BUSKERIZING MATH

Ontario Teacher's Federation Grant

2017

Rebecca Stewart and Kelly Johnson

Roch Carrier French Immersion Public School

Thames Valley DSB

HOW THE PROJECT BEGAN AND ADAPTED OVER TIME

- Last year, Rebecca and Kara applied for the grant together. They submitted a team including themselves, Kelly, and Emma.
- Due to staffing changes over the summer and in the fall, the team changed again. As the project continued to evolve, so did the team.
- We were fortunate to be able to meet with Kelly, Rebecca, Meg, Erica, Patti, and Mylène in February to introduce our materials.
- We met last week with Kelly, Rebecca, Erica, Mariam, Patti, and Mylène to revisit student and teacher learning and to document that learning
- Kelly and Rebecca have one more meeting to complete and submit the final report to OTF.

WHAT HAS BEEN DONE?

NOVEMBER

- Filling out forms
- Planning and revising the plan due to reorganization
- Booking dates for the rest of our meetings
- Planning our budget

DECEMBER

- Searching for and ordering whole-body math resources in order to have them for our February 10th – P.D. Day (half day with the team) – looked into Learning Carpet options,
- Looking into options for our pavement painting – Creative Playgrounds

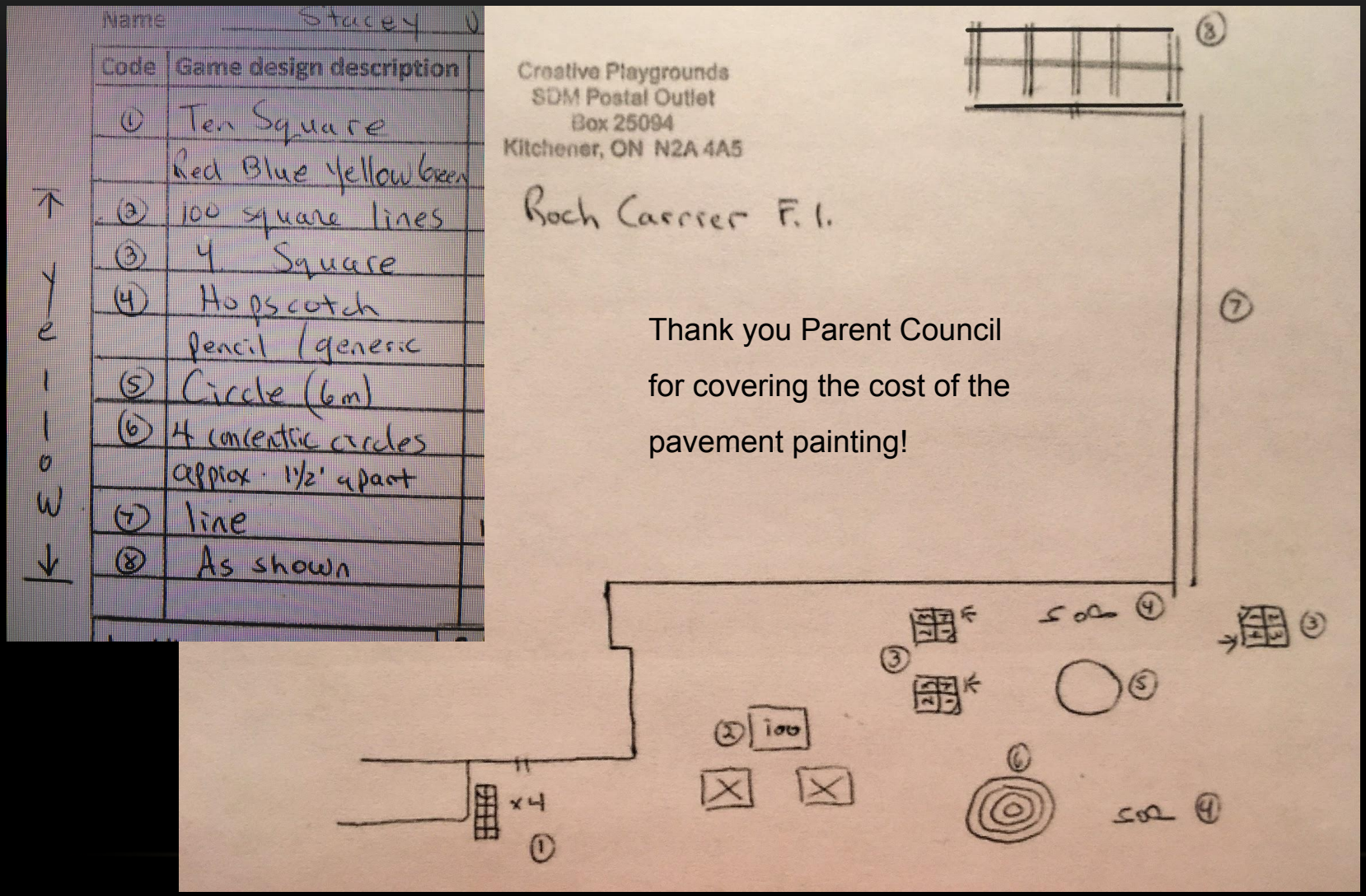
FEBRUARY

- Giving ECEs, masters student, and Instructional Coach an overview of our project
- Submitting our ideas for tarmac painting to Parent Council for approval – a number line, a blank hundreds chart (that we could use as a hundreds chart, a graph, etc.), ten frames, hopscotch, target, and large blank circle (to be used as a clock, split into fractions, etc.)
- Opening our new resources and exploring them. Talking about how we felt the students might use them.
- Translating the vocabulary cards into French for the magnetic polydrons and the giant polydrons so we could expose the students to this vocabulary as they explored the materials
- Composing lists of vocabulary we might use with the students as we explore these resources in class. We referred to the EQAO vocabulary list so we could find words we might be able to incorporate into our daily play-based math learning times, allowing students to become more familiar with the terms they would be required to use at a later date.
- Talking about ways to measure student growth: documentation on Seesaw and Fresh Grade, learning stories, observations, invitations and provocations, conferencing, videos, journals, etc.

MARCH

- Meeting with Creative Playgrounds, Stacey Vries, and Nick to map out the tarmac painting for the school.
- Reviewing and reflecting upon student growth, planning next steps, and assessing the success of the project.
- Presenting our project to the RCFI Staff at the March PD Day.

TARMAC PAINTING – HAPPENING SOON!



PLAY-BASED LEARNING

- As everyone is now aware, kindergarten has a new curriculum that involves play-based learning.
- It is important for us as kindergarten educators to create a play-based environment that is rich in math and language learning opportunities.
- We want to provide intentional materials to explore concepts based on their needs and interests.
- We also want to push the students' thinking further by asking meaningful, open-ended, and thought-provoking questions.

MATERIALS WE PURCHASED TO ENRICH OUR PLAY-BASED LEARNING PROGRAM

- Giant Polydron Set
- Giant Octoplay 40 Piece Set
- Magnetic Polydron Class Set
- Magnetic Spehra Polydron Class Set
- Number Line Floor Mat 0-30
- Cumulo
- Alex Lawson Books
- Blokus
- Twister
- Torreto
- Circle Time Activity Set
- Magna-tiles
- Clever Circles
- Large Magnetic Pattern Blocks
- Large Whiteboard for SKA room

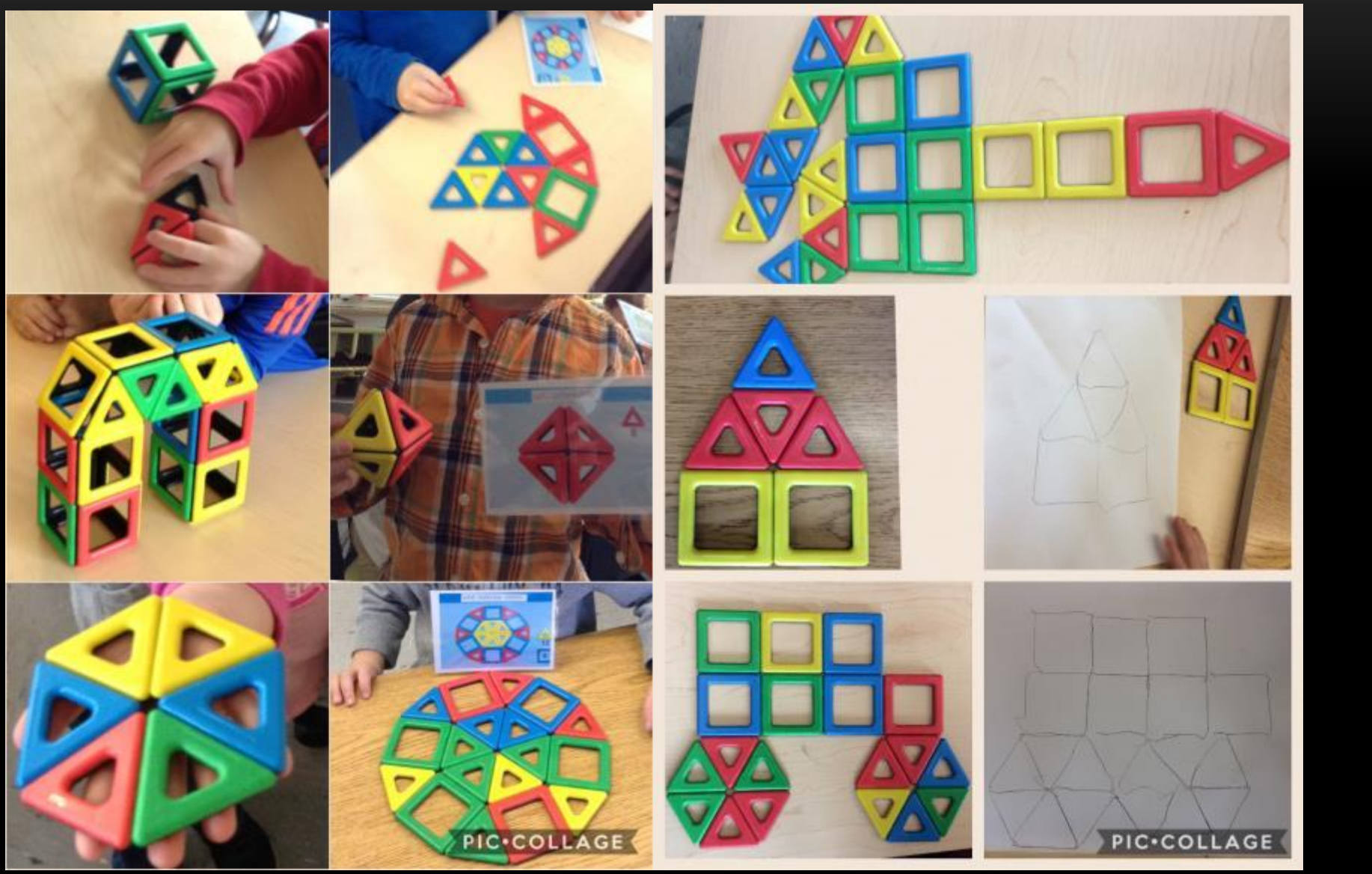
GIANT POLYDRON SET

BUILDING A TOWER

- G: “Put down the floor, then the walls, then the roof.”
- M:”You put the roof on, then you go in.”
- D:”We were starting to make a little house and then we decided to make a selfie house.”
- M:”Today we’re making a different kind of house called a shop house that all three of us will fit in.

GIANT OCTOPLAY

MAGNETIC POLYDRON CLASS SET

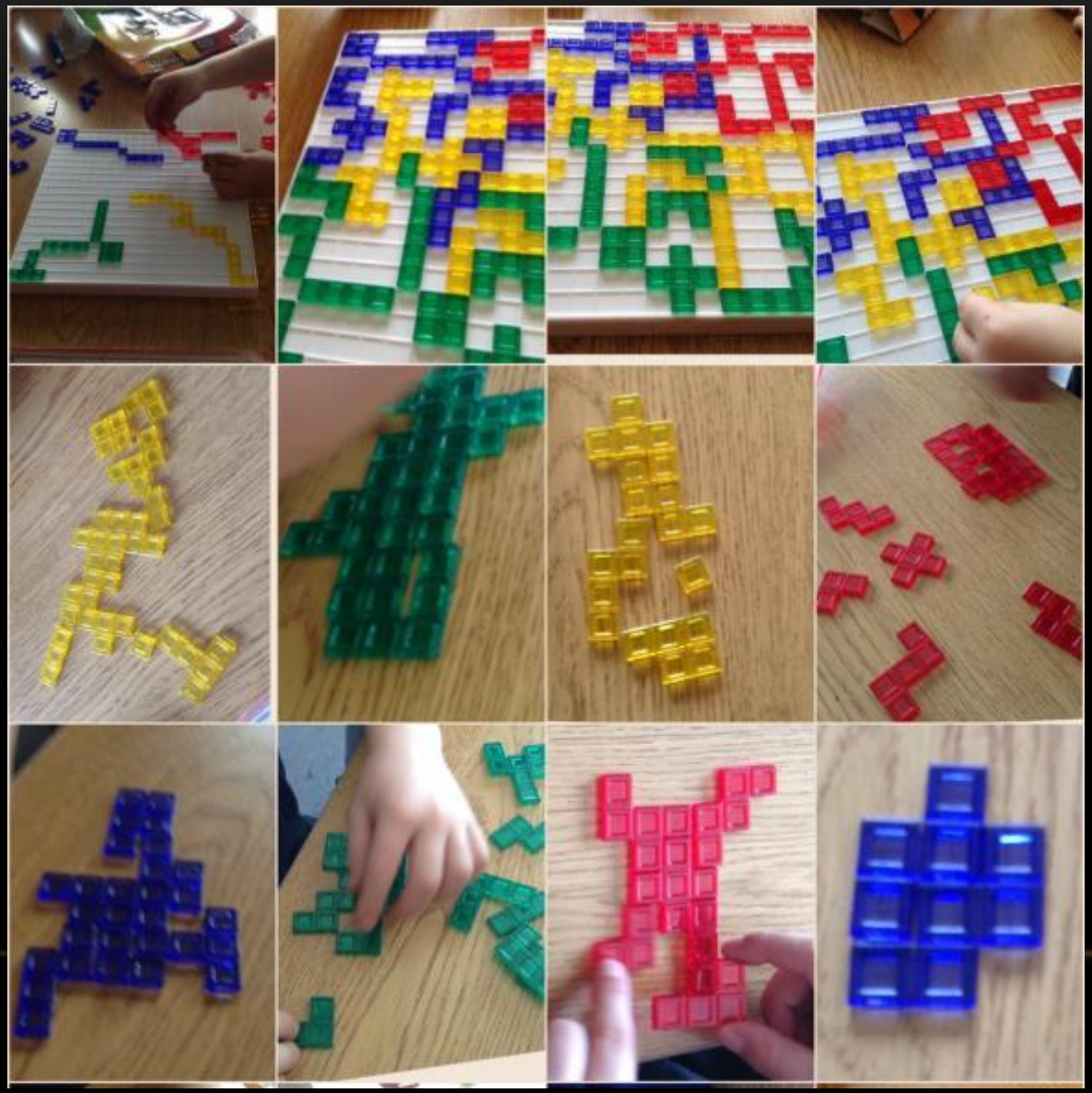


MAGNETIC POLYDRON SPHERA CLASS SET

NUMBER LINE FLOOR MAT 0-30

CUMULO

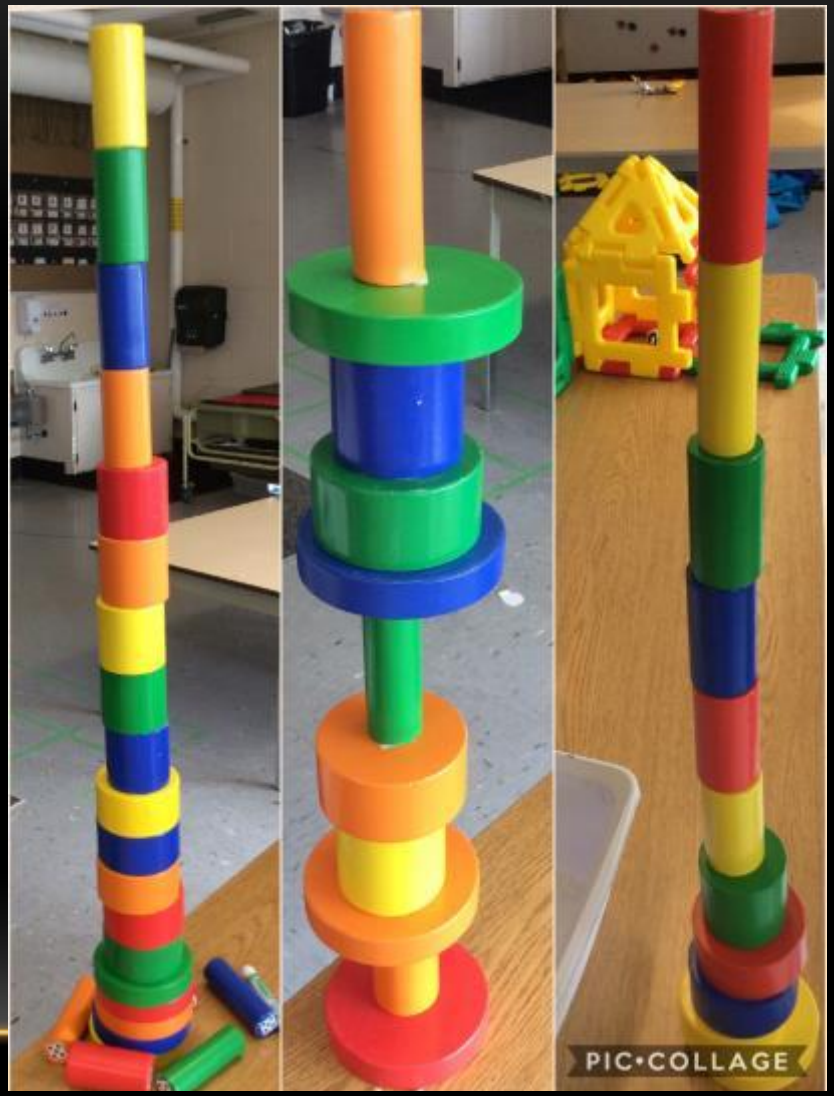
BLOKUS



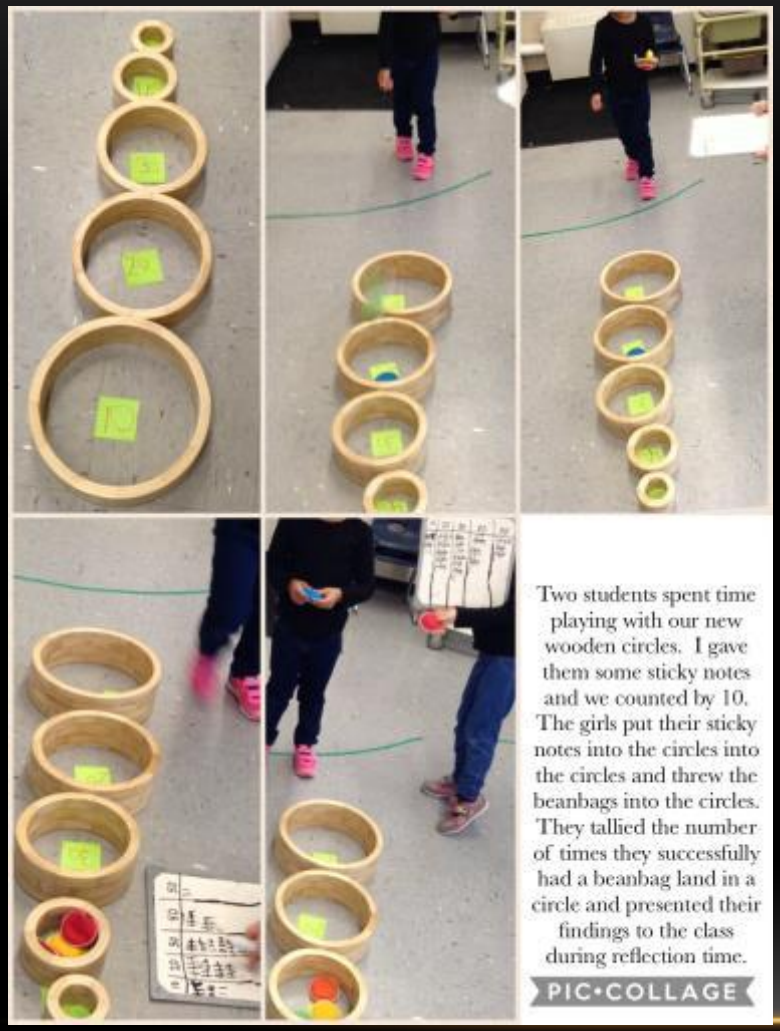
TWISTER

CIRCLE TIME ACTIVITY MAT

TORRETO



CLEVER CIRCLES



PATTERNING

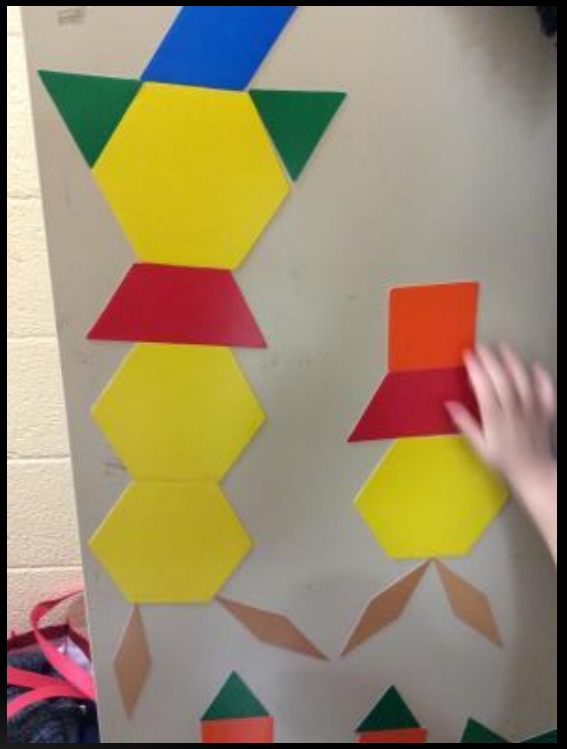
Two students were working with the circles and a bag of foam hearts in three sizes. On the smallest wooden circle, they used the smallest hearts in an ABC pattern. On the largest circle with the largest hearts, they created an ABC pattern. On two interior circles they used the medium hearts to create an ABC pattern and an AABC pattern.

MAGNA-TILES

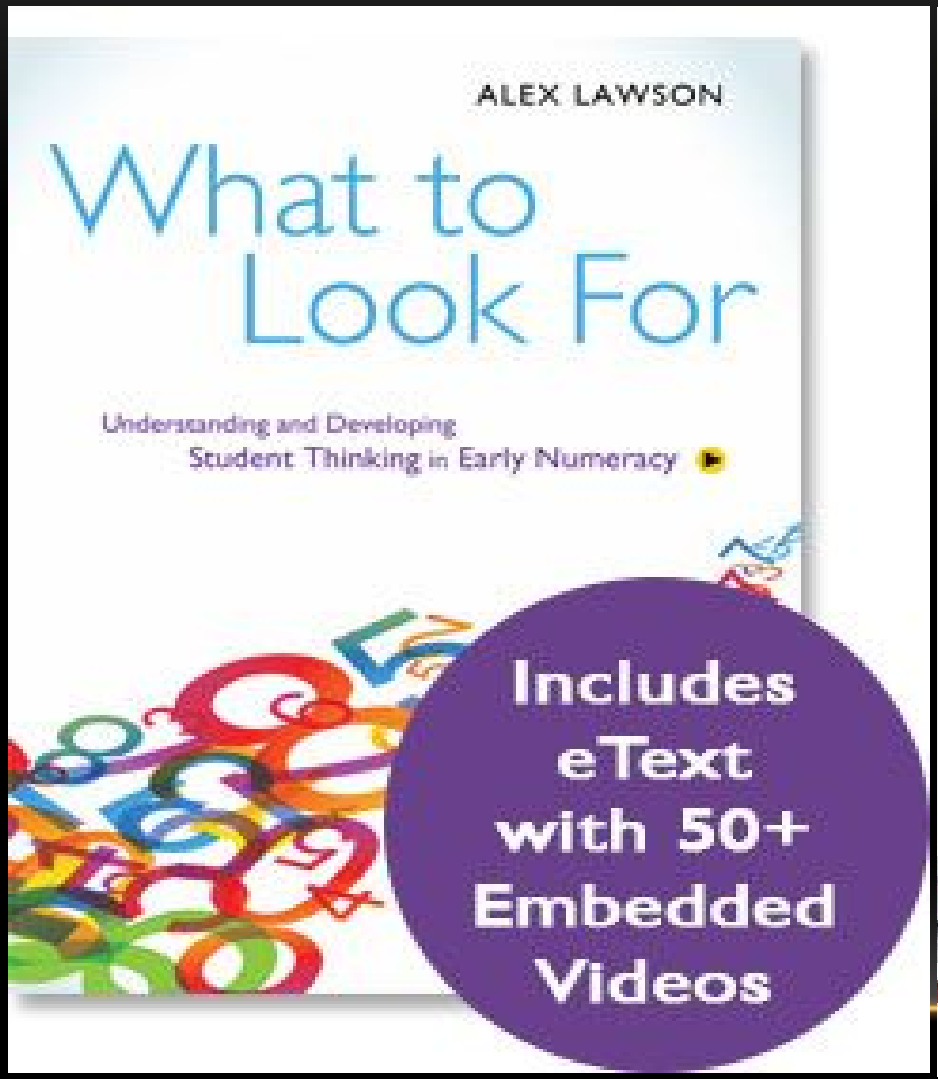
GIANT MAGNETIC PATTERN BLOCKS

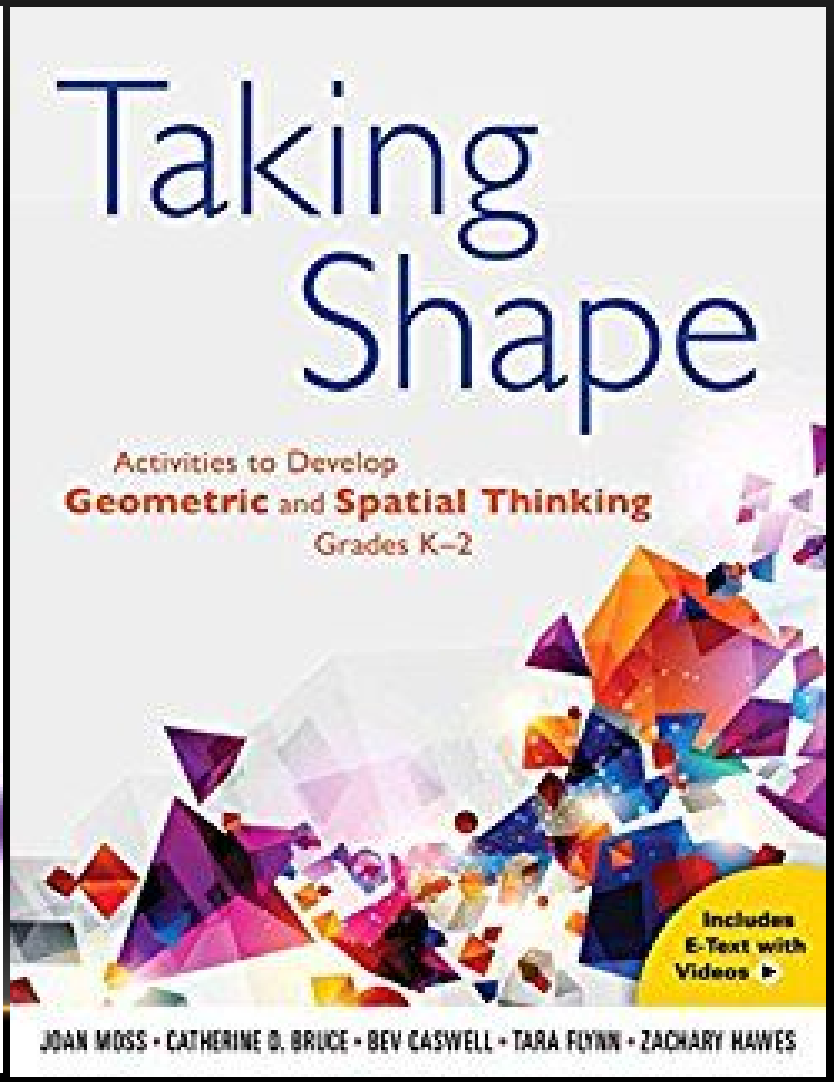
Rockets

Toopy and Binoo

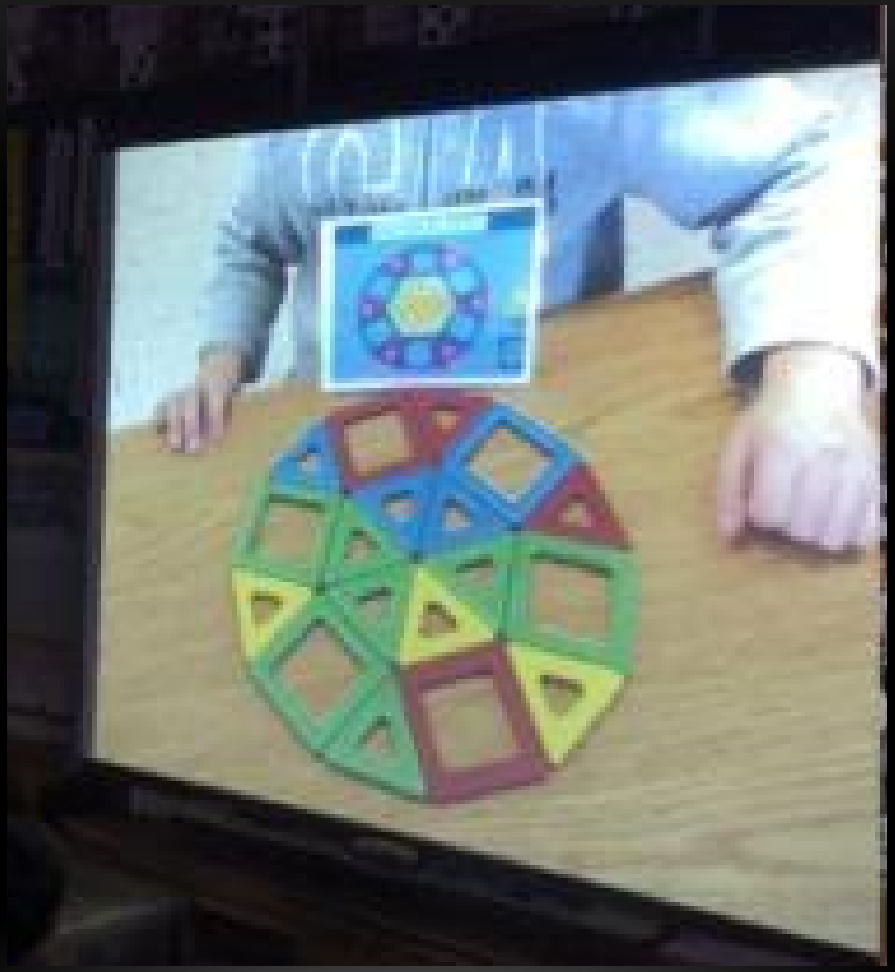


ALEX LAWSON BOOKS





STUDENT CONFIDENCE AND VOCABULARY-BUILDING



DOCUMENTATION

Stages of Block Play

(from Thinking it Through: Assessment that Informs Instruction ETFO 2010, p. 64 Appendix 4)

Stages of Block Play

Unit blocks were invented by Caroline Pratt in 1914. After observing children's block play, Harriet Johnson (1966/1933) developed the following stages of block play.[38] Repetition is evident throughout most of the stages.

Stage 1
- Children carry blocks without building with them

Stage 2
- Horizontal towers or vertical rows
- Tiling on flat surfaces such as floors and walls

Stage 3
- Bridging

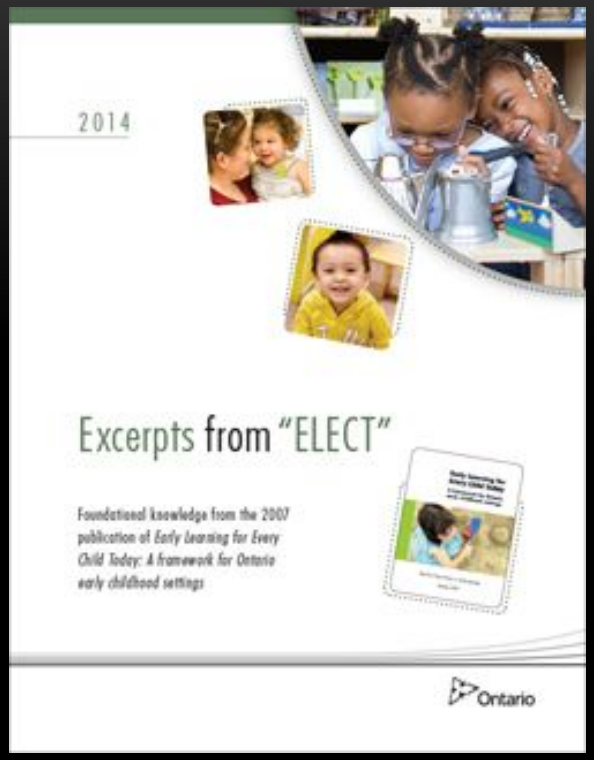
Stage 4
- Enclosures

Stage 5
- Symmetry, patterns for decoration

Stage 6
- Representation
- Structures named in relation to their function

Stage 7
- Representation
- Pre-planning of structures evident
- Used in dramatic play
- Reproduction of known structures[39]

What stages of development are represented in these photos?



The continuum of child development provides descriptors for consecutive age groups. The stages of development can be traced from birth to school age. The stage a child is at can be identified and the zone of proximal development so that prompts and provocations will foster the development of the child.

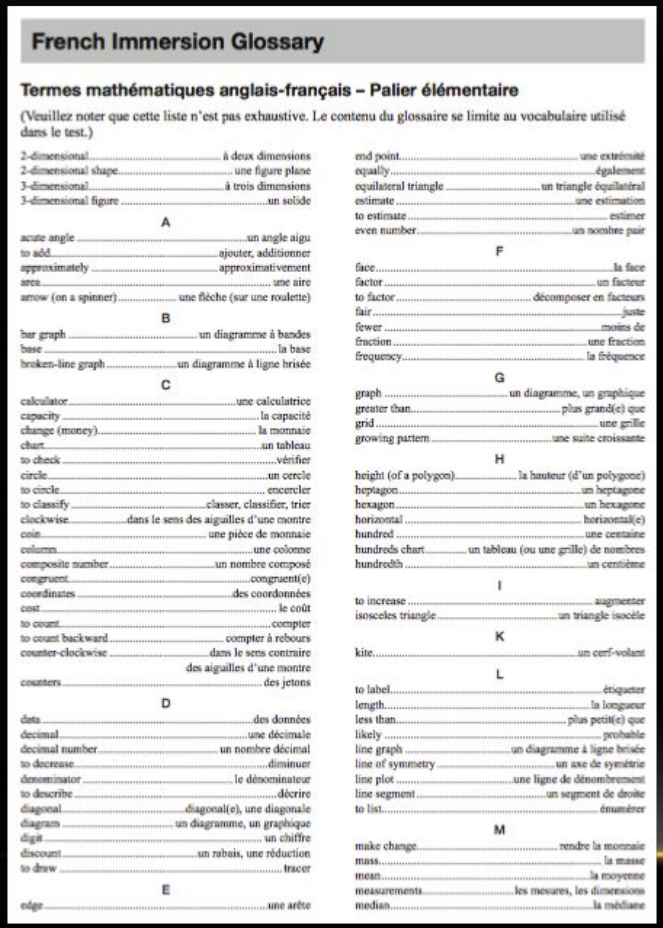
- **4.9 Sorting** • grouping like objects together (Infants: Birth to 24 months)
- 4.9 Sorting • sorting and labeling objects by characteristics, such as hard and soft or big and small • matching items by function (e.g., spoon with bowl) (Toddlers: 14 months to 3 years)
- **4.10 Classifying • sorting objects, pictures and things into groups • comparing, matching and sorting according to common properties • comparing objects • moving from random classification to classifying by one and then two or more properties (Preschool children: 2.5 to 6 years)**
- **4.6 Classifying** • creating hierarchies • creating sub-categories and -classes • understanding relationships between categories in the hierarchy (School-age children: 5 to 8 years)

DEMONSTRATING LITERACY AND MATHEMATICS BEHAVIOURS

- 15. demonstrate an understanding of numbers, using concrete materials to explore and investigate counting, quantity, and number relationships
- 16. measure, using non-standard units of the same size, and compare objects, materials, and spaces in terms of their length, mass, capacity, area, and temperature, and explore ways of measuring the passage of time, through inquiry and play-based learning
- 17. describe, sort, classify, build, and compare two-dimensional shapes and three-dimensional figures, and describe the location and movement of objects through investigation
- 18. recognize, explore, describe, and compare patterns, and extend, translate, and create them, using the core of a pattern and predicting what comes next
- 19. collect, organize, display, and interpret data to solve problems and to communicate information, and explore the concept of probability in everyday contexts
- 20. apply the mathematical processes to support the development of mathematical thinking, to demonstrate understanding, and to communicate thinking and learning in mathematics, while engaged in play-based learning and in other contexts
- 21. express their responses to a variety of forms of drama, dance, music, and visual arts from various cultures
- 22. communicate their thoughts and feelings, and their theories and ideas, through various art forms

EQAO FRENCH IMMERSION GLOSSARY

http://www.eqao.com/en/assessments/assessment-docs-elementary/french-immersion-glossary-elementary.pdf#search=glossary



French Immersion Glossary

Termes mathématiques anglais-français – Palier élémentaire

(Veuillez noter que cette liste n'est pas exhaustive. Le contenu du glossaire se limite au vocabulaire utilisé dans le test.)

2-dimensional — à deux dimensions
2-dimensional shape — une figure plane
3-dimensional — à trois dimensions
3-dimensional figure — un solide

A

acute angle — un angle aigu
to add — ajouter, additionner
approximately — approximativement
area — une aire
arrow (on a spinner) — une flèche (sur une roulette)

B

bar graph — un diagramme à bandes
base — la base
broken-line graph — un diagramme à ligne brisée

C

calculator — une calculatrice
capacity — la capacité
change (money) — la monnaie
chart — un tableau
to check — vérifier
circle — un cercle
to circle — encercler
to classify — classer, classifier, trier
clockwise — dans le sens des aiguilles d'une montre
coin — une pièce de monnaie
column — une colonne
composite number — un nombre composé
congruent — congruent(e)
coordinates — des coordonnées
cost — le coût
to count — compter
to count backward — compter à rebours
counter-clockwise — dans le sens contraire des aiguilles d'une montre
counters — des jetons

D

data — des données
decimal — une décimale
decimal number — un nombre décimal
to decrease — diminuer
denominator — le dénominateur
to describe — décrire
diagonal — diagonal(e), une diagonale
diagram — un diagramme, un graphique
digit — un chiffre
discount — un rabais, une réduction
to draw — tracer

E

edge — une arête
end point — une extrémité
equally — également
equilateral triangle — un triangle équilatéral
estimate — une estimation
to estimate — estimer
even number — un nombre pair

F

face — la face
factor — un facteur
to factor — décomposer en facteurs
fair — juste
fewer — moins de
fraction — une fraction
frequency — la fréquence

G

graph — un diagramme, un graphique
greater than — plus grand(e) que
grid — une grille
growing pattern — une suite croissante

H

height (of a polygon) — la hauteur (d'un polygone)
heptagon — un heptagone
hexagon — un hexagone
horizontal — horizontal(e)
hundred — une centaine
hundreds chart — un tableau (ou une grille) de nombres
hundredth — un centième

I

to increase — augmenter
isosceles triangle — un triangle isocèle

K

kite — un cerf-volant

L

to label — étiqueter
length — la longueur
less than — plus petit(e) que
likely — probable
line graph — un diagramme à ligne brisée
line of symmetry — un axe de symétrie
line plot — une ligne de dénombrement
line segment — un segment de droite
to list — énumérer

M

make change — rendre la monnaie
mass — la masse
mean — la moyenne
measurements — les mesures, les dimensions
median — la médiane
mirror line — un axe de réflexion
mode — le mode
to move — déplacer
movement — un déplacement

N

net — le développement d'un solide
number — un nombre
number line — une droite numérique
number sentence — un énoncé mathématique
numerator — le numérateur

O

obtuse angle — un angle obtus
obtuse triangle — un triangle obtus
octagon — un octogone
odd number — un nombre impair
ones — des unités
order of operations — l'ordre des opérations
order of rotational symmetry — l'ordre de rotation de symétrie
ordered pair — des coordonnées
overlap — un recouvrement

P

parallel lines — des droites parallèles
parallelogram — un parallélogramme
pattern — une suite
pattern blocks — des blocs géométriques
patterning — faire une suite
pattern rule — une régularité
pentagon — un pentagone
percent — pour cent
percentage — un pourcentage
perimeter — le périmètre
pictograph — un diagramme à pictogrammes
place value — la valeur de position
to plot points — entrer les données sur un diagramme
point of intersection — le point de rencontre (ou d'intersection)
polygon — un polygone
to predict — prédire
prime number — un nombre premier
prism — un prisme
probability — la probabilité
product — le produit
protractor — un rapporteur
pyramid — une pyramide

Q

quadrilateral — un quadrilatère

R

range — la variation, l'écart, l'étendue
rate — un taux
ratio — un rapport
rectangular — rectangulaire
reflection — une réflexion
to repeat — répéter
rhombus — un losange
right angle — un angle droit
rotation — une rotation
rounded number — un nombre arrondi
row — une rangée
ruler (instrument) — une règle (un instrument)

S

sample — un échantillon
scale (graphic) — l'échelle (graphique)
scalene triangle — un triangle scalène
set — un ensemble
shaded — ombré(e)
shape — une forme
shrinking pattern — une suite décroissante
side — un côté
similarities — les ressemblances
to sort — classer, classifier, trier
spinner — une roulette
square — un carré
square-based — à base carrée
square units — des unités carrées
stem-and-leaf plot — un diagramme à tiges et à feuilles
to subtract — soustraire
subtraction — une soustraction
sum — une somme
surface area — l'aire de la surface
survey — un sondage
symmetrical figures — des figures symétriques

T

tally chart — un tableau des effectifs
ten — une dizaine
tenth — un dixième
term number — le rang
thousand — un millier
thousandth — un millième
translation — une translation
trapezoid — un trapèze
to travel, to move — déplacer
triangular — triangulaire
triangular-based — à base triangulaire

U

unit of measurement — une unité de mesure
units — des unités
unlikely — peu probable

V

value — la valeur
vertex — un sommet
vertical — vertical(e)
vertices — des sommets

W

to weigh — peser
whole number — un nombre entier
width — la largeur

X

x-axis — l'axe des *x*

Y

y-axis — l'axe des *y*

In the beginning, we figured the students would play and explore the materials, but over time, we would be able to introduce more vocabulary to the students and provoke more complex thinking with the materials we purchased. We felt that some ways we might be able to evaluate our growth would be to use Pic Collages, Learning stories, and have student growth look more like making lists of words about their items, creating instructions as to how students might construct their shape, completing challenge cards, creating graphs, tallying their findings, more detailed and more French vocabulary in their explanations during reflection time, seeing growth in the number of strategies and the confidence they develop when solving problems, and comparing and contrasting. We used the EQAO list of terminology to establish a list of common vocabulary that we figured that we might incorporate into provocations with our new materials and have available in print near the centres to help our ECEs.

Number Line	plus grand que, plus petit que, moins de, une droite numérique, additionne, compte, une somme, soustrais, compte à rebours, un nombre pair, un nombre impair, déplacer
Clever Circles	rouler, lancer, dans / à l'intérieur de, grand, petit, moyen, classer, trier, classifier
Circle Time Activity Mat	**Les formes:** un carré, un coeur, un triangle, un cercle, un ovale, un hexagone, un croissant, un losange, un rectangle, un octogone **Les couleurs:** rouge, vert, jaune, bleu, orange – à côté de, en face de, sac de fèves, un dé, compte dans les sens des aiguilles d'une montre
Torreto	plus mince, plus épais, tomber, construire, rouler, balancer, empiler, la hauteur, diamètre, circonférence
Magnetic Polydrons	une figure plane, un solide, un carré, un triangle, un cube, un pyramide, une face, une base, un sommet, un côté, créer, construire, déplacer, ajouter, compter
Magna-Tiles	Un carré, un triangle, une pyramide, un cube, un hexagone, un côté, une base (carrée, triangulaire), une face, une fraction, des figures symétriques, créer, construire, déplacer, ajouter, compter, l'aire, le périmètre
Magnetic Polydrons Sphera Set	un solide, une sphère, un cylindre, un cône, une figure plane, une solide, quarts d'un cercle, un huitième d'une sphère, un rectangle courbé, un triangle rectangle, un carré, un triangle courbé, des coins, rouler, tourner, créer, construire, déplacer, ajouter, compter
Cumulo	une forme (ouverte, fermée), trier, classer, décrire, deviner, créer
Giant Pattern Blocks	une figure plane, un carré, un triangle, un losange, un trapèze, un triangle, un hexagone, des blocs géométriques, tracer, déplacer
Giant Polydron Class Set	la longueur, la largeur, la hauteur, une forme, un carré, un triangle, une suite, une aire, le périmètre, un sommet, un côté, décrire
Giant Octoplay	décrire, déplacer, ajouter, les Octos, la hauteur
Twister	une flèche, une roulette, dans le sens des aiguilles d'une montre, dans le sens, probable, la probabilité, contraire des aiguilles d'une montre, un cercle, tomber, droite, gauche, main, pied, déplacer
Blokus	une grille, un carré, une unité, un côté, une rotation, une translation, une réflexion, déplacer, diagonal

COMMUNICATION OF LEARNING

Growing Success - Kindergarten Addendum (page 11)

Evaluation in Kindergarten is the summarizing of evidence of a child's learning in relation to the overall expectations at a given point in time, in order to specify a child's key learning, growth in learning, and next steps in learning. It is the culmination of the process of analysing and interpreting collected evidence of learning, whereby educators regularly and systematically examine their anecdotal observations, notes and jottings, and other documentation; photos and videos; samples of the child's work; information shared by the family; and other types of evidence, and ask the questions, "What is the most significant learning demonstrated by this child at this time? How does it link to the overall expectations within this frame? What does it tell me about the growth in learning of this child?" Through analysis and interpretation of a child's learning, educators gain greater insight into the child's relationships, interactions, understanding of concepts, learning styles, dispositions, and interests, as well as into the role of cultural context in the child's learning. With this insight, educators are able to judge each child's key learning, growth in learning, and next steps in learning at given points in time.

SAMPLE COMMENT FOR A STUDENT'S COMMUNICATION OF LEARNING

Rebecca is an aspiring mathematician who is constantly wondering about the world around her. Before beginning our journey with whole-body math materials, she would often choose to play at the dramatic play centre or colour independently. As math became more integrated into her daily play, her creativity blossomed. She no longer spent her time colouring, but gravitated towards creating and explaining her mathematical thinking. She changed her "petite maison" made of giant polydrons blocks to include 4 triangles and 5 squares instead of 7 squares and 2 triangles. She challenged her friends to turn houses into giant towers. On one occasion, Rebecca was building a house for the dinosaurs out of Magna-tiles on the light table and another student asked to play. Rebecca immediately said, "Sure," handed over some blocks, and asked her if she could help make a bedroom for the baby dinosaur. Rebecca was no longer choosing to work independently, but engaging in conversations and working towards common goals with her classmates. Her creation of a charging station made of squares inspired a detailed class discussion about size. One student had created a rectangle with 8 tiles and Rebecca had created a square with 9 tiles. As we observed the pictures of the students' shapes together, Rebecca pointed out, "My square is 3+3+3 and Kelly's rectangle is 2+2+2+2. Although Kelly's creation was taller, Rebecca explained, "Mine is bigger because it has one more tile." As Rebecca moves on to Grade 1, she will be encouraged to continue to collaborate with her peers and welcome new problem-solving strategies.

MORE TO CONSIDER . . .

- Number Talks
- Pense et parle
- Je parle français
- Math Curriculum Mapping
- Vocabulary development
- Additions to R.C.F.I. P.S. Teacher Toolbox

To apply for an OTF TLC grant go to:

https://www.otffeo.on.ca/en/learning/teacher-learning-and-leadership-program/