EDMONTON CATHOLIC SCHOOLS & UNIVERSITY OF ALBERTA

EARLY NUMERACY PARTNERSHIPS: EXPLORING PROFESSIONAL DEVELOPMENT TO ENHANCE EARLY NUMERACY

AMY SWINKELS & STEPHANIE POWER

NCTM Annual Conference 2018 – Washington D.C.
EARLY NUMERACY PROFESSIONAL DEVELOPMENT PROJECT
Monthly Professional Development Sessions

Thursday Mornings (3 hours): October 2016 – June 2018

NUMERACY COHORT:

- Preschool (100 Voices) Teachers + Early Learning Facilitators (9 teams)
  - Early Learning Consultants (Amy Swinkels & Stephanie Power)
- University Mathematics Education Researchers (Dr. Lynn McGarvey, Nicole Jamison, Barbara O’Connor)
• Early exposure to mathematics has a tremendous impact on children’s readiness for school and later school success (Bagiati, Yoon, Evangelou & Ngambeki, 2010)

• Mathematical thinking, however, beyond counting and shape labelling, has not been part of the educational experiences of many preschool teachers (Ginsburg, Lee, & Boyd, 2008)

• As a result, opportunities for rich mathematical interactions may go unnoticed (Ginsburg, Lee, & Boyd, 2008; Clements, Sarama & DiBiase, 2004)
PROFESSIONAL DEVELOPMENT GOALS:
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1. To increase teachers’ and facilitators’ knowledge and awareness of mathematics appropriate for young children and the ways they might support children’s learning.
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1. To increase teachers’ and facilitators’ knowledge and awareness of mathematics appropriate for young children and the ways they might support children’s learning

2. Change teaching practices so that educators purposefully plan for rich mathematical experiences and capitalize on mathematical opportunities that take place during common classroom routines and activities
**1ST PROFESSIONAL DEVELOPMENT SESSION (OCTOBER)**

- Introduction to the early numeracy professional development project & participant survey
  - Profile of the participants
  - Personal experiences and comfort with mathematics
  - Current preschool practices
  - Learning goals the cohort hoped to achieve while participating

- Results were used by the university researchers and early learning consultants to collaboratively plan and deliver subsequent PD sessions for the year.
How long have you been part of the 100 Voices Program? (21 responses)
PERSONAL EXPERIENCES WITH MATHEMATICS:

• 48% of the participants had positive experiences with mathematics and still do

• 29% struggled with mathematics in school and still do not feel confident

• 14% struggled in school but it is now an area of interest
CURRENT CLASSROOM PRACTICES:

The Kindergarten curriculum is based on the following four strands/substrands. Indicate how strongly you focus on these topics in your program.

- **Number**
- **Patterns**
- **3D/2D (Geometry)**
- **Measurement**

The bar chart shows the current focus areas for each strand, with labels indicating 'Strong focus', 'Moderate focus', 'Minimal focus', and 'Do not address'.
CURRENT MATHEMATICS RESOURCES:

• Pinterest

• Previously used mathematics ideas and materials

• Coworkers or preschool team

• Storybooks and literacy
NUMERACY COHORT PARTICIPANTS

COLLECTIVE LEARNING GOALS:

• How to incorporate more mathematics into classroom activities?

• What is considered developmentally or age appropriate?

• How to have purposeful, meaningful, interesting and fun mathematics?

• How to communicate and share mathematics information with parents?
NUMERACY COHORT PARTICIPANTS

COLLECTIVE LEARNING GOALS:

• Wanted opportunities for collaborative sharing of ideas
• Interested in increasing personal confidence with mathematics
• Interested in increasing mathematics knowledge and strategies
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FORMAT OF PROFESSIONAL DEVELOPMENT SESSIONS
1. Group sharing of classroom practices/activities related to the previous PD’s focus
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FORMAT OF PROFESSIONAL DEVELOPMENT SESSIONS

1. Group sharing of classroom practices/activities related to the previous PD's focus
2. Written reflections on understandings/practices related to a specific focus/strand in mathematics
2. Written reflections on understandings/practices related to a specific focus/strand in mathematics

Patterns and Relations

Patterns Free Write: 1) What do you think are the key ideas of patterns for young children? 2) Do you think it is important to teach patterns to your students? Explain and 3) What is one activity or action you observed related to patterns ideas within the past couple of weeks?

3 class comments
3. Presentation of current research, best practices, and discussion of challenges for a specific focus/strand in mathematics.
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**Spatial Orientation**

- First geometric experiences involve moving & using location (Shaw, 1999)
- One’s own position and movement through space --> abstract perspectives of maps' coordinates/symbols (Sarama & Clements, 1999)
- Goal: help children develop an intuitive feel for their surroundings & objects in them
- Can use a variety of indoor & outdoor activities --> movement / music / literature

**Language of Space**

(Sarama & Clements, 2009)

1. In/ On/ Under (topology) & Up/ Down (directionality)
2. Beside/ Between (proximity)
3. In Front Of/ Behind (frames of reference)
4. Left/ Right (learned later --> 6 - 8 years of age)

**Block Building**

- Block building is an effective tool to build spatial understandings (Caldera et al., 1999; Casey et al., 2008)
- Storytelling can give an effective context to improving spatial skills (Casey et al., 2008)
- Context can make mathematics meaningful to children (Casey, Erkut, Ceder, & Young, 2008)
- Embedding the mathematics in a context improves understanding and retention (Casey, Erkut, Ceder, & Young, 2008)

**Research and Best Practices in Patterns and Relation Activities**

**Patterns and Relations (Patterns)**

General Outcome: Use patterns to describe the world and to solve problems.

Kindergarten Specific Outcome

1. Demonstrate an understanding of repeating patterns (two or three elements) by:
   - identifying
   - reproducing
   - extending
   - creating patterns using manipulatives, sounds and actions.
4. Hands-on participation in teacher and student activities for a specific focus/strand in mathematics
FORMAT OF PROFESSIONAL DEVELOPMENT SESSIONS

4. Hands-on participation in teacher and student activities for a specific focus/strand in mathematics

- Select a spatial word from Rosie’s Walk or the list below:
  - In/ Out
  - Forward/ Backward
  - Top/ Bottom
  - Around/ Through
  - Over/ Under
  - In Front/ Behind
  - Up/ Down
  - Above/ Below

- Draw a picture representing the word & action using a prop in the room as a reference point
- If you finish early, select another word(s) to draw
- Stack the drawings in a pile for your table group to use

Block building activity

As you are working:
- What spatial reasoning skills are being used in each task in the activity?
- What problem solving and mathematical language is being built through the task?

- Sneeze Builds a Castle
- Getting to Know Myself
- The Circle Game

Where is the mathematics?

What spatial understanding is developed?

What might you do to make the spatial aspects of the dance more explicit for children?

Spatial Orientation Activities

1. SPATIAL TABLEAU: Select one of the cards and create a still image using your body (and props) to represent the spatial word for your group to guess

2. SPATIAL OBSTACLE COURSE: As a group, place your cards in a sequence and create an obstacle course (using props - i.e., chairs, tables, other items). Say your spatial action as you complete the movements
- If you finish your obstacle course:
  - Try it again by moving in a different way (i.e., slide, crawl, etc.)
  - Rearranges your cards and creates a new obstacle course
5. Collaborative planning time for teacher and facilitator teams (commit to try)
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<td>General Outcome</td>
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<td>Describe the characteristics of 3-D objects</td>
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<td>and 2-D shapes and analyze the relationships</td>
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<td>2. Sort 3-D objects, using a single attribute. [C, GN, P6, R, V]</td>
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Edmonton Catholic Schools

UNIVERSITY OF ALBERTA
PROFESSIONAL DEVELOPMENT GOALS:

1. To increase teachers’ and facilitators’ knowledge and awareness of mathematics appropriate for young children and the ways they might support children’s learning

2. Change teaching practices so that educators purposefully plan for rich mathematical experiences and capitalize on mathematical opportunities that take place during common classroom routines and activities
PRELIMINARY FINDINGS

1. To increase teachers’ and facilitators’ knowledge and awareness of mathematics appropriate for young children and the ways they might support children’s learning
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**GEOMETRY REFLECTIONS**

**Initial Understandings**

- Learning about shapes (labelling/observing)
- Spatial awareness and visual perception (2)
- Connection to measurement (1)
1. To increase teachers’ and facilitators’ knowledge and awareness of mathematics appropriate for young children and the ways they might support children’s learning

GEOMETRY REFLECTIONS

**Initial Understandings**
- Learning about shapes (labelling/observing)
- Spatial awareness and visual perception (2)
- Connection to measurement (1)

**After PD Session/Classroom Implementation**
- Distinction between 2D shapes and 3D objects
- Identifying shapes (labelling) but also attributes/classifying/comparing
- Building 2D shapes and 3D objects
- Spatial awareness, directions, mapping, and sequencing
- Connection to measurement and number sense
PRELIMINARY FINDINGS

1. To increase teachers’ and facilitators’ knowledge and awareness of mathematics appropriate for young children and the ways they might support children’s learning

FINAL SURVEY REFLECTIONS

• “I feel more confident in planning appropriate activities focusing on Math for this age group”

• “As an educator, I gained increasing confidence in math concepts”

• “I have become more aware of purposeful, developmentally appropriate ‘math’ activities”
2. Change teaching practices so that educators purposefully plan for rich mathematical experiences and capitalize on mathematical opportunities that take place during common classroom routines and activities.
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FINAL SURVEY REFLECTIONS

- “Participating in this cohort has drastically changed the intentionality of our whole group and small group numeracy conversations. We have as a classroom staff pushed ourselves to think more mathematically in the classroom and encourage students to do so. Our preconceived notions of what our students can understand with respect to mathematics has changed drastically.”
Classroom Examples

**Common Core Geometry Standards**

**CCSS.Math.Content.K.G.A.2**
- Correctly name shapes regardless of their orientations or overall size.

**CCSS.Math.Content.K.G.B.5**
- Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

**CCSS.Math.Content.K.G.B.6**
- Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?"

**WNCP**

**General Outcome**
Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.

**Specific Outcomes**
- Sort 3-D objects using a single attribute.
- Build and describe 3-D objects.

[C, CN, PS, R, V] [CN, PS, V]
Familiar activities:

- Read books about shapes
- Find shapes in the environment
- Explore shapes with puzzles
EXPLORING SHAPES

In 100 Voices we have read several books about shapes and finding shapes everywhere! We use shapes to draw ourselves, we match shapes to things in the world, we put together shape puzzles, use shape blocks to build, and look for shapes on our clothes.

Not only is it fun to explore shapes, it is great for building language, it is great for paying attention to details: matching, noticing similarities and differences, comparing sizes, looking at colors, exploring what you can build with different shapes, sorting various shapes, etc. It assists with early numeracy, community and environmental awareness, early literacy and more!

New activities:
- Match shapes
- Display shapes in different rotations
- Notice similarities and differences
- Sort shapes (attributes)
### Common Core Geometry Standards

**CCSS.Math.Content.K.MD.A.1**
Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

**CCSS.Math.Content.K.MD.A.2**
Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

### How Long is Our Hockey Rink?

In small groups, we asked the students how we could measure the length of our hockey rink. Alex thought we should use our arms to measure.

The group joined hands to measure the length with their arms. They realized this did not work when Claire said she was too long and touched the wall.

We sat down to problem solve: "Our arms are too long to measure. So what else can we use?"

**CCSS.Math.Content.1.MD.A.2**
Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
CLASSROOM EXAMPLES

HOW LONG IS OUR HOCKEY RINK?

**General Outcome**
Use direct or indirect measurement to solve problems.

**Specific Outcomes**
- Use direct comparison to compare two objects based on a single attribute, such as length (height), mass (weight) and volume (capacity).

[C, CN, PS, R, V]
CLASSROOM EXAMPLES

HOW LONG IS OUR HOCKEY RINK
PART 2

We made 'skates' for our rink and sorted them into sizes: small, medium and large. The first group decided to use the large skates to measure the length of the rink. The teacher put two skates down first and asked the children how many skates long the rink would be. There were guesses such as 100, 20 and infinity! Some students studied the skates carefully and then counted imaginary skates all the way to the end of the rink. Alex predicted the rink would be 10 skates long.

The students placed the skates end to end to count them. When they ran out of large skates, they had a difficult time deciding what to do next. One child added small sized skates but the other children said they were not the same and took them off the rink. The teacher suggested we remember the count of 6 and then remove one of the skates from the beginning of the line and add it to the end and continue counting. The students did not like this option. This was a difficult concept to understand. Many students finished the activity saying the rink was 6 skates long rather than 10 skates long. I believe this was because there were only 6 concrete skates visible to them.
Familiar activities:

- Introducing measuring with nonstandard units and concrete objects
CLASSROOM EXAMPLES

NEW ACTIVITIES:

- Using a variety of nonstandard units and concrete objects to measure
- Discussion about which unit was more or less (comparing quantities)
CLASSROOM EXAMPLES
CLASSROOM EXAMPLES
We need to measure this. It's gonna be big. Really big. Like as big as me. - Shep

How are you going to remember how big it is - Mrs. K

Um, we have to write down the numbers. Quick. I need writing paper. - Huixin

Look! Now I know it's as big as me. I used me to measure.
We asked the children what they wanted to learn about last week. A group of children in the morning class wanted to learn about bees, and in the afternoon they wanted to learn about tigers. Our interpreter, Mr. Robert, sat and taught the children as they ate their snacks, and then took them to visit the insect and animal sites in the zoo. We are very lucky to have an interpreter twice a week as part of our program!
After watching Lucy paint with her trunk we put paint brushes into the end of pool noodles and tried “trunk painting” ourselves. I think that Lucy would be impressed!
Pre-Kindergarteners going on to become Physiotherapists
By Jasmine Spraakman, Zoo Experiences Program Manager (Edmonton Valley Zoo)
February 1, 2018

Meet Frodo, the Edmonton Valley Zoo’s resident 20-year-old Central Asian Tortoise. Frodo came to the zoo after being confiscated by Canada Border Services Agency from a passenger returning from Europe. Frodo had a vet check recently and it was noted that he had some weakness in his rear limbs. The zoo’s vet, Dr. Limoges, recommended that he get daily exercise over uneven terrain to help his back legs get a little stronger. The animal care and zoo experiences teams put their heads together to find a solution to get Frodo some more daily exercise.

They had an idea to move him into the 100 Voices Pre-Kindergarten classroom. Recently, the Pre-K classroom lost their friend Floppy, a lop-eared rabbit, to old age. They did such a great job creating an exercise area for Floppy (who was blind) that they thought it was a great idea to move Frodo into their classroom and get the whole class involved with his rehabilitation! Working with a zookeeper, the class built Frodo a ramp and a new area where he can exercise.

The children in the 100 Voices classroom get to try out news activities with Frodo and interact with him daily. They recently found out that he gets very excited when he sees his reflection in the mirror and have used this tactic to get him to walk up his new ramp.

The 100 Voices Pre-Kindergarten program is in partnership with the Edmonton Catholic School District. They have 19 classes in City of Edmonton recreation centres and attractions facilities, including two at the Edmonton Valley Zoo.
We were entrusted with a new class pet this week... Frodo the tortoise. We discovered that he gets very excited when he sees his reflection in the mirror.

Our interpreter Miss Brenna showed us a turtle and taught us about the differences between turtles and tortoises. We learned that turtles have flippers and tortoises have legs, turtle shells are flat and tortoise shells are dome shaped, turtles are omnivores and tortoises are herbivores, and turtles live in the water some or all of the time and tortoises live on land.
Zookeeper Karyn asked us to build a ramp to help strengthen Frodo’s legs. The children began experimenting with materials that they thought would work. They thought that putting two narrow pieces of wood together would be wide enough... but then we measured the width of Frodo and decided that it would be better to use wood that was wider than he was. The children also decided to put rails on the side for safety. The children worked hard at hammering the sides on the ramp.

Once it was complete we tested it out. We placed a mirror in front of Frodo and he eagerly chased it to interact with his reflection!
Tortoise Town will be a work in progress, but for now it provides different kinds of surfaces for Frodo to explore, complete with a soaking pool and a UV lamp. He travels constantly and seems to enjoy being able to move around freely. The children enjoy watching him.
“Spatial thinking is integral to everyday life. People, natural objects, human-made objects and human-made structures exist somewhere in space, and the interactions of people and things must be understood in terms of locations, distances, directions, shapes, and patterns” (National Research Council, 2006, p.5)

Mathematics achievement is related to spatial abilities

Two types of competencies (Sarama & Clements, 2009):

SPATIAL VISUALIZATION & SPATIAL ORIENTATION
“Spatial visualization involves understanding and performing imagined transformations of two- and three-dimensional objects, including motions, matching, and combining” (Sarama & Clements, 2009, p.183)

Generating or creating a mental image and manipulating it (sliding/turning/flipping/diagonal)
First geometric experiences involve moving & using location (Andrews, 1996)

One’s own position and movement through space --> abstract perspectives of maps/coordinates/symbols (Sarama & Clements, 2009)

Goal: help children develop an intuitive feel for their surroundings & objects in them

Can use a variety of indoor & outdoor activities --> movement/music/literature
LANGUAGE OF SPACE

(Sarama & Clements, 2009)

1. **In/ On/ Under** (topology) & **Up/ Down** (directionality)
2. **Beside/ Between** (proximity)
3. **In Front Of/ Behind** (frames of reference)
4. **Left/ Right** (learned later --> 6 - 8 years of age)
As you watch Rosie’s Walk:
- Pay attention to the spatial vocabulary or “language of space” used
- Consider how to represent these words with a drawing
- Consider what actions & movements could represent these words
Rosie the hen went for a walk
across the yard
around the pond
OVER THE HAYSTACK
PAST THE MILL
THROUGH THE FENCE
UNDER THE BEEHIVES
and

got back in time

for dinner.
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<td><strong>CCSS.Math.Content.K.G.A.1</strong></td>
<td><strong>Spatial Sense</strong></td>
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<td>Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.</td>
<td>Spatial sense involves visualization, mental imagery and spatial reasoning. These skills are central to the understanding of mathematics. Spatial sense enables students to reason and interpret among and between 3-D and 2-D representations and identify relationships to mathematical strands.</td>
</tr>
</tbody>
</table>
Select a spatial word from Rosie’s Walk or the list below:

- In/ Out
- Top/ Bottom
- Over/ Under
- Up/Down
- Forward/ Backward
- Around/ Through
- In Front/ Behind
- Above/Below

Draw a picture representing the word & action using a prop in the room as a reference point.

If you finish early, select another word(s) to draw.

Stack the drawings in a pile for your table group to use.
SPATIAL ORIENTATION ACTIVITIES

1. SPATIAL TABLEAU: Select one of the cards and create a still image using your body (and props) to represent the spatial word for your group to guess.

2. SPATIAL OBSTACLE COURSE: As a group, place your cards in a sequence and create an obstacle course (using props - i.e., chairs, tables, other items). Say your spatial action as you complete the movements.

- If you finish your obstacle course:
- Try it again by moving in a different way (i.e., tiptoe, crawl, etc.)
- Rearrange your cards and create a new obstacle course
- Switch cards with another group and create a different course
CLASSROOM EXAMPLES
Curricular Links

**Early Numeracy:**
Describe the characteristics of 3D objects and 2D shapes, and analyze the relationship among them.
1. Build and describe 3D objects

**Early Literacy:**
The child listens, speaks, reads, writes, and represents to manage ideas and information and enhance the clarity and artistry of communication
~ The child represents and talks about ideas and information; dictates to a scribe
~ The child explores and experiments with new words and terms associated with topics of interest

**Physical Skills and Well-Being:**
~ The child experiences and develops locomotor skills through a variety of activities; e.g., walking, running, hopping, jumping, leaping, rolling, skill if, galloping, climbing, sliding
~ The child experiences and develops nonlocomotor skills through a variety of activities; e.g., turning, twisting, swinging, balancing, bending, landing, stretching, curling
~ The child experiences the basic skills in a variety of environments
~ The child experiences educational gymnastics

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100 Voices

**Mathematics**
Visual-Spatial Skills, Integrating 2D and 3D Objects, Physical Skills and Speech and Language for Prepositions

**Introduction**
Over the past week, we read the book Rosie's Walk by Pat Hutchins, watched the video, and discussed what happened to the hen Rosie and the fox in the story.
Obstacle Course

"Roll down!"
"Walk on top!"
"Jump over!"
"Climb up!"
"Go in!"
"Go under!"
"Hop in!"
"Over!"
"Under!"

Conga Line

We extended our learning of prepositions by having friends hold the stick and telling them to move it higher or lower, or up or down.
Making Maps

The children enjoyed using their map to make their own obstacle course in the gym. We read My Map Book by Sara Fanelli, which inspired them to make a road map, a body map, a playground map and a family tree map so far...

100 Voices Walk Outside

When the weather was warm enough we took a walk around the playground. The children told me what they were doing... working in our prepositions!

- "On top of the table"
- "Behind the bars"
- "Down the stairs"
- "Up the stairs"
- "On the snow"
- "On top"
- "Across the steps"
- "Inside the tube"
On the Smartboard there were pictures of gym equipment, the children drew a shape and helped make an obstacle course in the order they wanted. The next day, we transferred our map to paper to bring with us to the gym. We labeled what the children told us they could do at each spot.

**Making Our Obstacle Course Map**

**Building Our Obstacle Course From Our Map**

Our map was brought to the gym to assist us in building our obstacle course. The children set up and took down the equipment! They also used the map to tell us where they would like to start first.

"I will start here."

"I can roll the trampoline!"

"We will finish. Need mats."

"I can push the wall!"
CLASSROOM EXAMPLES

Mapping Rosie's Walk

"I want haystack down"

"She goes through the fence..."

"Go around here"

"Okay I am gonna move Rosie"

"Fox is hiding under her house"

An image of Rosie's Walk was left on the Smartboard during center time. A couple of children came over and moved the hen around the map to retell the story. When asked if they could make a map for Rosie, they moved the objects, drew where to go and then moved the hen and fox from start to finish.

100 Voices Walk Inside

Because the weather was too cold to go outside for a walk of our own, we went for a walk in the school.

We ended up in the gym where there was an obstacle course set up already! The children were introduced to the different equipment and asked them what we could do at each stage...
CLASSROOM EXAMPLES

The carpet. I go over there at the dinosaur table. Then I go under the fun foam table. I go around it, the art table (easel) and then I go to this table. Now upstairs, I want to go back to the carpet.
100 Voices Walk Outside

When the weather was warm enough we took a walk around the playground. The children told me what they were doing... working in our prepositions!

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- "Behind the bars"
- "Down the stairs"
- "Up the stairs"
- "On the snow"
- "On top"
- "Across the steps"
- "Inside the tube"

New activities:

- Focus on spatial orientation for geometry
- Use more prepositions in a variety of activities
Classroom Examples

Santa's Walk at the Clareview Recreation Centre

Over the bench
Under the chairs

Jaeden: Hey this is just like 'Rosie's Walk'!

Around the pendulum
And through the gym
MARY AND JOSEPH’S WALK

We read the Nativity Story many times. We asked the children: “What do you think Mary and Joseph saw while they walked to Bethlehem?” The children thought Mary and Joseph walked through the desert. We researched photos of the desert and the children decided Mary and Joseph would see cactus plants, mountains, sand and rocks.

We brought in a cactus and used rocks to build mountains. The children added to the Nativity Story by describing Mary and Joseph’s Walk. We created a map with string as the Mary and Joseph figures walked to Bethlehem.

Our Map Mary and Joseph walked around the cactus, past the rocks and over the mountain.
The children looked at maps and then drew their own map describing how Mary and Joseph walked to Bethlehem.

DRAWING MAPS OF MARY AND JOSEPH’S WALK
### Common Core Geometry Standards

**CCSS.Math.Practice.MP1**  
Make sense of problems and persevere in solving them.

**CCSS.Math.Practice.MP2**  
Reason abstractly and quantitatively.

### WNCP

- Problem Solving [PS]
- Reasoning [R]
- Technology [T]
- Visualization [V]
2. Change teaching practices so that educators purposefully plan for rich mathematical experiences and capitalize on mathematical opportunities that take place during common classroom routines and activities.

FINAL SURVEY REFLECTIONS

• “I have realized that mathematics is much more than just counting with children. Math is part of everyday in our classroom.”

• “This cohort has reaffirmed the notion that children in early childhood classrooms know and understand more than we give them credit for.”
2. Change teaching practices so that educators purposefully plan for rich mathematical experiences and capitalize on mathematical opportunities that take place during common classroom routines and activities.

REFLECTING ON CLASSROOM PRACTICES:

The Kindergarten Curriculum is based on the following four strands/substrands. Indicate how strongly you focused this year on these topics in your program.
PROJECT EXPANSION FOR 2017-2018

- Continue to work with the current preschool numeracy cohort (15 educators)
- Expand to a second preschool cohort (20 educators)
- Expand to all kindergarten teachers (45 teachers)
- Develop an early learning mathematics resource for preschool and kindergarten
THANK YOU!

AMY SWINKELS & STEPHANIE POWER

lynn.mcgarvey@ualberta.ca
amy.swinkels@ecsd.net
stephanie.power@ecsd.net
REFERENCES