



New Jersey Department of Education

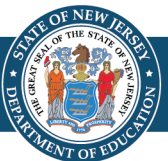


Centers in the P–3 Mathematics Classroom

Office of K–3

Division of Early Childhood Services

12/4/23



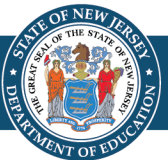


Agenda



1. Introduction
2. Managing Centers
3. Scaffolding and Differentiation
4. Topics for Centers
5. Assessment

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Introduction



The National Council of Supervisors of Mathematics (NCSM), The National Council of Teachers of Mathematics (NCTM) and National Association for the Education of Young Children (NAEYC) support flexible small group instruction and center-based play in mathematics.



Early Childhood Mathematics:
Promoting Good Beginnings

[NAEYC Position Paper](#)

**Supporting All Students Through
Flexible Grouping Practices**

A Position Statement from NCSM: Leadership in Mathematics Education

[NCSM Position Papers](#)



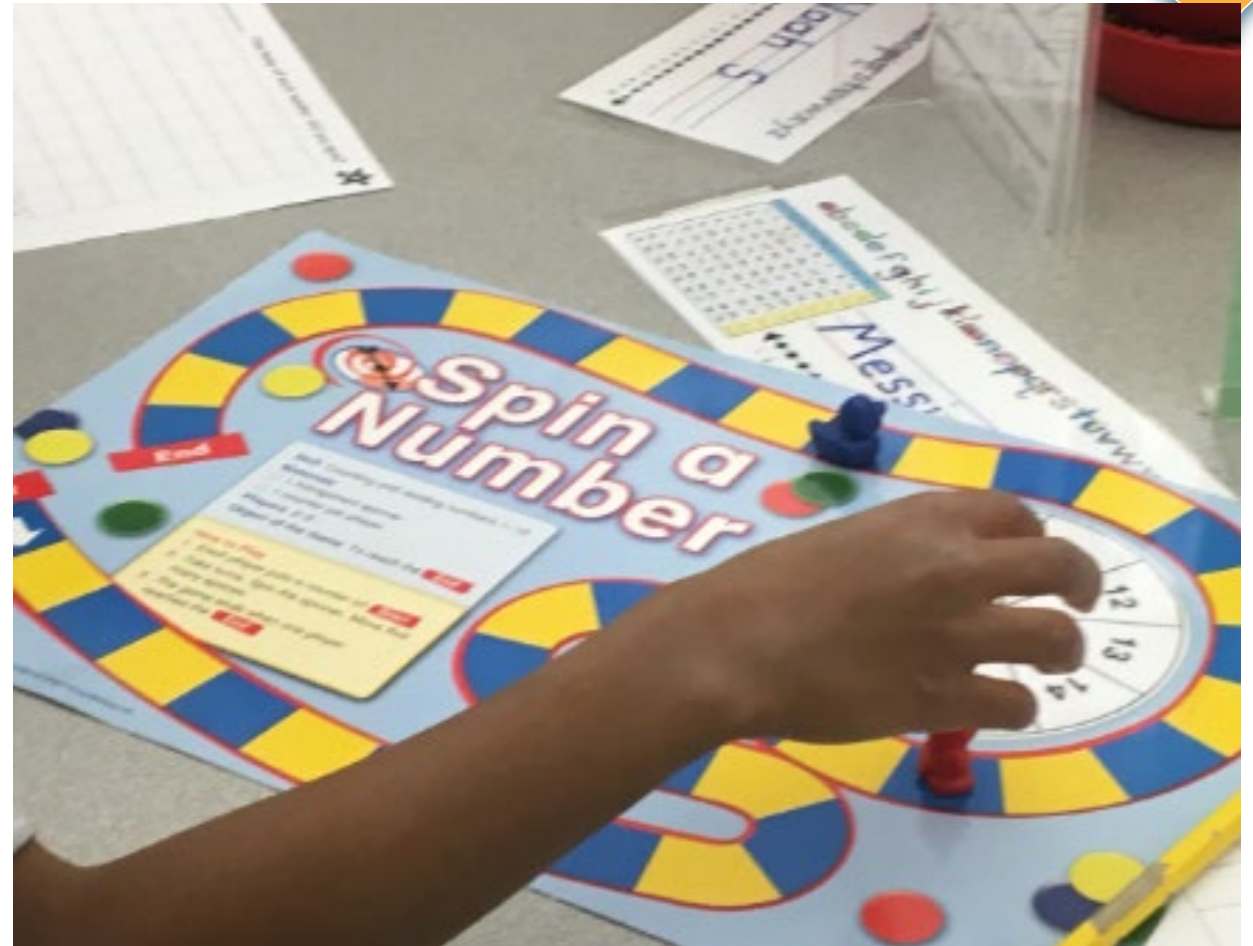
Mathematics in Early Childhood Learning
A Position of the National Council of Teachers of Mathematics

[NCTM Position Paper](#)



Centers/Workstations

What is a Mathematics Center/Workstation?



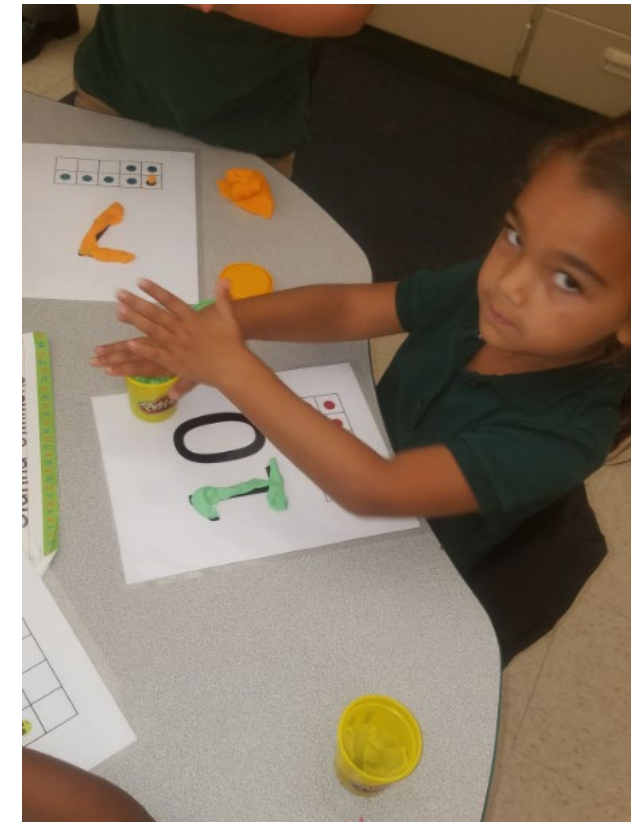
Goal of Centers



What is the goal of mathematics centers?

- Purposeful, differentiated practice
- Enrichment
- Independent
 - (teacher does not need to be there)
- Self checking
- Artifacts

[About Differentiated Centers](#)



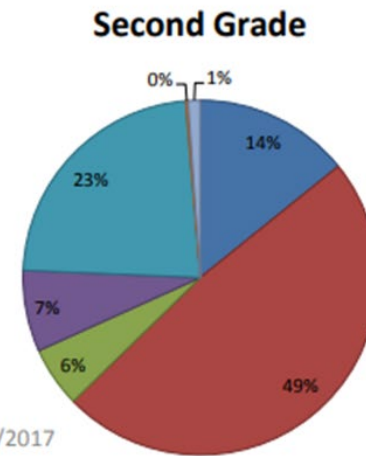
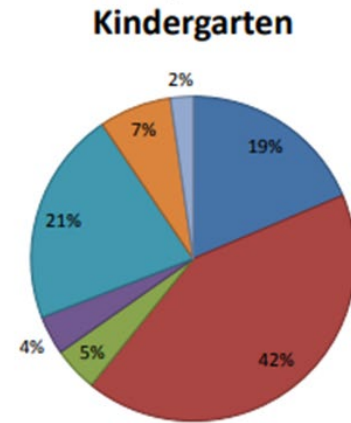


Getting Started (1 of 7)

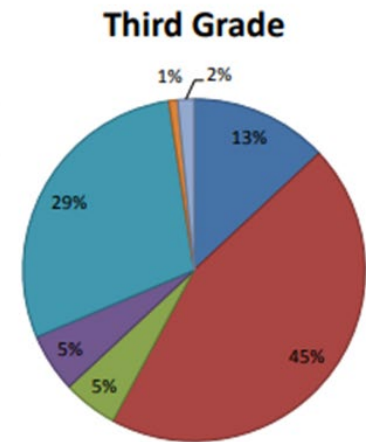
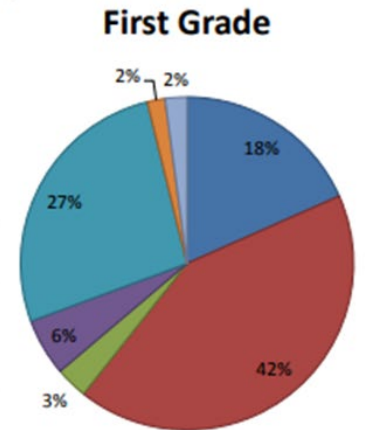


Activity Settings by Grade Level

- Transitions: Children are moving or waiting between Transitions locations or activity settings
- Whole Group: Most children are engaged in teacher-led activities



	Transitions
	Whole group
	Small group
	Group work
	Individual
	Choice
	Meals



/2017

NJASCD-NJPSA-FEA Fall Conference



Text Version of Activity Settings By Grade Pie Chart



Percentage of Time Spent in Each Activity (by Grade)

Activity	Kindergarten	Grade 1	Grade 2	Grade 3
Transition	19	18	14	13
Whole group	42	42	49	45
Small group	5	3	6	5
Group work	4	6	7	5
Individual	21	27	23	29
Choice	7	2	0	1
Meals	2	2	1	2

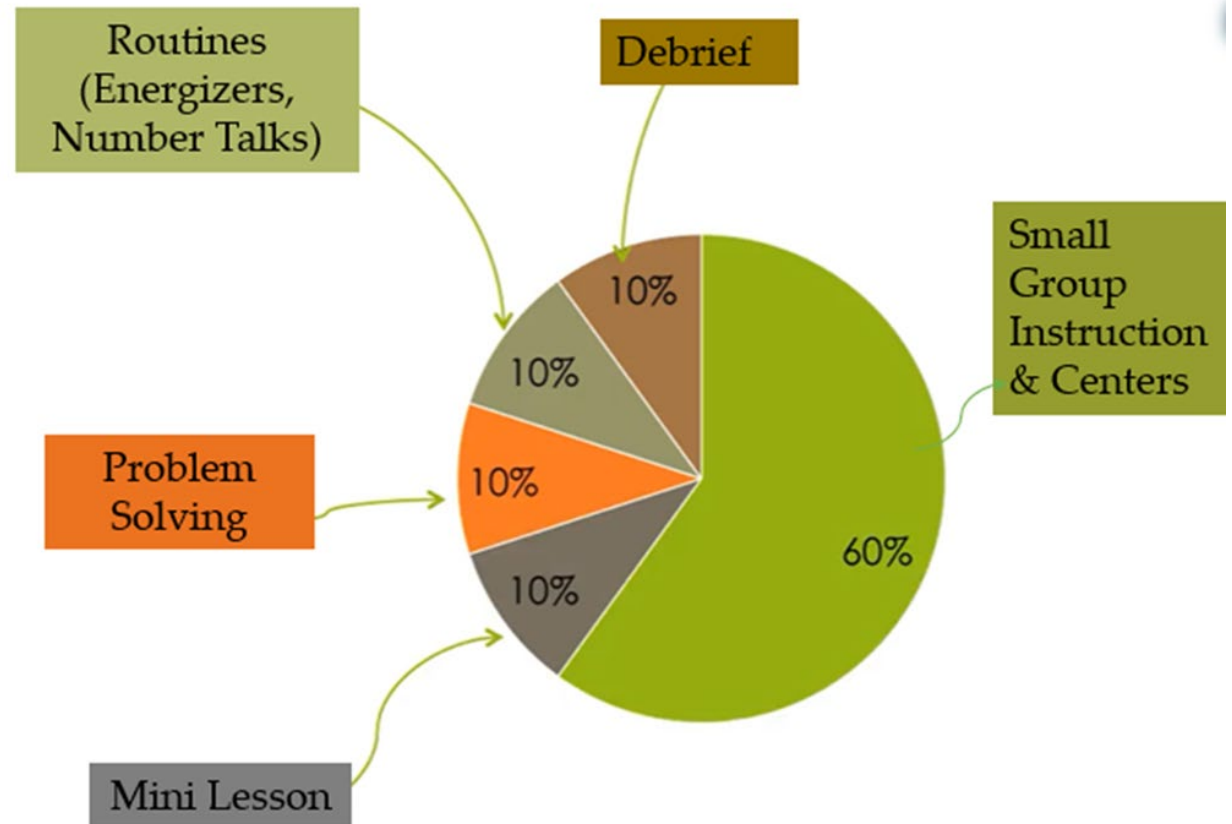


Getting Started (2 of 7)



An overview of math activity times:

Activity	Percentage of time
Routines	10%
Problem Solving	10%
Mini-lesson	10%
Small Group and Centers	60%
Debrief	10%





Getting Started (4 of 7)



What are we doing in the centers?

2nd Grade Centers: Addition and Subtraction; Place Value; Geometry/Describing Analyzing Shapes, Measurement and Data, Problem Solving

3rd Grade Centers: Operations, Fractions, Geometry, Measurement and Data, Problem Solving





Getting Started (5 of 7)



What are we doing in centers?

Priority Goals for K–3

**KINDERGARTEN
PRIORITY
MATH
GOALS**

Building Number Sense!

A poster for Kindergarten Priority Math Goals. It features a blue dashed border, a pink and red curved graphic in the top left, and a blue triangle in the bottom left. The text is in blue and orange.

**1st
GRADE
PRIORITY
MATH
GOALS**

Building Number Sense!

A poster for 1st Grade Priority Math Goals. It features a green dashed border, a red and orange curved graphic in the top left, and a yellow triangle in the bottom left. The text is in blue and orange.

**2nd
GRADE
PRIORITY
MATH
GOALS**

Building Number Sense!

A poster for 2nd Grade Priority Math Goals. It features a yellow dashed border, a green and yellow curved graphic in the top left, and a pink triangle in the bottom left. The text is in purple and yellow.

**3rd
GRADE
PRIORITY
MATH
GOALS**

Building Number Sense!

A poster for 3rd Grade Priority Math Goals. It features a blue dashed border, a pink and red curved graphic in the top left, and a blue triangle in the bottom left. The text is in blue and orange.

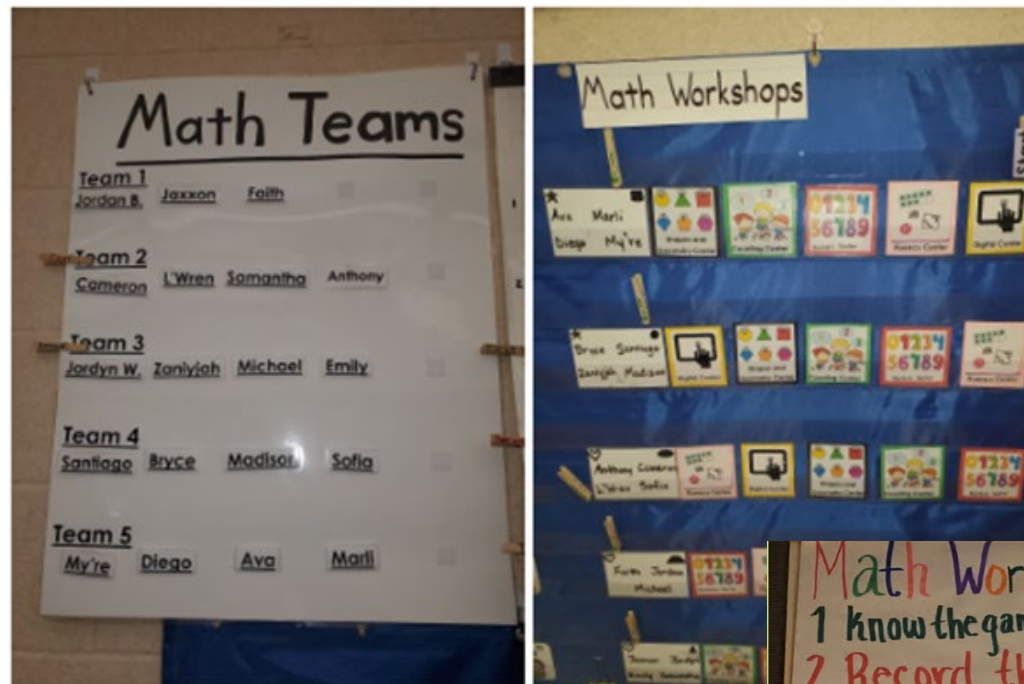


Getting Started (6 of 7)



Setting Expectations

Practice familiar games, how to use recording sheets (or exit slips), playing fair, being helpful, being respectful, perseverance, clean up.



Math Workstation Games

- 1 Know the game, the rules, the math
- 2 Record the math
- 3 Play fair
- 4 Use inside voices
- 5 Be helpful
- 6 Be Respectful
- 7 Stick with it
- 8 Put the Game back (make sure all the pieces are there)

Centers 1



Getting Started (7 of 7)



Dividing Mixed Numbers

A. A dowel is used to make axles for wooden trains. From a dowel $10\frac{2}{3}$ inches long, how many axles can be made if each axle is $2\frac{2}{3}$ inches long?

Divide $10\frac{2}{3} \div 2\frac{2}{3}$.

Since you will divide by $2\frac{2}{3}$, you must find its reciprocal.

$$2\frac{2}{3} = \frac{8}{3} \quad \frac{8}{3} \times \frac{3}{8} = 1$$

Write fractions for both numbers.

$$10\frac{2}{3} \div 2\frac{2}{3} = \frac{32}{3} \div \frac{8}{3}$$

Four axles can be made.

Multiply by the reciprocal. Simplify.

$$\frac{32}{3} \times \frac{3}{8} = \frac{4}{1} = 4$$

B. Divide $3 \div 7\frac{1}{2}$.

Write whole numbers and mixed numbers as fractions.

$$3 \div 7\frac{1}{2} = \frac{3}{1} \div \frac{15}{2} = \frac{1}{13} \times \frac{6}{13} = \frac{6}{13}$$

Other examples:

$$\text{Divide } 6\frac{3}{4} \div \frac{5}{8}.$$

$$\frac{27}{4} \div \frac{5}{8} = \frac{27}{4} \times \frac{8}{5} = \frac{54}{5} = 10\frac{4}{5}$$

$$\text{Divide } 8 \div \frac{2}{3}.$$

$$\frac{8}{1} \div \frac{2}{3} = \frac{8}{1} \times \frac{3}{2} = \frac{36}{2} = 18$$

Checkpoint Write the letter of the correct answer.

Divide.

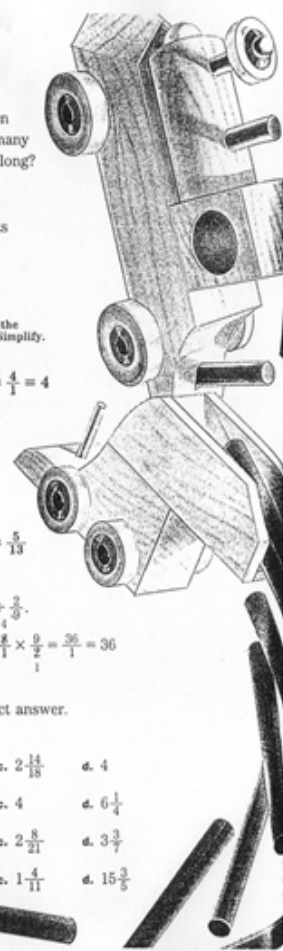
1. $3\frac{1}{2} \div 1\frac{1}{2}$ a. $\frac{9}{2}$ b. $2\frac{7}{2}$ c. $2\frac{11}{8}$ d. 4

2. $5 \div 1\frac{1}{4}$ a. $\frac{1}{4}$ b. $\frac{4}{5}$ c. 4 d. $6\frac{1}{4}$

3. $1\frac{3}{4} \div 1\frac{2}{3}$ a. $1\frac{1}{2}$ b. $\frac{9}{7}$ c. $2\frac{5}{21}$ d. $3\frac{3}{7}$

4. $6\frac{3}{8} \div 9$ a. $\frac{11}{8}$ b. $\frac{3}{2}$ c. $1\frac{4}{11}$ d. $15\frac{3}{8}$

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Divide. Write the answer in simplest form.

- | | | | |
|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|
| 1. $3\frac{1}{4} \div 1\frac{3}{4}$ | 2. $4\frac{1}{3} \div 1\frac{2}{3}$ | 3. $4\frac{5}{8} \div 2\frac{1}{8}$ | 4. $2\frac{1}{3} \div 1\frac{2}{3}$ |
| 5. $5 \div 2\frac{1}{2}$ | 6. $10 \div 3\frac{1}{3}$ | 7. $16 \div 1\frac{2}{3}$ | 8. $2 \div 1\frac{2}{3}$ |
| 9. $2 \div 1\frac{1}{4}$ | 10. $6 \div 3\frac{2}{3}$ | 11. $7 \div 4\frac{1}{4}$ | 12. $12 \div 3\frac{1}{2}$ |
| 13. $2 \div \frac{7}{8}$ | 14. $4 \div \frac{3}{4}$ | 15. $12 \div \frac{3}{8}$ | 16. $7 \div \frac{2}{3}$ |
| 17. $9\frac{9}{10} \div \frac{4}{5}$ | 18. $6\frac{2}{3} \div \frac{5}{6}$ | 19. $12\frac{1}{3} \div \frac{1}{4}$ | 20. $11\frac{5}{6} \div \frac{1}{4}$ |
| 21. $6\frac{5}{6} \div \frac{5}{6}$ | 22. $4\frac{1}{2} \div \frac{1}{3}$ | 23. $9\frac{9}{10} \div \frac{9}{10}$ | 24. $13\frac{1}{10} \div \frac{5}{6}$ |
| 25. $9\frac{1}{3} \div 3\frac{2}{3}$ | 26. $14\frac{1}{4} \div \frac{5}{6}$ | 27. $6 \div 3\frac{2}{3}$ | 28. $10\frac{1}{3} \div 5\frac{1}{3}$ |
| 29. $7 \div \frac{7}{8}$ | 30. $4 \div 4\frac{2}{3}$ | 31. $5\frac{1}{2} \div 2\frac{1}{4}$ | 32. $6\frac{1}{3} \div \frac{2}{3}$ |

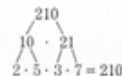
Solve.

33. Larry bought a piece of wood $34\frac{1}{2}$ inches long to build crossing gates. He cut the wood into 6 pieces of equal length. How long was each piece?
34. George laid down a length of track that was $5\frac{3}{4}$ feet long. He used 5 sections of equal length. How long was each section?
35. Paula wanted to have rugs of equal length for each of her 4 miniature houses. She used up a strip of blue felt $6\frac{3}{4}$ inches long. How long was each rug?
36. In 10 minutes, Lisa's train goes around the track $7\frac{1}{2}$ times. How long does it take the train to go around the track once?

ANOTHER LOOK

You can use a factor tree to find the prime factorization of a number.

Find the prime factorization of each number.



1. 150 2. 496 3. 392 4. 711 5. 1,200 6. 4,585 7. 30,000

More Practice, page 483

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“Practice does not make perfect. Only perfect practice makes perfect.” -Vince Lombardi



Differentiated Centers



Gamify Centers!

Differentiate within your centers.

Scaffold...don't over scaffold, but scaffold!

CPA (procedural fluency needs to happen after conceptual understanding).

Play together, children scaffold for each other. Students know how to help without giving the answer (teachers need to teach this). Teach children how to ask good questions.

Double Bump 0-20
Double your number.
Cover the sum

Instructions:
Each person gets 10 cubes. Each cube is a different color. Take turns pulling a card. Put a cube on the sum for that card. If your partner pulls that number they can "bump" you off the number. If you have two cubes on a space, that number is locked. Whoever gets rid of all their cubes first wins.



Numbers and Operations (1 of 4)



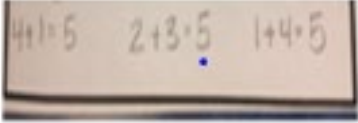


Addition/Subtraction or Multiplication/Division Centers

Level Activities!

Within the Levels:

- Concrete
- Pictorial
- Abstract

Concrete Activity	Representational/ Pictorial Activity	Abstract Activity
<p>Show different ways to make a number on a number bracelet.</p> 	<p>Use a pictorial representation of a number bracelet to show the many ways a number can be composed.</p> 	<p>Find many ways to make the number and write the number sentence.</p> 



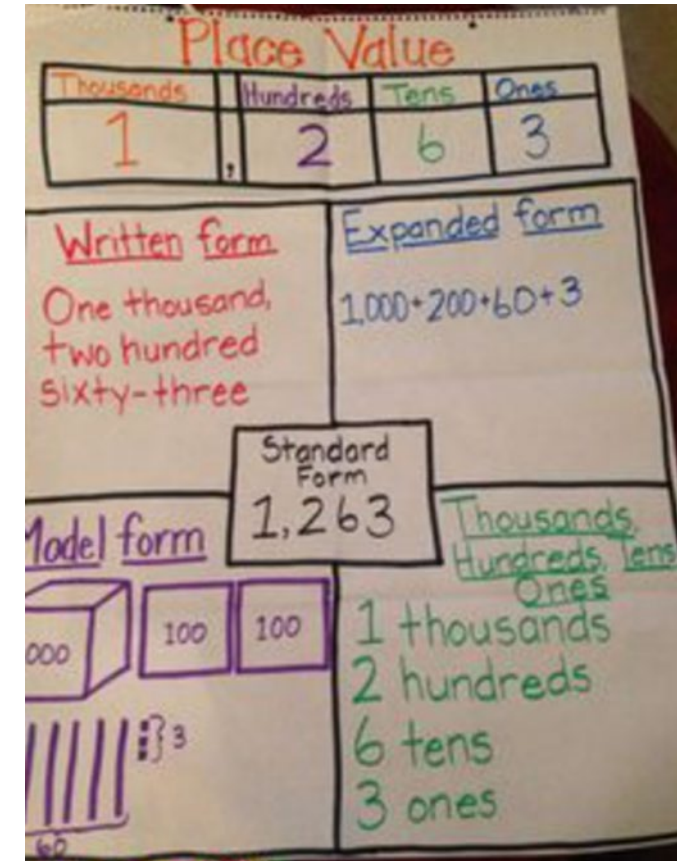
Numbers and Operations (2 of 4)



Addition/Subtraction or Multiplication/Division Centers

Anchor Charts of Strategies

- At stations
- In student notebooks
- In a file folder
- On the wall
- Using technology



Text Version of Place Value Anchor Chart



Thousands	Hundreds	Tens	Ones
1	2	6	3

Standard form: 1,263

Written Form:

One thousand two hundred sixty-three

Expanded Form:

$1,000 + 200 + 60 + 3$

Model Form: (text version of model)

1000 cube, two 100 cubes, six stacks of 10 cubes, and one stack of 3 cubes

Thousands, hundreds, tens, ones:

1 thousands

2 hundreds

6 tens

3 ones





Numbers and Operations (3 of 4)



Generic Games or Evergreen Games


- Memory
- Dice
- Dominoes
- Deck of Cards
- Board Games

32	$20 + 12$	13	$10 + 3$	$9 + 20$
33	$23 + 10$	69	$60 + 9$	29
$43 + 10$	53	$24 + 20$	44	$58 + 10$
35	$15 + 20$	66	$50 + 16$	68

Two-Dice-Difference Graph

How to Play

- Toss two dice. Find the difference.
- Fill in the box above the difference.



0	1	2	3	4	5

START	$0 + 1$	$5 + 6$	$4 + 5$	$1 + 2$	$6 + 7$	Take an extra Turn
	$6 + 7$	$3 + 4$	$2 + 3$	$7 + 8$	Go back 2 spaces	$8 + 9$
$1 + 2$	$5 + 6$	Lose a Turn	Lose a Turn	$4 + 5$	$1 + 2$	$3 + 4$
$8 + 9$		$0 + 1$				$2 + 3$
$0 + 1$	$7 + 8$	END	Go ahead 3 spaces	$7 + 8$	$5 + 6$	Go back 4 spaces

Addition with Doubles Plus 1 Board Game



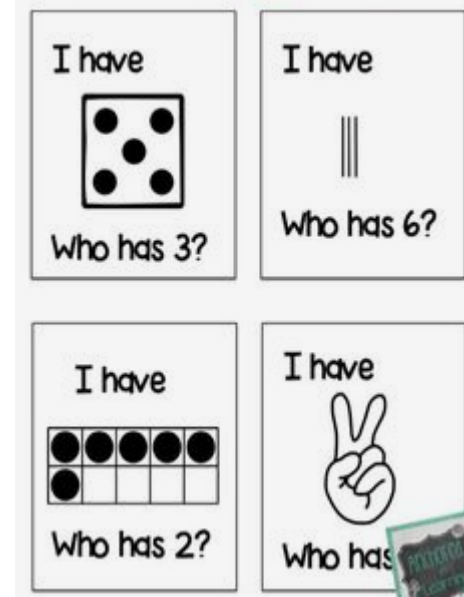
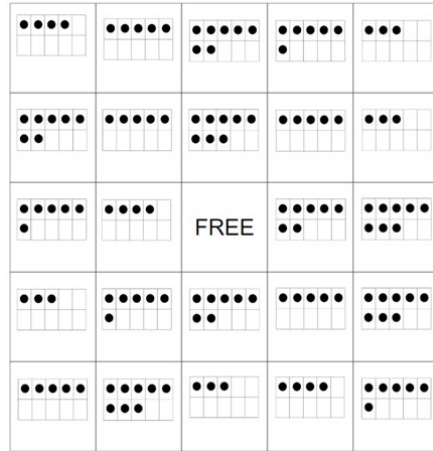


Numbers and Operations (4 of 4)



Generic Games or Evergreen Games

- Bump
- Capture 4
- Shake and Spill
- I have! Who has?

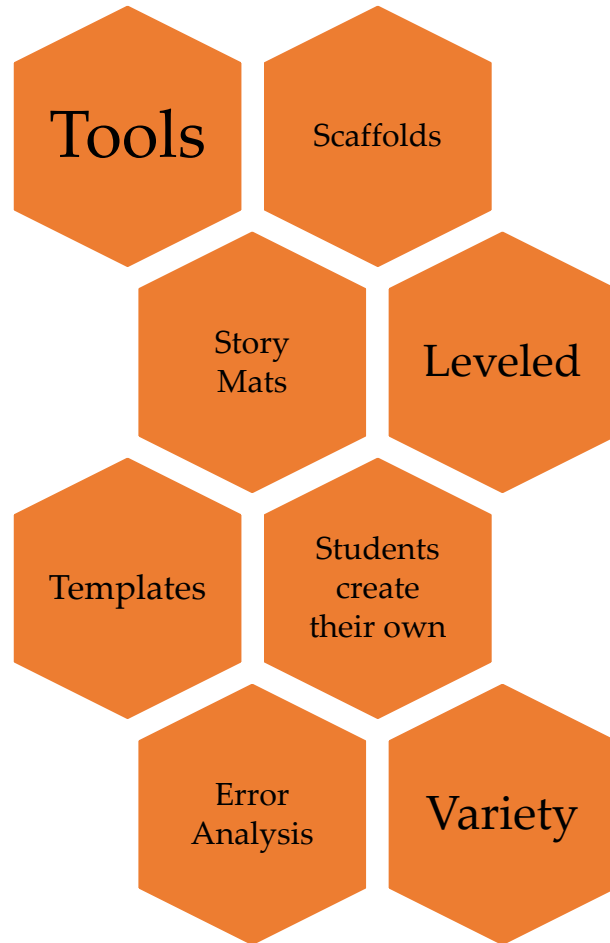


Make Ten BUMP

Roll the die. Then, put your marker on the spot that has the ten frame you would need in order to "Make Ten." For example, if I roll a 4, I would place my marker on the ten frame showing 6 because 4 + 6 makes 10.



Problem Solving (1 of 6)



What does the research say?

[Problem Solving PD](#)



Problem Solving (2 of 6)



Problem Solving


Scaffolded: Templates and Tools



<p>Understand (discuss, visualize, sketch, retell, translate)</p>	<p>Plan (which way will you solve)</p>
<p>Solve (carry out your plan)</p>	<p>Check (does your answer make sense? How do you know)</p>

Read It

We caught 9 flies but then 3 flew away. How many flies are left?



Build It

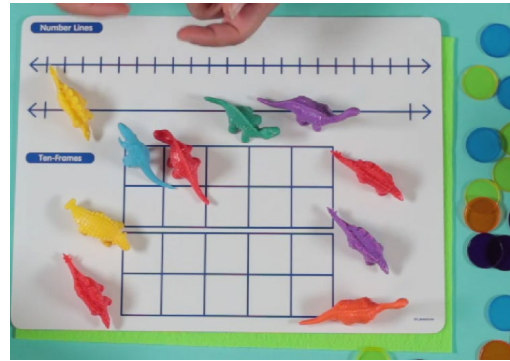
Draw It

Problem Solving (3 of 6)

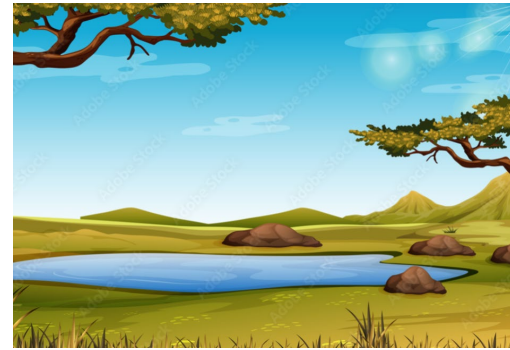


Story Mats

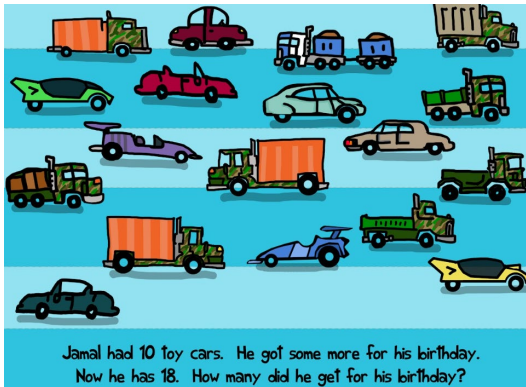
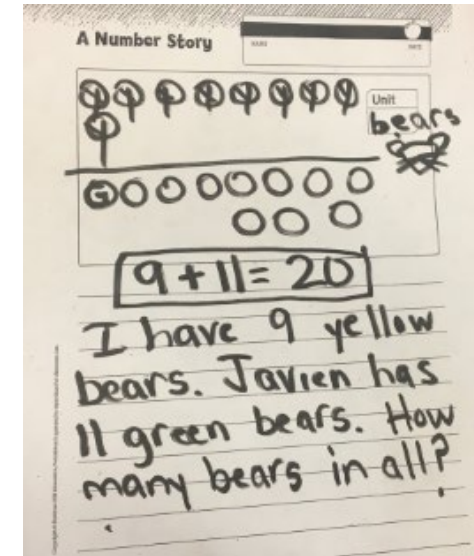
[Dr. Nicki Newton on Pinterest](#)



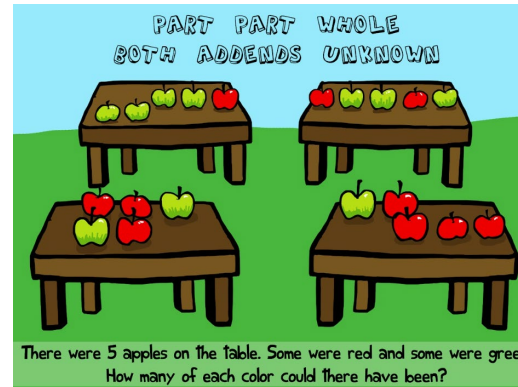
[Ten Frame Mats](#)



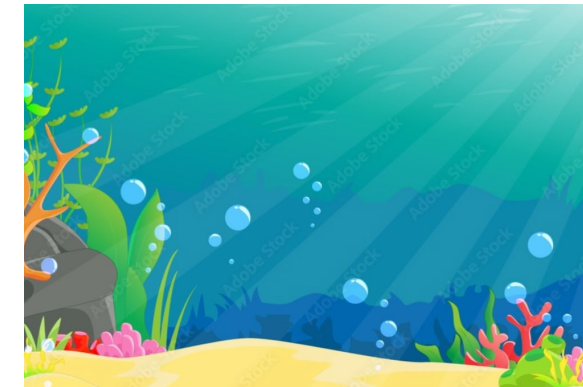
[Story Mat: Savannah](#)



[Story Problem: Cars](#)



[Story Problem: Apples](#)



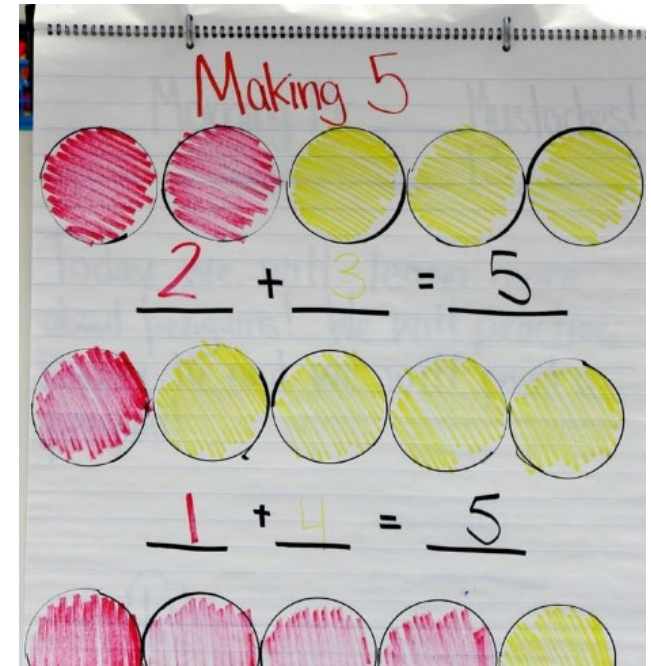
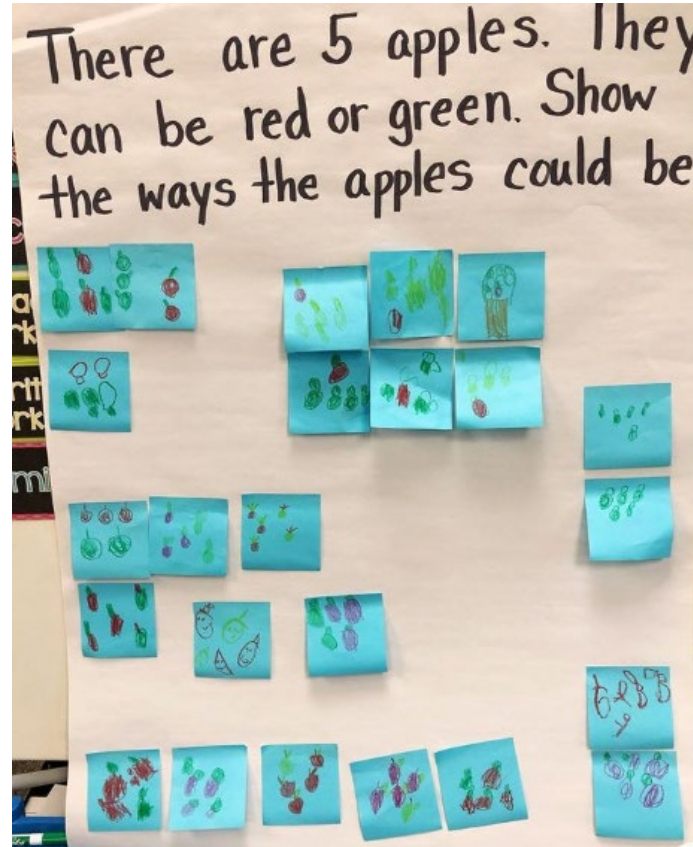
[Story Mat: Ocean](#)

Problem Solving (4 of 6)



Contextualizing

- The answer is five rabbits.
What's the question?
- The answer is 50.
- The answer is three cows,
the operation is division.





Problem Solving (5 of 6)



Contextualizing

Find and Fix the Error:

Mel ate $\frac{1}{2}$ of her sandwich at lunch and ate $\frac{1}{4}$ of her sandwich at dinner. Joy said she ate $\frac{2}{6}$ of the sandwich. What did Joy do wrong?

Problem Solving (6 of 6)



Lawrence Hall of Science

- [Beaded Braids](#)
- [Two and Three Bean Salad/Grandpa's Coins](#)



Place Value (1 of 2)



Concrete Understanding:

1. Build a ten
2. Base ten blocks

Use anchor charts modeling Place Value

Place Value

Thousands	Hundreds	Tens	Ones
1	2	6	3

Written form
One thousand, two hundred sixty-three

Expanded form
 $1000 + 200 + 60 + 3$

Standard Form
1,263

Model form

1 thousands
2 hundreds
6 tens
3 ones



NUMBERS

Constructing Numbers

36

tens ones

Construction Zone

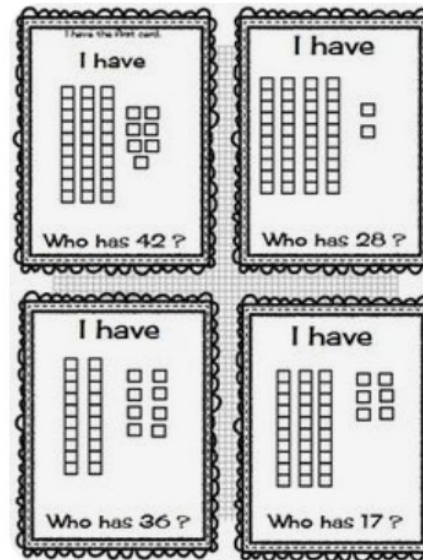
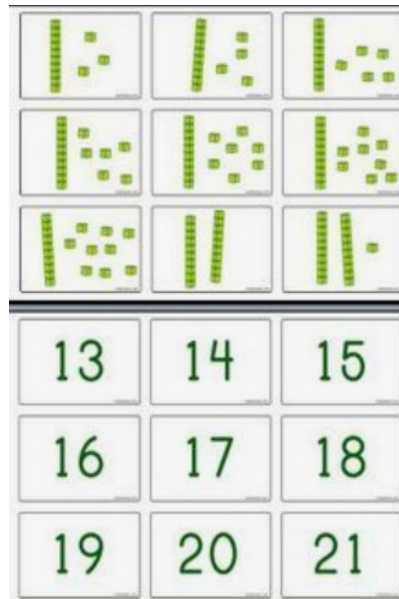


Place Value (2 of 2)



Generic Games:

- Dice
- Cards Games/Memory Games
- Dominoes
- Board Games



Geometry (1 of 3)



- The geometry center needs to reflect the cycle of engagement: concrete, pictorial, abstract.
- Use the language of geometry! (faces, edges, vertices, angles)

Preschool- Children begin to conceptualize measurable attributes of objects. Children develop spatial and geometric sense.



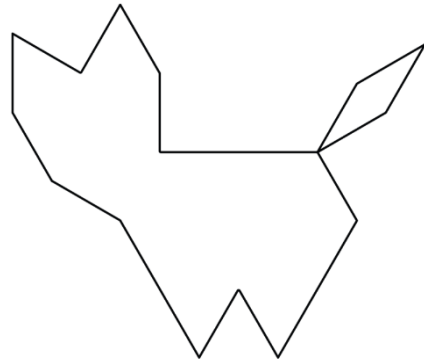
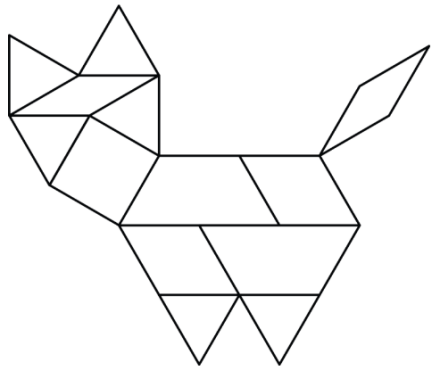


Geometry (2 of 3)



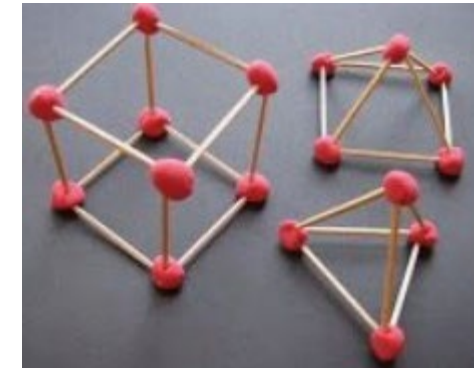
K- Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, spheres). Analyze, compare, create, and compose shapes.

1- Reason with shapes and their attributes.



Count It Out:
How many did you use of each shape?

How many blocks did you use total?

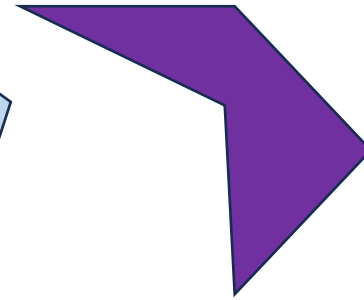
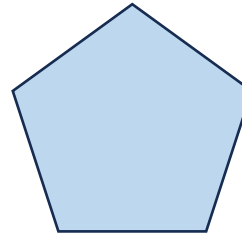


Geometry (3 of 3)



2- Reason with shapes and their attributes.

3-. Reason with shapes and their attributes.



- Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
- Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as $\frac{1}{4}$ of the area of the shape.

Data



K- Classify objects and count the number of objects in categories.

1-3 - Represent and interpret data.



Survey: Which do you like better?

Reading Alone	Buddy Reading	Adult Reads
Blank	Blank	blank

Measurement



K-Describe and compare measurable attributes.

1-Measure lengths indirectly and by iterating length units. Tell and write time.

2- Measure and estimate lengths in standard units. Relate addition and subtraction to length. Work with time and money.

3- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. Represent and interpret data.

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.



Technology



Technology should be embedded throughout all centers, small group, and whole group instruction.

Technology should be used to develop and deepen learner understanding, stimulate interest in the mathematics being learned, and increase mathematical proficiency. When technology is used strategically, it provides more equitable access and opportunities for each and every learner to actively engage and participate in the learning of mathematics.

Science (1 of 2)



Name _____

Magnet Experiment

Take out all of the items in the container. You are going to test if each object is magnetic. If the objects pulls towards the magnet than it is magnetic.

Are these items magnetic?

<input checked="" type="checkbox"/> refrigerator <u>yes</u>	<input type="checkbox"/> paper _____
<input type="checkbox"/> cotton t-shirt <u>no</u>	<input type="checkbox"/> thread _____
<input type="checkbox"/> toothpick _____	<input type="checkbox"/> pencil (Use your own) _____
<input type="checkbox"/> penny _____	chalk board (in the front of the room) _____
<input type="checkbox"/> plastic cup _____	white board (in the front of the room) _____
<input type="checkbox"/> safety pin _____	glass (Check the window) _____
<input type="checkbox"/> staples _____	<input type="checkbox"/> scissors (Use your own) _____
<input type="checkbox"/> rubber band _____	<input type="checkbox"/> screw _____
<input type="checkbox"/> bobby pin _____	<input type="checkbox"/> brass brads _____
<input type="checkbox"/> crayon _____	<input type="checkbox"/> fabric _____
<input type="checkbox"/> paper clips _____	<input type="checkbox"/> plastic button _____
<input type="checkbox"/> tack _____	<input type="checkbox"/> tin can _____
<input type="checkbox"/> aluminum foil _____	<input type="checkbox"/> plastic figures _____
<input type="checkbox"/> nail _____	

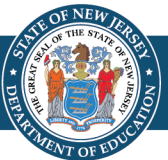
What do you notice in this center compared to...



Science (2 of 2)



What is different here?





Assessment (1 of 2)



What should teachers assess?

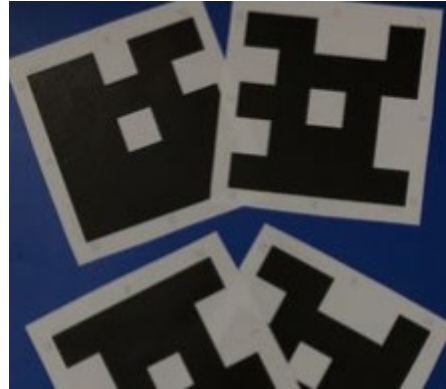


Name: _____

Piles of Five

Directions: Color the circles to make a pile of five. Write the numbers on the line.

2 and 3 make 5	4 and 1 make 5		
_____ and _____ make 5	_____ and _____ make 5		
_____ and _____ make 5	_____ and _____ make 5		



Name: Jessica Date: 8-25-15

Operations and Algebraic Thinking Exit Ticket

Color some cubes red and the rest blue. Write the number equation, KOA.3

 $3 + 2 = 5$	 $1 + 3 = 4$
-----------------	-----------------

Name: _____

Here's my thinking...

Exit

MATH EXIT SLIP

Name: _____ Date: _____

1. $\frac{1}{2} + \frac{2}{3} =$	2. $56 \times 243 =$	3. $6 \frac{1}{2} \text{ feet} =$
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Assessment (2 of 2)



Ongoing Assessment:

- Recording Sheets
- Anecdotal Notes
- Checklists
- Math Interviews/Conferences
- Math Journals
- Portfolios and Artifacts:
 - Teacher Selected
 - Student Selected





Just Start!



Teachers should start small, start slow, but just start!



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Thank You!



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