

GOOD TASKS & QUESTIONS HAVING MEANINGFUL DISCUSSIONS WITH YOUNG CHILDREN

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FUN FAIR SCRIP

We are using scrip to make purchases at the school's annual family fun fair. The scrip are in lengths of 1, 2, 3, or 4 scrip. An 'ono pop' costs 10 scrip. Find a way to make a collection of scrip with which you can buy an ono pop.

- At your table, find several ways that you can make a total of 10.
- When you have 4 collections made, compare and contrast those you have with others at your table.

EXAMINING THE TASK

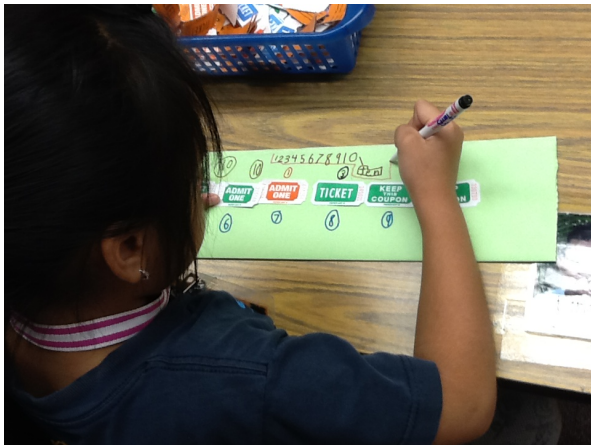
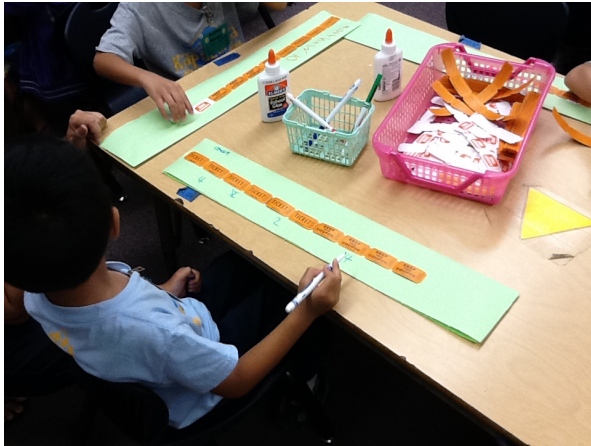
AT YOUR TABLE, DISCUSS ...

- What does or does not makes this a good task?
- What questions do you think teachers can explore based on your experience with the problem?

KINDERGARTEN TEACHERS' MOTIVATION FOR THE PROBLEM

- Studying the CCSSM and trying to select a problem that matched a CCSSM K standard
 - 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
- Encouraging more problem solving, communication, validation, reasoning

FUN FAIR SCRIP... ACTIONS AND REFLECTIONS



HOW THE LESSON MATCHED THE INTENDED GOAL

- Teachers able to identify students who needed more support and practice with one-to-one correspondence
- Even solutions which were wrong (were) used as teachable moments in which the students were taking the lead as problem solvers
- Students developed oral communication when sharing their combination of 10. Even the less verbal students felt confident in sharing
- Problem was relevant and had a personal connection to students' own experiences using scrip at their school's Family Fair/Chuck E Cheese/Fun Factory

WHAT WAS LEARNED FROM KINDERGARTEN STUDENT RESPONSES

- Self correct/identify how to help others
- Collaborate with each other
- Show many combinations of 10, compare and contrast their own combinations with their peers
- Subitize 1–4 scrip
- See the big idea that there are a variety of ways to make 10
- Verbalize their thinking
- Take the initiative to extend the lesson. For example, some children took the initiative to add the sets of 10.

ICE CREAM CONES

Because we have had a good year, we are going to Bubbies Ice Cream Shop. You each will be able to get a three-scoop ice cream cone. Your flavor choices will be guava, pineapple, and kiwi.



- Use the stickers to represent a few different types of cone you can make.

REPRESENTING THE CONES



EXAMINING THE TASK

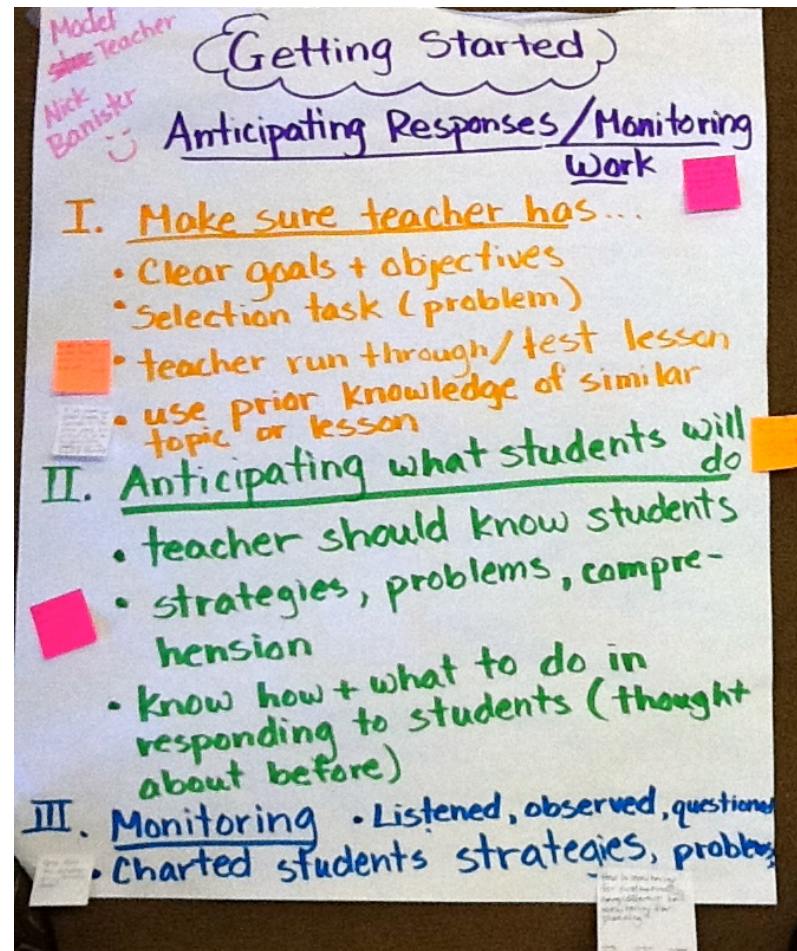
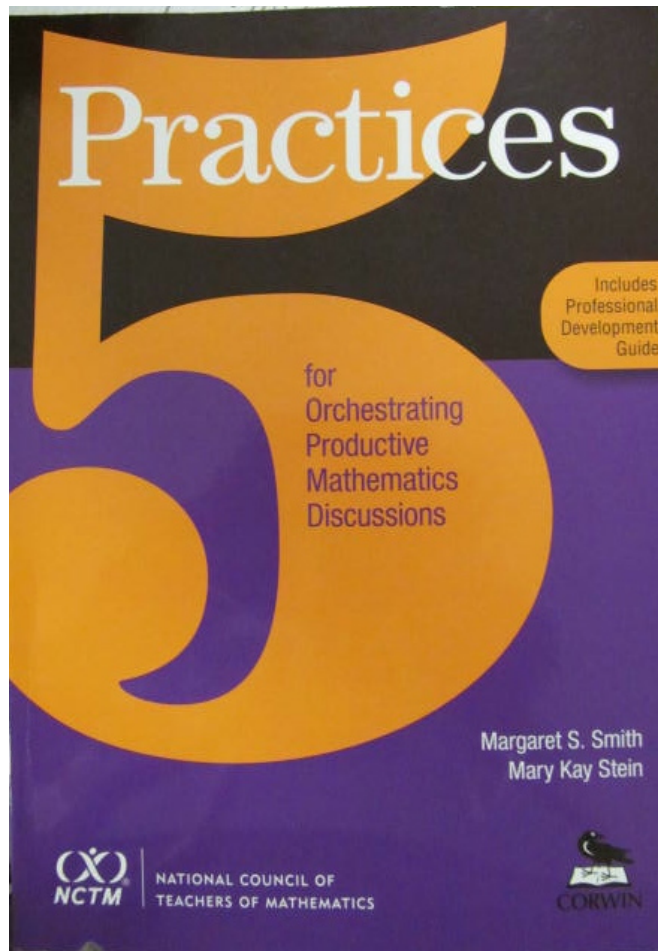
AT YOUR TABLE, DISCUSS ...

- What does or does not makes this a good task?
- How does this task fit with the kindergarten common core standards?

ACTIONS AND REFLECTIONS



5 PRACTICES INFLUENCE PLANNING



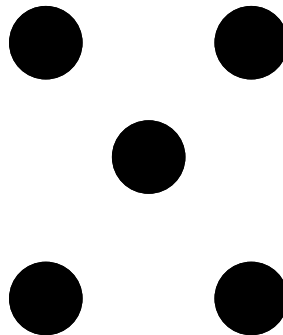
DECIDING WHAT TO DISCUSS



GRADE 1

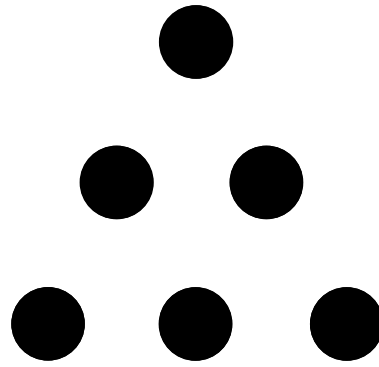
- Subitizing: perceptually (visually being able to recognize a small number of objects without counting) and conceptually (being able to recognize a number of objects in an organized pattern) numbers 1-20.
 - From attending NCTM Indianapolis
- Adding and subtracting
 - CCSSM

HOW DO YOU SEE THE DOTS?



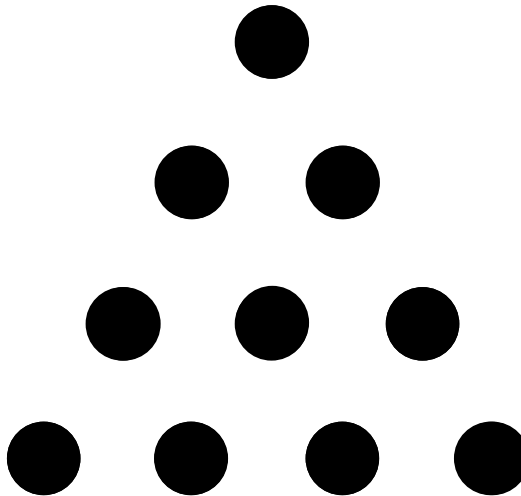
- How many dots do you see?

HOW MANY DOTS DO YOU SEE?



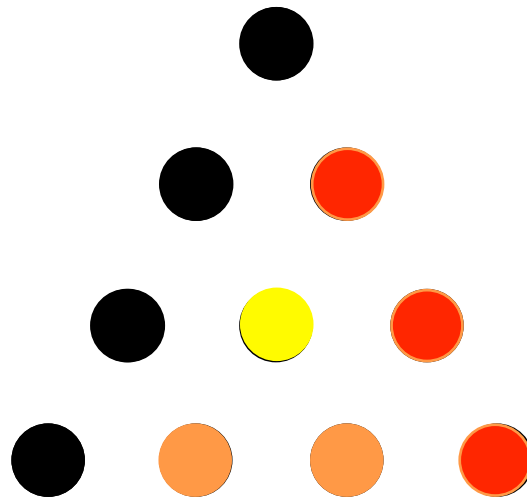
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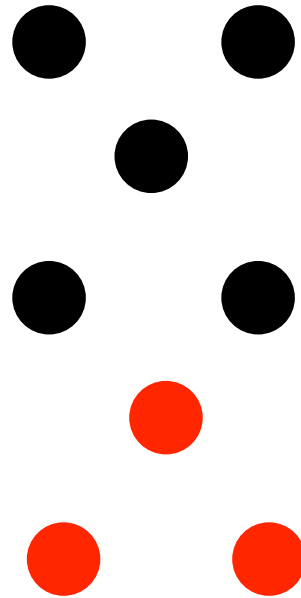
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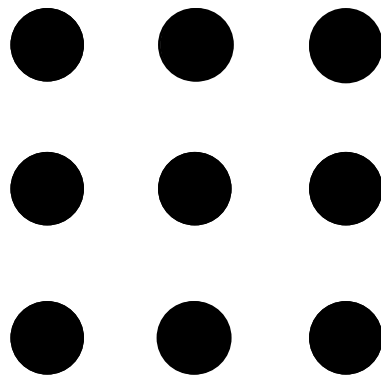
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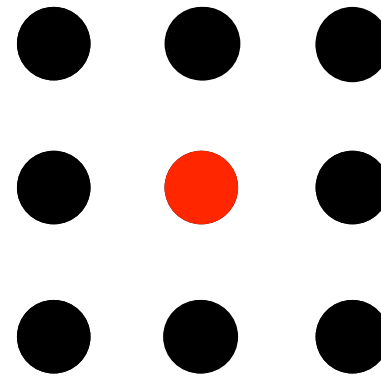
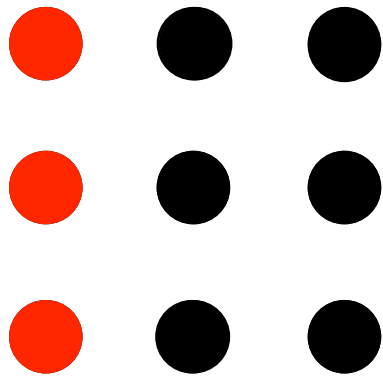
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HOW MANY DOTS DO YOU SEE?

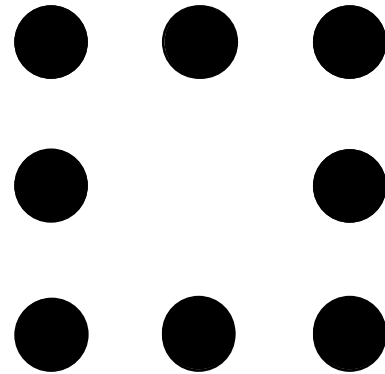


- How do you see the dots?

DID YOU SEE EITHER OF THESE?

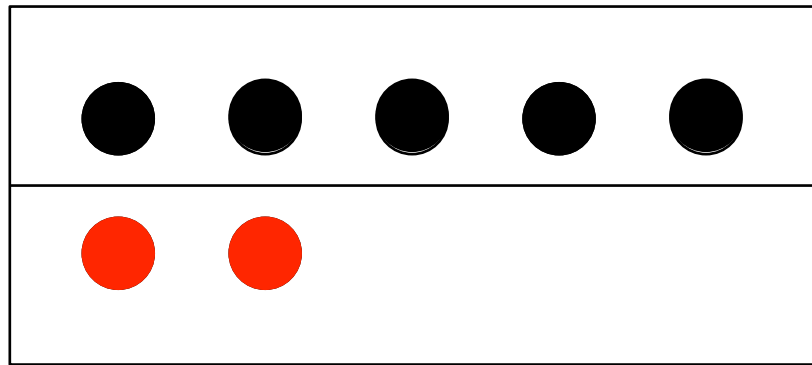


HOW MANY DOTS DO YOU SEE?



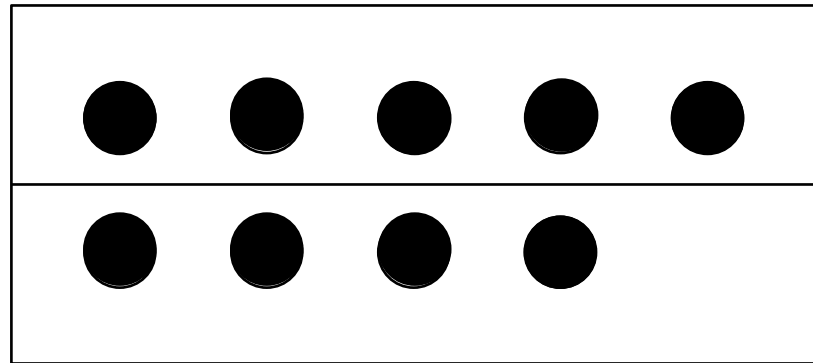
- How do you see the dots?

HOW DO YOU SEE THE DOTS?



- How many dots do you see?

HOW MANY DOTS DO YOU SEE?



- How do you see the dots?

MAKE TWO SUBITIZING PIECES

- Discuss why you made them.
- Explore ways that children may see them.

GRADE 1: ADDITION OR SUBTRACTION?

The Easter Bunny had 64 Easter Eggs in his basket. He hid some eggs. Now there are 41 eggs in his basket. How many eggs did the Easter Bunny hide?



EXAMINING THE TASK

AT YOUR TABLE, DISCUSS ...

What does or does not makes this a good task?

ADD/SUBTRACT HOW MANY WAYS?



TABLE 1. Common addition and subtraction situations.*

	Result Unknown	Change Unknown	Start Unknown
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? $2 + 3 = ?$	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? $2 + ? = 5$	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? $? + 3 = 5$
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? $5 - 2 = ?$	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? $5 - ? = 3$	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? $? - 2 = 3$
	Total Unknown	Addend Unknown	Both Addends Unknown ¹
Put Together/ Take Apart²	Three red apples and two green apples are on the table. How many apples are on the table? $3 + 2 = ?$	Five apples are on the table. Three are red and the rest are green. How many apples are green? $3 + ? = 5$, $5 - 3 = ?$	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? $5 = 0 + 5$, $5 = 5 + 0$ $5 = 1 + 4$, $5 = 4 + 1$ $5 = 2 + 3$, $5 = 3 + 2$
	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare³	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Julie have than Lucy? $2 + ? = 5$, $5 - 2 = ?$	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? $2 + 3 = ?$, $3 + 2 = ?$	(Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? $5 - 3 = ?$, $? + 3 = 5$

*These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes (results in) but always does mean is the same number as.

¹Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.

²For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.

WHICH IS IT?

Today as I prepared for the presentation, I noticed I had 5 coins in my pocket. On the way here I stopped for a cup of coffee. I paid for the coffee, pocketed the change, and came directly to the presentation. When I arrived here, I noticed I had 8 coins in my pocket. How many coins did I obtain when I stopped for coffee?

- Is this an addition problem or a subtraction problem?

WATCHING THE WORDS IN A CONTEXT

- Watch the verbs---they give the action in a problem.
- Addition and subtraction are considered *operations*.
 - Why does this matter?
 - Which number is being operated on? How do you know?

ADD/SUBTRACT: HOW MANY WAYS?

	Result Unknown	Change Unknown	Start Unknown
Add to			
Take From			
	Total Unknown	Addend Unknown	Both Addends Unknown
Put Together/ Take Apart			
	Diff Unknown	Bigger Unknown	Smaller Unknown
Compare			

Chose a cell; write a word problem that matches the cell;
write the equation for the problem

	Result Unknown	Change Unknown	Start Unknown
Add to	$2 + 3 = ?$	$2 + ? = 5$	$? + 3 = 5$
Take From	$5 - 2 = ?$	$5 - ? = 3$	$? - 2 = 3$
	Total Unknown	Addend Unknown	Both Addends Unknown
Put Together/ Take Apart	$3 + 2 = ?$	$3 + ? = 5, 5 - 3 = ?$	$5 = 0 + 5, 5 = 1 + 4, \text{ etc.}$
	Diff Unknown	Bigger Unknown	Smaller Unknown
Compare	How many more/fewer $2 + ? = 5, 5 - 2 = ?$	Has more/fewer $2 + 3 = ?, 3 + 2 = ?$	Has more/fewer $5 - 3 = 2, ? + 3 = 5$

FIRST GRADE CHALLENGES/BENEFITS

- Focus on using numbers in the context of a worded problem
- Importance of vocabulary
- Integration of language arts
- Tie equations to words
- Explain thinking with materials and pictures
- Tie stories, equations, pictures

GRADE 2

Mrs. DeBusca gave 60 Malama tickets for Mrs. Oshiro's class to sell. The class sold 15 tickets in October and 15 tickets in November. They also sold some tickets in December. The class has 10 tickets left.

How many tickets did the class sell in December?

EXAMINING THE TASK

AT YOUR TABLE, DISCUSS ...

- What does or does not makes this a good task?
- What questions do you think teachers can explore based on your knowledge of the problem?

QUESTIONS THAT BUILD STRONG MATHEMATICAL THINKING

- To promote problem solving & check student responses, ask...
- To help students share their mathematical thinking, ask...
- To help students learn to formulate their explanations & justify their conclusions, ask...
- To encourage reflection, ask...
- To promote mathematical discourse and communication, ask...
- To make connections among ideas and applications, ask...

MAHALO!



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