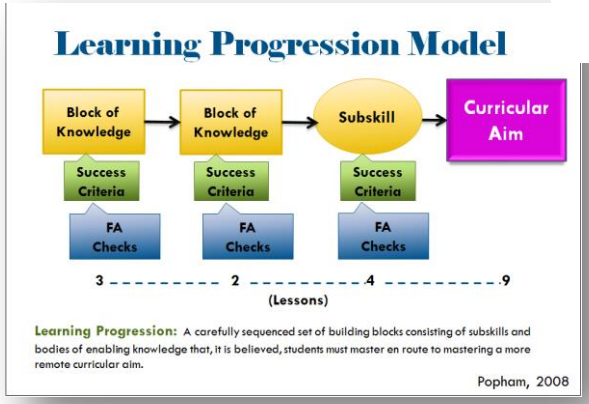
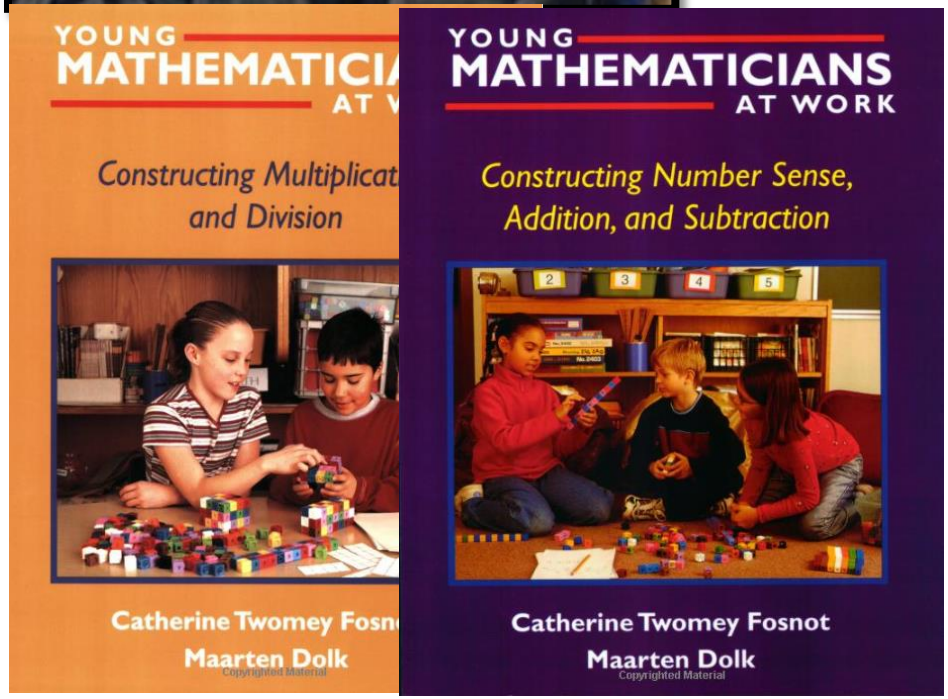
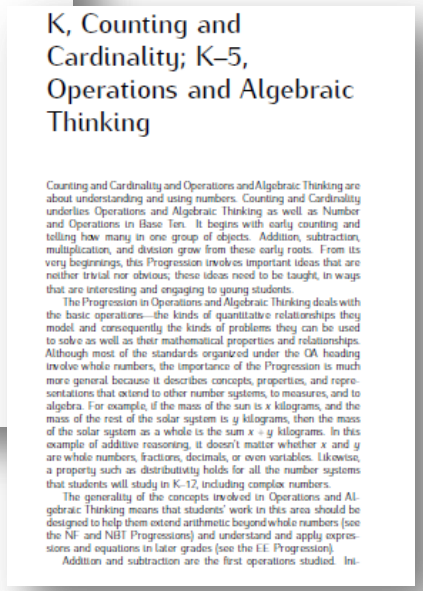
Learning Progressions



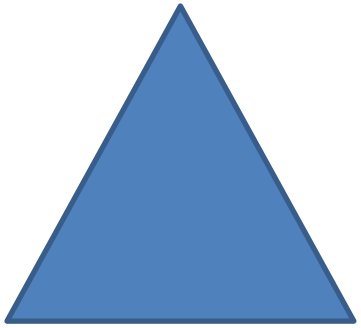




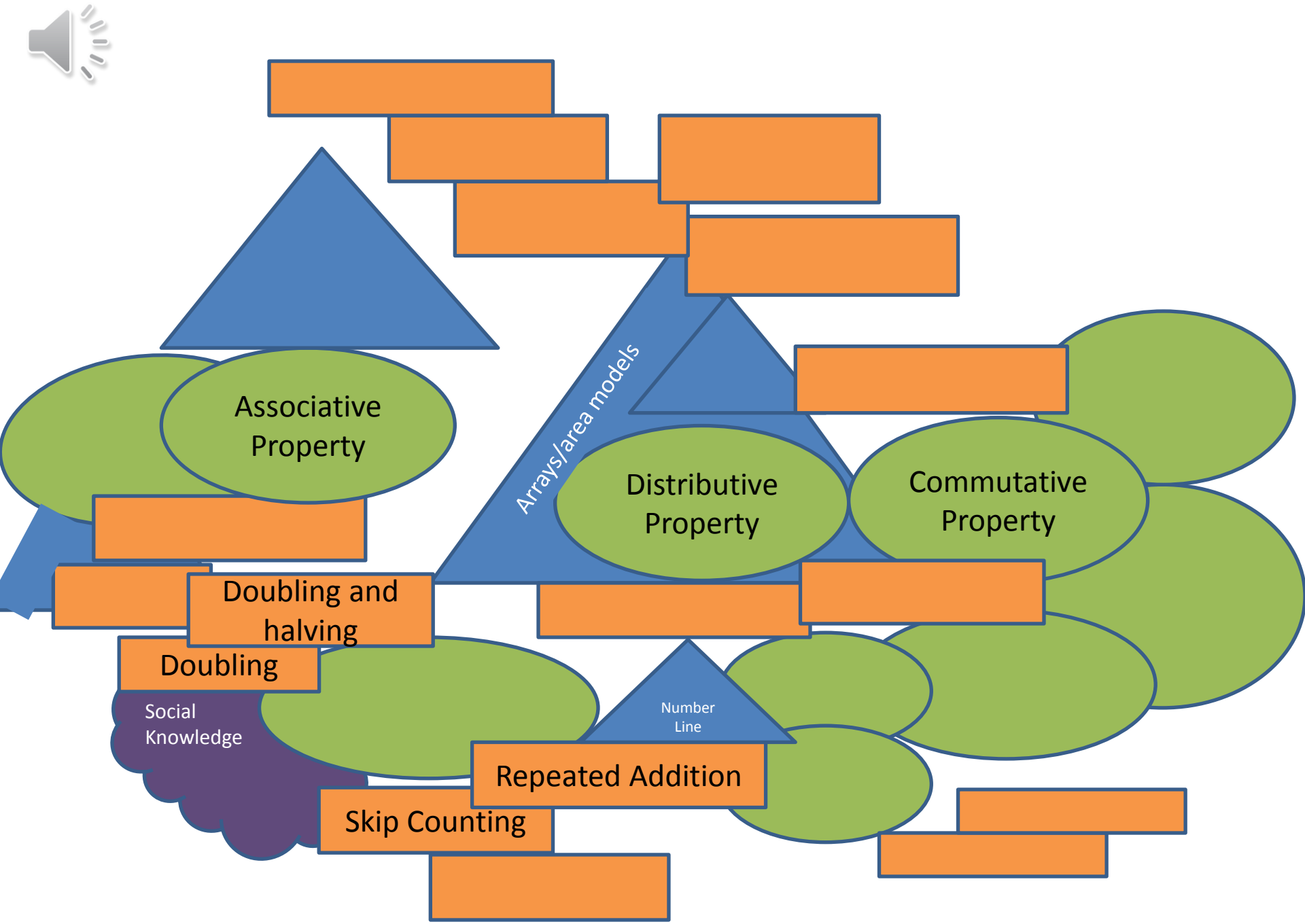
Constructing a Landscape

Big Ideas

Strategies



Mathematical Models

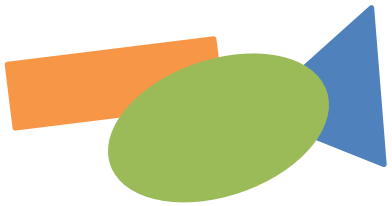

Associative Property
Arrays/area models
Distributive Property
Commutative Property
Doubling and halving
Doubling
Social Knowledge
Number Line
Repeated Addition
Skip Counting

Big Ideas, Strategies, Models

Working in your group:

- Which are you familiar with? Which does your group need to know more about?

- How might you group these or place these in a "landscape" to show the mathematical connections?
- Do any build on each other?

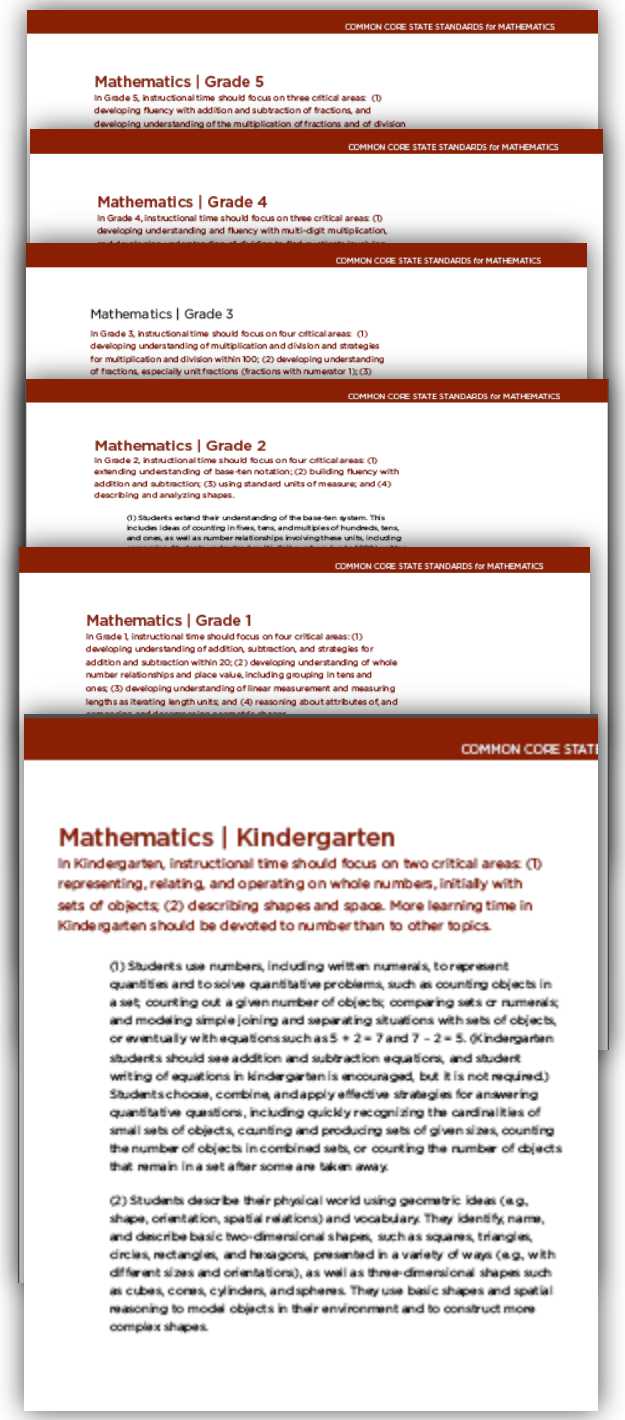


Activity: "Big Idea"

Step 1: Critical Content

- Identify big ideas, strategies, and models related to (x and ÷) / (+ and -)
- Discuss with your face partner which critical content area(s) focus(es) on (x and ÷) / (+ and -)

Packet Page 11

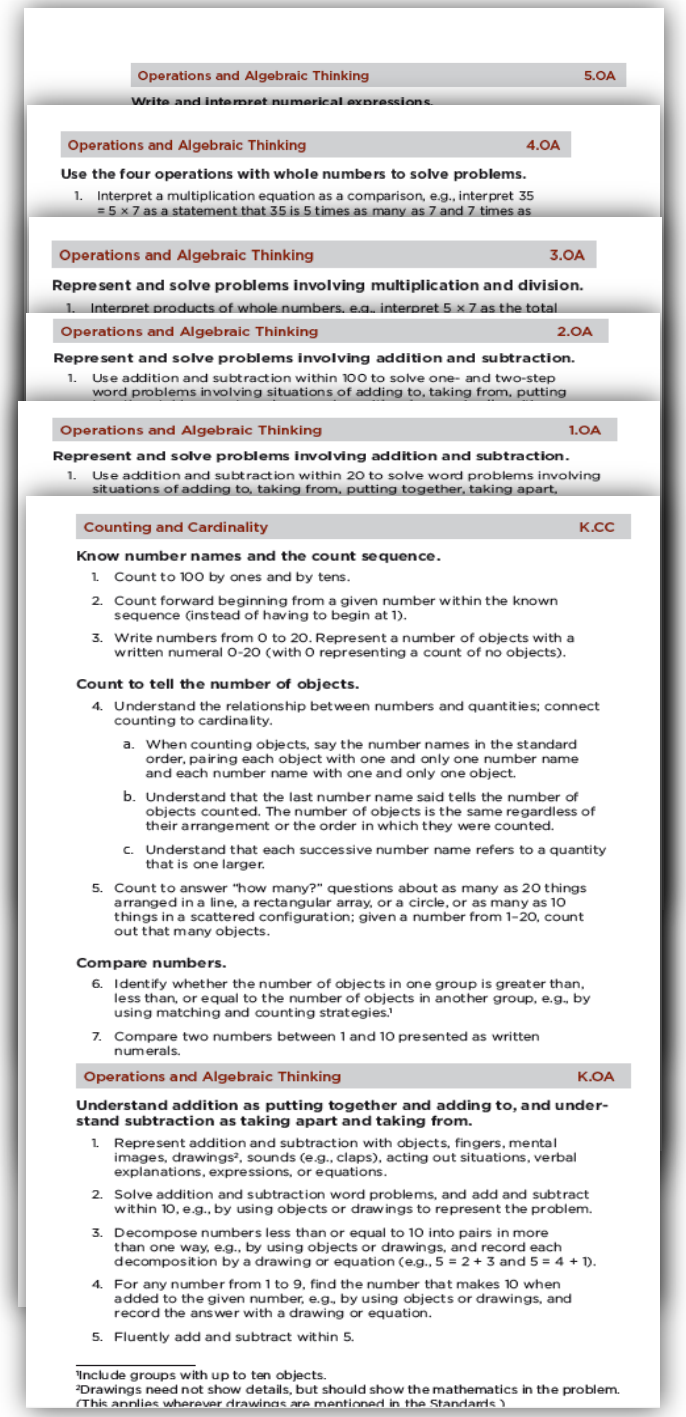


Activity: "Big Idea"

Step 2:

- Quickly skim and scan cluster headings and standards related to multiplication and division or addition and subtraction.

Packet Page 13



Operations and Algebraic Thinking 5.OA

Write and interpret numerical expressions.

Operations and Algebraic Thinking 4.OA

Use the four operations with whole numbers to solve problems.

1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as

Operations and Algebraic Thinking 3.OA

Represent and solve problems involving multiplication and division.

1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total

Operations and Algebraic Thinking 2.OA

Represent and solve problems involving addition and subtraction.

1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting

Operations and Algebraic Thinking 1.OA

Represent and solve problems involving addition and subtraction.

1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart,

Counting and Cardinality K.CC

Know number names and the count sequence.

1. Count to 100 by ones and by tens.
2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Count to tell the number of objects.

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
   a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
   b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
   c. Understand that each successive number name refers to a quantity that is one larger.
5. Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.

Compare numbers.

6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.[1]
7. Compare two numbers between 1 and 10 presented as written numerals.

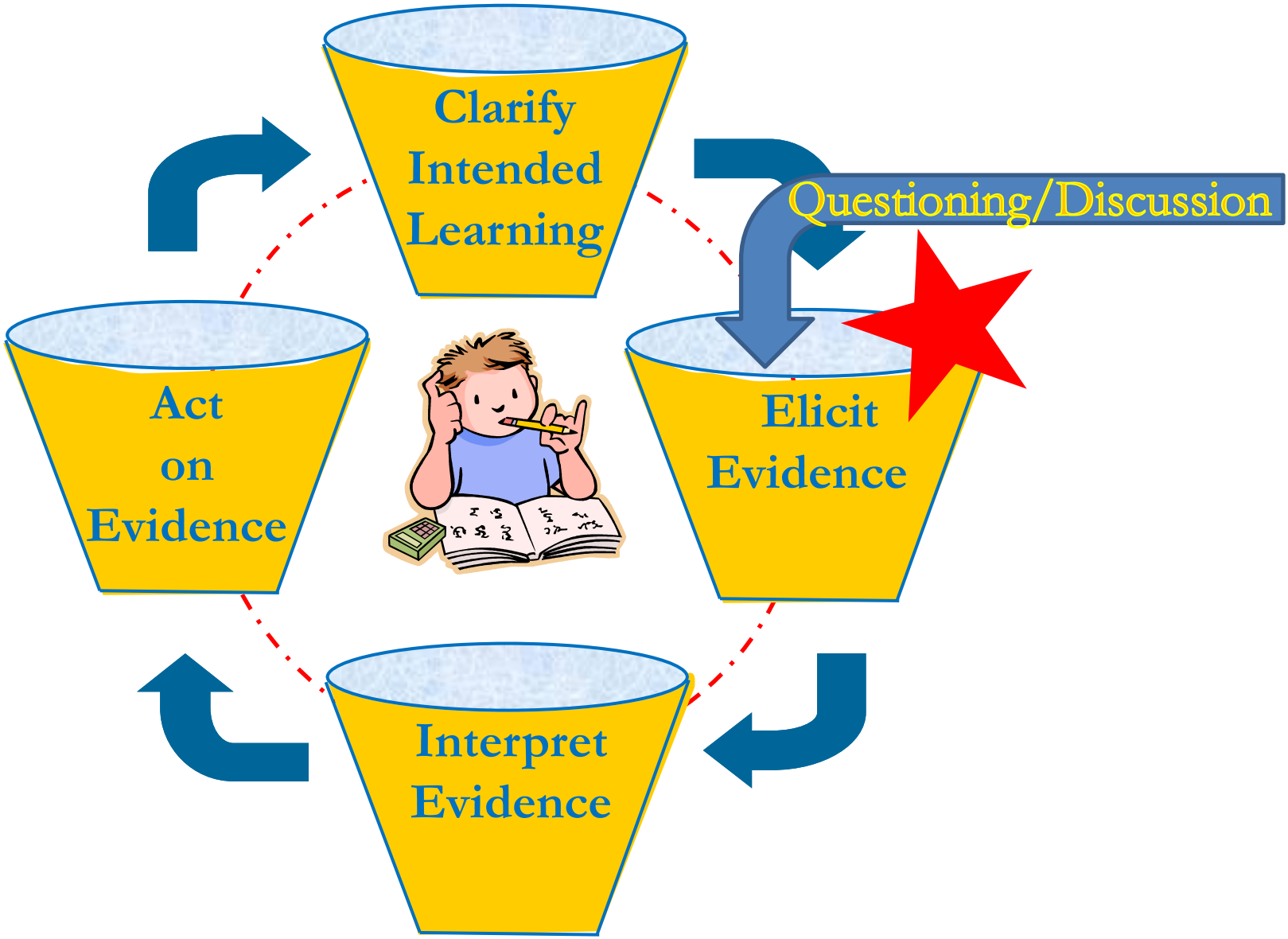
Operations and Algebraic Thinking K.OA

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

1. Represent addition and subtraction with objects, fingers, mental images, drawings[2], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).
4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
5. Fluently add and subtract within 5.

[1]Include groups with up to ten objects.
[2]Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)


BREAK
TIME



Formative Assessment Process

Eliciting Evidence of Learning

We have to know where we are ***before*** deciding where we need to go.

Learning Target: Students will develop a conceptual understanding of counting and cardinality. (GRADE K)

In preparation for the beginning of the school year, we were organizing our supplies and we found a large container of paperclips that need to be inventoried.

Considering strategies used by **kindergarten students**, with your table group, how might this task be solved? Record your strategy on chart paper.

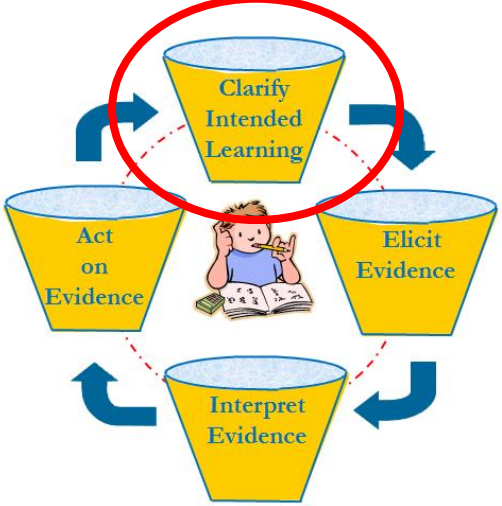
Task Activity – Kindergarten

Gallery Walk: Making Connections to your Classroom

- As you observe solutions offered by other groups, consider what you might expect to observe with your students?

- Based on experience, what typical steps and missteps do you anticipate?

Populate your Landscape



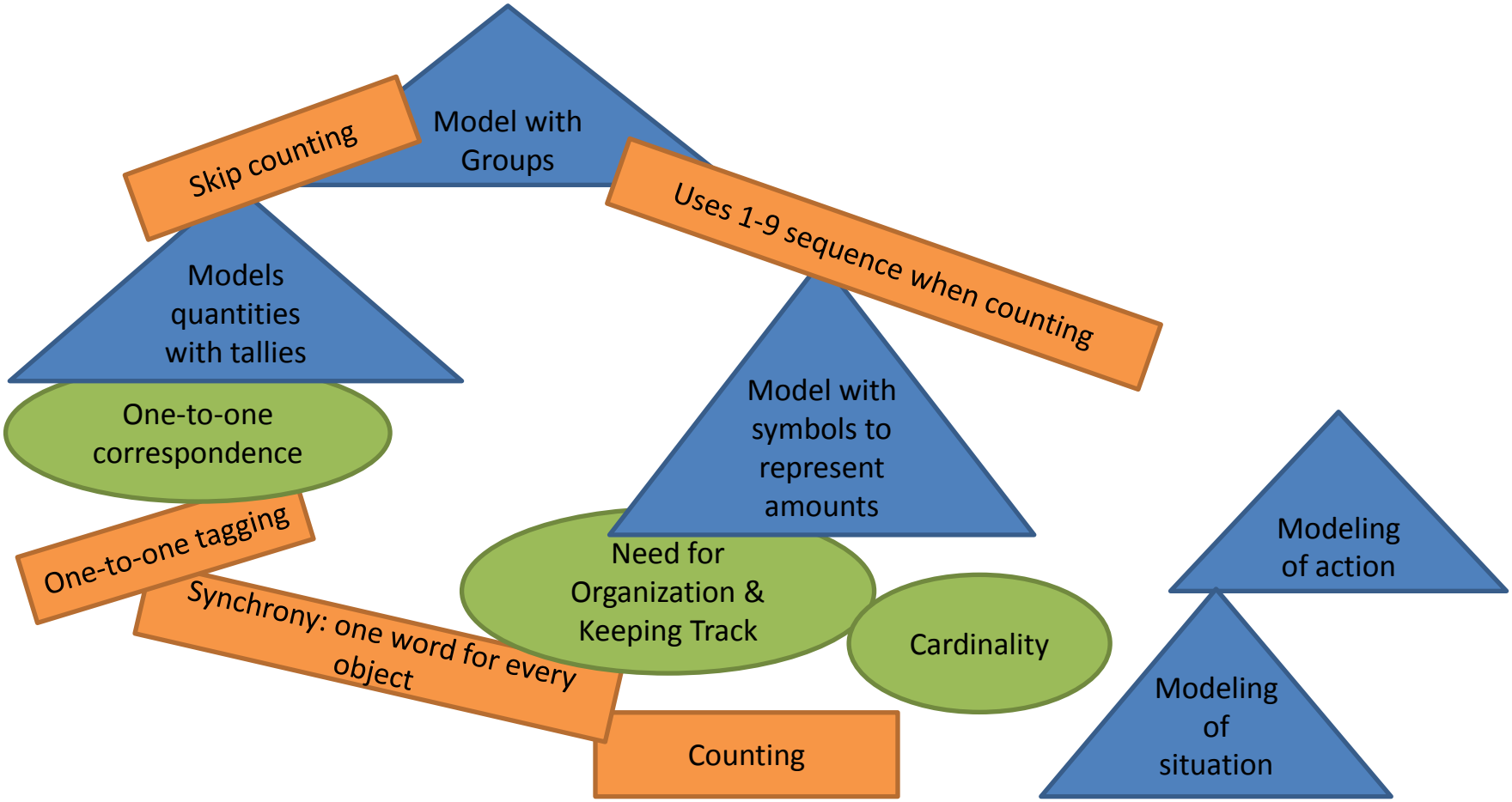
Based on observations that you made during the gallery walk and your work with this task; relook at your sort and make connections between the big ideas, strategies, and models.

Strategies

Big Ideas

Model

Populate the Landscape



Norms for Watching Teaching Videos

- Teaching is multi-faceted.
  - *The video doesn't show everything.*
- Teaching is incredibly hard work!
  - *Assume positive intent.*
- No lesson is ever perfect.
  - *Focus on what you can use to improve your classroom instruction*.
  - *Focus on the student's and teacher's interaction with the Mathematics.*

Observing Students: Discussion

- What do you think Jodi's mathematical goal is in choosing this particular task?

- Given the investigation that Jodi developed, what mathematical ideas and strategies do you expect to see as the children set to work?

Observing Students: Preview Video 2 and 3

While watching the videos…

- Think about some of the strategies from the landscape you see Jodi's students using.
- Find one example of how Jodi is using formative assessment to move her students along the landscape.

Observing Students: Discussion Video 2 and 3

- Think about some of the strategies from the landscape you see Jodi's students using.

- Find one example of how Jodi is using formative assessment to move her students along the landscape.

Observing Students: Discussion Video 2 and 3

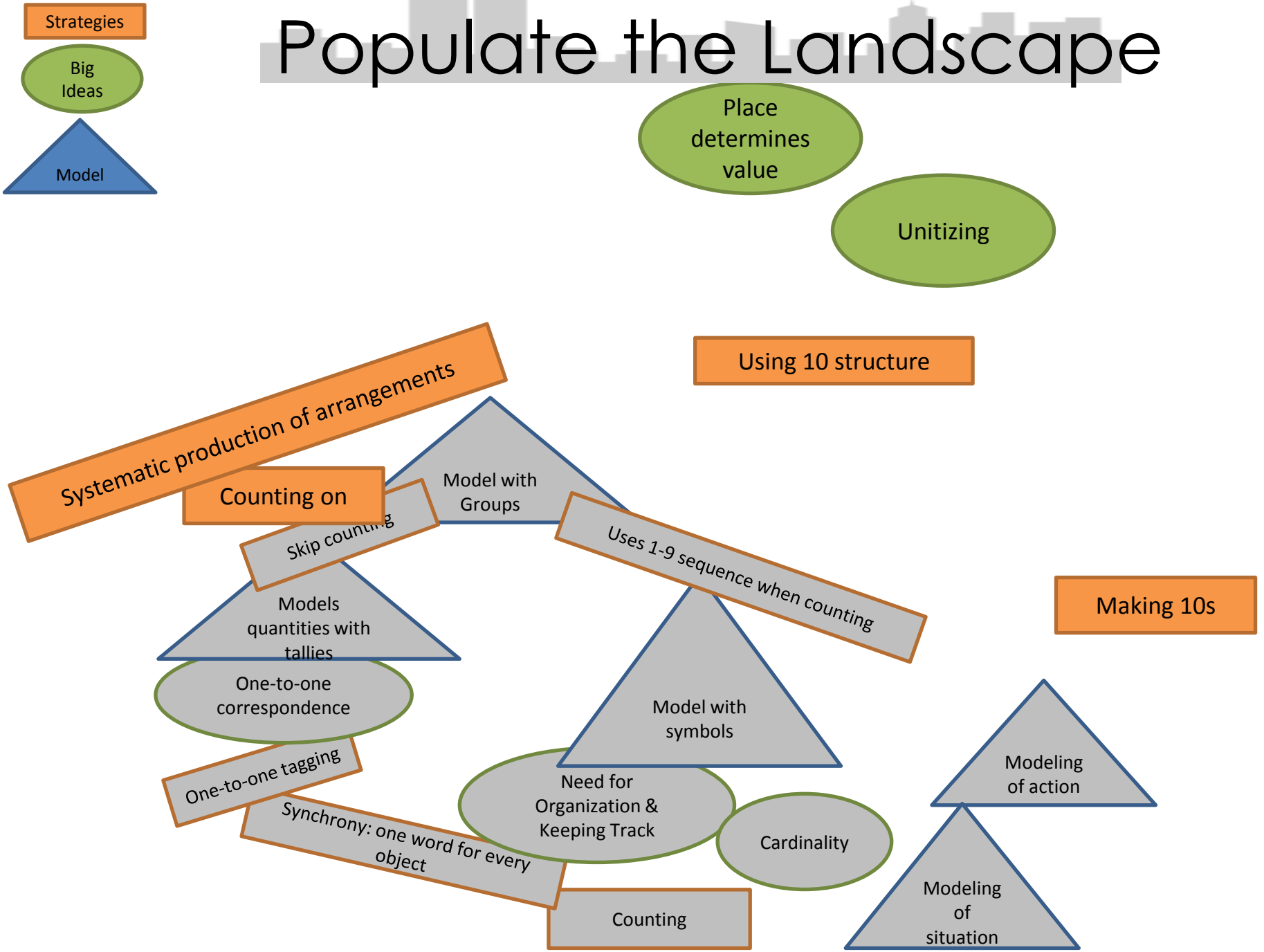
- Think about some of the strategies from the landscape you see Jodi's students using.

- Find one example of how Jodi is using formative assessment to move her students along the landscape.

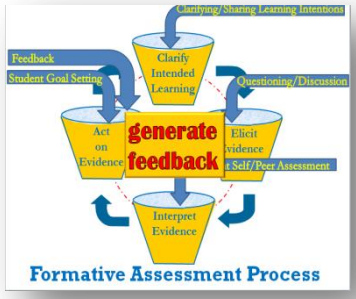
Populating Your Landscape

- Consider what big ideas, strategies or models we can now add to our landscape as a result of our learning.

Populate the Landscape



Balcony View



1

Quiet Reflection: (3 min.)
Looking at your note taker, what formative assessment practices did you notice in these video clips?

2

Discuss in your table groups.

Reviewing Task Considerations

- ✓ Does the task expose students' current levels of understanding in **relation to** the mathematics **learning target**?
- ✓ Is it **problematic** for students?
- ✓ Does the **cognitive demand** enable students opportunities to expose the depth of their knowledge?
- ✓ Does the task have **multiple entry and exit points**?
- ✓ Is the context and the mathematics of the task **relevant** to students?

(Van de Walle et. all, p. 19, 2014)

LUNCH
11:30 to 12:30

- See you promptly at 12:30.
- Remember to sign in when you return.

How to embed formative assessment practices into daily math instruction.

Explore ways in which FA attributes and practices move learning forward.

-Participants will construct a progression of learning.
-Participants will discuss FA practices observed.

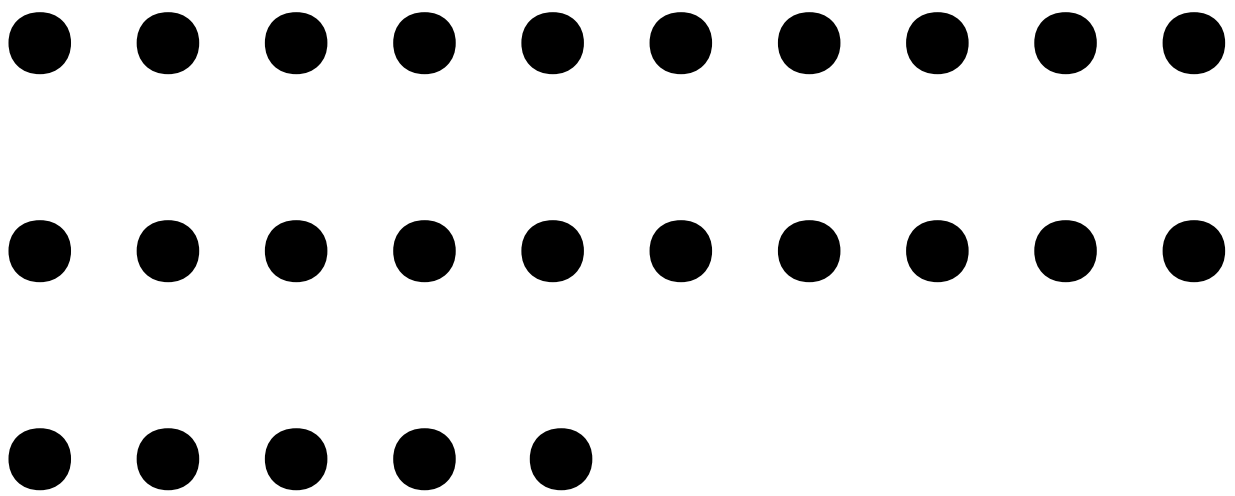
Context of Learning:
x and ÷
+ and -

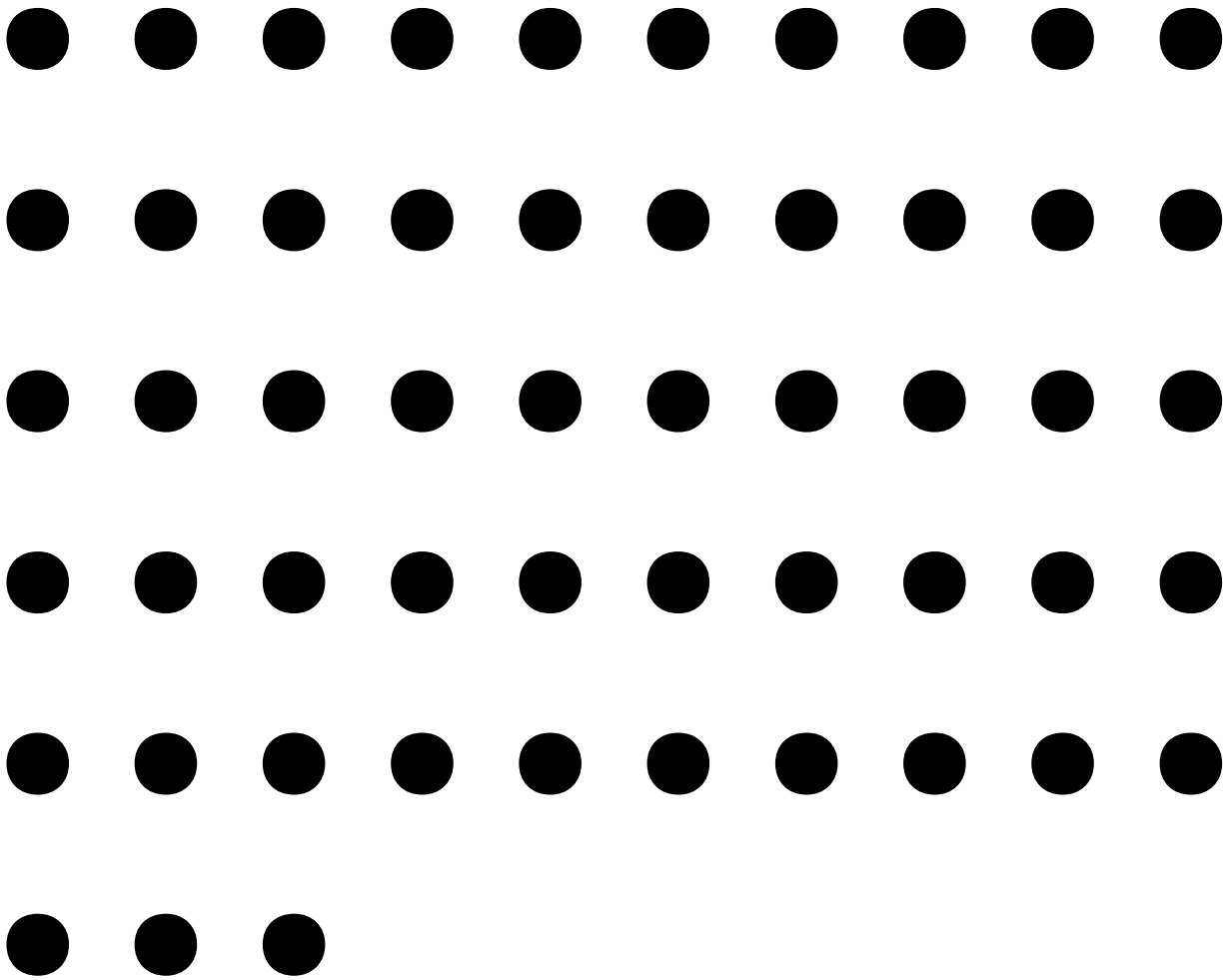
Bringing it Back to Your Classroom

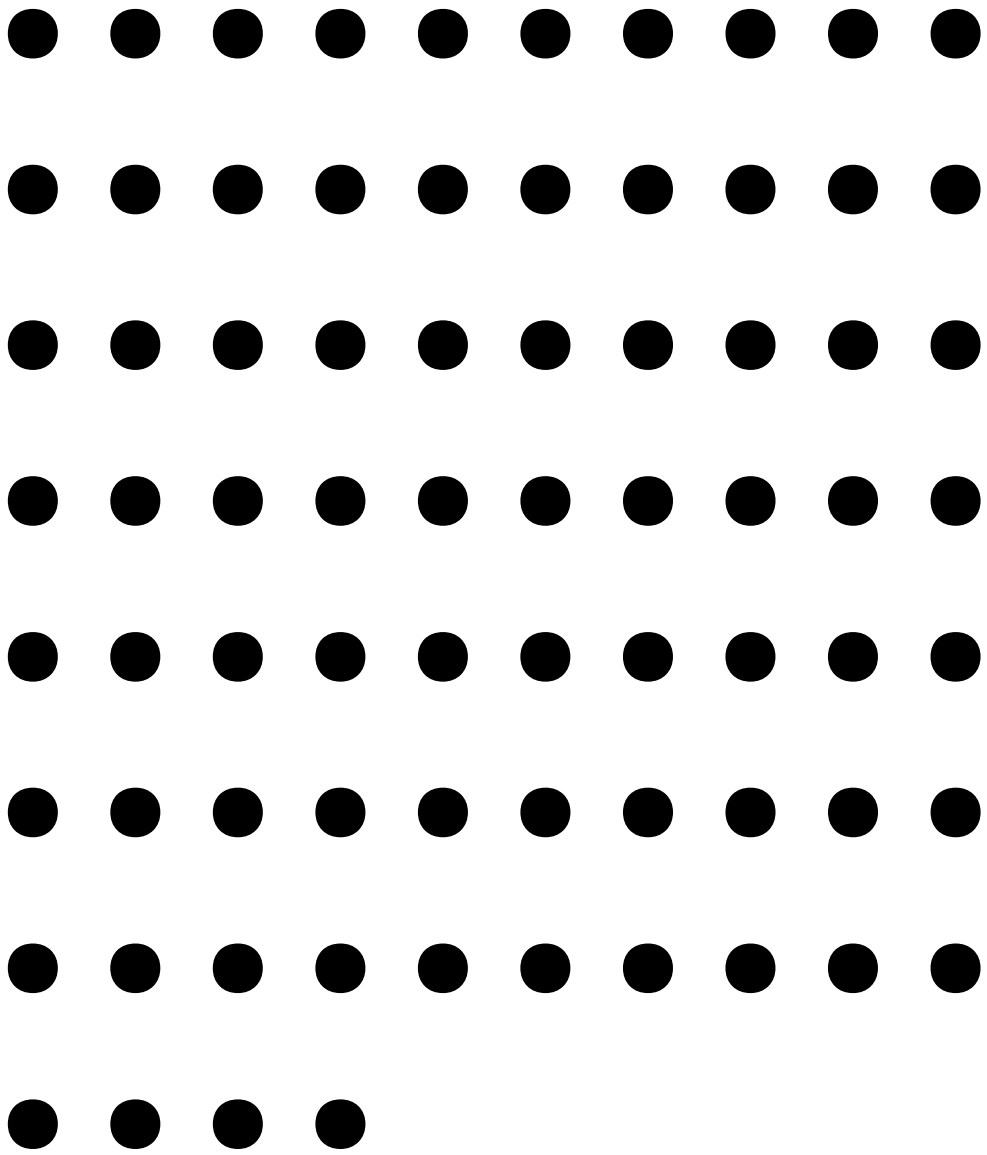
- Discuss with your table partners how this would look in your classroom at the beginning of the year.
  - How would you differentiate the task for students who are unable to count to 10? To 5?
  - What would these students count and how would you facilitate their learning?
  - How would you use your data from Kindergarten Portfolio Math Task 1 to structure this in your classroom?
  - How could the children organize their data?
- How would you adjust this task for mid year? End of year?
  - When would students be responsible for adding labels to the items being inventoried?

Observing with Purpose

How Many Do You See?







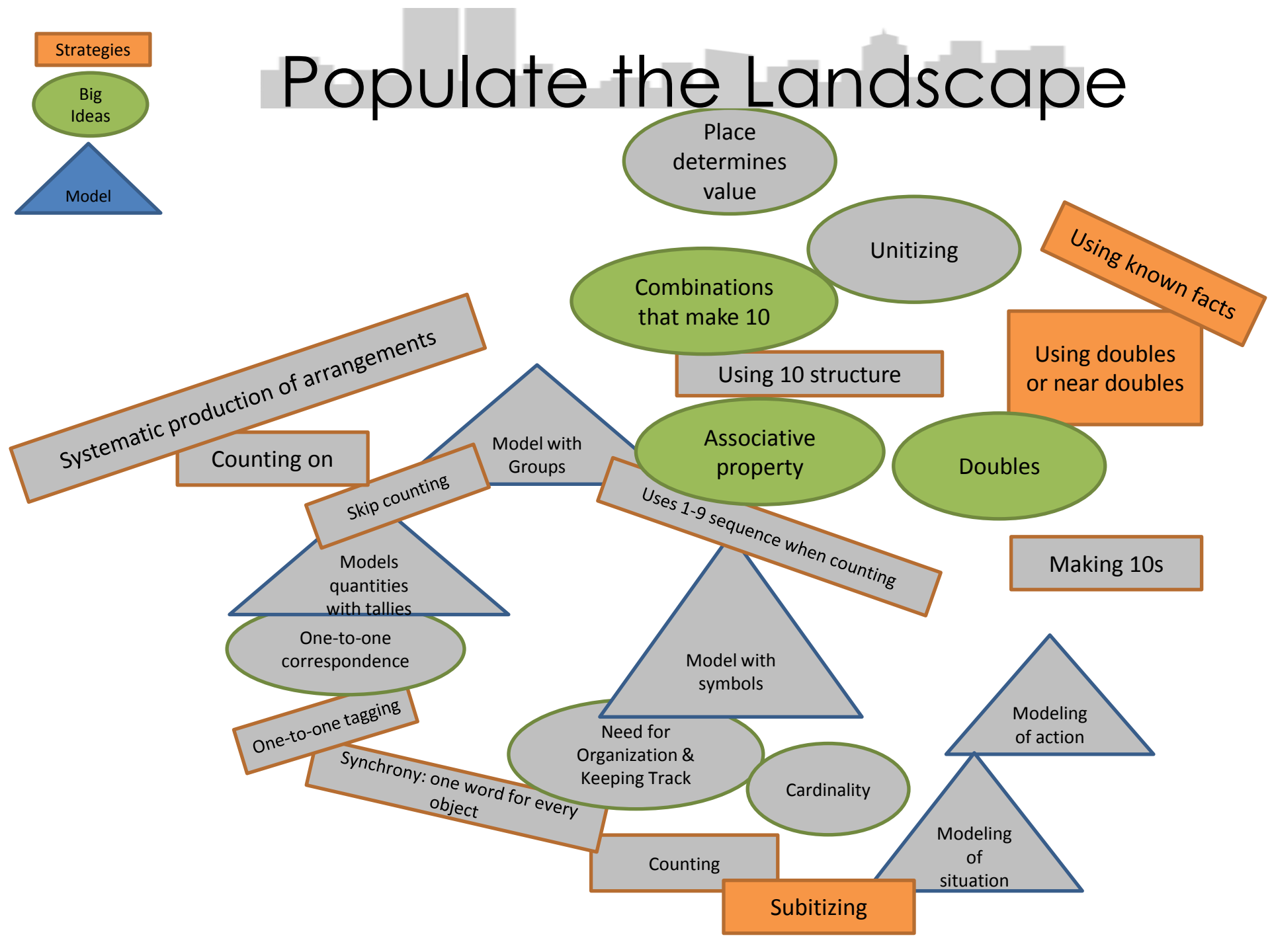
TIPS for Class Discussions

Engaging all learners and keeping cognitive demand high

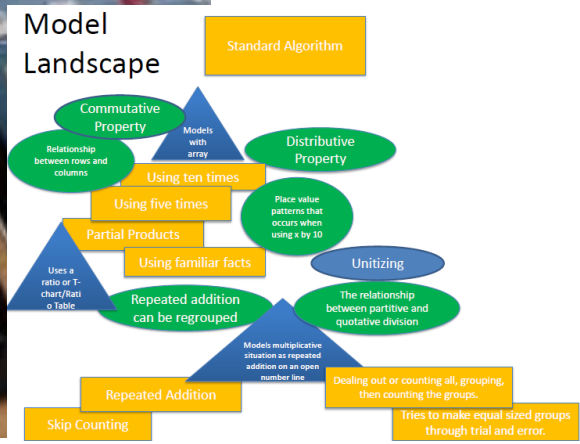
- Helping Individual Students Clarify and Share Their Own Thoughts.
- Helping Students Orient to the Thinking of Others.
- Helping Students Deepen Their Own Reasoning.
- Helping Students Engage with the Reasoning of Others.

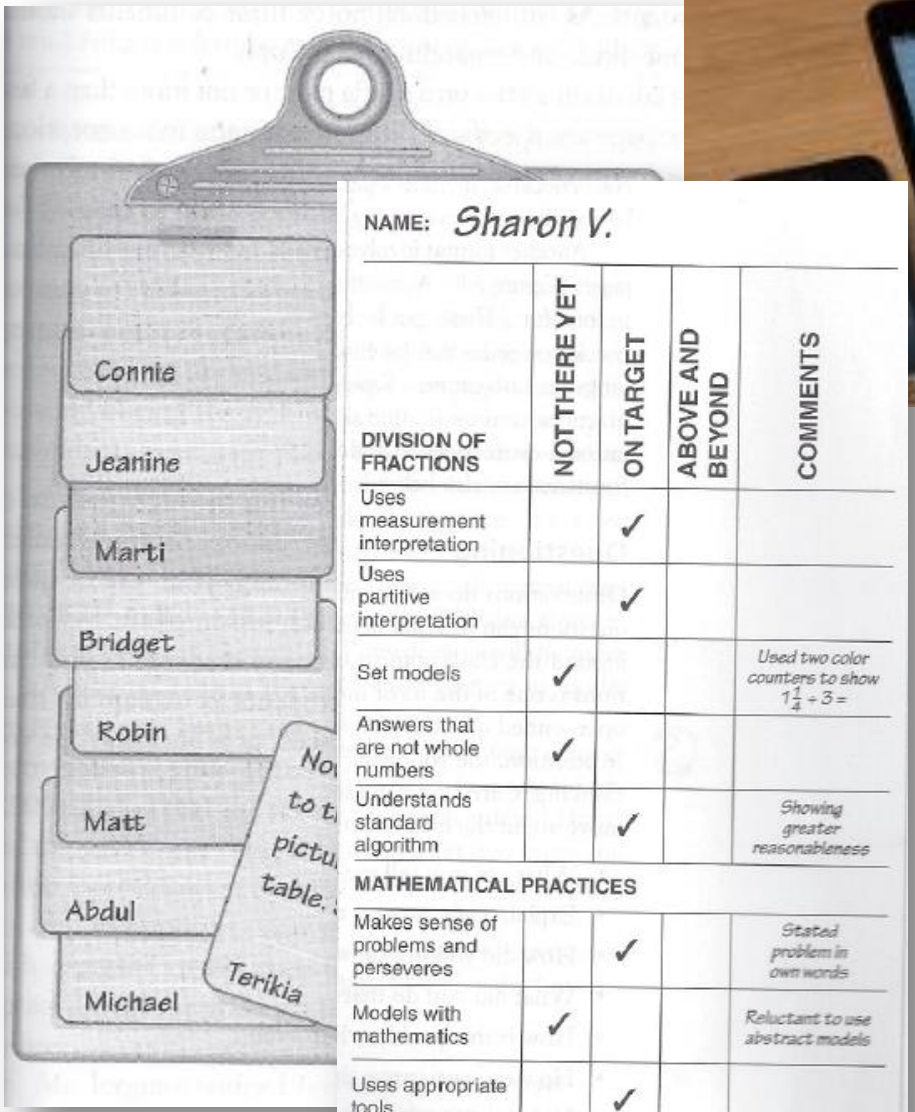
Populating Your Landscape

"The landmarks in this journey are not necessarily sequential. Many paths can be taken toward this horizon. Some landmarks are, of course, precursors to others." ~Cathy Fosnot


Strategies
Big Ideas
Model
Populate the Landscape
Place determines value
Unitizing
Using known facts
Combinations that make 10
Using doubles or near doubles
Using 10 structure
Systematic production of arrangements
Counting on
Model with Groups
Skip counting
Associative property
Doubles
Uses 1-9 sequence when counting
Making 10s
Models quantities with tallies
One-to-one correspondence
Model with symbols
One-to-one tagging
Need for Organization & Keeping Track
Modeling of action
Synchrony: one word for every object
Cardinality
Modeling of situation
Counting
Subitizing

Data Collection – Kidwatching and the landscape





NAME: *Sharon V.*

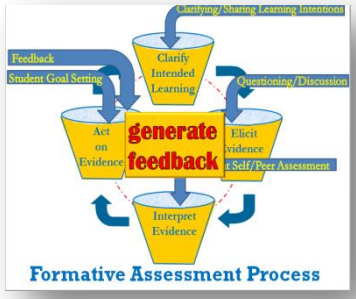
DIVISION OF FRACTIONS	NOT THERE YET	ON TARGET	ABOVE AND BEYOND	COMMENTS
Uses measurement interpretation		✓		
Uses partitive interpretation		✓		
Set models	✓			*Used two color counters to show* $1\frac{1}{4} \div 3 =$
Answers that are not whole numbers	✓			
Understands standard algorithm		✓		*Showing greater reasonableness*
MATHEMATICAL PRACTICES				
Makes sense of problems and perseveres		✓		*Stated problem in own words*
Models with mathematics	✓			*Reluctant to use abstract models*
Uses appropriate tools		✓		

Student Observations on 4th Grade Landscape

Student_____ School Year_____

Big Idea	Date Observed				
Commutative Property					
Distributive Property					
Relationship between rows and columns					
Place value patterns that occurs when using x by 10					
Repeated addition can be regrouped					
The relationship between partitive and quotative division					

Balcony View



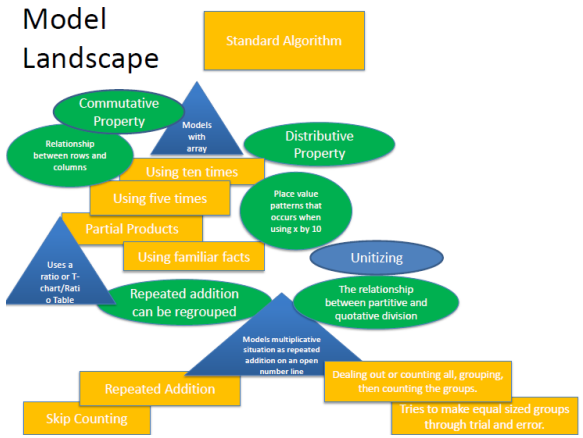
1

Quiet Reflection: (3 min.)
Looking at your note taker, what formative assessment practices did you notice in these video clips?

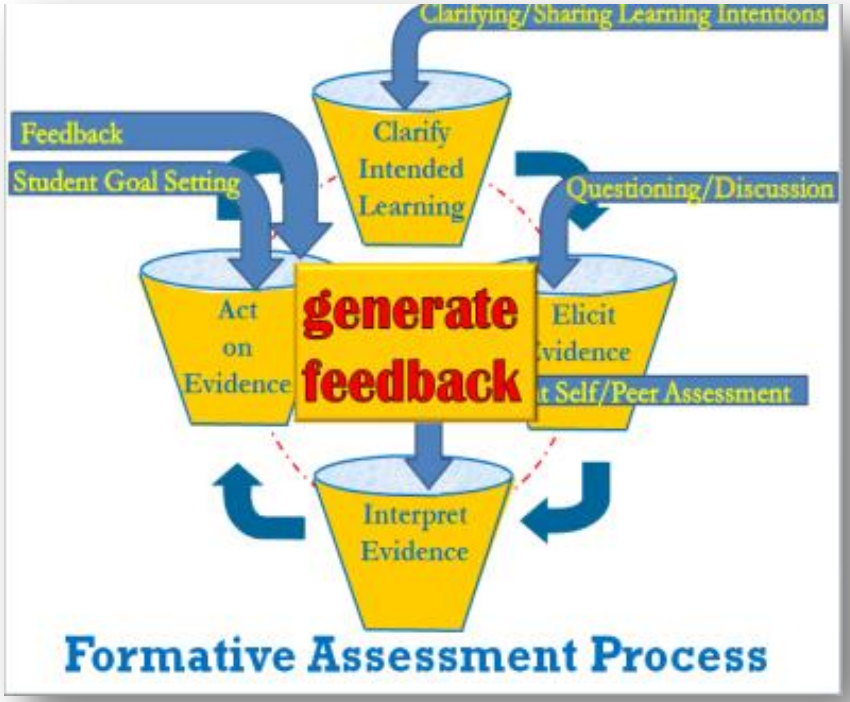
2

Discuss in your table groups.

Considering Formative Assessment and the Landscape



- ✓ **Clarify intended learning**
- ✓ **Elicit evidence.**
- ✓ **Interpret evidence**
- ✓ **Act on evidence**



Review and Connections

Partner Conversation:
(4 min.)

1. What are the NVACS critical areas for my grade level?

2. How does the landscape support the critical areas?

3. What are some of the connections between the NVACS standards and the Mathematical landscape?

Considering the Critical Areas and the Mathematical Landscape

Students use **numbers**, including **written numerals**, to represent **quantities** and to solve **quantitative problems**, such as **counting objects** in a set; **counting out** a given number of objects in a set; **comparing sets** or numerals; and modeling simple **joining** and **separating** situations with sets of objects, or eventually with **equations** such as 5 +2 = 7 and 7 – 2 =5.

Considering the NVACS Standards

NVACS Standards Pg. 9 – 12	Language from the standards	Big Ideas from the landscape	Strategies and Models to use with students
K.CC.4a	• number name • standard order • pairing	• Need for Organization and Keeping Track • One-to-one correspondence	• Actions • Situation • Synchrony • 1-1 tagging
K.OA.3	• decompose • equal • pairs • drawings	• Commutative • Associative • Equivalence	• Pictures • Model with Symbols • Splitting
K.NBT.1	• compose • Decompose • Tens and ones • further ones	• Place Determines Value • Unitizing • Grouping	• Additive Structuring • 5 Structure • 10 Structure • Landmarks • Counting • Splitting

The Landscape's Big Idea

K.CC.4
"quantities"

K.OA.1
"addition and subtraction"

K.MD.2
"more of, less of"

K.CC.5
"how many"

K.OA.2
"addition and subtraction"

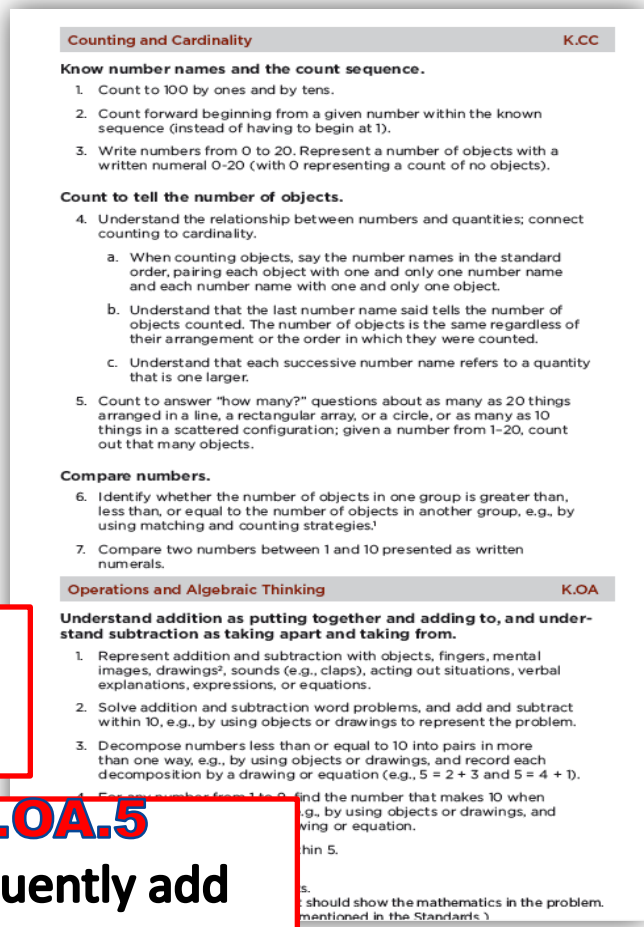
K.NBT.1
"compose and decompose"

K.CC.6
"greater, less than, or equal to"

K.OA.3
"decompose numbers"

K.OA.4
"makes 10"

K.OA.5
"fluently add and subtract"



Counting and Cardinality K.CC

Know number names and the count sequence.

1. Count to 100 by ones and by tens.
2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Count to tell the number of objects.

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
   a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
   b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
   c. Understand that each successive number name refers to a quantity that is one larger.
5. Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.

Compare numbers.

6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.[1]
7. Compare two numbers between 1 and 10 presented as written numerals.

Operations and Algebraic Thinking K.OA

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

1. Represent addition and subtraction with objects, fingers, mental images, drawings[2], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

- Review the standards. Where are the connections to addition and subtraction?

Develop a conceptual understanding of the Formative Assessment Process and its benefits.

Compose and share a definition or quote capturing the essence of what formative assessment is.

Explore ways in which FA attributes and practices move learning forward.

-Participants will construct a progression of learning.
-Participants will discuss FA practices observed.

Plan next steps in embedding learning into practice.

Vertical teams will begin planning instruction, within today's context, embedding formative assessment practices in plans.

How to embed formative assessment practices into daily math instruction.

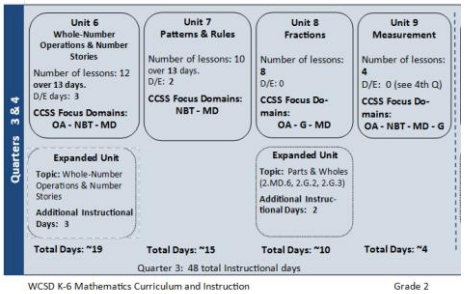
Context of Learning:
x and ÷
+ and -

Fall PD Opportunities

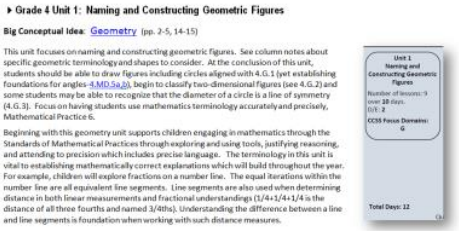
- ✓ District-Wide PLTs (16 hours, 1 credit)
  - ✓ Continue your learning from today!
  - ✓ Four follow-up sessions: 9/25, 12/4, 2/26, 5/21
  - ✓ Work in grade level teams
  - ✓ Content tied to "Pacing Timeline" to provide "just in time" connected learning opportunities to prepare for the next quarter of content
- ✓ Computational Strategies/Algorithms (8 hours, ½ credit)
- ✓ Core Connections: K-5 (8 hours, ½ credit)Same as offered last year. Join us if you missed it or have changed grade levels!
- ✓ eSuite Basic (no credit): 8/19 or 9/9
- ✓ Intensification Lab: During winter break
- ✓ Planning in Math (16 hours, 1 credit)
- ✓ Using Classroom Discussion to Promote Problem Solving and Solution Strategies in Mathematics
- ✓ Formative Assessment Webinars – (October – November)

Check Solutionwhere frequently for updates and additional opportunities!

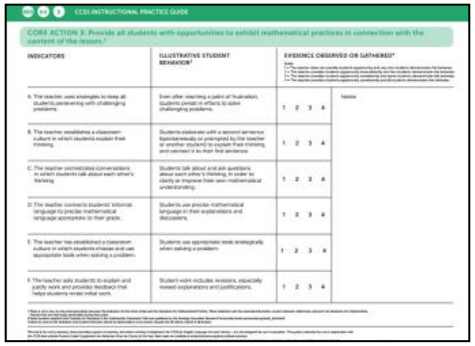
Resources to Support



- WCSD Pacing Timeline

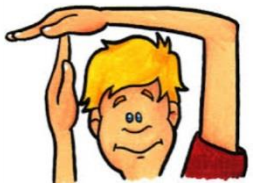


- WCSD Curriculum Documents



- Instructional Practice Guides

District Performance Plan Goal 1, Objective 4: The percentage of site administrators, instructional coaches, teachers, and instructional ESPs who report familiarity with WCSD Core NACS Materials and curriculum tools adopted and/or endorsed by WCSD will reach 50% by October 2014 and 75% by May 2015.



Break and Moving to Verticals

2:45-3:30 Vertical Teams with your School

Each school will turn in an exit ticket that addresses the guiding question. Individual copies of the questions have been provided for you to refer to during the discussion.

Guiding Question:

- How does the Mathematical landscape and formative assessment fit with my current teaching practices and my knowledge about nurturing and developing young mathematicians?

- **Presenters: List schools and assigned room numbers here!**