**Understanding by Design Long Range Planning Template**

**Kindergarten**

(See Appendix 1 for Principles of Early Learning.)

|  |  |  |  |
| --- | --- | --- | --- |
| **Title of program design, project, inquiry, or ECD domain** | Living Mathematics:A holistic approach to Kindergarten mathematics. | **Time Frame** | Year-long exploration |
| **Developed By** | Sarah Klatt in collaboration with Kelly Vickaryous. |
|  |
| **Stage 1 - Identify Desired Results**  |
| **Broad Areas of Learning (See Appendix 2 for Broad Areas of Learning.)**How will the Broad Areas of Learning be incorporated? |
| **Lifelong learners**: Student will explore and construct knowledge of mathematics in an authentic environment that supports place-, play-, and inquiry-based learning. They will understand that mathematics is integrated into every part of their lives, and develop a positive disposition towards mathematics that will support them throughout their educational careers. They will discover that mathematics is for everyone, and that they are capable and competent mathematicians. **Sense of self, Community and Place**: Students will explore mathematics in our belonging classroom community that fosters collaboration. They will engage in rich dialogue with all members of our belonging community to explore, reflect upon, and construct personal strategies to facilitate a deep understanding of mathematics. Furthermore, they will investigate diverse perspectives and ways of knowing to explore mathematics within daily lives, communities, and the larger world. This will inspire them to honor and value all perspectives, including their own. **Engaged Citizens**: In a place-, play-, and inquiry-based learning environment, students are empowered to collaborate to explore various mathematical concepts. Such collaboration strengthens our belonging school community and social harmony as students not only share their personal perspectives and understandings, but also value the perspectives and understandings of others. They will be empowered to find joy in mathematics as they explore where mathematics lives in their lives, their community, and within the larger world.  |

|  |
| --- |
| **Cross curricular Competencies (See Appendix 3 for Cross Curricular Competencies.)**How will the Cross Curricular Competencies be promoted? |
| **Develop thinking**: Students learn in holistic ways, with each new learning experience building upon the previous ones. Throughout this unit, students will be given the opportunity to develop thinking contextually, creatively, and critically. Contextually, they will activate their funds of knowledge and background knowledge to build upon past experiences and make connections with the various mathematical concepts they explore. Creatively, students’ innate sense of joy and curiosity will aid in infusing mathematics into their daily dramatic play, storytelling, and artwork. Critically, our belonging school community fosters students to feel safe and take risks to test hypothesizes, thus empowering them to create their own personal strategies and fostering a deep understanding of mathematics. **Develop Identity and Interdependence**: This unit will inspire students to view themselves as capable and competent mathematicians. They will be supported in their ability to take risks to develop their own personal ideas, strategies, and mathematical abilities. Through a holistic approach to mathematics, students will develop their identity as mathematicians within their social-emotional, physical, spiritual, and intellectual domains. They will not only collaborate with students from within their own class, but will also collaborate with students from the grade 6 SAGE program. Such collaboration will foster a sense of community and a respect for various mathematical perspectives. **Develop Literacies**: This unit will support students’ ability to construct knowledge on mathematical concepts through a variety of literacies. They will investigate mathematics through oral storytelling, written word, numbers, music, drama, and by exploring the natural world in our outdoor space and surrounding community. They will use many different manipulative such as loose parts, open-ended toys, art mediums, and technology to test hypotheses and construct knowledge. Furthermore, they will explore a variety of FNMI literature and ways of knowing to make connections and deepened their mathematical understandings.**Develop Social Responsibility**: Students will develop a sense of social responsibility and citizenship as they explore various mathematical perspectives and ways of knowing. They will work collaboratively with various members of our belonging school community to engage in meaningful dialogue to test hypotheses and develop a deep understanding of mathematical concepts. Furthermore, they will gain a deep sense of respect for diverse perspectives by investigating how multiple ways of knowing work together to infused mathematics into daily life. |

|  |
| --- |
| **Learning Outcomes**What relevant goals will this timeframe, program design, project, or inquiry address? *(This could come from curriculum [include the designations e.g. IN2] and/or from ECD domains [for example, fine motor, gross motor, language acquisition, etc.])* *Before determining the big idea or ECD domain, observe the children multiple times, listen to their interactions, have conversations with their parents, and reflect by asking yourself these questions:** *What are my observations? What am I hearing from the children and their parents?*
* *What do I know about each child and what more can I learn about them through this timeframe, project, or inquiry?*
* *What questions are children asking?*
* *What have I learned about each child with respect to the four dimensions that will also inform my planning (see Questions to Guide Observations on pages 24-27 of* Children First*)?*
* *What are the needs of each child that might require further supports or adaptations?*
 |
| **Saskatchewan Curriculum Outcomes:**Mathematics:NK.1 Say the whole number sequence by 1s starting anywhere from 0 to 10 and from 10 to 0.NK.2 Recognize, at a glance, and name familiar arrangements of 1 to 5 objects, dots, or pictures.NK.3 Relate a numeral, 0 to 10, to its respective quantity.NK.4 Represent the partitioning of whole numbers (1 to 10) concretely and pictorially.NK.5 Compare quantities, 0 to 10, using one-to-one correspondence.PK.1 Demonstrate an understanding of repeating patterns by identifying, reproducing, extending, and creating patterns using manipulatives, sounds, and actions.SSK.1 Use direct comparison to compare two objects based on as single attribute such as: length including height, mass, volume, and capacity.SSK.2 Sort 3-D objects using a single attribute.SSK.3 Build and describe 3-D objects.English Language ArtsCRK.2 View and interpret the basic message of visuals and objects in a variety of texts including models, photographs, dramas, dance creations, and videos. CRK.3 Listen, comprehend, and respond to gain meaning in oral texts. CRK.4 Comprehend, retell, and respond to basic ideas in stories, poems, songs, and informational texts read to them. CCK.1 Compose and create various visual, multimedia, oral, and written texts that explore and present thoughts, ideas, and experiences. CCK.2 Use and construct symbols, pictures, and dramatizations to communicate feelings and ideas in a variety of ways.  CCK.3 Use oral language to converse, engage in play, express ideas, and share personal experiences. CCK.4 Create messages using a combination of pictures, symbols, and letters. ARK.1 Reflect on viewing, listening, emerging “reading”, representing, speaking, emerging “writing” experiences in the context of teacher-led discussions.ARK.2 Reflect and talk about new learning. Social Studies:PAK.2 Recognize situations in which disagreement may be part of living, studying, and working together, and that resolution may be an avenue to progress to a state of peace, balance, and harmony.Treaty Education Outcomes:SIK2: Express personal connectedness to nature and one another (e.g., Circle of Life, seasons, elements, weather, families, and relatives).HCK2: Explore the connection all people have to the land as expressed through stories, traditions, and ceremonies.**ECD Domains:**Social Emotions:* Developing self-worth.
* Developing a sense of belonging.
* Interacting with other.
* Taking the perspective of others and showing empathy.

Physical Development:* Developing fine motor skills.
* Developing space and body awareness.

Spiritual Development:* Experiencing a sense of wonder, awe, and joy.
* Experiencing heightened sensory awareness.
* Developing an appreciate of beauty and connection to the Natural and Man-made world.

Intellectual Development:* Solving problems by demonstrating curiosity, exploring, and observing.
* Creating and imagining.
* Recognizing attributes and characteristics.
* Exploring numeracy.
* Exploring position and direction.
 |
| **Enduring Understandings**What understandings about the big ideas are desired?(What do you want children to understand & be able to use several years from now?)What misunderstandings are predictable? | **Essential Questions**What provocative questions will foster curiosity and wonder into the content?(These are open-ended questions that stimulate thought, inquiry, and language learning linked to the content of the enduring understanding.) |
| *Students will understand that...*Mathematics lives in all aspects of their lives, and that they are capable and competent mathematicians. There are multiple perspectives and ways of knowing that shape mathematics.*Related misconceptions…** Not everyone is good at math.
* Math does not live in their daily lives.
* There is only one way to look at math, only one way of knowing.
 | *Content specific….** Where does mathematics live in your world?

*FNMI, multicultural, cross-curricular…** How does mathematics live within other cultures?
* How can different mathematical perspectives deepen our understandings of mathematical concepts?
* How is knowing mathematics synonymous with knowing about the world?
 |

|  |  |
| --- | --- |
| **Knowledge and Vocabulary Acquisition:**What knowledge and vocabulary will children acquire as a result of this timeframe, project, or inquiry? This content knowledge and vocabulary may come from the indicators (nouns) and/or ECD domains. | **Skills**What skills will children acquire as a result of this timeframe, project, or inquiry? List the skills and/or behaviours that children will be able to exhibit as a result of the experience. These will come from the indicators (verbs) and/or from ECD domains. |
| *Children will know...** There are various mathematical perspectives and ways of knowing.
* That mathematics is a living component of their daily life.
* That mathematics is collaborative, and sharing of different mathematical perspectives allows for a deeper understanding of mathematical concepts.
* That everyone is a mathematician.
* They are competent and capable mathematicians.
* The order of numbers 1-10.
* The connection between numbers and the quantity they represent.
* Terminology to use when comparing sets of numbers (more than, fewer, as many as, equal, and same as).
* Repeating patterns with two or three elements (for example AB, AAB, ABB, ABC repeating patterns).
* Proper terminology when comparing two objects (length, height, mass, and volume).
* The attributes of a 3-D object, such as shape and size.
* There is mathematical meaning to be gained from oral stories, print, multimedia, and visual texts.
* That mathematics is found within both the man-made and natural world.
 | *Children will be able to…** Confidently explore various mathematical concepts and take risks to test personal strategies.
* Use oral language and written representations to demonstrate their deep understanding of mathematical concepts.
* Count forward and backwards to 10, represent quantities of numbers, and demonstrate multiple ways to compare quantities and partition whole numbers using loose parts and manipulatives.
* Subitize quantities of 1-5 found within the classroom, the school, and the surrounding community (for example: 1-5 loose parts, 1-5 dots on a dice, 1-5 trees in a row).
* Create and identify repeating patterns found within their environment (loose parts, clothing, patterns in nature and the community).
* Represent their thinking through dialogue or writing when critically evaluating and comparing objects.
* Describe, sort, and build various 3-D objects.
* Problem solve when disagreements may occur during collaborative work with classmates.
* Recognize themselves as capable, competent, and confident mathematicians.
* ­Collaborate with other members in our belonging community to share their personal strategies and knowledge of mathematical concepts.
* Recognize that there are multiple mathematical ways of knowing, and that mathematics is used across all nations and cultures.
* Find mathematics living in their daily lives and natural world.
* Recognize that mathematics lives not only within their own stories and traditions, but within those of other cultures as well.
 |

|  |
| --- |
| **Stage 2 – Assessment Evidence** |
| **Anticipated Performance Task -** The performance task might be the cumulative observations and documentation of the children’s play and exploration of the planned experiences, or it might be a specific planned activity or performance that emerges from the children’s responses and interests. Consider the observations you are making of the children’s on-going play and exploration. Does an authentic performance task emerge that will further demonstrate the desired understandings, knowledge, and skills? (Describe the learning activity in “story” form. Typically, the Performance Task describes a scenario or situation that requires children to apply knowledge and skills to demonstrate their understanding in a real life situation.) **How will children represent their learning?** **How will you document the learning process?** By what criteria will performances of understanding be measured? |
| **GRASPS Elements of the Performance Task**  |
| I believe in integrating mathematics in a holistic fashion that truly demonstrates how mathematics lives in students’ lives. When students are given opportunities to truly engage in mathematics, they come to realize that knowing mathematics is synonymous with knowing about the world. Since the first day of school, I have been asking students various open-ended questions while they play such as: “How many people are in your story?”, “how many colors are on your paper?”, and “Can you find a pattern in your drawing?”. Furthermore, I regularly model playful storytelling that fuses together students’ inquiry and mathematics. One very meaningful moment was when the Prekindergarten turtle visited our classroom. The students were delighted to spend the morning with the turtle. They took magnifying glasses and carefully studied the turtle up close. They counted the lines and how many different colors they could find on his shell. They then began to draw the turtle and incorporate turtles into their play. That same day the class came together and I modeled a playful math story. I used one of the turtles a student drew as my main character in the story. The class worked together to name the paper turtle, and I told them this paper turtle was going to a Pattern Party! We then worked together as a class to stick loose parts on the paper turtle’s shell that would be his costume for the Pattern Party. Through this story, the students worked collaboratively to share personal strategies and problem solve to create an AB pattern. This moment with the little paper turtle truly opened my eyes to how engaged my students become when mathematics is consistently infused within their inquiry. Therefore, the purpose of this unit is to offer my students educational experiences where they can explore how mathematics lives within their daily lives, communities, and larger world. Students will represent their learning through various strategies. These include imaginative play, oral storytelling, as well as written and artistic representation of their knowledge. Documentation will occur by taking photographs of the students’ work, by recording their knowledge and thoughts using iPhone or computer, sharing their work with their families using Seesaw, and documenting their ideas and work in the class Floorbook.Formative assessment will be conducted throughout the unit to ensure that students are developing the various curriculum outcomes associated with this unit. This will enable us to guide our invitations and lessons, thus ensuring that the students understand the key concepts of this unit. Such assessment will be conducted by:* Asking open-ended questions during whole-group and small-group discussions, and recording student’s answers.
* Asking open-ended questions while children explore and play at the various invitations and recording student’s answers.
* Asking open-ended questions to assess students’ current mathematical understandings and recording this information in a rubric (see appendix 4). This information will be used as evidence to plan invitations and lessons.
* Observing students during their play and recording anecdotal notes to gather evidence of their learning.
* Recording the various learning stories, thoughts, and ideas of the students.
* Creating various pieces of documentation to record the students’ thoughts and learning.

Summative assessment will be conducted by reviewing the various forms of documentation that will be created over the course of this unit. These various forms of documentation will provide us with a range of records that will enable us to understand the progress made by the students, and to assess if each student reached the various outcomes associated with this unit.  |
| ***G*** *– Goal**What should children accomplish by completing this task(s)?*  | The goal for students to view themselves as capable, competent, and confident mathematicians as they take risks to investigate mathematical concepts relating to their inquiry and daily life.My goal as a teacher-researcher will be to work alongside my students to think critically and reflect upon the work being done. I will observe and listen to my students to understand the depths of their thinking, thus placing their ideas, questions, and observations at the heart of the learning experience. My goals as a teacher candidate will be to continuously learn and reflect from my experiences in the classroom so I can strengthen my teaching pedagogy. There are several PGP goals associated with this unit:Knowledge: 2.5 Knowledge of a number of subjects taught in Saskatchewan schools (disciplinary/interdisciplinary knowledge).Instructional: 3.1 the ability to utilize meaningful, equitable, and holistic approaches to assessment and evaluation.Curricular: 4.1 Knowledge of Saskatchewan curriculum and policy documents and applies this understanding to plan lessons, units of study and year plans using curriculum outcomes as outlines by the Saskatchewan Ministry of Education. |
| ***R*** *– Role**What role (perspective) will the children be taking?* | Students are active members in our belonging learning community. As such, they will:* Take risks to challenge themselves and discover a deep understanding of various mathematical concepts.
* Listen, think critically, and share their knowledge when collaborating with classmates, educators, and other members of our belonging community.
* Become the author and creator of their own written documentation that depicts their mathematical perspectives.
 |
| ***A*** *– Audience**Who is the relevant audience?* | The relevant audience are all members in our belonging learning community. These members include students at Caswell school, educators, families, and members of the surrounding community. |
| ***S*** *– Situation**What is the context or challenge provided to the children?* | Students will explore mathematics in a holistic context in which mathematics seamlessly infuses into every aspect of their lived worlds. |
| ***P*** *– Product, Performance**What “product” will the children create or how will you capture their “performance” through play and exploration?* | Students will create a variety of products. These include:* Sharing their personal strategies, thoughts, and ideas. These will be documented in various forms including in the class Floorbook, SeeSaw, anecdotal notes, and formal documentation.
* Various forms of written and artistic representation such as drawings, collages, and collaborative works of art.
* Through building various 3-D objects, sculptures, and patterns during authentic play. These will be kept on display if possible, or be photographs to add to the class Floorbook, posted on SeeSaw, and put into formal documentation.
 |
|
|
| ***S*** *– Standards & Criteria for Success**Create a plan for a learning story or documentation piece to capture the learning process and/or create a rubric if required for tracking progress.*  | Documentation will take place daily by:* Recording students’ thoughts, ideas, and work in the class Floorbook.
* Taking daily anecdotal notes of the students’ knowledge during play.
* Sharing their work with their families daily using SeeSaw.

To ensure we document each student’s learning consistently, a checklist will be created that will be used weekly. This checklist will guide us in determining who we observe daily, as well as what we need to observe. |

|  |  |
| --- | --- |
| **Other Evidence**Through what other evidence (work samples, observations, scripted conversations, journals, or other means) will children demonstrate the achievement of the desired results or have their achievement captured? What are the considerations for being inclusive of all learning contexts: home, community, culture, school? | **Documentation and Children’s Self-Assessment**How will children reflect upon or self-assess their learning? How will evidence be gathered and shared to assist children in becoming aware of their thinking and to make their learning visible? How will this be shared with parents, and perhaps the community? |
| * Students will demonstrate they have achieved the desired results through oral storytelling, conversations, whole-group and individual conversations.
* Various considerations will be put into place to ensure there is inclusivity of all learning contexts. For example, students will be able to demonstrate their learning in a variety of ways including oral storytelling, dramatization, writing, and artwork. Furthermore, their work will be shared with their families using Seesaw and will be displayed inside and directly outside of the classroom.
 | Numerous opportunities will be provided over the course of this unit for students to revisit and reflect upon their work, as well as the work of their peers. Making learning visible through real examples of students’ work, provides students with an opportunity to reflect and evaluate the learning that occurs. This empowers their ability to construct, gain insights, reconstruct, and deepen their ideas, knowledge, and understandings of the concepts being explored. Furthermore, by making learning visible, this creates the opportunity for parents and other members of our school community to gain insight into students’ knowledge and ideas, thus bridging the gap between students’ home life and school life, and strengthening our belonging community. As parents gain insight and become an active participant in their children’s learning, this facilitates collaboration between parents and educators. This collaboration provides an opportunity to think together about the learning to strengthen future educational experiences. Students will reflect upon their learning through various whole-group, small-group, and individual discussions. The class Floorbook will provide a means for students to view and reflect upon their daily learning, as it will be displayed within the classroom in an area that is accessible to both the educator and the students. Floorbooks are a child-led approach that enables educators and students to work together to create a holistic and engaging learning environment. They are a simple, highly effective documentation and planning tool that provide a genuine record of students’ thinking, thus giving each student a voice in shaping the learning that occurs within the classroom. In addition to class Floorbook, various products created by the students will be displayed in the classroom. These include collaborative works of art, individual and collaborative forms of written or artistic representations of their knowledge, and the various buildings and structures created during authentic play. The evidence of learning obtained through these products will be shared with our belonging community using SeeSaw, and in documentation hung within and outside of the classroom.  |

|  |
| --- |
| **Stage 3 – Long Range Plans for the Learning Program, Project, Inquiry, or ECD Domain**What teaching and learning experiences will you use to:* achieve the desired results identified in Stage 1?
* equip children to explore the assessment tasks identified in Stage 2?
 |
| **Where are the children headed? Where have they been? How will you make sure the children know where they are going?** **What experiences do the learners bring to the planning? How have the interests of the learners been ascertained? Have the learners been part of the pre-planning in any way?**  |
| Since the first day of school, mathematics was effortlessly woven into students’ inquiry and play. I noted students counting their characters, comparing the size and shape of various objects, and building 3-D structures using blocks and magnetic tiles. These observations reinforced my belief that children are natural born mathematicians. They have a genuine desire to learn and explore to develop deep understandings of their lived worlds. However, as students’ progress into older grades they can lose mathematical confidence that diminishes their desire to form deep mathematical understandings. My goal for this unit is to support students as they take risks to explore various mathematical concepts so they can strengthen their self-confidence and recognize themselves as capable and competent mathematicians. I believe the best way to holistically teach mathematics is to take the time to listen and record the words of my students. This allows me to understand their funds of knowledge and background knowledge, thus guiding how I plan various invitations and small- and whole-group lessons. Furthermore, this holistic approach to mathematics lends itself to uncovering the math present in our year-long inquiry into of “How Same can be Different”. For example, how can the same plant have different math living within it (i.e. number of petals, patterns in the petals and leafs, 3-D shape of the flower), or how can different mathematical perspectives deepen our understanding of a single mathematical concept.  |
| **How will you engage with parents to learn about the children’s interests, experiences, and knowledge building opportunities in home, cultural, and community contexts? How will you consider parents’ hopes and dreams for their children? Have parents been part of the pre-planning in any way? What invitational opportunities are there for parents to participate in the experiences?** |
| Parents will be engaged in this unit through individual conversations during pick-up and drop-up, displaying students’ work for them to see in the classroom and hallway, and through sharing their child’s inquiry using the app Seesaw. |
| **How will you provoke children’s curiosity and sense of wonder to introduce this timeframe, project, or inquiry?** (Consider whether this will be an invitation, a group experience, the reading of children’s literature, an outdoor adventure, a small combination of planned experiences, and so on.) |
| Children enter Kindergarten with a natural born sense of curiosity and wonder. My role as the educator is to awaken their recognition that mathematics is holistic and infuses into every aspect of their lives. One-way to awaken students’ recognition that math lives within their worlds is through playful storytelling based upon their inquiry. For example, if the students’ inquiry focused on dinosaurs, a playful math story could be about two dinosaurs that go on an adventure. A dice could be rolled each time the dinosaurs would move to determine how many steps the dinosaurs would take. Students would look at the dots on the dice and subitize to determine how far the dinosaur would move. While on their adventure, the dinosaur could find plants in a repeating pattern, they could find 3-D objects, or they could build a 3-D object. Playful storytelling facilitates students to collaborate to think creatively and deepen their understanding of many curricular outcomes in a short period of time (with each story taking around 5-10 minutes). |
| **What are open-ended stems and questions you might use to engage the children in conversation and/or thinking?** (What would happen if . . . Tell me about . . . I wonder . . . How did you make that choice . . .) |
| Where does math live in our outdoor play area?Where does math live in our lines and marks?How can we measure….? (measuring objects, plants, people that connects to students’ inquiry).What shapes live in your world? (i.e. classroom, school, outdoors, and in community). How do shapes make you think about numbers?What patterns can you find in ……? (loose parts, their play, their drawings, our classroom, school, outdoor play area, nature, surrounding community).What does your counting story look like?Where does math live in your story?How does beading help us think about math? (this open-ended question can be extended to other art forms as well including weaving and felting). How can you show 10? (this could be any number found within students’ play).How can mirrors help us explore doubling? |
| **What resources will you be using? (**Include FNMI resources.Consider materials, print, media, technology, people, and so on. What are ways families and community can participate in supporting the children’s learning?) |
| Various resources will be used for this unit.Some examples include: * Various loose-parts.
* Open-ended toys such as miniature figurines.
* Fabric.
* Mirrors.
* Art mediums: paint, pastels, markers, pencils, pens, paintbrushes, scissors.
* Water.
* Trays.
* Bowls.
* Food: spices, herbs, food coloring, Jell-O mixes.
* Mortar and pestle.
* Spoons.
* Clipboards.
* Mathematical learning materials.
* Beads.
* Thread.
* Documentation tools:
	+ Camera.
	+ iPhone – taking photos, noting observations, using Seesaw.
	+ iPad- taking photos, noting observations, using Seesaw.
	+ Pen and paper to record observations.
	+ Class Floorbook.

Possible literature connected to this unit:Adams, L. (2013). *Let’s get sized! An inquiry systems of measurement.* Portland, OR: Center Publications.Adams, L. (2015). *Circles*. Duncan, BC: Eaglecrest Books.Adams, L. & Bruvold, L. (2003). *The dream catcher.* Duncan, BC: Eaglecrest Books.Bossio, P. (2013). *The line.* Toronto, ON: Kids Can Press.Burton, W., & Caron, A. (2014). *Métis dance shapes*. Saskatoon, SK: Gabriel Dumont Institute.Burton, W., & Caron, A. (2014). *The Métis star dance.* Saskatoon, SK: Gabriel Dumont Institute.Carmi, G. (2015). *A circle of friends.* Cambridge, MA: Star Bright Books. Daly, L., & Beloglovsky, M. (2015). *Loose parts: Inspiring play in young children*. St. Paul, MN: Redleaf Press.Edwards, C. P., Gandini, L., & Forman, G. E. (2012). *The hundred languages of children: The Reggio Emilia experience in transformation*. Santa Barbrara, Calif: Praeger.Flett, J., (2014). *We all count.*  Vancouver, BC: Garfinkel Publications.Freedman, D. (2017). *This house, once.* New York, NY: Atheneum.Formento, A. (2014). *These rocks count.* Park Right, IL: Albert Whitman & Company.Hoban, T. (1998). *More, fewer, less.* New York, NY: HarperCollinsKrans, K. (2017). *Whose moon is that?* New York, NY: Random House Children's BooksNovakowski, J. (2015). *Reggio-inspired mathematics.* La Vergne, TN: Lightning Source Inc .Otoshi, K. (2008). *One*. Novato, CA: KO Kids Books. Reynolds, P. (2003). *The dot.* Somerville, MA: CandlewickRissman, R. (2009). *Shapes in art.* Chicago, IL: Heinemann Library.Rissman, R. (2009). *Shapes in buildings.* Chicago, IL: Heinemann Library.Rissman, R. (2009). *Shapes in the garden.* Chicago IL: Heinemann Library.Rissman, R. (2009). *Shapes in music.* Chicago, IL: Heinemann Library.Rissman, R. (2009). *Shapes in sports.* Chicago, IL: Heinemann Library.Springman, I.C. (2012). *More*. Boston, MA: Houghton Mifflin Harcourt.Wheeler, J. (2010). *Just a walk.* Penticton, BC: Theytus Books.William, J. (2014). *The numberlys.* Toronto, ON: Simon and Schuster. |
| **What events will help children experience and explore the enduring understandings and essential questions in this timeframe, project, or inquiry? What experiences will equip them with needed skills and knowledge?** |
| **Possibilities of** **Play Based Experiences**What materials/resources are already available for the children related to their interests, and the curricular outcomes and ECD domains?What can I add to the environment to support children’s investigations through play and further develop their thinking? Considering the gifts, learning needs, and diversities of all children and families, what are the needs of each child that might require further supports or adaptations?  | **Possibilities of** **Educator Guided Experiences**What materials/resources can I use that will provoke children’s sense of wonder and curiosity? How can I use a full or small group time to inspire further interest in the interest area? Considering the gifts, learning needs, and diversities of all children and families, what are the needs of each child that might require further supports or adaptations?  |
| **Observations and responding to children’s interests through focus-specific invitations (or provocations):** Plan for location, materials, literacy support, and intended length of time. Plan for one or several invitational (or provocation) opportunities. Various invitations and lessons have been planned for this unit. These include:* Daily talking circle where students will share their thoughts, knowledge and stories. This will also foster within students compassion and respect for their fellow classmates as they sit and listen to everyone’s story.
* Playful storytelling investigating where math lives within their inquiry.
* Creation of a collaborative work of art exploring how different lines work together to create numbers, patterns, and 3-D shapes.
* Invitation to explore the 3-D shapes they can create using paper, scissors, and tapes.
* Invitations to explore where various mathematical concepts live within their play, stories, and artwork.
* An invitation to work collaborative to explore where lines live in their drawings.
* An invitation to work collaboratively with grade 6 students to explore where mathematics lives in beading.
* Invitations and lessons that investigate where mathematics lives within the natural world (i.e. four seasons, circle of life, plant life surrounding the school).
* Various invitations and lessons to explore different ways to represent numbers.
* Various invitations to explore where mathematics lives within FNMI ways of knowing.

Locations: The various invitations and lesson will occur in the kindergarten classrooms, in our outdoor play area, and outside within the community.Length of time: This unit will be an on-going exploration taking place over the course of the entire year. Materials/resources available:There are various materials/resources readily available in our room. These include various loose parts, art supplies, open-ended materials, and literature. For the lessons and invitations of this unit, we plan on using many resources in the classroom including:* Loose parts.
* Open-ended materials, including miniature figurines of animals, transportation vehicles, and people.
* Fabric.
* Mirrors.
* Clip boards.
* Art supplies: paper, markers, paints, paint brushes, pastels, scissors, crayons.
* Trays.
* Mortar and Pestle.
* Magnifying glasses.
* Bowls, jars, spoons.
* Various learning materials.

What can I add:There are many things that I will add to the environment to support students in their investigations through play and further develop their thinking. Some of these include:* Class Floorbook to provide a real-time documentation of their knowledge, which will be readily available for them to view and reflect upon.
* Photographs and guiding questions to engage students during the various invitations and lessons.
* Literature that connects to the invitation and lessons being presented.

Each item added will be carefully thought out and placed in the environment to engage students and guide them in their pursuit of knowledge.Support or adaptations:* There will be many different opportunities for students to demonstrate their knowledge, thus enabling students to create products to share their knowledge. Some examples include oral storytelling, written stories, dramatizations, creating pieces of art, or creating images with loose parts.
* As we converse and interact with the students, we will make real-time adaptations to facilitate engagement in the learning experience. This could include introducing new materials (such as dice, pens, paper) to scaffold their play.
* Students will explore the various materials in their own way, thus ensuring that their work is authentic.
* Through recognizing the various learning schemas present in the students, we will be able to create experiences that awaken their mathematical minds and foster healthy risk taking to form personal strategies and test hypothesis surrounding the various mathematical concepts presented.
 | **Observations and responding to children’s interests through whole class opportunities:** Include the provocative text\* you intend to use. Plan for one or several experiences and/or opportunities. **\***provocative text includes oral stories, children’s literature, songs, fingerplays, photos, artifacts, demonstrations, videos, conversations, etc. Exploring how lines live in our world, and the math that lives within those lines.Day 1: This exploring will begin with an interactive read-aloud of the wordless book *The Line* by Paula Bossio. We will work collaboratively as a class to find the story hidden within the lines on the pages. Following the read aloud, students will have choice to explore invitations in which they can create their own line story or work with a partner to see how their lines merge together to make a story.Day 2: The following day, the students will work collaboratively to re-tell the story of *The Line*, while I draw the images they describe. Following this whole-group activity, an invitation will be present in which students can continue to draw line stories.Day 3: We will work together as a whole group to find the math hidden within our lines stories. Each student will be given a piece of paper on which they will draw a line. We will then put their lines together, and investigate each line one at a time to find the math hidden inside their lines. This could include counting the number of bumps they drew, comparing the size of their line to another’s, measuring their line and comparing the length to another class member’s line, and finding a pattern in the way the line is drawn.Ways to scaffold this investigation further:* Have students create personalized peg people, and have their peg people make lines and patterns.
* Have students paint with their feet to explore the lines and patterns they create as they move.
* Have students explore our outdoor play area to find lines in our natural world. How does math live within those lines?
* Where do lines live within Indigenous beading? What math can we find in Indigenous beadwork?
* Where do lines live within Indigenous dancing? What math can we find in Indigenous dancing?
* What shapes can our lines make?
* How do our lines form a circle? Where do we find circles in our world? How is the circle important in Indigenous ways of knowing? What math lives within our circles?
* How can mirrors double our lines?

Materials/Resources:* Various loose parts.
* Open-ended toys.
* Art mediums.
* Pencils.
* Paper.
* Fabric.
* Mirrors.
* Beads.

Literature: See Resources listed above. While all could be incorporated, some key literature includes:Bossio, P. (2013). *The line.* Toronto, ON: Kids Can Press.Burton, W., & Caron, A. (2015). *Métis dance shapes*. North York, ON: Pearson Education Canada.Carmi, G. (2015). *A circle of friends.* Cambridge, MA: Star Bright Books. Further support or adaptation:By performing multiple readings and invitations inspired by the book *The Line*, this offers students many ways (oral storytelling, dramatization, written or artistic representation) to explore the math living in their lines. |
| **Observations and responding to children’s interests through areas of exploration and play:**Plan for opportunities within the context of ongoing program environment areas such as: drama and role play, blocks and construction, science exploration, sensory experiences (rice, sand, water, lentils, etc.), art studio experiences (including paint easel, clay or other modelling modes, studio table, etc.), and the outdoors. Various opportunities will be presented to the students within the context of ongoing program environment areas. These will include:* Dramatic play using various loose-parts.
* Storytelling using various loose-parts, open-ended toys, art mediums such as paint, clay, markers, pastels, pens, crayon, scissors, glue, and using various spices, herbs and food.
* Sensory exploration using various loose-part, art mediums, spices, herbs, and fruit. These could include mixing spices and water to create recipes, exploring paint mixing, and painting using not only brushes but their hands and feet as well.
* Exploring the role of a presenter by re-telling their storytelling and knowledge to the entire class.
* Exploring our natural world within our outdoor space, school playground, and surrounding community.
 | **Observations and responding to children’s interests through small group opportunities:**What are the possibilities of support in specific developmental areas that you anticipate for individuals and small groups of children? Who will be the participants in these small group interactions? Support in specific developmental areas that you anticipate for individuals and small groups of childrenThroughout the course of the unit, we will be observing the specific needs of each student. From these observations, we will create invitations and lessons that will support each child in reaching the various curriculum and ECD outcomes associated with this unit. This could include provocations to develop their fine motor skills through cutting, or fostering their social development through partner play. Participants in small group interactions: Throughout the course of this unit, all students will participate in the various small-group interactions. This will enable us to document their learning, and ensure they are achieving the various outcomes associated with this unit. |
| **Culmination:** If required, how do you anticipate this learning time or area of interest to come to an end?  |
|  |

|  |
| --- |
| **Assess and Reflect (Stage 4)** |
| **Reflective Lens** |
| **🞏 belonging and contributing**How do children connect in meaningful ways to the people who are important to them? How do children make a positive contribution to their family, classroom, school, or community? Children connect to people through play. Play is their most authentic and meaningful form of communication. It is through play that they express themselves, their opinions, and their knowledge. Children are authentic. They are already all they need to be, with their own individual strengths, knowledge, skills, and personalities. It is through being their authentic selves that children contribute to their families, classrooms, schools, and communities. They view the world is a truthful way, and share their thoughts in an honest and poetic fashion that speaks from the heart. The wisdom they share with their community is valuable, and can be very impactful when they are viewed as capable and competent. **🞏 exploring and creating**How do children use their imaginations, explore their environments, show curiosity about the world around them, and question and theorize about how things work? How do children express themselves, experiment, construct their understanding, structure their thoughts, and develop their worldview?Children are natural born researchers. They have an innate sense of curiosity and wonder, and it is through play that they test personal strategies and take risks to learn about the world. Play helps them express their emotions, knowledge, and ideas. It allows children to construct understandings, structure their thoughts, and develop their worldview. Play is the vehicle through which children connect to and learn from their place, their peers, their families, and their community. It also facilitates the children to develop holistically, thus fostering a deep sense of self-worth and self-esteem that supports them throughout their lives.**🞏 understanding and sharing**What opportunities are there for children to develop and share their understandings? How do children draw on their potential using factual, conceptual, procedural, attitudinal, and metacognitive knowledge to make sense of what is being learned and to reflect on how they are learning? How do children represent their understanding to make sense of and express their ideas? As the purpose of this unit is to use a holistic approach to teaching mathematics, this lends itself to numerous opportunities for children to develop and share their understandings. Children will explore various mathematical concepts through numerous ways such as play, various small- and whole-group invitations, collaborative projects, dance, and song. This unit is based upon the concept of “student’s voice, student’s choice”. This allows for anything to be a mathematical opportunity if the educators listen and respond to childrens’ interests. Children draw on their potential through play and exploration. When they are free to explore, and test their hypotheses, they are able use their factual, conceptual, procedural, attitudinal, and metacognitive knowledge to learn, take risks, test hypotheses, develop personal strategies, reflect, and develop a deep understanding of various mathematical concepts. When given the ability to do so, children will represent their knowledge in the fashion that is most authentic to them. This unit offers children the freedom to represent their knowledge in multiple ways including oral conversations, story-telling, written word, dramatizations, and artistic representations. |
|  | **Comments** |
| **Goals and Results:****Is there alignment between learning outcomes, early childhood development, and assessment?** | Yes. This unit focuses on the holistic development of students, and infuses mathematics into every aspect of their day. Therefore, students will reach the curriculum and treaty outcomes associated with this unit while they explore, develop, and strengthen all early childhood developmental domains. Furthermore, evidence will be collected daily through anecdotal notes, documentation in the class Floorbook, photography, and by recording students’ quotes describing their work and knowledge. All this evidence will help guide lesson planning, and will provide a whole picture of students’ knowledge and skill.  |
| **Adaptive Dimension:** **Have I made purposeful decisions about individual and small group support, and/or the learning environment, to meet the learning needs and diversities of all the children? And of all families?** | Yes. The goal of this unit is to create a learning environment where students feel safe to take risks to deepen their mathematical understandings. As the educator, I will be listening and documenting students’ research as they play and explore, thus adapting and creating individual and small group support for students as the need arises. Furthermore, the learning environment is the third teacher in this unit. As such, it will be flexible, stimulating, safe, and inviting for not only students, but for their families and other members within our belonging school community. |
| **FNM/I Content and Perspectives/Gender Equity/Multicultural Education:** **Have I nurtured and promoted diversity while honoring each child’s personal, familial, and cultural identity?**  | The purpose of this unit is for students to recognize that to know mathematics is to know the world. It will infuse seamlessly with the ongoing inquiry of my first unit that focuses on honoring and valuing diversity. FNM/I ways of knowing are the foundation upon which this unit was created, as this unit is based upon holistic teaching practices and honoring individuals, community, and the natural world. This unit provides students with the opportunity to explore where math lives within FNM/I culture, and connect this exploration to their personal, familial, and cultural identity.  |
| **Next Steps:** **What happens next?** | Continual documentation and reflection of students’ learning to guide in planning meaningful educations experiences that fosters holistic develop of every student.  |

From: Wiggins, Grant and J. McTighe. (1998). *Understanding by Design*, Association for Supervision and Curriculum Development, ISBN # 0-87120-313-8 (pbk) and Saskatchewan Curriculum. (2009). *Children First: A Resource for Kindergarten*, p. 31.

**Appendix 1:**

|  |
| --- |
| **Guiding Principles of Early Learning****(adapted from Saskatchewan Curriculum: Kindergarten, 2010 and Play and Exploration, 2008)** |
| **Children as Competent Learners*** children are viewed as capable, competent thinkers who have multiple ways of knowing, doing, and understanding
* children come to school competent, inventive, and full of ideas that can be expressed in many ways

**Development and Learning as Holistic*** children are offered opportunities that support their holistic growth beyond their current level of knowledge, skills, interests, attitudes and abilities
* children learn through integrated experiences that support achieving outcomes of the seven areas of study and growth in each of the four dimensions

**Relationships as Opportunities*** relationships are opportunities for young children to create a sense of self, identity, and belonging while learning about the world around them
* relationships exist not only between people and the environment but also among ideas, theories, and belief systems

**Environments as Stimulating and Dynamic*** carefully designed environments are aesthetically pleasing and inspire children to wonder, ask questions and be curious
* environments that promote holistic nature of children’s learning encourage independence, responsibility, and participation
 |

**Appendix 2:**

|  |
| --- |
| **Broad Areas of Learning****(from Saskatchewan Curriculum: Kindergarten, 2010, pp. 2-3)**  |
| Lifelong Learners:* Within natural and constructed environments, children are encouraged to develop a positive disposition towards, and a passion for, learning
* holistic learning experiences provide children an opportunity to apply their knowledge and skills in daily life
* holistic learning engages children in meaningful play and inquiry

Sense of Self, Community, and Place* purposefully designed environments develop a positive sense of self, and a respect for their own and others’ ways of seeing the world
* purposefully designed environments encourage children to interact with each other, explore who they might become, and learn to appreciate diverse perspectives

Engaged Citizens* holistic learning opportunities empower children to develop courage, confidence, and commitment to be actively involved citizens
* children seek to discover who they are, envision who they might become, imagine possibilities and provide new ideas for building a sustainable future
 |

**Appendix 3:**

|  |
| --- |
| **Cross Curricular Competencies****(from Saskatchewan Curriculum: Kindergarten, 2010, pp. 3-4)** |
| Developing Thinking* addresses how people make sense of the world around them
* goals: thinking and learning contextually, creatively, and critically

Developing Identity and Interdependence* addresses the ability to reflect upon and know oneself, and act autonomously and collaboratively as required in an interdependent world
* goals: understanding, valuing, and caring for oneself, others, and social, economic, and environmental interdependence and sustainability

Developing Literacies* addresses a variety of ways to interpret the world and express understanding through words, numbers, images, sounds, movements, and technologies in various situations
* goals: constructing knowledge, exploring and interpreting the world, and expressing understanding and communicating meaning using various literacies

Developing Social Responsibility* addresses how people contribute positively to their physical, social, and cultural environments
* goals: using moral reasoning, engaging in communitarian thinking and dialogue, and taking action
 |

**Appendix 4: Example of Rubric to Assess Curriculum Outcomes**

