



AGENDA: TMWM AT BROCK

- A bit about Cathy
- Main Objectives of Teaching Math with Meaning
- Chapter 1-3 overview with discussion
- Translanguaging and Critical Voices
- Activity: wanted number
- Activity: concept wheel
- Math and Literacy with Book Creator
- One is a Snail- Ten is a Crab

WHY THIS BOOK BY THIS AUTHOR?

<https://www.youtube.com/watch?v=20vQ0hViQDE>

Check out the video (start at 22:30 until 28:00 min, 1:05-1:08, 1:39-1:42):

What is Optimum Knowledge for Teaching Science and Mathematics?

What do students need?

What does it look like for teachers?



ATTENDANCE:

- Cecilia Joseph
- Kristy Jasey
- Pauline Brown
- Stephanie Molenda
- Louisa Mattina
- Sheri Gaetz
- Jillian Authier
- Anne Adamson



MAIN OBJECTIVE OF TMWM:

- Provides a framework linking the creativity, communication and collaboration
- Each chapter presents the relevant research on competency-based learning coupled with practical classroom activities
- Links competencies to current topics like growth mindset, inquiry, math anxiety and math discourse

CHAPTER 1: PROMOTING A CULTURE OF LEARNING IN MATHEMATICS

- Our current understanding of mathematics (metacognition is important)
- Misconceptions about new initiatives in mathematics and the teacher's role:
 - - Number facts aren't valued
 - - teachers' roles are reduced
 - - whole class teaching is no longer valuable

It isn't the solution that they can't see. It is that they can't see the problem

G.K Chesterton, 1935

CHAPTER 1: CONTINUED

- Questioning our own efficacy... collaboration between teachers
- Uncovering student misconceptions- we're detectives
- Infusing Meaningful Problem-Solving and inquiry into our practice- rich open math tasks, inquiry is research based, let go of the one class wonder
- Valuing Parent voices in mathematics education...
- Reaching Out to Let Everyone In.....

CHAPTER 2: SELF EFFICACY & LEARNING COMPETENCIES

The Importance of Self Efficacy in the Math Classroom

- Cultivating Student Self-Efficacy
- Cultivating Teacher Self-Efficacy

Learning Competencies

- Personal & Social Competency
- Communication Competency
- Thinking Competency

CLASSROOM CULTURE

- Establishing a Culture That Values Student Voices- expectations around accountable talk.
- A Framework for Accountable talk-
 - 1) Anticipate student thinking
 - 2) Listen to students with a mathematical focus and equity focus.
 - 3) Posing effective questions
 - 4) Monitoring and Providing Feedback
 - 5) Selecting and Sequencing Work



USING ASSESSMENT AND FEEDBACK TO HELP FOSTER SELF EFFICACY

- Assessing student learning
- Success criteria in mathematics – they need to be concrete behaviours
- Effective Descriptive Feedback- actionable information
- Providing Effective Feedback- strengths, questions, next steps, have them share this first.

Examples of Open *If Questions* to Promote Math Discourse

If mathematics were an animal, which animal would it be and why?

If you could be any number, which number would you be and why?

If you could be any shape, which shape would you be and why?

Which song best represents mathematics and why?

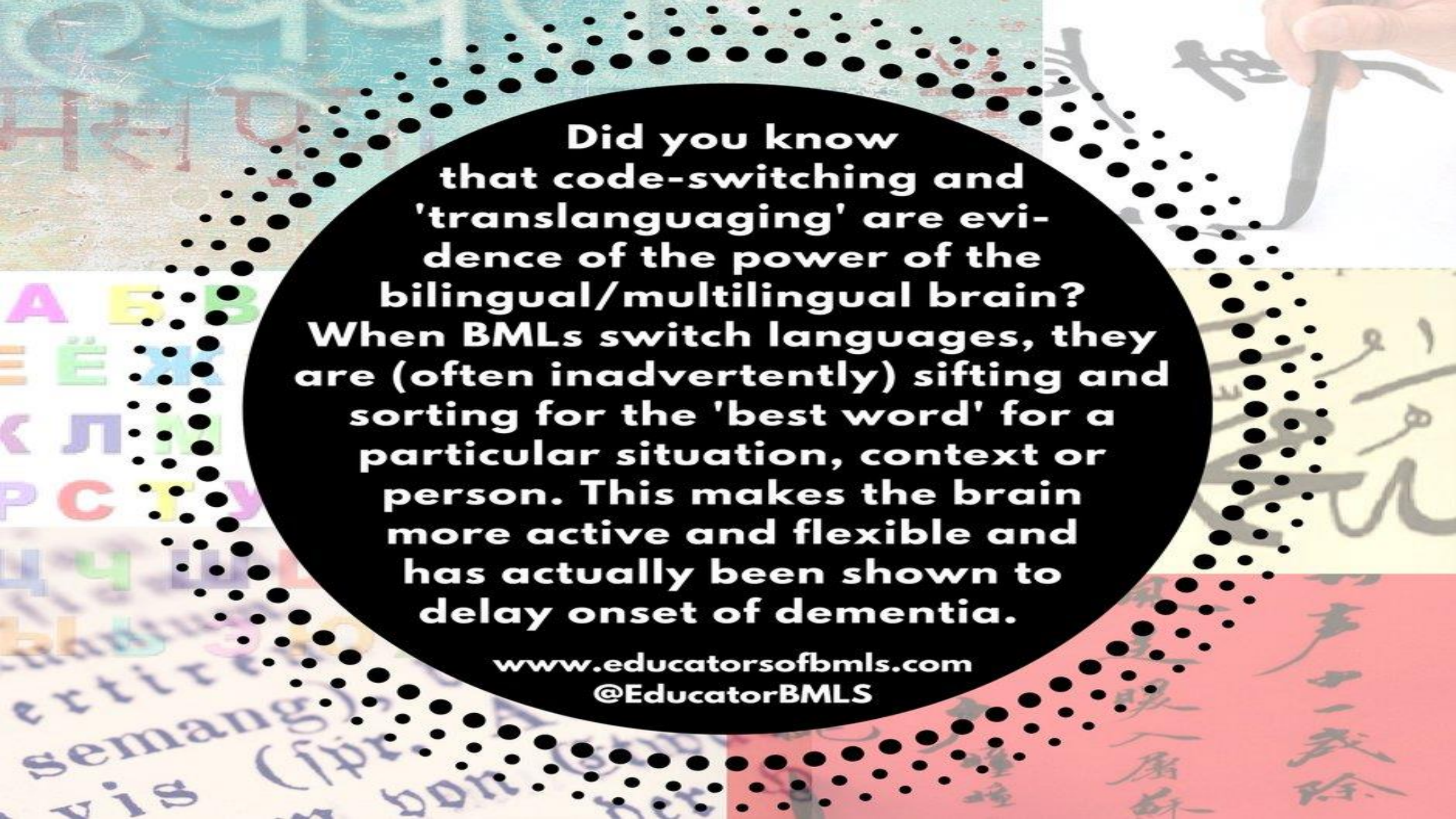
If you could choose any geometric shape to represent happiness, which one would you pick and why?

If you could be any angle, what type of angle would you be and why?

@CathyMarksKrupan

CHAPTER 4 SELF EFFICACY IN MATHEMATICS WITH DIVERSE LEARNERS

- Developing an understanding of how students learn
- Research has supported our shift from an emphasis on rote learning and memorization to a focus on teaching approaches that foster students' abilities to think, problem-solve, and communicate effectively.
- Dweck's work- pg. 40



**Did you know
that code-switching and
'translanguaging' are evi-
dence of the power of the
bilingual/multilingual brain?
When BMLs switch languages, they
are (often inadvertently) sifting and
sorting for the 'best word' for a
particular situation, context or
person. This makes the brain
more active and flexible and
has actually been shown to
delay onset of dementia.**

www.educatorsofbmls.com

@EducatorBMLS

CRITICAL VOICES

- Do we stereotype based on ability to communicate in English?
- Mathematical language is often difficult because of the cultural associations with the context.
- Working memory is overloaded processing the language- we could provide prompts.
- Using their own language in mathematics is critical.
- Use of peer translators
- ELL are on an emotional learning journey as well as an academic one
- They learn best from listening to other students share their math thinking
- Review Instructional strategies- Pg.51

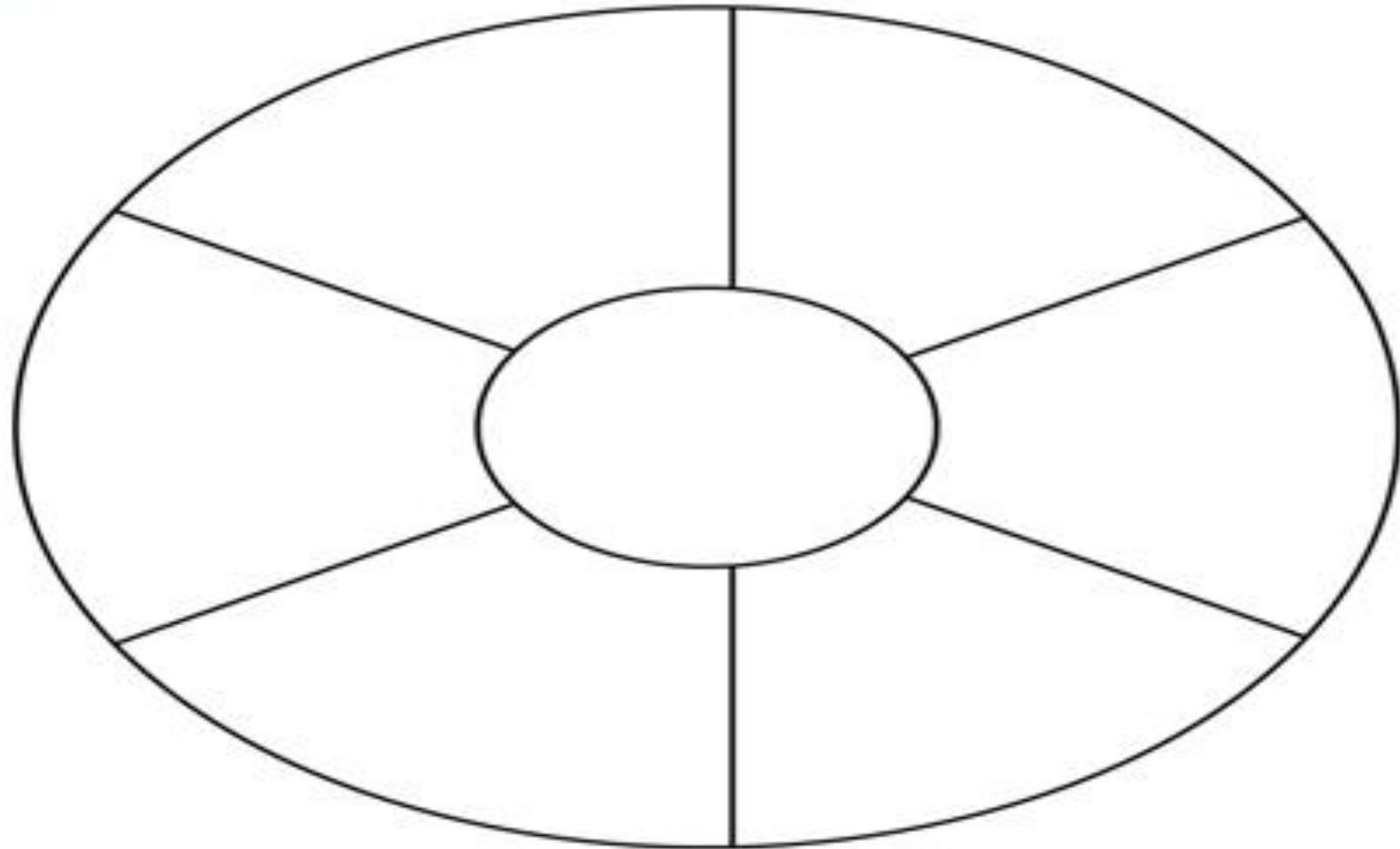
LEARNERS WHO STRUGGLE

- Often lack self regulatory skills = makes problem solving really tough
- Effective teachers do not think my students cannot do this they think- how can I make this accessible for all of my students?
- Using math language- sometimes it is the simple things (= the same as)
- Organizing the communication- use routine/templates
- Explore multiple examples- think Bansho- have the kids explain to each other
- Reading mathematical texts- offer visuals/picture books
- Offering parallel tasks
- Limiting choices- offer solutions and have them develop their own.



ACTIVITY: WANTED NUMBER

ACTIVITY: CONCEPT WHEEL



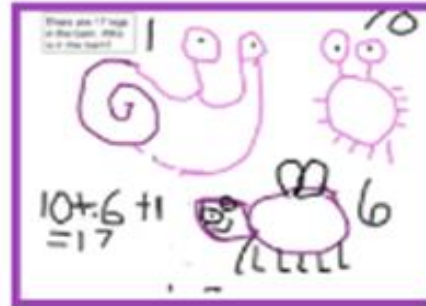
One is a Snail, Ten is a Crab

Curriculum Focus:

- Solve problems involving the addition of whole numbers to 18.

Learning Goal:

- I can show different ways to make a number.

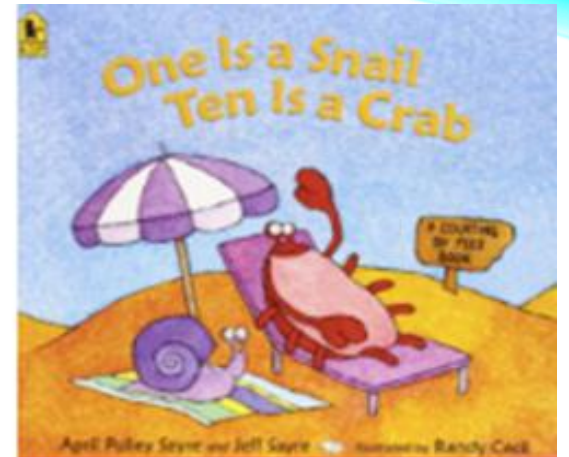


I can:



1. Choose a number between 1-18.
2. With that number in mind, answer this question. There are "your number" legs in the the barn. Who is in the barn?
3. Open the Book Creator app.
4. Tap New Book (top left).
5. Choose landscape.
6. Leave the title page empty and go to the second page.
5. Choose the pen to draw the animals that could be in the barn to equal your number.
5. Choose the pen and write an addition sentence to match your picture.
6. Tap the "+" button to select voice recording.
7. Record yourself explaining your thinking.

Math and Literacy with Book Creator



Math and Literacy with Book Creator



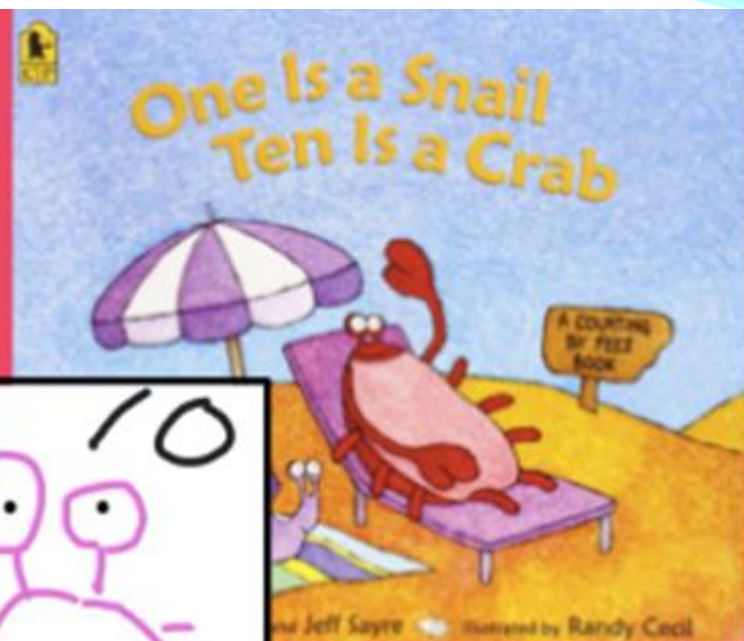
There are 17 legs in the barn. Who is in the barn?

10

6

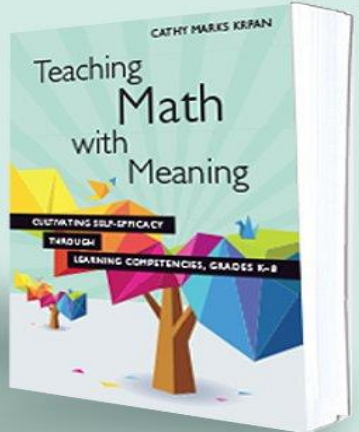
$$10 + 6 + 1 = 17$$


The central image shows a white rectangular area with a black border. At the top left, a text box contains the question: "There are 17 legs in the barn. Who is in the barn?". Below this are three hand-drawn illustrations in purple ink. On the left is a snail with a large spiral shell and two antennae, with the number "1" written above it. On the right is a crab with two eyes and several legs, with the number "10" written above it. At the bottom center is a rabbit with long ears and four legs, with the number "6" written to its right. Below the drawings is a handwritten mathematical equation: $10 + 6 + 1 = 17$.



TEACHING MATH WITH MEANING: PART 2 MAY 1 2018

Cultivating self-efficacy through learning competencies, Grade K-8
Cathy Marks Krpan



 Pearson

“ Effective math teachers do not think, ‘My students cannot do this activity’; they think. How can I make this activity accessible for my students? ”

Teaching Math with Meaning
by Cathy Marks Krpan

BEFORE HIS TIME:

- Children at play are not playing about; their games should be seen as their most serious-minded activity.
- **Michel de Montaigne** 1533 – 1592
- Montaigne's views on child education continue to have an influence in the present. Variations of Montaigne's ideas on education are incorporated into modern learning in some ways. He argued against the popular way of teaching in his day, encouraging individualized learning. He believed in the importance of experience over book learning and memorization.

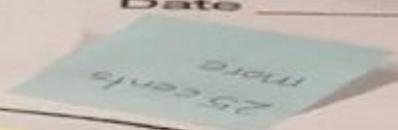
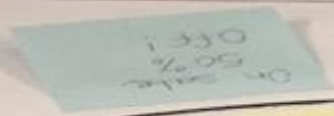
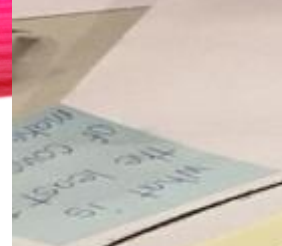
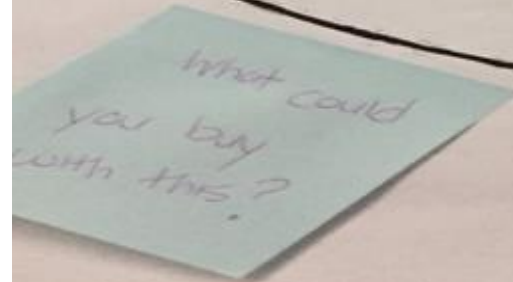
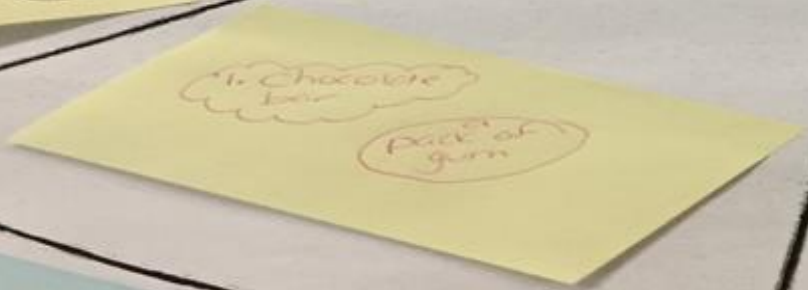
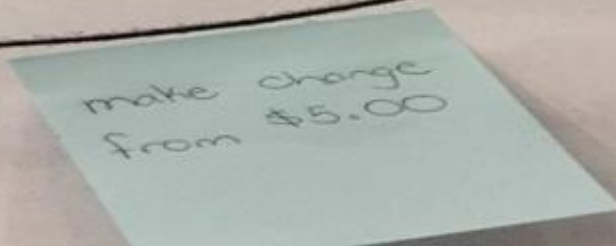
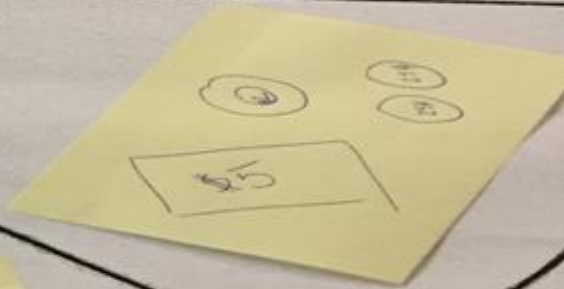
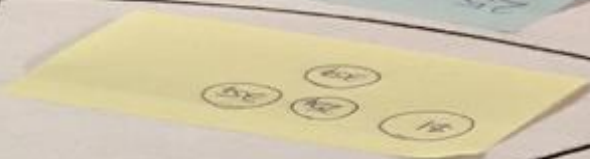
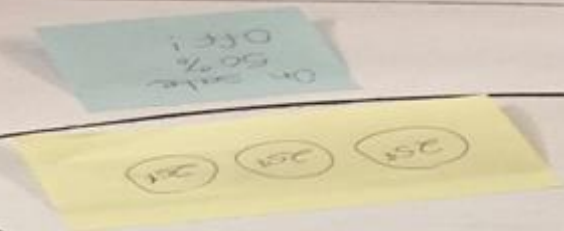
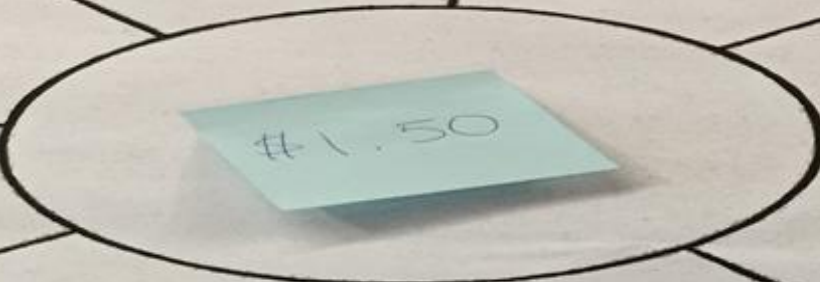


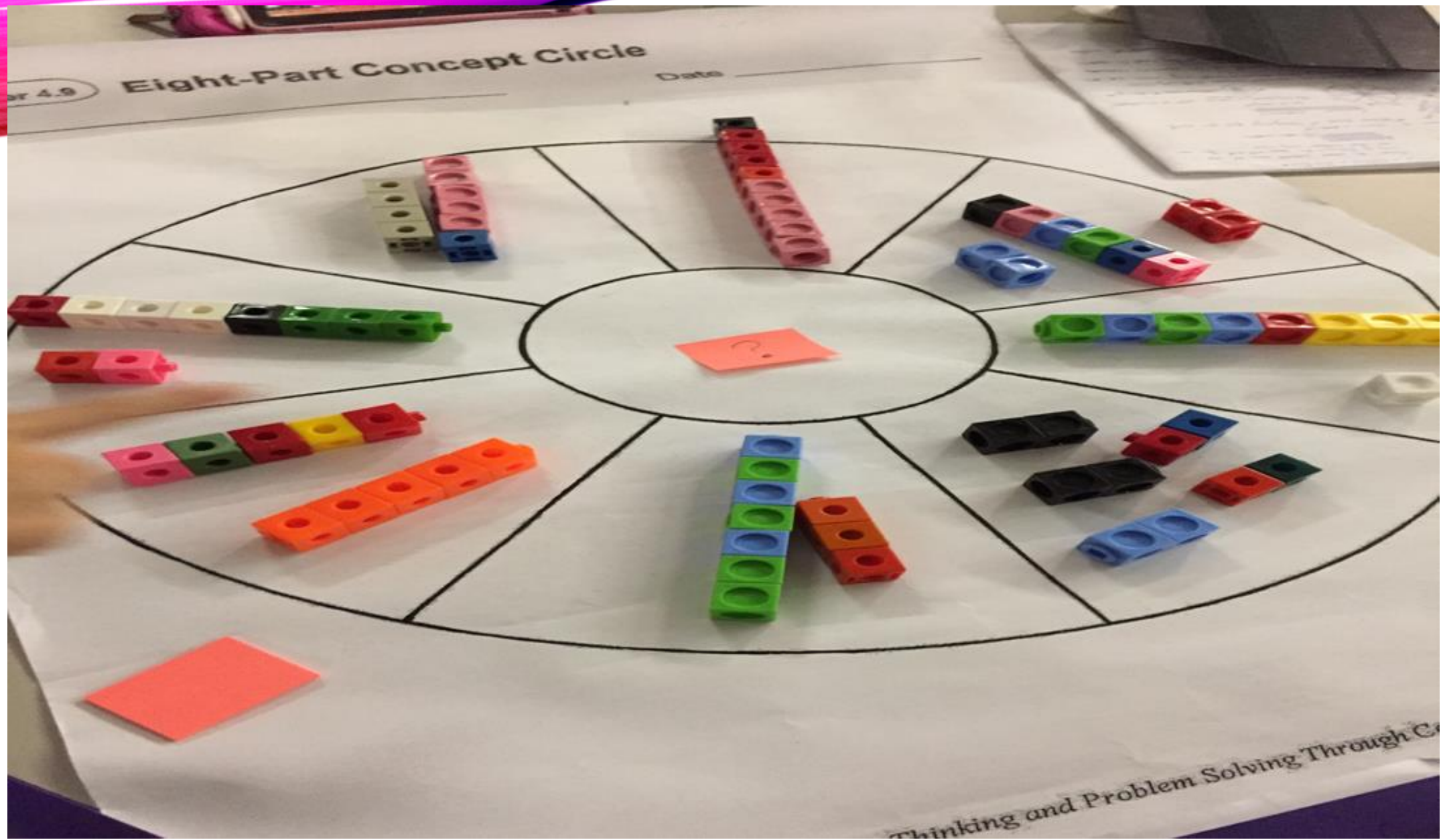
FIVE PRINCIPLES OF EXTRAORDINARY MATH TEACHING | DAN FINKEL



Name _____

Date _____



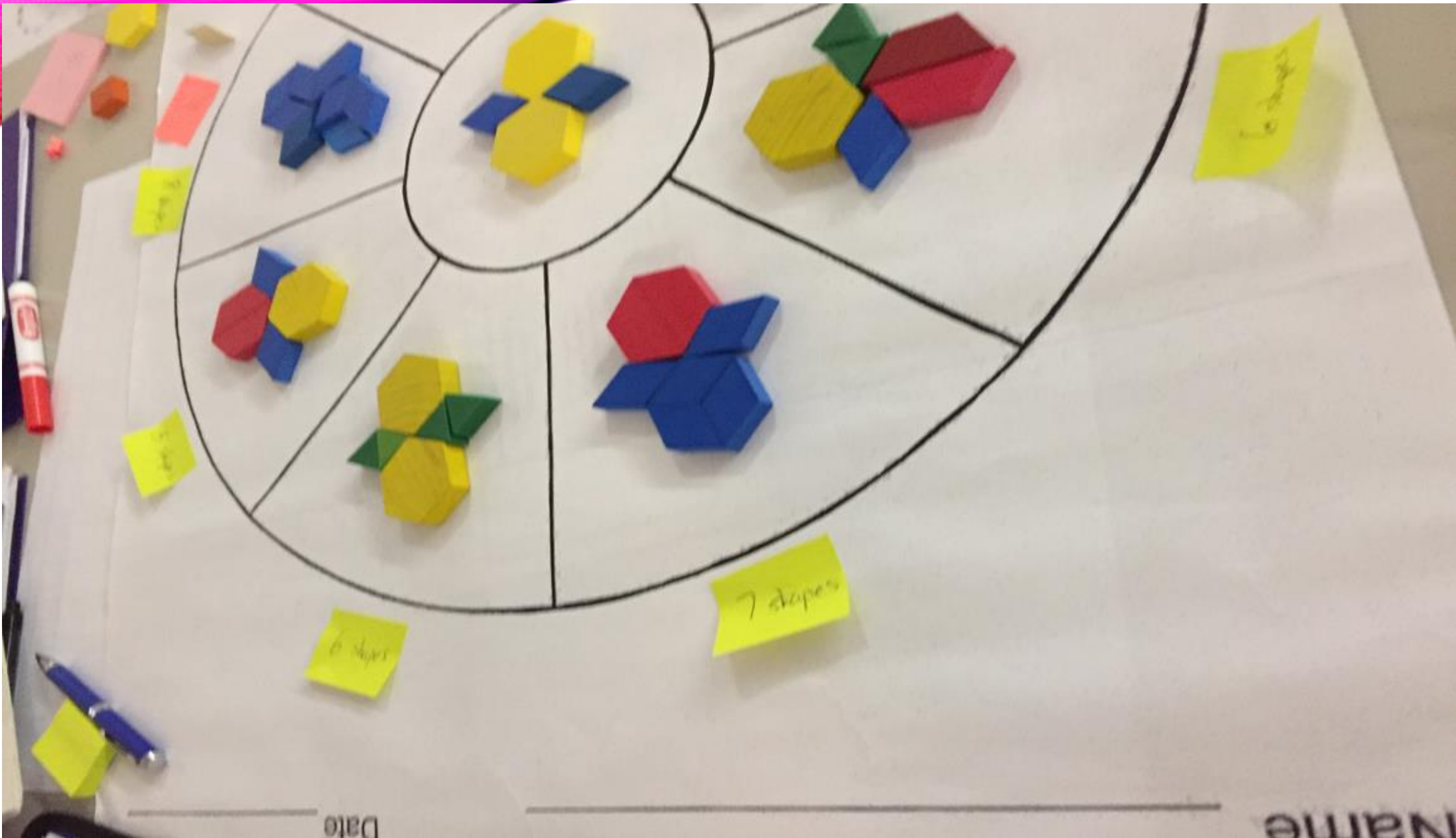


er 4.9

Eight-Part Concept Circle

Date _____

Thinking and Problem Solving Through C



Date

Name

CHAPTER 5 THE COMMUNICATION COMPETENCY

Importance of communication:

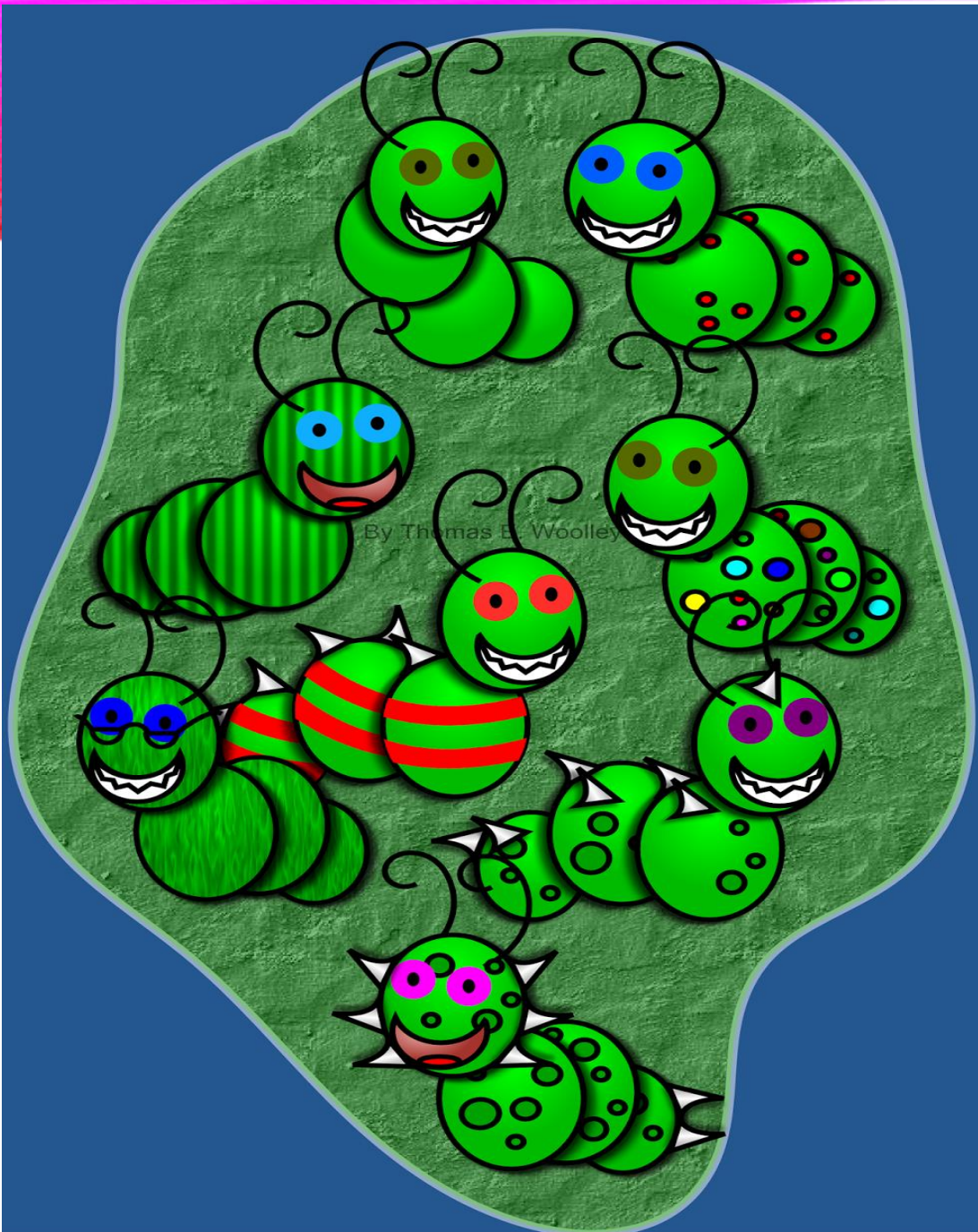
- Communication is paramount in mathematics discussing our thinking is fundamental to learning
- Effective teaching facilitates discourse
- Assessment arises from what our students do and say

Challenges for facilitation

- They don't talk about math outside our walls--- think about this.
- Unclear expectations (ESL)
- Does their strategy make mathematical sense (our own efficacy)

DISCOURSE : WHERE'S THE LOGIC?

- Do you need to know the answer as a teacher?
 - Using questions to foster mathematical conversations--- have them ready
 - Using Prompts---keep the focus
- (little resource for you all to keep 😊)



Unfortunately, some of them are dangerous to touch.

Equally troubling is that I do not know which the dangerous ones are!

All I know is that the following three statements are true:

If a caterpillar has blue eyes or spots it is dangerous.

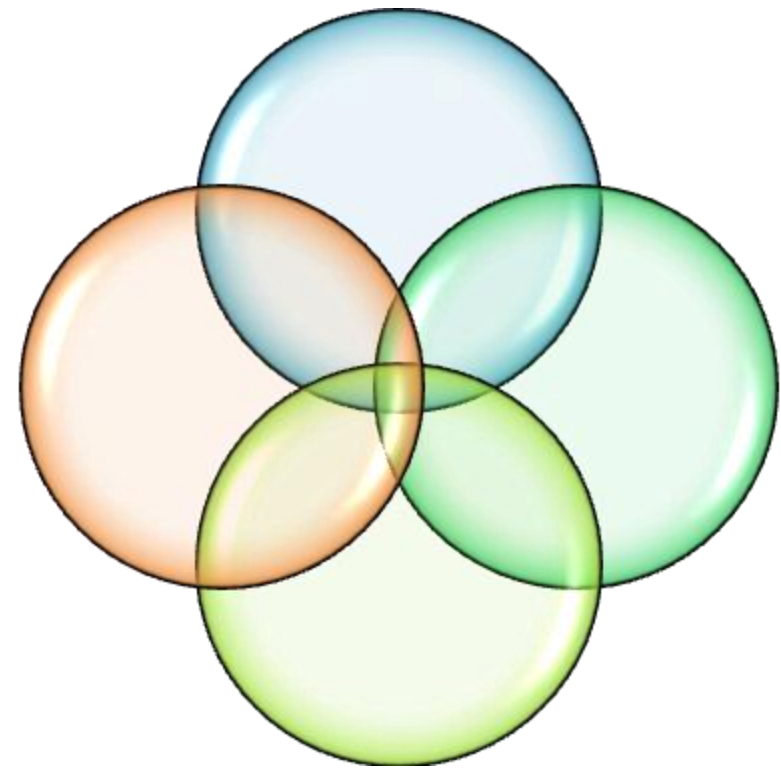
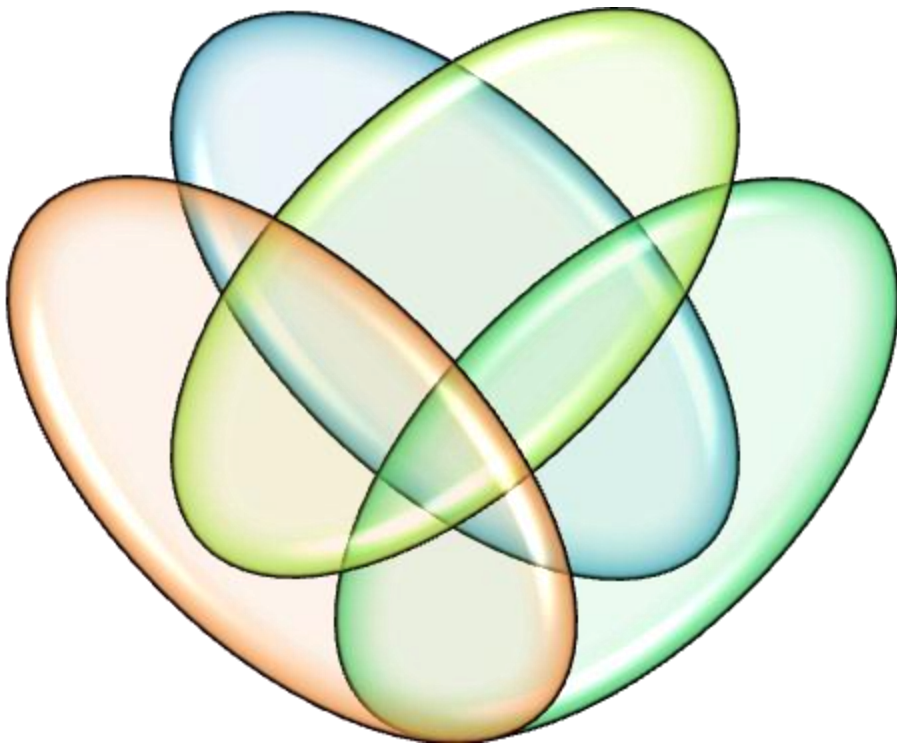
If a caterpillar has both, we can't tell if it is dangerous.

All safe caterpillars have more than one of the following features: teeth, blue eyes, spots, or spikes.

Caterpillars with both teeth and spots are dangerous.

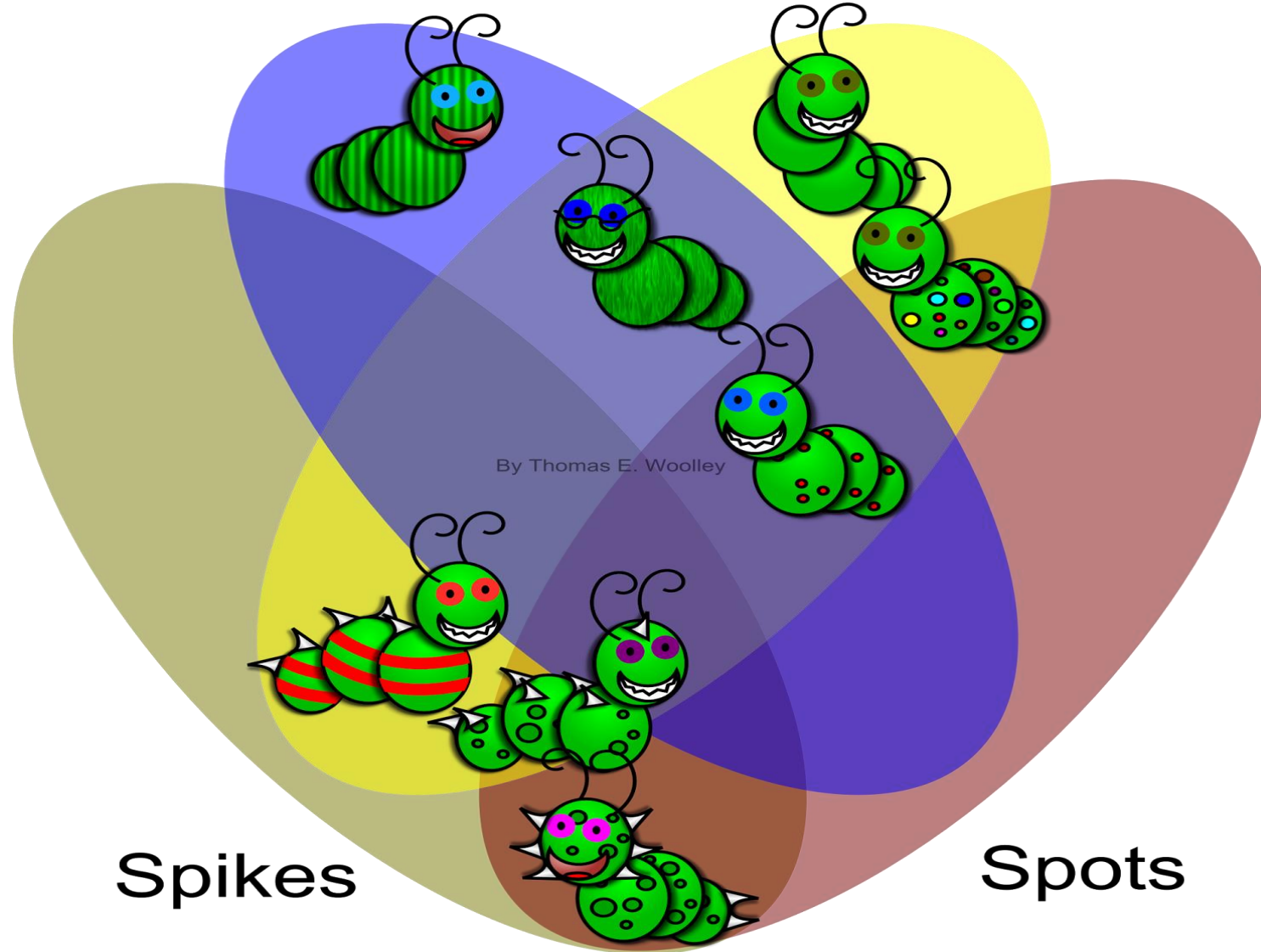
Using just these facts, which caterpillars are safe to touch?

DIAGRAMS: VENN



Blue eyes

Teeth

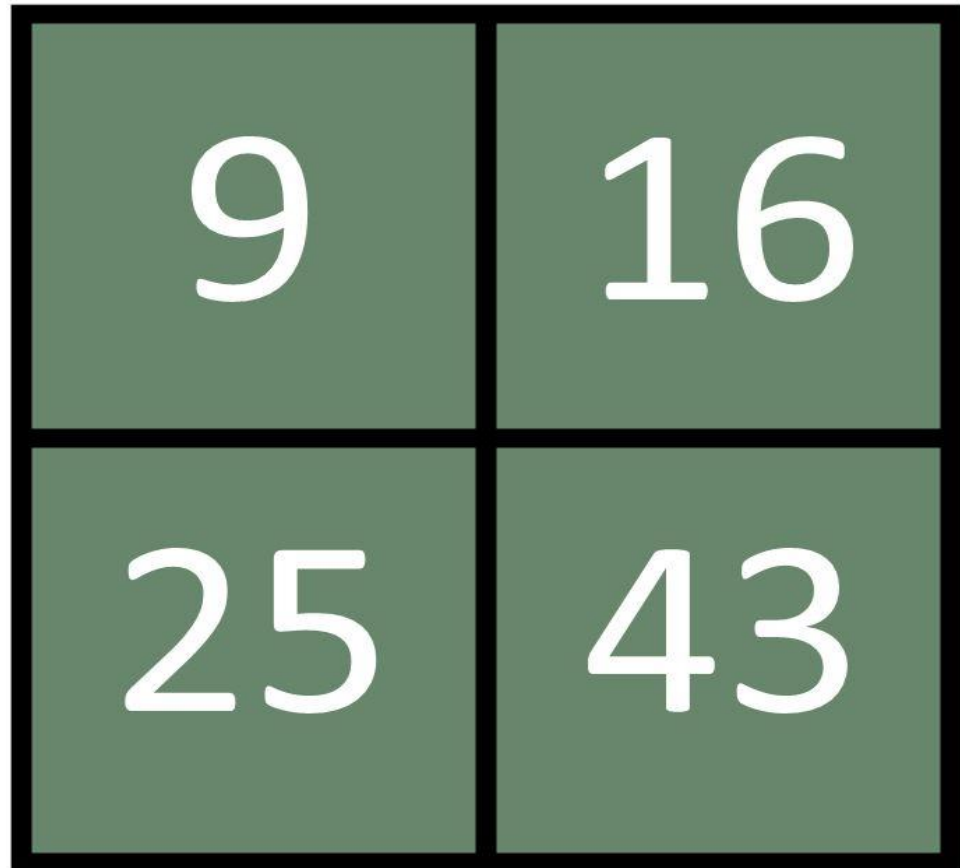
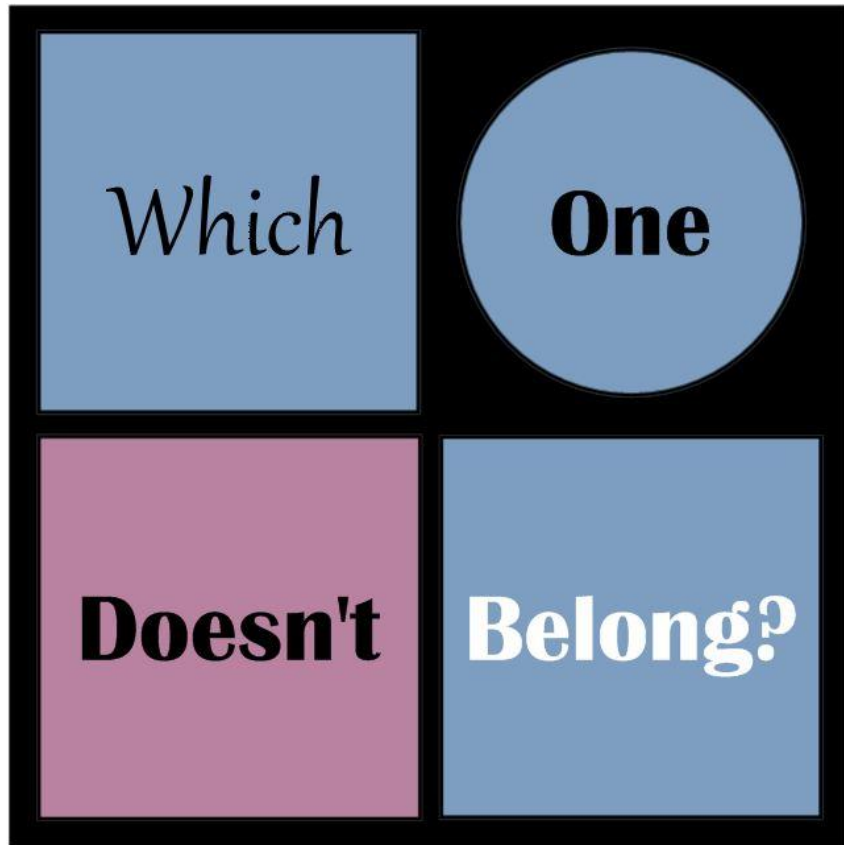


By Thomas E. Woolley

Spikes

Spots

WHICH ONE DOESN'T BELONG?
HTTP://WODB.CA/



CHAPTER 6: THE THINKING COMPETENCY

- What is Mathematical Creativity?

Believe that fluency, flexibility and originality are key components of mathematical creativity. Fluency relates to the continuity of ideas and produce a variety of solutions and originality is characterized by the uniqueness of the work.

Despite the focus on global competencies it is still socially acceptable to state that you are not a creative person...

Kids are not born disliking math... it can be reasoned that it is only through experience that an aversion has developed.

Children must be
taught how to think
not what to think-
Margaret Mead

ESTABLISHING A CREATIVE CULTURE

- Engaging in problem solving and **problem posing**
- Understanding what it means to be creative in mathematics
- Discussing their mathematics and that of others
- Valuing creative solutions and diverse ways of thinking

Metacognition: Knowledge of cognition vs. regulation of cognition

- Self talk plays a key part- classifying self talk- pg. 132
- Think alouds--- do we do this as math teachers?

MODEL: Number Strings

PROOF IN ELEMENTARY MATHEMATICS

- Mathematical Argumentation

What does it mean to prove or convince someone of something?

This is not true because...

I agree because....

This is true because...

My best argument is Because...

INFUSING MATH FIGHTS:

- Head Bands
- Would you rather?
- Which one Doesn't Belong?
- Estimation 180
- Math Before Bed



CHAPTER 7: THE PERSONAL AND SOCIAL COMPETENCY

- Establishing a Collaborative Classroom Culture
- Setting Up Your Classroom to Foster Social Skills
- Fostering Personal and Social Growth with Open Mathematical Tasks

WOULD YOU RATHER?

- <http://www.wouldyourathermath.com/>

- 
- <http://www.101qs.com/index.php>