/2019/03/19/first-nations-blanket-traditions-through-time/

Student Handout (Grades K - 2)

Introduction:

In the book we are reading, Ojiig's quilt is made of many shapes and patterns. The First Nations University in Saskatchewan also has a patterned floor. Today, we're going to explore these patterns and create some of our own using tangram tiles!

Part 1: Observing Patterns

- **Look at Ojiig's Quilt:**

  - What shapes do you see?

    _____

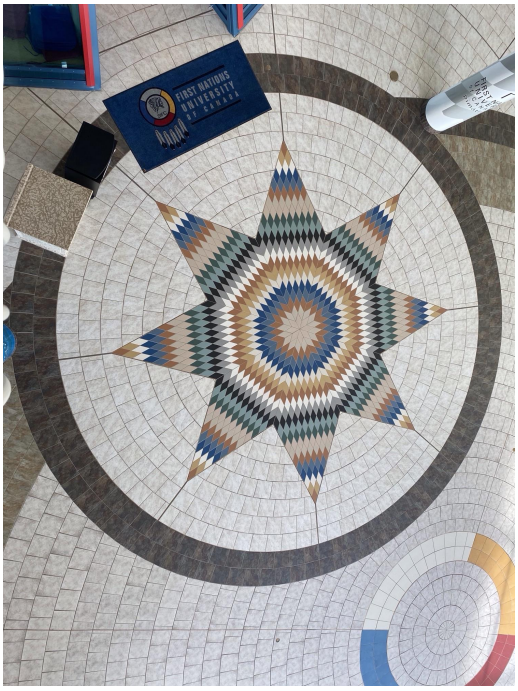
  - What colors do you see?

    _____

  - Describe the patterns you see:

    _____

- **Look at the First Nations University Floor**



  - What shapes do you see?

    _____

  - What colors do you see?

    _____

  - Describe the patterns you see:

    _____

- Are there similarities or differences between the quilt and the floor patterns?

  _____

Part 2: Creating Tessellations

- **What is a Tessellation?** Tessellations are patterns made of shapes that fit together without any gaps or overlaps.
- **Using Tangram Tiles:** Use the tangram tiles (physical or online) to create your own tessellation pattern.
    - Create a pattern that is meaningful to you and tell your classmates about it.

Part 3: Deeper Thinking

- Do you see any symmetry in the quilt, the floor, or your own design?

  _____

- Are there any patterns or symbols that are important to you, your family, or your culture?

  _____

- Where else have you seen tessellations or patterns in the world?

  _____

Student Handout (Grades 3 - 5)

Introduction:

In the book we are reading, Ojiig's quilt is made of many shapes and patterns. The First Nations University in Saskatchewan also has a patterned floor. Today, we're going to explore these patterns and create some of our own using tangram tiles!

Part 1: Observing Patterns

- **Look at Ojiig's Quilt:**

  - What shapes do you see?

    _____

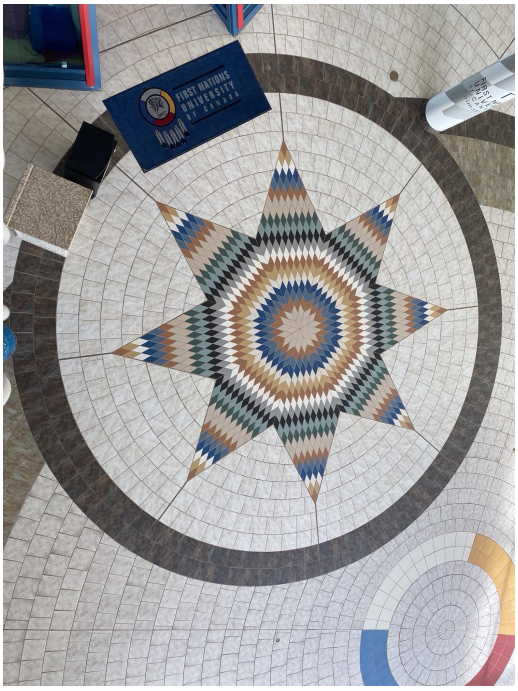
  - What colors do you see?

    _____

  - Describe the patterns you see:

    _____

- **Look at the First Nations University Floor**



  - What shapes do you see?

    _____

  - Describe the patterns you see:

    _____

- Are there similarities or differences between the quilt and the floor patterns?

  _____

- Estimate the number of tiles this pattern might require

  _____

- Using your estimate what do you think the perimeter/circumference of the shape might be?

  _____

Part 2: Creating Tessellations

- **What is a Tessellation?** Tessellations are patterns made of shapes that fit together without any gaps or overlaps.
- **Using Tangram Tiles:** Use the tangram tiles (physical or online) to create your own tessellation pattern.
    - Create a pattern that is meaningful to you and tell your classmates about it.

Part 3: Deeper Thinking

- Do you see any symmetry in the quilt, the floor, or your own design?

  _____

  Are there any patterns or symbols that are important to you, your family, or your culture?

  _____

- Where else have you seen tessellations or patterns in the world?

  _____

- Look at the different triangles in all the patterns (Ojiig's quilt, the FNU floor, and your own patterns). Can you find equilateral, isosceles, scalene, and right triangles? Show them to your classmates.

Student Handout (Grades 6 - 8)

Introduction:

In the book we are reading, Ojiig's quilt is made of many shapes and patterns. The First Nations University in Saskatchewan also has a patterned floor. Today, we're going to explore these patterns and create some of our own using tangram tiles!

Part 1: Observing Patterns

- **Look at Ojiig's Quilt:**

  - What shapes and patterns can you find in the quilt?

    _____

  - Make an estimate of the size of the quilt as a whole. Explain your reasoning.

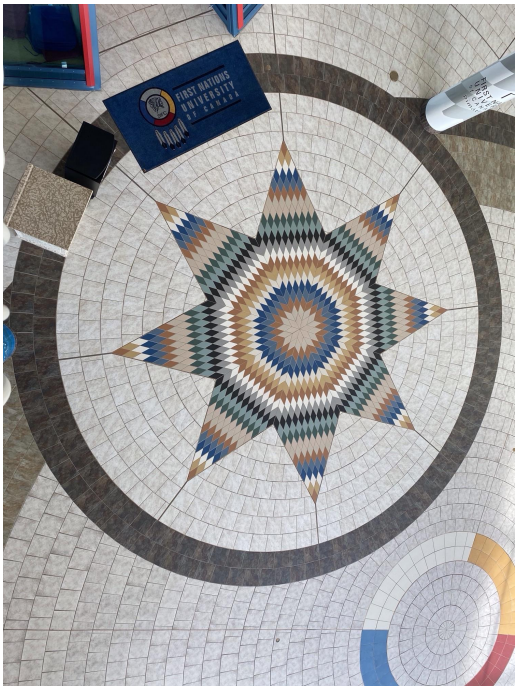
    _____

  - Based on your estimate of the quilt size, make an estimate of the perimeter of the main star pattern.

    _____

  - **Challenge Question:** Based on your estimates, can you guess how much thread would be required to stitch the entire star pattern together? Explain your reasoning.

- **Look at the First Nations University Floor**



  - What shapes and patterns do you see?

    _____

  - What are the similarities and differences between the quilt and the floor patterns?

    _____

Part 2: Creating Tessellations

- **What is a Tessellation?** Tessellations are patterns made of shapes that fit together without any gaps or overlaps.
- **Using Tangram Tiles:** Use the tangram tiles (physical or online) to create your own tessellation pattern.
  - Create a pattern that is meaningful to you and tell your classmates about it.

Part 3: Deeper Thinking

- Do you see any symmetry in the quilt, the floor, or your own design?

  _____

- Are there any patterns or symbols that are important to you, your family, or your culture?

  _____

- Where else have you seen tessellations or patterns in the world?

  _____

- Look at the different triangles in all the patterns (Ojiig's quilt, the FNU floor, and your own patterns). Can you find equilateral, isosceles, scalene, and right triangles? Explain them to your classmates.

- Use estimations and reasoning to calculate the area and perimeter of the various shapes (Ojiig's quilt, the FNU floor, and your own patterns) you find.

When the Stars Came Home
Additional Resources

Using Stellarium to Learn About the Sky

Level	K – 8, see specific activities for each grade level
Student Groupings	small groups or as a class demo
Length	15 – 30 minutes
Materials Needed	computer

Brief description: In the book, Ojiig misses seeing the stars and the night sky. In this activity, students are invited to learn about the night sky using a planetarium app on the computer.

Materials:

- computer and projector for the teacher
- tablets or computers for the students if they are to try to program themselves (older students)

Preamble: Stellarium is a planetarium app which allows you to simulate the sky at any time, from any location. It can be used to show the sky to the students. If they are old enough and enough computer or tablets are available, the students could also learn to use it themselves. There are two versions:

- Stellarium Web is the easiest way to familiarize yourself with the app since it runs directly in a browser.
- Stellarium - this desktop app needs to be downloaded and installed on your computer. This extra step is rewarded with more options, including the possibility of showing the constellations of many different cultures such as Ojibwe. It can also show the interface in different languages.

Preparation: The teacher should take a few minutes to familiarize themselves with the app. Two tutorials are available:

- Introduction to Stellarium Web (**https://www.youtube.com/watch?v=q41ZfxnVdQg**)
- Introduction to Stellarium (**https://youtu.be/-okzJbZgBEo**)

Here are a few important points for both versions:

- Make sure Stellarium knows where you are located as the sky will vary from one place to another, especially at different latitudes. The location doesn't need to be super precise (a nearby city is OK), but this should be the first thing you check when accessing Stellarium.
- You can change the date and time, which allows you to simulate the sky at any time. You can also fast-forward time to see how things appear to move in the sky.
- You can see stars and planets at the position they would appear in the real sky. Planets might appear big but they are just points of light: the size indicates how bright it appears in the sky.
- You can activate constellation lines, names and drawings. In the desktop version, you can access the Options to change the Skylore.

Procedure:

Here are some ways Stellarium can be used in the classroom:

- **Today's sky**: Show today's sky to the students. As you move N-S-E-W, highlight familiar patterns, such as the Big Dipper and a few bright stars and planets (if any). You can also show the Moon and the phase during that day. Repeat once a week for a few weeks to notice differences.
- **The Moon**: Start a day when the Moon will be visible in the evening - around first quarter is the best. Show today's sky to the students and invite them to look up after school to see the Moon - no need to wait for darkness! Repeat for a few days to see how the Moon changes shape and location night after night.
- **The sky throughout the seasons:** Start by showing today's sky and have the students pay attention to the main stars and constellations. Then change the time to 3 months in the future. Have students notice how different the sky is. What

happened to the stars and constellations from before? Repeat two more times and maybe a third time to come back to the same sky as before, one year later.

- **Birthdate sky**: invite the students to look up at the sky in the evening of their birthdate, and compare it with their friends. Are there constellations and stars which are visible on both? Were there planets in the sky on that evening? Where was the Big Dipper on both dates?

Student Handout

- Draw and write the name of a constellation visible in the sky tonight.

- Can you name the stars making up this constellation?

  _____

- If the Moon is visible tonight, draw it.

- What time will it be visible (remember, depending on the day this could be during the day and not just at night)?

  _____

- Will the Moon be in the same place tomorrow? Draw or explain how its appearance and position will change over the next week.

- How did the sky look on the evening of your birthdate? Draw a few stars and constellations and indicate in what direction of the sky they were visible.

When the Stars Came Home
Additional Resources

Create an Observation Journal

Level	Grades 2 – 8
Student Groupings	individuals
Length	5 minutes/day, over a few weeks

Brief description: Students are invited to observe the sky as often as possible over a few weeks and record their observations in a journal.

Materials:

- Printed copies of the journal worksheet
- One small binder or duo-tang per student

Preamble: Astronomers can't touch or run experiments to study the objects in the sky. They have to use observations to learn about the Universe and they must record their observations to notice changes and patterns. Nowadays, very sensitive cameras have replaced drawing and note-keeping in astrophysical research, but many amateur astronomers still keep records of their observations in log books. In this activity, students are invited to become astronomers by creating their own observation journal!

Preparation: Print the journal page in many copies and invite students to put a few in a small binder. They should be able to add more pages if they need to.

Procedure: Over the course of a few weeks or months, invite your students to look up in the evening, but also during the day, and note what they observe. They might notice interesting phenomena and objects, such as phases of the Moon, very bright stars and possible planets. If

they're lucky, they might even spot a shooting star or catch an aurora! Note: this activity will be weather/location dependent but students can note these facts in their journal as well and discuss them.

Discussion prompts

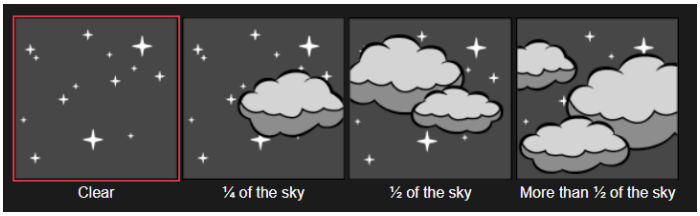
- The students might be surprised to notice how the Moon changes from day to day, and how it's not always in the same place. Discuss the phases of the Moon and ask them if they know the name of the phase they observed.

- Did they notice some bright stars? You could use Stellarium (see Activity 2) to identify the stars they noticed. Some of them might turn out to be planets! Planets also appear as points of light as they reflect the light from the Sun. Their light doesn't twinkle as much as the light from the stars, but they are not always easy to identify. Stellarium will help!
- Did you notice colours in the sky? Most objects in the sky appear white, but some stars can have a colour that is noticeable. Some are really blue while others are red! The colours are shown in Stellarium (colour of the dot of the star). Planets also have slight colours: Mars appears reddish while Saturn and Jupiter are more yellow. Other phenomena can also have colours such as shooting stars and the aurora.
- Were they able to identify a constellation or pattern in the sky? Starting with the Big Dipper is a good idea since it's visible every night of the year in Canada and it's made up of seven relatively bright stars.

Note: If it's difficult for the students to observe the sky independently, or if you want to do this activity during a stretch of bad weather, don't hesitate to use Stellarium (see Activity 2) and have them fill their journal this way. The real sky is more beautiful, but Stellarium is a very useful tool when the real sky isn't accessible!

Student Handout

Become an astronomer! Observe the sky and note your observations in this journal. Make sure to put some important information in your notes, such as where you were, and the date and time of your observation. The weather and quality of the sky are also important in astronomy so you can include some information about the cloud cover.



Date: _____

Time: _____

Location: _____

Weather and sky conditions: _____

_____

When the Stars Came Home
Additional Resources

Create Your Own Constellation!

Level	K – 6
Student Groupings	individuals
Length	30 minutes

Brief description: Ojiig is named after an Anishinaabe hero and is related to the constellation Gichi Ojiig, which many of us know as the Big Dipper. In this activity, students invent their own constellation and write a story related to it.

Materials:

- Printed copies of the worksheets

Preamble: Constellations are patterns we have imagined in the sky. By connecting the stars with imaginary lines in creative ways, humans have put warriors, animals and gods in the sky. Different cultures invented their own constellations, based on the important characters of their own mythology and belief systems. If we were to invent constellations today, which important character, animal or object would be immortalized in the sky?

Procedure: Invite your students to invent their own constellation and to write a short story about its importance. They simply need to connect the dots the way they want.

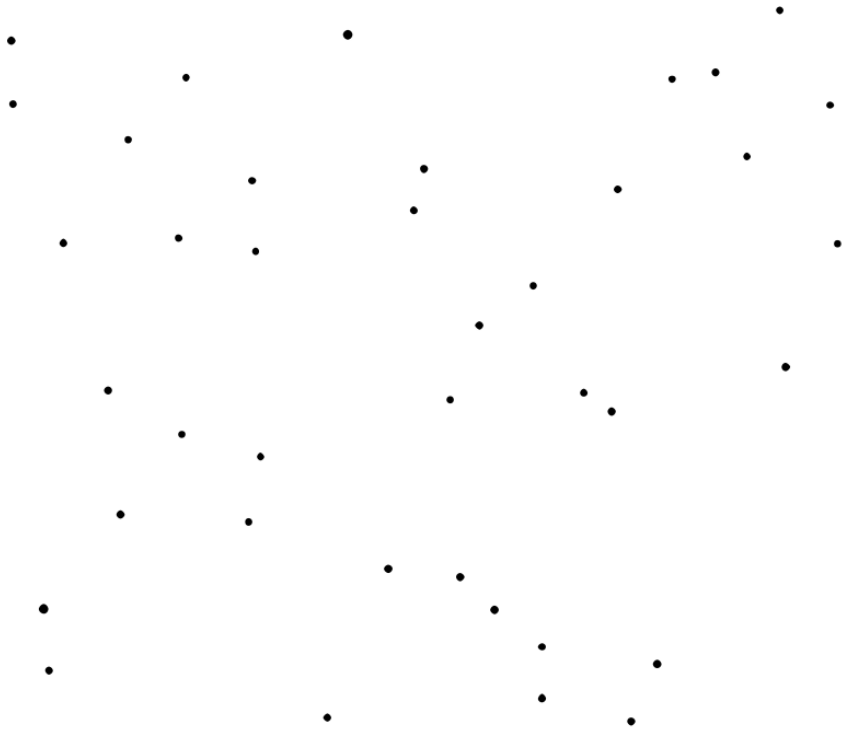
Some information about constellations:
There are no right or wrong answers here. Constellations were all invented by humans and the constellations from different cultures are just as valid. The stars in a constellation generally don't have anything in common, other than being in the same part of the sky as seen from Earth. Scientists don't study constellations - they are not real objects in space - but we use them as a reference system to find our way in the sky.

Indigenous Connections: there are many fascinating stories about the constellations in the skies. Here are some links that explore Indigenous stories you can look at and discuss with your students:

- Wilfred Buck: https://acakwuskwun.com/ (see the bottom of the page for videos of stories)
- Video: Gichi-ojiig: The Legend of the Great Fisher (https://youtu.be/U0YRj3Fgc5c?si=FXmnK3IvHK3g5MdG)
- The Tracks Program Webinar Series: https://www.tracksprogram.ca/blog-media/archived-giizhigoong-webinar-recordings-and-online-activities

Student Handout

My constellation name: _____



The story of my constellation: