



KENTUCKY CENTER
FOR MATHEMATICS

Constructing Number Sense

Fluency within 20

Welcome!

Your host:

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Kentucky Center for Mathematics

- KCM seeks to advance the knowledge and practice of effective mathematics teaching and learning, encompassing early childhood through adult education.
- KCM provides and develops statewide leadership, facilitate professional learning experiences, and cultivate innovation with the aim of improving mathematics education, practice and policy.

KCM Yearly Numbers

29 math courses taught

73 cohorts of teachers

Over 1000 KY teachers
attending

Over 182 days of
math professional learning

Over \$150,000 of math
materials directly in the hands
of teachers

109 school districts

300 KY schools

100 principals trained

>5000 students impacted

KCM Annual Math Conference
national prominence

Closing the achievement gap
for our KY math students.

Math Achievement Fund
intervention students (3000)
had an average of 10 percentile
points gained as a direct result
of KCM trained math
interventionists.

Visit Our Website

www.kentuckymathematics.org



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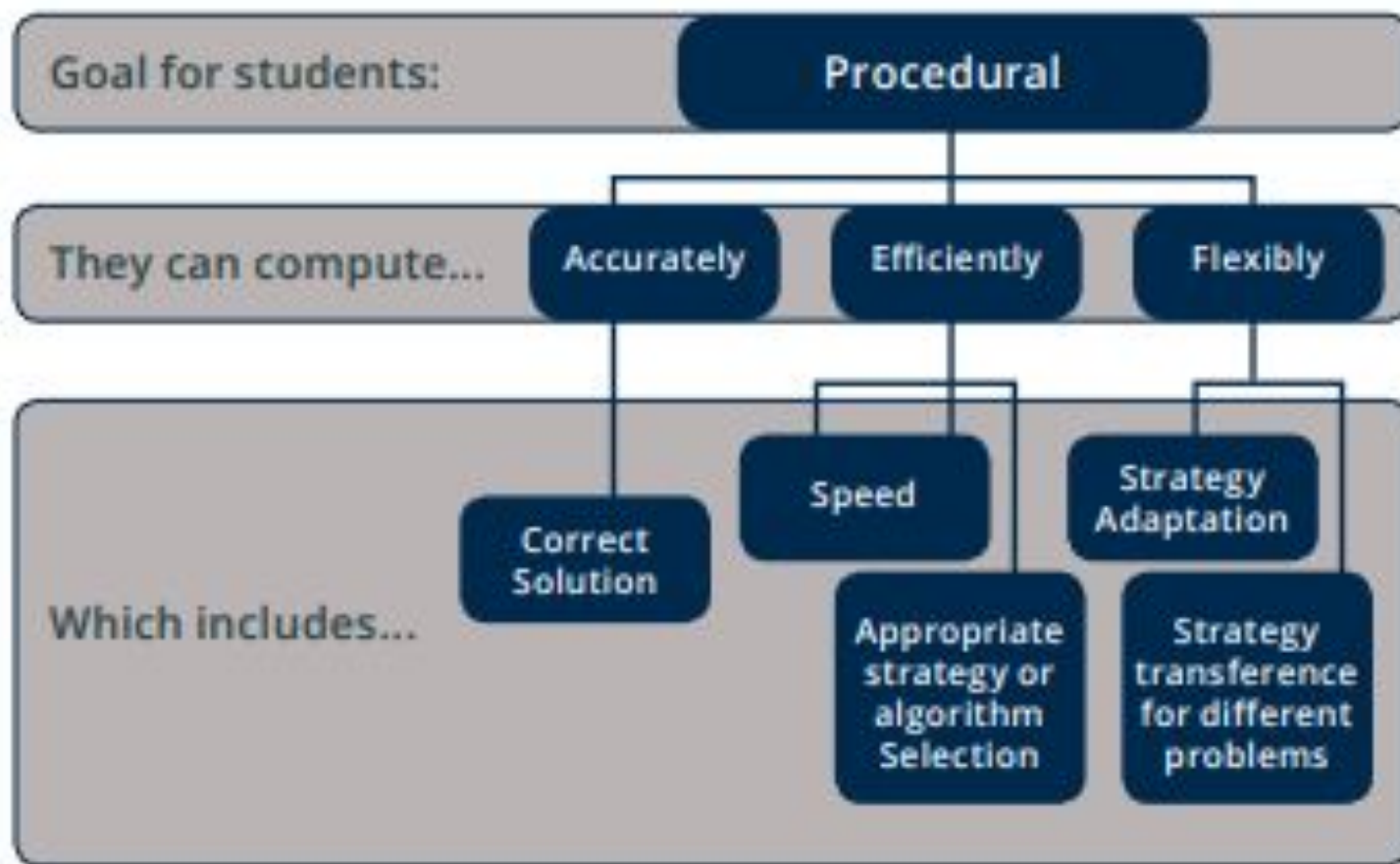
Find resources to help you engage learners, allowing them to make sense of mathematics and develop problem solving skills.

Today's Agenda

- Review Content Standards
- Save 20
- Card on My Forehead
- Salute
- Geometric Subitizing Cards
- Full Speed Ahead
- Virtual Resources
- KCM Loves Teachers!
- #BetterTogether #TeamKcm



Research



Source: Bay-Williams, J. M., & Stokes Levine, A. (2017). *The Role of Concepts and Procedures in Developing Fluency*. In D. Spangler & J. Wanko (Eds.) *Enhancing Professional Practice with Research Behind Principles to Actions*. Reston, VA: NCTM

Standards

- KY.2.OA.2 Fluently add and subtract within 20 using mental strategies.
- KY.2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or sides. Identify triangles, quadrilaterals, pentagons, hexagons and cubes (identify number of faces).
- KY.2.MD.8 Solve word problems with adding and subtracting within 100, (not using dollars and cents simultaneously) using the \$ and ¢ symbols appropriately (not including decimal notation).

Why focus on games?



- Playing board games and math games can help students develop subitizing skills through rolling dice, and also practice number relationships of addition and subtraction by being the “banker” and exchanging money and giving change, etc.
- Games offer substantial and enjoyable practice!
- Games are just fun and interactive and focus on math in a real world situation!
- Games are interactive and students can think aloud and hear each others’ strategies. Think aloud opportunities are beneficial to all students but are particularly effective with students who traditionally struggle to learn mathematics (Frye et al., 2013; Gersten & Clarke, 2007).



Save Twenty



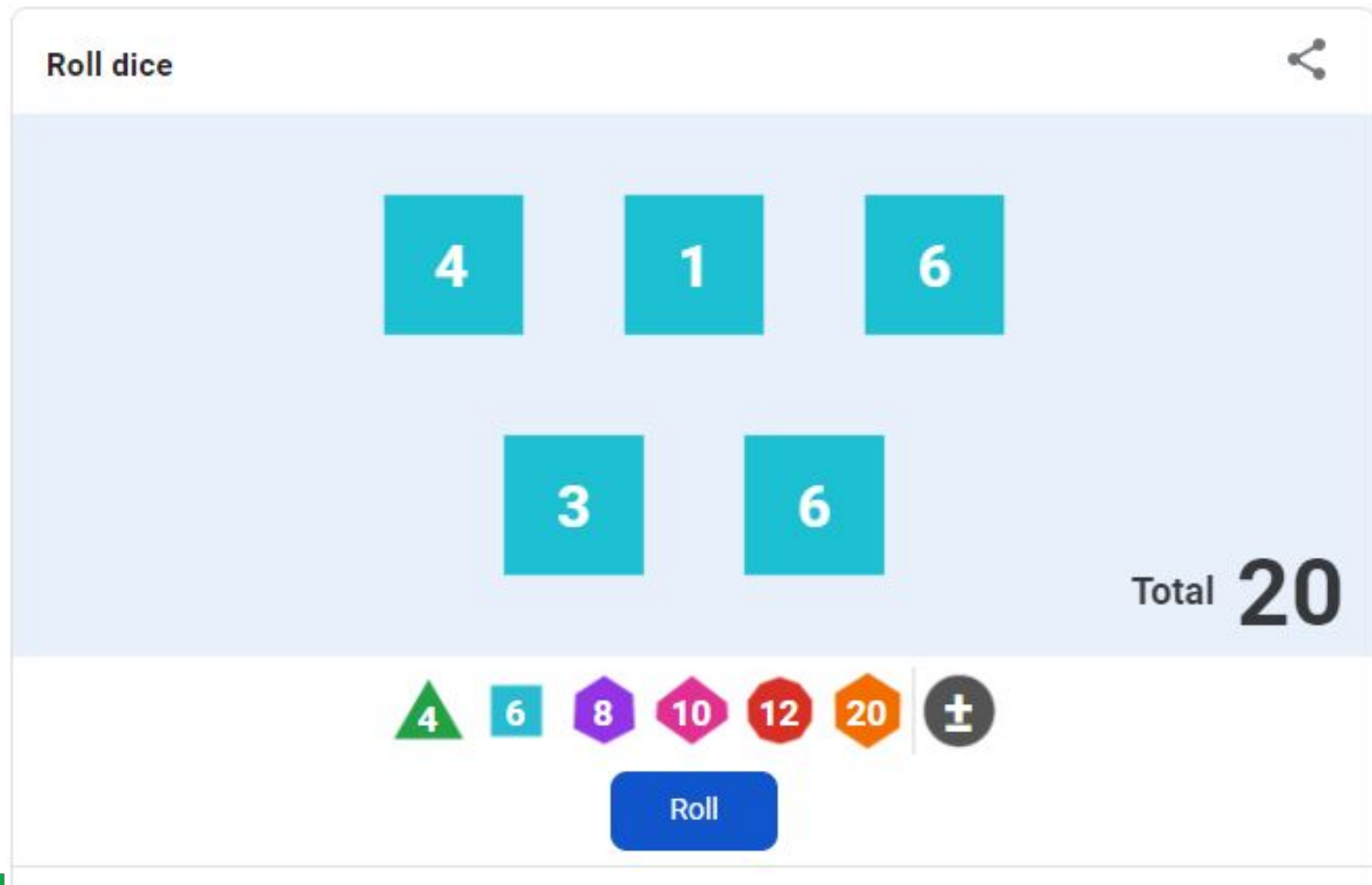
Materials:

Five Dice per game; scratch paper and pencil

Directions:

- The goal of the game is to roll as close to (or equal) to 20, without going over.
- You'll have 4 rounds per turn. For the first rounds, roll all five dice. You may save as many as you like from zero to all. Any dice that are saved may not be re-rolled for the rest of your turn.
- For your second or third round, roll the dice you haven't saved. You may save as many of these as you like.
- For the fourth and final round, roll any remaining unsaved dice.
- Now score your points. If your five dice form a sum greater than 20, you score 0. If the dice sum is 20 or less, that number is your score for the turn. Play for 9 turns. The winner is whoever has the greatest score at the end of the game.

Virtual Dice



Card On My Forehead



- Materials:
 - Ten Frame Cards or Numeral Cards 1-20
- Directions:
 - 1. Get numeral cards, shuffle and put in stack face down.
 - 2. Player 1 picks up a card and places it on her forehead without looking at the card.
 - 3. Player 2 looks at the card, states what goes with the amount shown to make 20 (or to make another amount as agreed to by players).
 - 4. Player 1, still without looking at his/her card, states what is shown on the card.
 - 5. Player 1 then checks to see if correct. If correct, player 1 gets a point. If player 2 gave the wrong missing addend, then player 1 gets a point.
 - 6. Players switch roles and play again until stack
 - 7. Player with the most points wins.

Salute

- Materials:
 - Printable 10 frame cards or playing cards
- Directions:
 - Decide who will be the two soldiers and who will be the sergeant.
 - Divide the deck into 2 equal piles and place a pile by each soldier.
 - When the sergeant says "Salute!" each soldier will take a card from their pile and place it on their forehead, as if saluting each other. The sergeant needs to make sure that each soldier can only see his partner's card and not his own.
 - The sergeant calls out the sum of the two numbers.
 - Each soldier uses the sum to figure out what number is on their card, announces it to the sergeant and gets a point for each correct answer.
 - When the cards have all been used, mix the cards up and switch jobs.



[Click here for video](#)

School Day

2 Players

Materials:






- School Day game board
 - Craft sticks and bundles of ten- Craft sticks and bundles are a great way to represent how ten single units create one ten. Straws can also be used. You will need loose sticks/straws and then bundled sticks/straws in groups of ten. The bundles can be separated and put together as needed throughout the game. We recommend hair elastics to keep the sticks/straws together.
 - Pawns/game pieces
 - Die

Directions:






Choose one player to be banker. All players place their pawns on the payday space. Banker pays each player 3 bundles. The youngest player goes first by rolling the dot die and moving his/her pawn that number of spaces. Each player will read their space and receive, or pay sticks or bundles as directed. If a player lands on a "chance" space they will roll the dot die and follow the directions in the middle of the board. Each player gets paid three bundles every time they pass payday. The player with the most sticks and bundles at the end of the game wins. Length of gameplay can be determined by number of turns, or by time played.




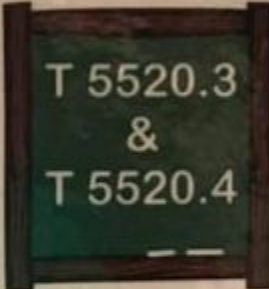


Game Board adapted from Scotty Bratcher's (Grayson County Public Schools) Original Version

Payday! Collect 3 bundles. 	Wasn't prepared for class. Pay 5 sticks.	Walking quietly in the hallway. Collect 1 bundle.	Borrowed a piece of paper. Pay 3 sticks.	Chance 	Class earned compliment in the cafeteria. Collect 1 bundle.	Didn't do homework. Pay 2 sticks.	Scored 100% on a math test! Collect 1 bundle.						
Talking in the hallway. Pay 1 bundle.	<div style="text-align: center;"> <p>T 5520.1</p> <h1>School Day!</h1>  <p>A day in the life of a student!</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%;"> <p>Chance: Roll the die</p> <table border="0"> <tr> <td>1. You lost your bundles/sticks in the bathroom.</td> <td>4. Trade places with another player.</td> </tr> <tr> <td>2. Collect an extra pay day.</td> <td>5. You lose your next turn.</td> </tr> <tr> <td>3. Trade your bank with another player.</td> <td>6. Take an extra turn.</td> </tr> </table> </div> </div>						1. You lost your bundles/sticks in the bathroom.	4. Trade places with another player.	2. Collect an extra pay day.	5. You lose your next turn.	3. Trade your bank with another player.	6. Take an extra turn.	Overdue library book. Pay 7 sticks.
1. You lost your bundles/sticks in the bathroom.							4. Trade places with another player.						
2. Collect an extra pay day.							5. You lose your next turn.						
3. Trade your bank with another player.							6. Take an extra turn.						
Helped a classmate. Collect 7 sticks.							Chance 						
Had perfect attendance for the week. Collect 8 sticks.	Brought the teacher a present. Collect 5 sticks.												
Field Trip. Pay 5 sticks.	Late for school. Pay 6 sticks.												
Scored 100% on a spelling test! Collect 7 sticks.	Student of the month. Collect 4 bundles.	Chance 	Didn't write in your journal. Pay 2 sticks.	Turned in all homework for the month. Collect 3 sticks.	It's your birthday! Collect 2 bundles.	Didn't wear proper shoes to PE. Pay 9 sticks.	Turned in all homework! Collect 1 bundle.						

Game Board adapted from Scotty Bratcher's (Grayson County Public Schools) Original Version.

Game Board adapted from Scotty Bratcher's (Grayson County Public Schools) Original Version									
Payday! Collect 3 bundles. 		Wasn't prepared for class. Pay 15 sticks.	Walking quietly in the hallway. Collect 1 bundle.	Borrowed a piece of paper. Pay 3 sticks.	Chance 	Class earned compliment in the cafeteria. Collect 2 bundles.	Didn't do homework. Pay 11 sticks.	Scored 100% on a spelling test! Collect 17 sticks.	
Talking in the hallway. Pay 1 bundle.		<div>T 5520.2</div> <div></div> <div>School Day!</div> <div>A day in the life of a student!</div> <div>Chance: Roll the die</div> <div><div>1. You lost your bundles/sticks in the bathroom.</div><div>2. Collect an extra pay day.</div><div>3. Trade your bank with another player.</div><div>4. Trade places with another player.</div><div>5. You lose your next turn.</div><div>6. Take an extra turn.</div></div>						Overdue library book. Pay 12 sticks.	
Brought the teacher a present. Collect 12 sticks.								Chance 	
Helped a classmate. Collect 10 sticks.								Had perfect attendance for the week. Collect 19 sticks.	
Late for school. Pay 16 sticks.								Field Trip. Pay 5 sticks.	
Scored 100% on a math test! Collect 2 bundles.		It's your birthday! Collect 3 bundles.	Chance 	Didn't write in journal. Pay 16 sticks.	Didn't wear proper shoes to PE. Pay 11 sticks.	Student of the month. Collect 2 bundles.	Turned in all your homework for the month. Collect 11 sticks.	Turned in all homework! Collect 2 bundles.	

Game Board adapted from Scotty Bratcher's (Grayson County Public Schools) Original Version

Payday! Collect 4 dimes.	Didn't do homework. Pay 13 pennies.	Student of the month. Collect 4 dimes.	Borrowed a piece of paper. Pay 11 pennies.	Chance 	Wasn't prepared for class. Pay 12 pennies.	Class earned compliment in the cafeteria. Collect 2 dimes.	Scored 100% on a math test! Collect 3 dimes.						
Overdue library book. Pay 18 pennies.	<div><h1>School Day!</h1><h2>A day in the life of a student!</h2><div><u>Chance: Roll the die</u><table><tr><td>1. You lost your money in the bathroom.</td><td>4. Trade places with another player.</td></tr><tr><td>2. Collect an extra pay day.</td><td>5. You lose your next turn.</td></tr><tr><td>3. Trade your bank with another player.</td><td>6. Take an extra turn.</td></tr></table></div></div>						1. You lost your money in the bathroom.	4. Trade places with another player.	2. Collect an extra pay day.	5. You lose your next turn.	3. Trade your bank with another player.	6. Take an extra turn.	Late for school. Pay 10 pennies.
1. You lost your money in the bathroom.							4. Trade places with another player.						
2. Collect an extra pay day.							5. You lose your next turn.						
3. Trade your bank with another player.							6. Take an extra turn.						
Field Trip. Pay 8 pennies.	Chance 												
Had perfect attendance for the week. Collect 13 pennies.	Brought the teacher a present. Collect 12 pennies.												
Helped a classmate. Collect 3 dimes.	Talking in the hallway. Pay 2 dimes.												
Turned in all homework! Collect 2 dimes.	It's your birthday! Collect 5 dimes.	Chance 	Didn't write in journal. Pay 18 pennies.	Turned in all homework for the month. Collect 15 pennies.	Walking quietly in the hallway. Collect 2 dimes.	Didn't wear proper shoes to PE. Pay 14 pennies.	Scored 100% on a spelling test! Collect 19 pennies.						

Geometric Subitizing Cards

Geometric Subitizing Cards (Tasks)

Show students a card and have them share what they see.



K-3 Integration of Geometric Subitizing Cards

Subitizing

Q: How many shapes?

A: "I see four shapes"

differentiated by the length of time a card is shown to the students

Advanced Counting And Part-Whole Thinking

Q: What did you see? How many of each shape?

A: "I saw 4 shapes...3 triangles and 1 rectangle"

Early Additive Part-Whole Thinking

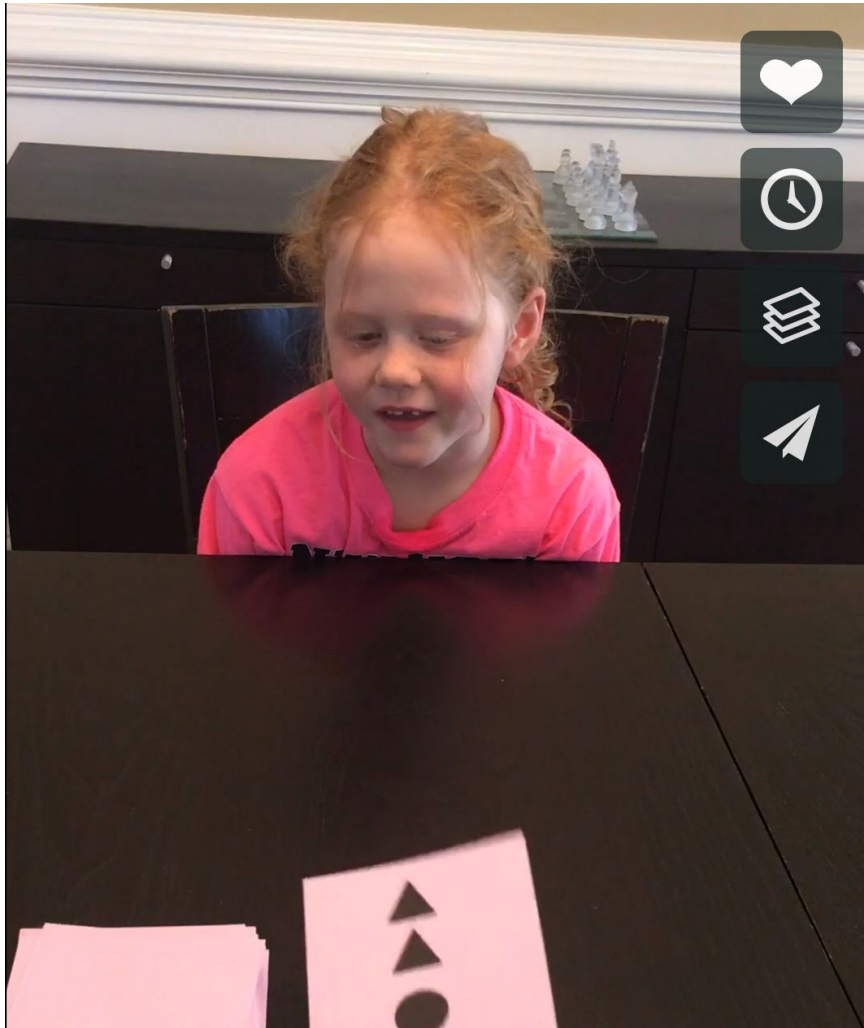
Q: How many sides did you see? How many vertices/corners did you see?

A: I saw 13 sides. I know that each triangle has 3 sides and there are 3 triangles so that is 9 and 4 more for the rectangle is 13"

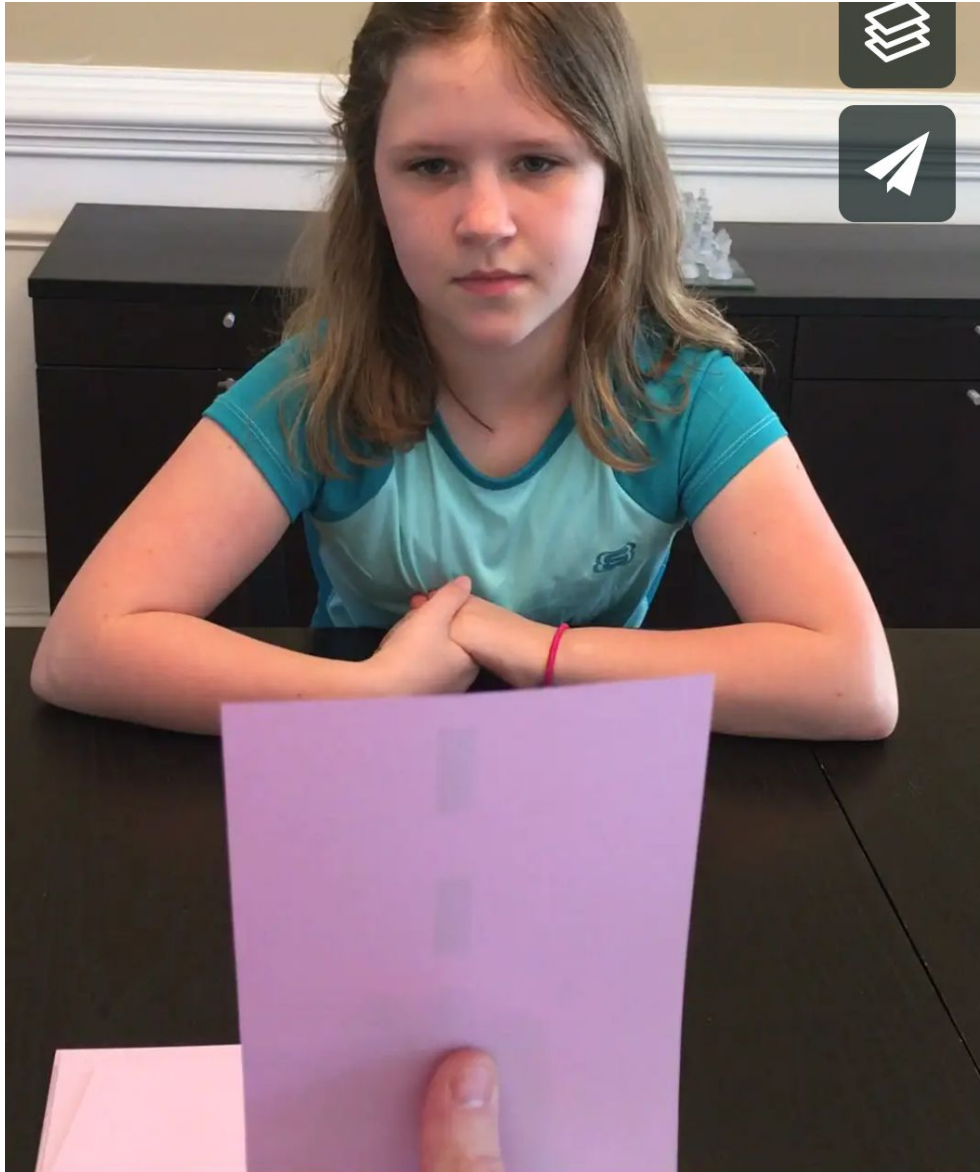
Algebraic Reasoning

Q: The teacher covers a triangle with their thumb and says "I have 13 corners. What shape could I be covering up?"

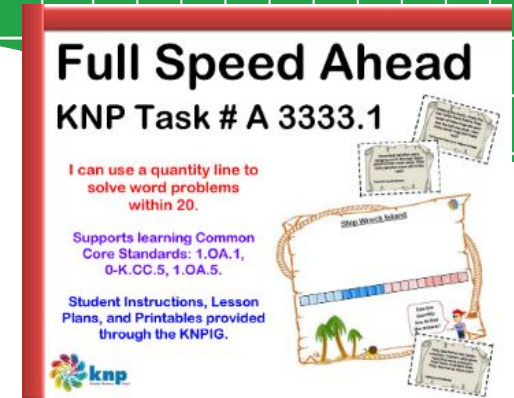
A: Well the 2 triangles and 1 rectangle have 10 corners altogether and you said there was 13. So the difference between 10 and 13 is 3 so I think you're covering a triangle.



[Click here for video](#)

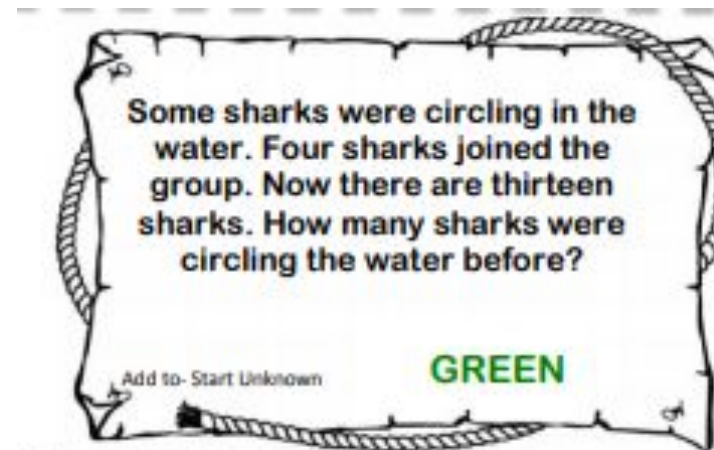


Full Speed Ahead



- Materials:
 - Full Speed Ahead Workmat
 - Word Problem Cards
 - Unit Cubes/countable objects
 - markers
- Directions:
 - Choose one of the Workmats with Quantity Lines. 2 different colored markers
 - Shuffle the problem cards and place them face down in the center of the group.
 - Gameplay
 - On your turn, Draw one card and read the problem aloud.
 - Use your 2 different colored markers and your quantity line to help you solve the problem.
 - Find the missing quantity and explain how you found it.

Example of Full Speed Ahead



Virtual Manipulatives

Didax Math Virtual Manipulatives

Virtual Manipulatives

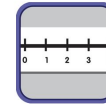
Use these Virtual Manipulatives to enhance classroom instruction. Each one is designed to be projected from your computer or tablet onto a screen or any brand of interactive whiteboard. Drag the manipulatives into position to see math concepts come alive! For help while using each app, look for the "i" symbol for more information.



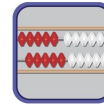
Unifix Cubes



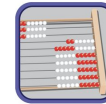
Ten Frames



Number Lines



20-Bead
Rekenrek



100-Bead
Rekenrek



Two-Color
Counters



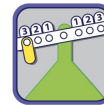
120 Number
Base



Color Tiles



Base Ten
Blocks



Math Balance



Dice



Spinners

Math Learning Center Apps



[Open Web App](#)
[Apple App Store](#)
[Chrome Store](#)

Number Rack

Number Rack facilitates the natural development of children's number sense. Rows of movable, colored beads encourage learners to think in groups of fives and tens, helping them to explore and discover a variety of addition and subtraction strategies. Free activities and free book available.



[Open Web App](#)
[Apple App Store](#)
[Chrome Store](#)

Number Frames

Number Frames help students structure numbers to 5, 10, 20, and 100. Students use the frames to count, represent, compare, and compute with numbers in a particular range.

Online Math Games



Ten Frame Mania



How Many



NumTanga



Coin Bubble



Minus Mania

<https://www.gregtangmath.com/>

<https://www.dreambox.com/at-home>



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KNP Intervention Guide



KCM-developed respository housing activities designed for math intervention teachers, but usable by any teacher, to support their math instruction. At this time, grade level standards addressed include K-3 with a few for 4.

KY Family Math



Website for parents looking for resources to use with their children to make sense of problems and persevere in solving them while having fun.



Learning Mathematics through Representations

Math Tools



Page listing resources that can

Upcoming Virtual Professional Learning

Week of March 23-27, 2020 2:00 -2:30 pm EST



Virtual Make 'n Take

With KCM Regional Consultants

Monday, March 23rd Fluency within 10
<https://nku.zoom.us/j/557268655>

Tuesday, March 24th Fluency within 20
<https://nku.zoom.us/j/827307599>

Wednesday, March 25th Fluency within 100
<https://nku.zoom.us/j/310467581>

Thursday, March 26th Fluency with x and /
<https://nku.zoom.us/j/290819568>

Friday, March 27th More fluency with x and /
<https://nku.zoom.us/j/311187020>

Welcome!

Your host:

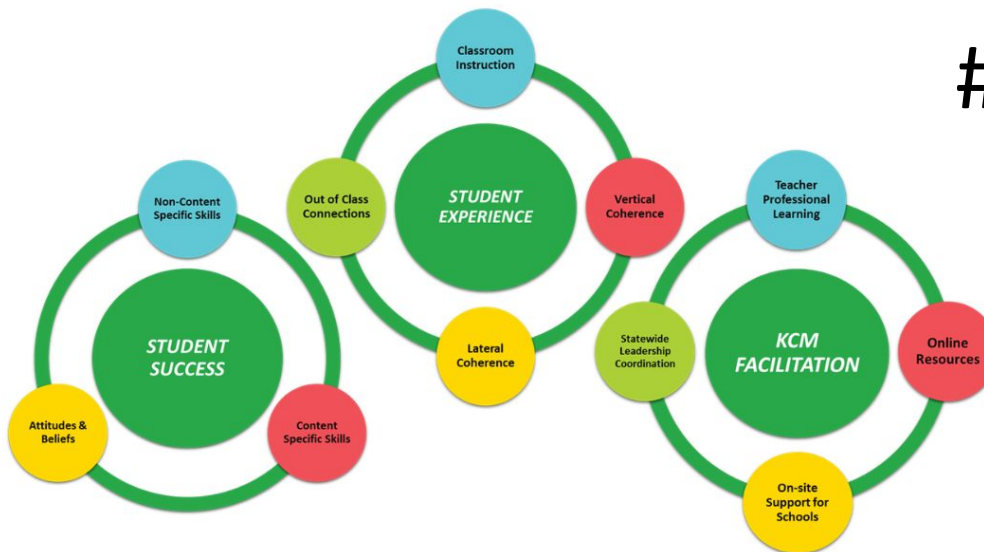
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KCM Support for Educators

- Kentucky Center for Mathematics is here to support our KY educators
- We are aspire to be a national leader in mathematics education



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#TeamKCM