

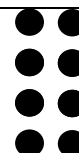
What makes 4-group Math different and effective?

The science behind 4-group Math is the ability to **subitize** which is generally defined as the **rapid, accurate, and confident** judgment of the quantity of a set of objects, without counting.

Look quickly at the dots. Can you tell how many there are without counting? ● ● ● ● ● ● ● ●
You might guess and be correct, but you are unlikely to be 100% certain of the number of dots at first glance.

Now look <u>quickly</u> at these dots: ● ● How many do you see? Four! ● ●	The ability to see four dots in a square pattern and know there are four <u>without counting</u> is an example of <i>subitizing</i> .
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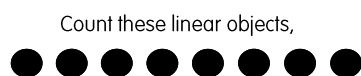
Keep the above picture of four dots in mind.
Now, look quickly at the dot arrangement to the right. How many dots do you see?
With your mind focused on the groups of four, you can easily see two groups of four making eight.



Research shows that young children can *subitize* four objects in a square pattern. They cannot *subitize* objects in a line greater than three.¹ When we put objects in a line for children to understand numbers, they must count and recount to tell how many. If they miscount, they have no way of checking themselves.

Of course, we know that children must learn to count random and linear objects.

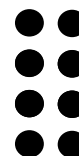
4-group Math gives them a way to self-check the **accuracy** of their counts and build **confidence**.



or count these random objects.



Then, move the objects into the 4-group number pattern to check that your count matches what you see with your *math eyes*.

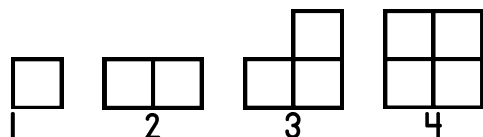


Why a 4-group? We are a base-ten number system. As contrary as its name may sound, 4-group Math is base-ten.

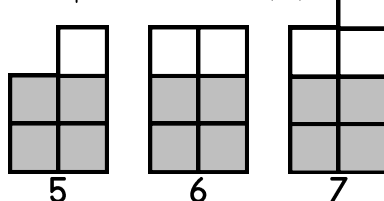
Introducing the 4-group Number Patterns

Children learn to construct, recognize and subitize the 4-group Number Patterns by seeing the 4-group(s) in each pattern.

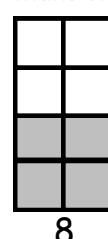
The patterns 1, 2, 3, and 4 are easy to see.



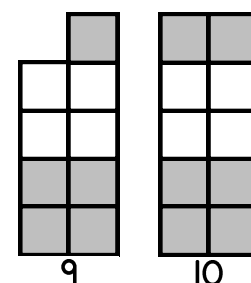
The patterns 1, 2, and 3 attach to the 4-pattern to make 5, 6, 7.



Two 4-patterns make 8.



The patterns 1 and 2 attach to the 8-pattern to make 9 and 10.



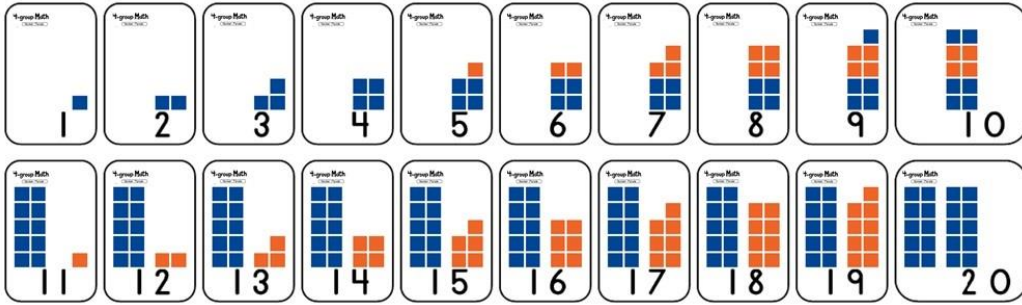
It does not matter what objects represent the number patterns.

What does matter is the configuration of the number patterns, or how the objects are laid out.



¹ Fischer, J. -P. (1992). Subitizing: The Discontinuity After Three. In J. Bideaud, C. Meljac and J. P. Fischer (Eds.), *Pathways to Number* (pp. 191-208). Hillsdale, NJ: Lawrence Erlbaum Associates.

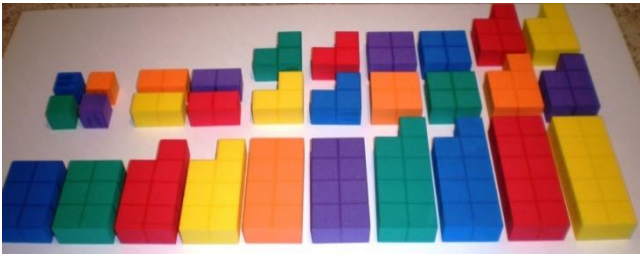
Starter Kit Contents



4-group Math Number Parade 1-20



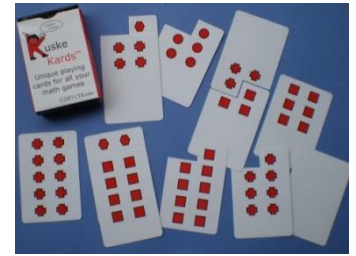
Ten-man Card, (1)



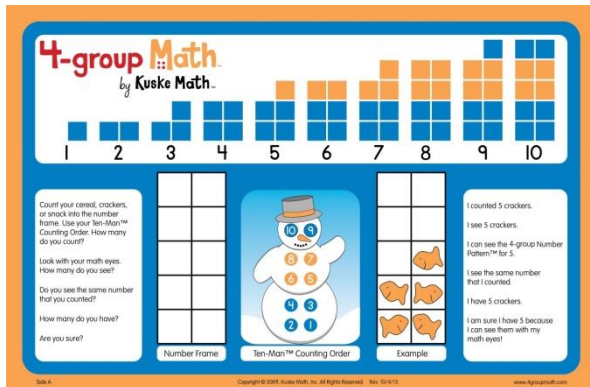
4-group Number Blocks, (1 set)



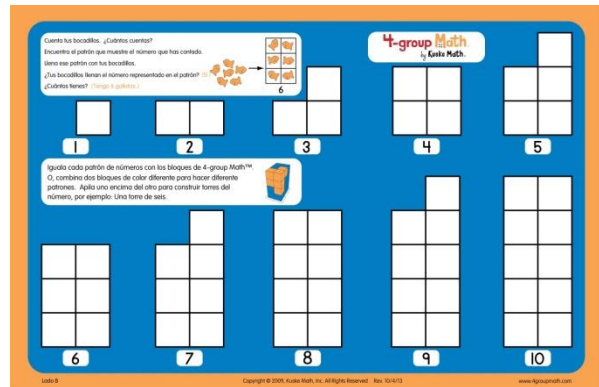
4-group Dice, (2)



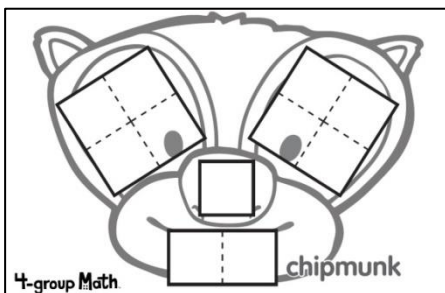
4-group Playing Cards, (1 deck)



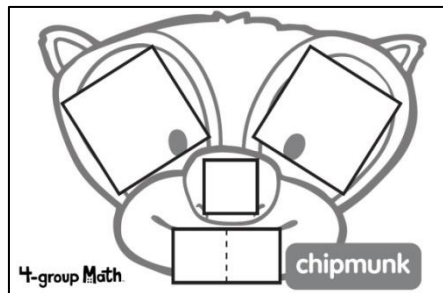
4-group Math Mat English or Spanish - front,



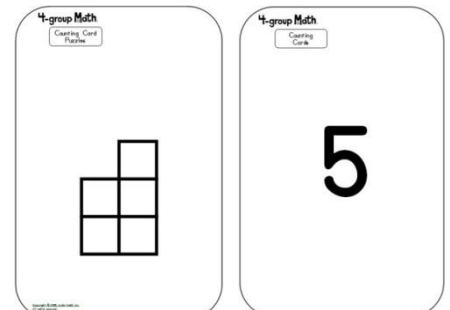
... back



4-group Puzzles, (10) – front,

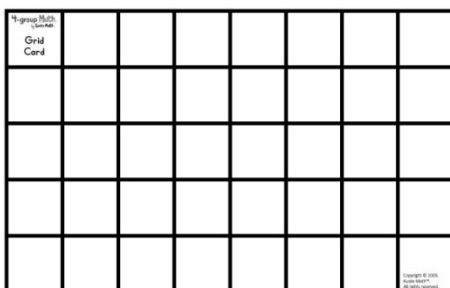


... back

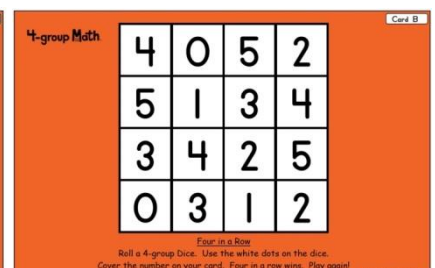
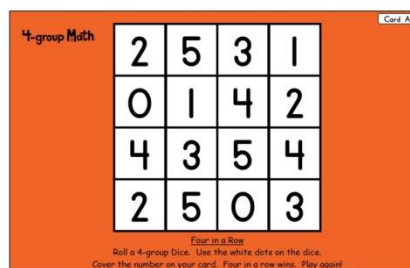


4-group Counting Cards 1-10 – front,

... back



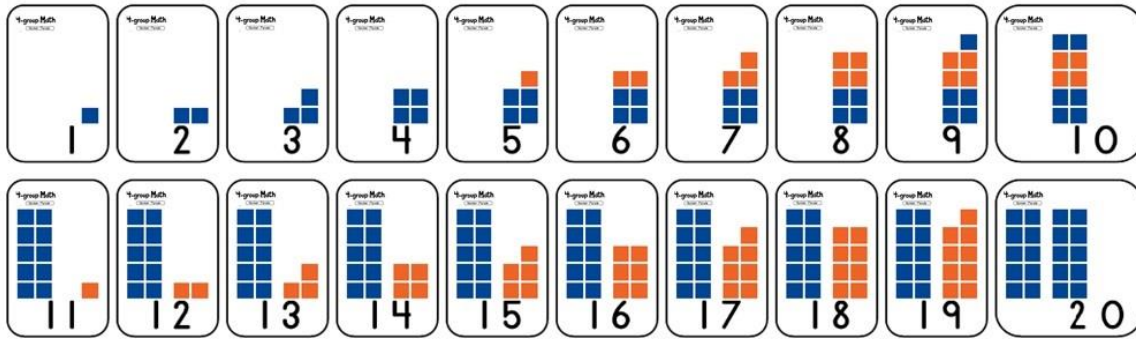
4-group Grid Card, (1)



Four in a Row game cards, (2)

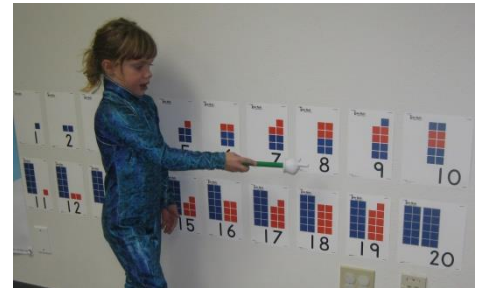
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4-group Number Parade



Children need to learn:

- To count – in other words, to recite the counting word list.
- To count objects to understand how many. To know that the last number counted states how many there are in all. This is called *count cardinality*.
- To count out a number of objects accurately. Each object gets one and only one number. This is called *one-to-one correspondence*.
- To tell what number comes next in order when counting.
- To explain, "That's a 3, and there are three puppies on this page."



- 1) Post the Number Parade at your child's eye level in a location where your child will see it often.
- 2) Point to the numbers as you count to ten.
 - a) Your child learns the rote counting order 1-10.
- 3) When your child can count 1-5:
 - a) Point to a number 1-5 out of order and ask, "What number is this?"
 - Your child learns to identify and say the numbers.
 - b) Say a number 1-5 and ask your child to point to that number on the Number Parade.
 - Your child learns to hear the number and recognize its written form.
 - c) Point to the squares in the number pattern for 1, 2, 3, 4, or 5 and ask, "How many squares?"
 - Then ask, "How do you know there are ____ squares?"
 - At first your child will count the squares. Soon she will see how many with her "math eyes."
- 4) When your child can count 6-10:
 - a) Point to a number 1-10 out of order and ask, "What number is this?"
 - Your child learns to identify and say the numbers.
 - b) Say a number 1-10 and ask your child to point to that number on the Number Parade.
 - Your child learns to hear the number and recognize its written form.
 - c) Point to the squares in a number pattern 1-10 and ask, "How many squares?"
 - Then ask, "How do you know there are ____ squares?" Encourage your child to say, "I see four (and four) and ____ more."
 - d) Let your child be the "teacher" and ask you the questions above. 95% of what we teach, we learn!
- 5) When your child is comfortable with 1-10, repeat the activities for the numbers 11-20.
- 6) Posting 11-20 under 1-10 (as shown above) allows children to see the 'same' and 'different' aspects between the ones and teen numbers such as:
 - Teen numbers have the same pattern in the ones place as the number above.
 - Teen numbers have a 10-pattern in front of the ones pattern.
 - Teen numbers have a 1 (meaning one group of ten) in front of the ones number.

Count everything!



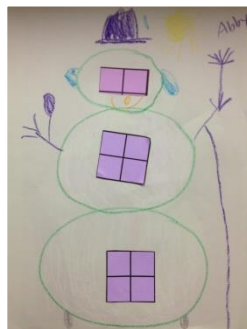
When possible, after counting, move the items into the 4-group Number Pattern to check with your *math eyes* that you counted correctly.



Ten-man



The Ten-man character provides a mental image of the quantity of ten in a fun and engaging way for children. There are four dots on the bottom snowball, four dots on the middle snowball, and two dots for the eyes. Children love to say, "Four, four and two more make ten!"



1. Show the Ten-man card to your child.
 - a. Say, "This is Ten-man. He is a snowman with a special name. His name is Ten-man. Why do you think his name is Ten-man? Because he has 10 dots! Let's count them together."
2. Point to each dot in order as you and your child count 1-10. *(See note below.)
3. Help your child point and touch each dot and count 1-10.
4. Cover all but the bottom snowball. Ask, "How many dots are on Ten-man's bottom snowball?" Your child may count at first but will soon be able to just look and say, "four."
 - a. Cover all but the middle snowball. Ask, "How many dots are on Ten-man's middle snowball?"
 - b. Cover all but the head. Ask, "How many dots are on Ten-man's head?"

The Ten-man method organizes counting. Model and encourage the counting order for your children. It has been our experience that children who "count like Ten-man" make fewer mistakes in their counting.

Use the link below to watch our children's video on how Ten-man got his name.

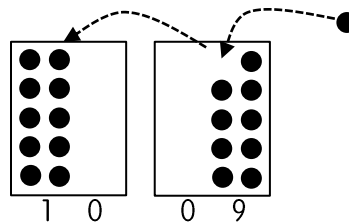
<http://www.kuskemath.com/step-2-meet-ten-man/>

***NOTE:** The 4-group Math *Counting Order* is counter intuitive to adults but easy for children. When building the 4-group Number Patterns; we count right to left instead of left to right, and from the bottom up. The reasons for this are:

1. A child starts with these counters: She wants to know how many. So she can count, then move the counters into a 4-group pattern to see with her "math eyes" how many.

She can see 1. She can see 2. She can see 3. She can see 4. She can see 5. She can see 6.

2. Our counting order helps children understand place-value. We build right to left because numbers get bigger as the digits move to the left. For example, when 9 becomes 10, the ones move to the left into the tens place to become one ten.



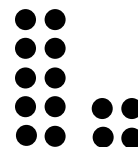
3. When we add, we regroup to the left.

1←
2 8
+3 4
2

4. With reading, this number is read left to right – *fourteen*.

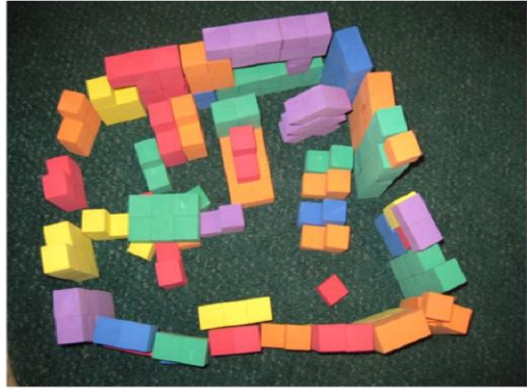
14

This 4-group Number Pattern is read left to right, one group of ten and four ones, or *fourteen*:



4-group Number Blocks

One set contains 30 blocks, in the primary and secondary colors. Each number comes in various colors so that children recognize a 4-group Number Pattern by its shape and not by its color.



Store the blocks where your child can play with them alone or with friends. Block play builds children's problem solving and spatial skills, as well as their imaginations and creativity. The child's job is to experiment and create using her own ideas.

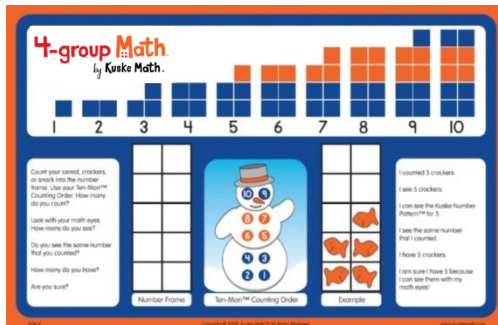


The parent's job is to use *Math Talk* with the children:

- **Use number words:**
"I see you used a two block for the wheels of your car."
"There are no more fours, might a three and a one work?"
"Let's count how many blocks you used in your tower."
- **Use position words** such as; in, out, above, under, next to, behind, in front of.
"I see you have an 8-block under your tower."
"Could you please hand me the 3-block next to you."
- **Use comparison words** such as; more, less, the same, different, bigger, smaller, taller, shorter.
"Which of your blocks is taller?"
"Who has more?" "Who has less?"
- **Ask open-ended questions:**
"How did you get the big block to stay on top?"
"What might happen if you...?"
Do not ask, *"What is it?"* Instead, say, *"Tell me about..."*
- **Describe what you see:**
"Your train has more cars than the one you built before."
"You built a taller tower this time."

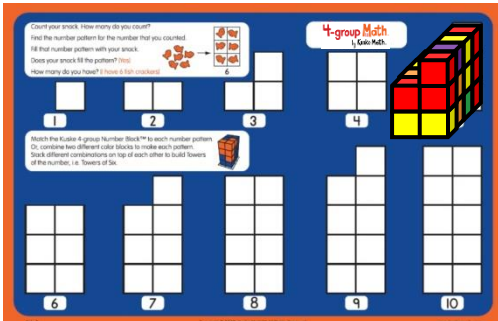


4-group Math Mat



Front

- The front of the Math Mat shows the 4-group Number Patterns in their subitizable component parts so that children learn to make a mental picture of the quantity of each number.
- The picture of Ten-man reminds adults and children to use the Ten-man Counting Order.
- Use the empty Number Frame to count objects into the number patterns and then check with your "math eyes" to see how many you have by matching the objects to the number pattern above.

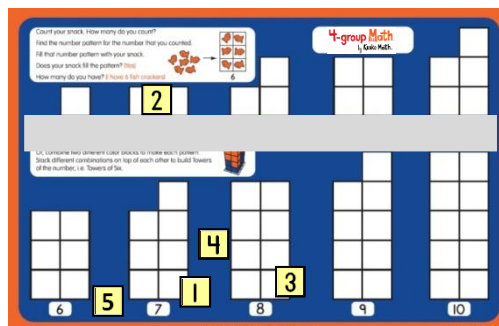


Back

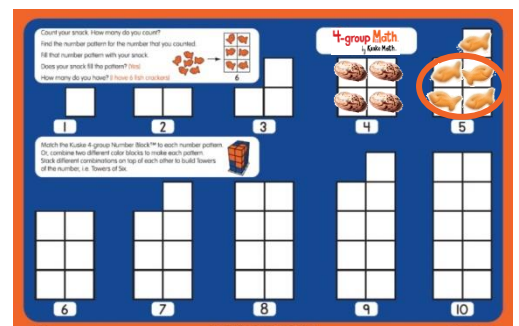
- The back of the Math Mat shows the whole 4-group Number Patterns so that children can learn to see the many parts that make up each number.

Use the 4-group Math Mat as a placemat. On the front of the mat you can use the same activities as with the 4-group Number Parade 1-10.

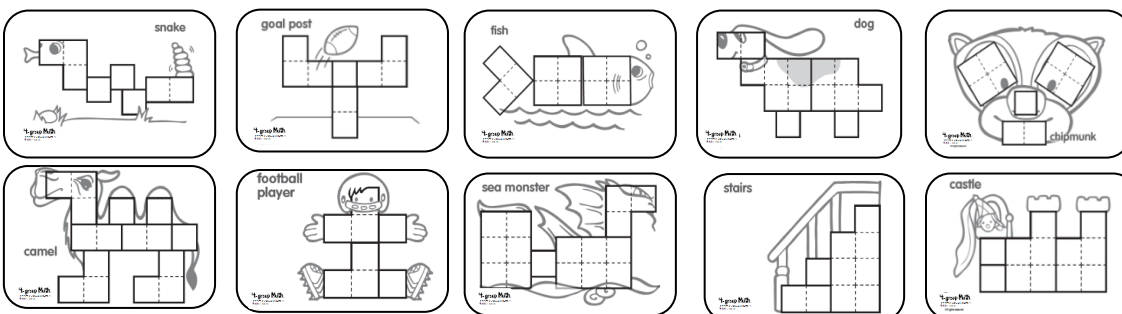
On the back, cover the numbers with a strip of paper and ask children to match number cards to the number pattern. They can move the paper strip to check their work.



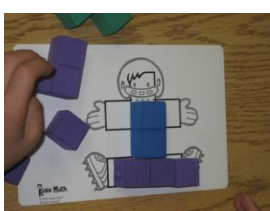
Count and see with your "math eyes" how many you have.



4-group Puzzles

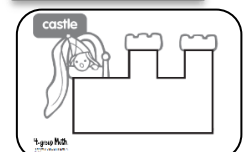


The front of each puzzle shows interior lines which suggest which number blocks will fit. The back of each puzzle has no interior lines. Children will discover many block combinations that fit.



Use number words as you talk to your child about the Number Blocks she is using to make the puzzle. "Here is a two. Do you need a three?" "What number did you use for the legs?" Ask for blocks by their number name, "May I please have a two?" When a particular Number Block is used up, suggest two smaller blocks to make the same number. For example your child wants to put a three in the puzzle and there are no more 3's. Suggest a 1 and a 2. "There are no more 3's but I can make you a 3 with 1 and 2."

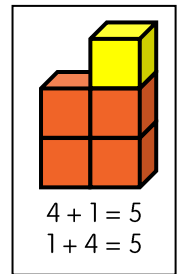
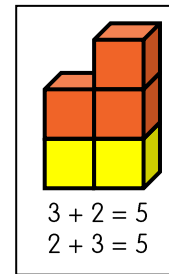
It's addition! To describe your action, use simple language such as, "One and two make three."



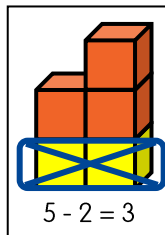
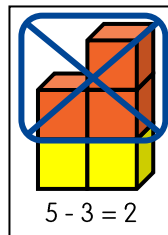
Addition and Subtraction with 4-group Number Blocks

To be successful in future mathematics and to find mathematics *easy and fun*, children must have rapid recall and know with accuracy and confidence their basic addition and subtraction facts.

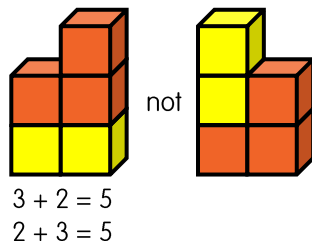
The 4-group Number Patterns are unique in that they are summative. They fit together to form the 4-group Number Pattern for their sum. For example, a 3-pattern and a 2-pattern combine to make the 5-pattern while the 4-pattern and 1-pattern combine to make the same 5-pattern. This allows you to add the whole 4-group Number Patterns together.



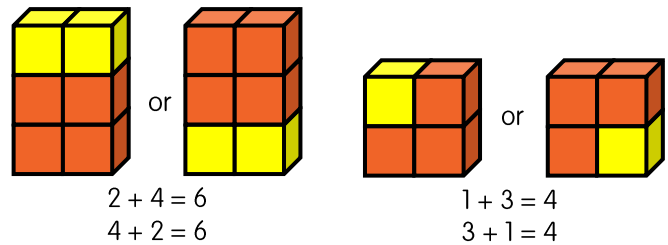
The 4-group Number Patterns are also unique in that subtraction is modeled as the exact opposite of addition. Take away the whole 4-group Number Pattern.



Note that when an odd and an even 4-group Number Pattern combine, the even pattern goes on the bottom to maintain its integrity.



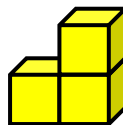
When two even or two odd number patterns combine, either can be on top.



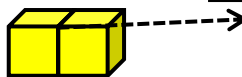
Use the 4-group Number Blocks to tell story problems:

Addition:

Three ducks are swimming in the pond.



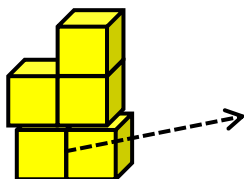
Two more ducks come to swim.



How many ducks in all?

Subtraction:

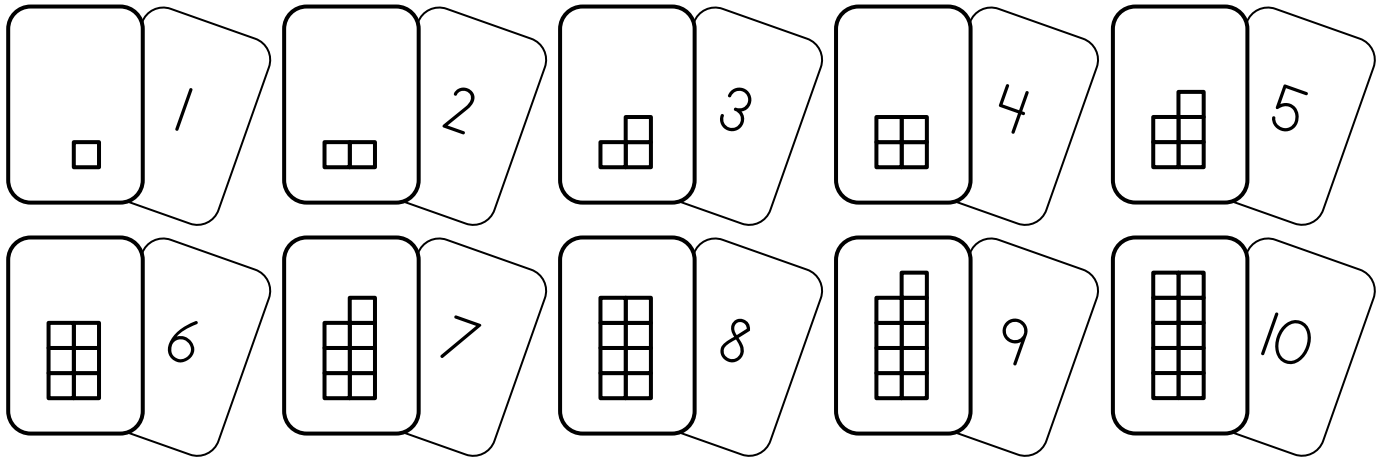
Five ducks are swimming in the pond.



Two ducks swim away.



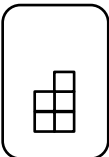

How many ducks are left?



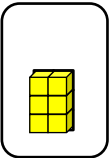

4-group Counting Cards 1-10



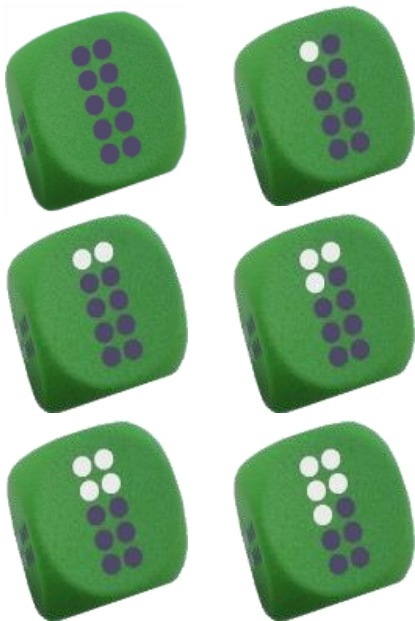
The number pattern side of the Counting Cards are sized to fit the 4-group Number Blocks. Here are some ideas for using the Counting Cards. You and your child will surely come up with other activities!

- Show one of the Counting Cards with the number side facing up.
Ask, "Can you find the number this matches on our Number Parade?"
Call the numbers by name; "Yes, your five matches the five."
Continue in random order with the other Counting Cards as interest allows.
- Show one of the Counting Cards with the 4-group Number Pattern side facing up.
Ask, "Can you find the number pattern this matches on our Number Parade?"
Call the patterns by name; "Yes, your five matches the five."
Continue in random order with the other Counting Cards as interest allows.
- In numerical or random order, display the Counting Cards with the number pattern sides face up.
Ask for the number card you call out.
- In numerical or random order, display the Counting Cards with the number sides face up.
Ask for the number card you call out.
- Line the cards up smallest to largest by the number patterns; left to right like a number line.
- Line the cards up smallest to largest by the numbers; left to right like a number line.
- On the number pattern side ask your child to count in the 4-group Math *Counting Order* or use her "math eyes" to see how many. Turn the Counting Card over and check the number.

<ul style="list-style-type: none"> • With the number side up build the 4-group Number Pattern using toys, crackers, etc. 			Then turn over the Counting Card to check the pattern.		
---	---	---	--	---	---

<ul style="list-style-type: none"> • With the number side facing up, find the 4-group Number Block that goes with that number. 			Then turn the card over and see if the block they found fits in the pattern.		
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4-group Dice



The white dots on the dice show the 4-group Number Patterns 0-5. The purple dots show the 4-group Number Patterns 5-10. Each side shows a number combination to make ten. Children may count the dots at first, but will soon learn to recognize the numbers at a glance. The 4-group dice can replace traditional dice for many math activities.

At first, use the white dots on each roll of the dice. When children are comfortable with 0-5, use either the white or the purple dots. Let the children choose which number to use on each roll. This develops their critical thinking and strategy skills.

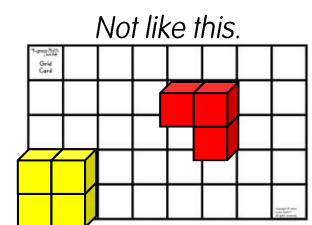
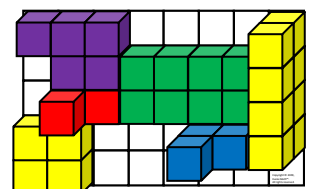
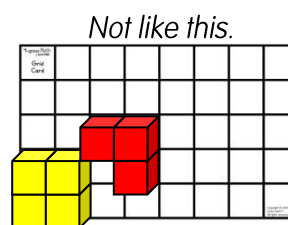
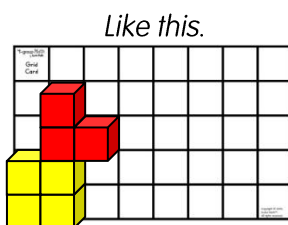


4-group Grid Card

The squares on the 4-group Grid Card are sized to match the 4-group Number Blocks. Children develop their spatial skills by trying to cover the grid with different combinations of blocks.

Put the Grid Cards out with the 4-group Number Blocks. Take turns putting a number block on the grid. *"We want to cover this grid with blocks so no white paper is showing."* Blocks may lay flat or stand up. Some part of each block must touch the grid and each block must touch one of the sides of a previous block as shown below:

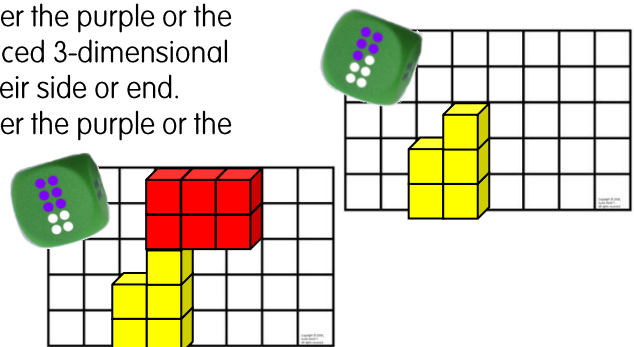
Use "math talk" as you place the blocks. *"I will take a four block and place it on the grid."* *"I am placing my two block under (next to, above, below) your three block."*



Play Fill the Grid Game

Player One rolls a 4-group Dice. He takes a Number Block for either the purple or the white number rolled and sets it anywhere in the grid. For an advanced 3-dimensional game, any side up is okay; meaning some blocks may stand on their side or end.

Player Two rolls a 4-group Dice. She takes a Number Block of either the purple or the white number rolled and sets it in the grid with the rule that it must touch one side of Player One's block. The player to place the last piece in the grid is the winner. If the last number is not rolled by either player on their last turn, it is a tie game. For a cooperative game, children can work together to fill the grid.



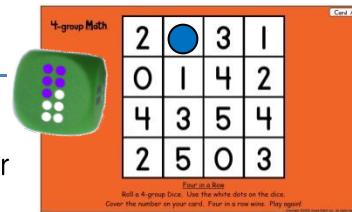
4-group *Four in a Row* Game Cards

Use small markers such as pennies or buttons to cover the numbers on the cards. *Four in a Row* Cards A & B, included in the Starter Kit, use only the white dots on the 4-group Dice and involve the numbers 0-5. (*Four in a Row* Cards C & D, a more advance game, are available for free in our Preschool Teacher's Manual on our website. They use only the purple dots on the 4-group Dice and involve the numbers 5-10.) It is okay if children count the dots on the 4-group Dice at first, but encourage them to see the four(s) in each pattern to recognize the number on the 4-group Dice.

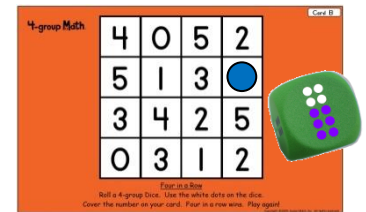
Play *Four in a Row* 2 players

Use the 4-group Dice and the *Four in a Row* Game Cards. Each player takes one of the cards. Players take turns rolling the dice and placing a marker on their card to cover the number of white squares showing on the dice. If no more of that number are left showing on your card, roll again. The first player to cover four squares in a row; wins. Then, play again! Variations:

- Play as a team - use one card and work together to get four in a row.
- Play until the entire card is covered.



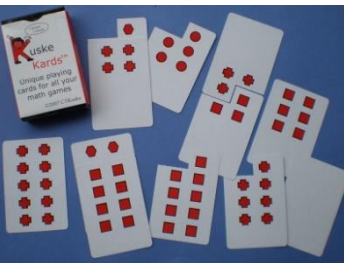
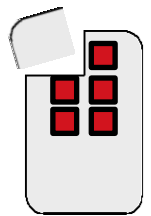
Player One rolls and covers the number on her card.



Player Two rolls and covers the number on his card.

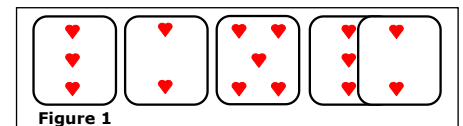
4-group Playing Cards

Open the box of 4-group Playing Cards. Remove the instruction sheet, read and store it in a safe place. It is hard to get back in the box! Read the red backed cards and store them with the instruction sheet or toss them. Remove the perforated notches from the odd numbered cards.

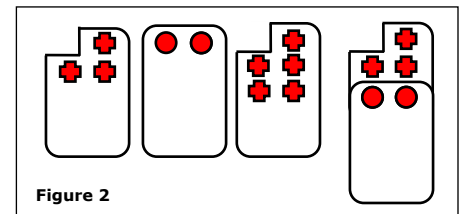


DO NOT throw away the four blank cards. They are the zeros!

Your child can practice many math skills through enjoyable card games. However, the number patterns found on traditional playing cards are visually difficult. Look at the 3, the 2, and the 5 playing cards. (**Figure 1**) Notice how the 3 and the 2 cards cannot be combined into the 5-pattern without rearranging the hearts.

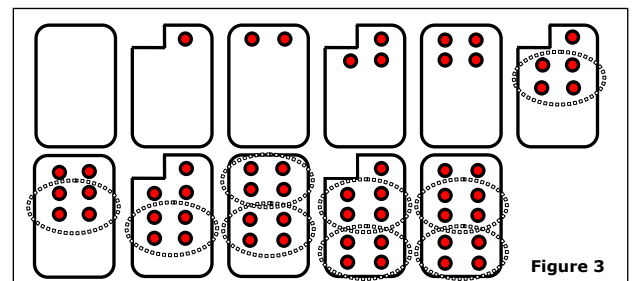
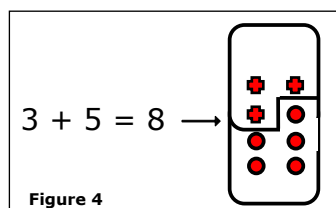


The number patterns on 4-group Playing Cards help children see how numbers relate to each other. Each number pattern fits together with all the others to form the pattern for their sum (to 10). For many young children this additional visual cue is a critical bridge to the difficult task of memorizing math facts. Look at the cards for 3, 2, and 5. (**Figure 2**) Notice how the 3 and the 2 cards can be combined to form a 5-pattern without rearranging the shapes.



Children learn to recognize the patterns on 4-group Playing Cards by looking for the groups of four in each pattern. (**Figure 3**)

Odd numbered cards are notched to allow two odd numbers to nest and form an even number. (**Figure 4**)



The unique 4-group Playing Cards use four shapes to represent each number pattern; squares, circles, pluses, and hexagons; making the cards useful for sorting and matching by shape or by number.

Card Games to Practice Recognizing the 4-group Number Patterns

Adjust the difficulty of the games by varying the cards. Start with the cards 0 to 5. When your child is comfortable with 0-5, play with the cards 0 to 6. When your child is comfortable with 0-6, play with the cards 0 to 7. Add a number each time until you are playing with 0 to 10.

More, Less, Same 2 players

Place the cards face down in a pile. Each player in turn picks up the top card, places it face up on the table, and says the number. (Your child may count at first, but will soon recognize at a glance how many.)

The player who has the highest number, says, *"I have more."* The player with the smaller number, says, *"I have less."* If both numbers are the same, both players say, *"We have the same!"*

It is important for the child to say the number and not just look at who has more.

Each player then places his card in the discard pile. When all cards have been played, play again!

Go Fish Matching 2-4 players

Place all the cards face down on the table and spread them out in a "pond." Players take 3 cards to form a hand. (For hands too small to hold the cards use a barrier between the players and put the hand face up on the table.)

Player One asks, *"Does anyone have a ____ (number in his hand)?"*

Any player who has a matching number card may give it to Player One.

Player One places the two matching cards in his "bucket" on the table in front of him.

If no one has a matching card, they all say, *"No. Go fish!"*

Player One draws a card from the "pond" and it is the next player's turn.

If a player runs out of cards, he draws three more cards from the "pond." Play until the "pond" is empty.

Card Games to Practice Addition - Basic Sums (4-10)

Make ____ (a Sum 4-10) 2 players

Choose a number for your sum. Set aside all cards higher than this number, i.e. if you want to play Make Seven remove the eights, nines and tens.

Lay out four rows of four cards face-up. (Figure 1)

Place the rest of the cards face-down for the draw pile.

Players take turns making the sum, using combinations of two of the face-up cards. Lay the chosen cards face-up on the table to form the number pattern for the sum.

After each player's turn, take cards from the draw pile and replace the used cards with new ones face-up.

Play until no more combinations for the sum can be made.

For fun, read your "equations" for the ways you made the sum. For example, if you have a 5 and a 2 together on the table, point to each card and say, *"Five plus two equals seven,"* and, *"Two plus five equals seven."*

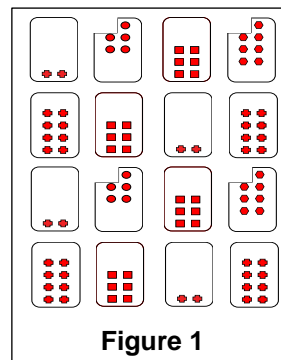
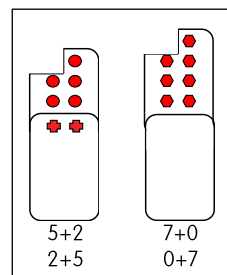


Figure 1

Target Number to ____ (a Sum 4-10) 2 players

Choose a number for your sum. Set aside all cards higher than this number: if you want to play Target Number to Seven remove the eights, nines and tens. Place one card of your Target Number face up on the table. Lay four cards face up in a row. Place the rest of the cards face-down to form the draw pile. (Figure 2)

Player One tries to combine two of the four cards to equal the Target Number.

If he is successful, he takes the cards and lays them down to form the Target number pattern.

He then replaces the cards he took from the row with new cards from the draw pile.

If he cannot make the Target Number, he takes a card from the draw pile and places it face-up at the end of the row. It is now Player Two's turn.

Play ends when no more combinations will make the Target Number. The player with the most Target Number combinations wins.

For fun, read your "equations" for the ways you made the sum. For example, if you have a 5 and a 2 together on the table, point to each card and say, *"Five plus two equals seven,"* and, *"Two plus five equals seven."*

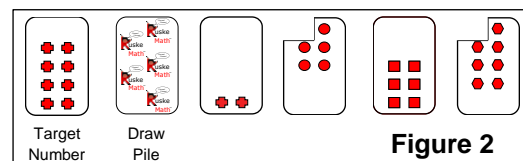


Figure 2

Go Fish to ____ (a sum 4-10) 2-4 players

Choose a number for your sum. Set aside all cards higher than this number: if you want to play Go Fish to Seven remove the eights, nines and tens. Place the cards face-down on the table and spread them out in a "pond." Players take 3 cards to form a hand.

Player One asks, "Does anyone have a ____ (card that makes the sum when added to a card in her hand)?"

For example, if the sum is 7 and she has a 5, she would ask for a 2.

Any player who has the requested card may give it to Player One.

She then lays down the two cards face-up to form the number pattern for the sum.

If no one has a matching card, they all say, "No. Go fish!"

Player One draws a card from the "pond" and it is the next player's turn. Play until the "pond" is empty.

For fun, read your "equations" for the ways you made the sum. For example, if you have a 5 and a 2 together on the table, point to each card and say, "Five plus two equals seven," and, "Two plus five equals seven."

Card Games to Practice Addition with Regrouping

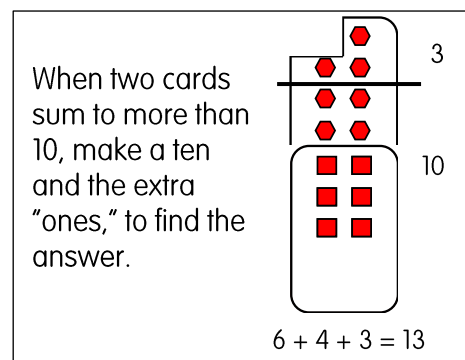
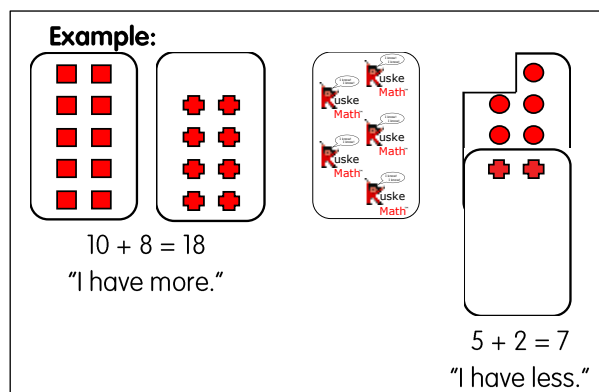
More, Less, Same – advanced 2 players

Place all the cards face down in a pile. Each player in turn picks up the top two cards, adds them together by placing them in the pattern for their sum, and says the equation. The player who has the highest number, says, "I have more." The player who has the lowest number, says, "I have less."

If the cards are the same number the players say in unison, "We have the same!"

Each player then places his cards in the discard pile. When all cards have been played, play again!

For a competitive game, the highest number takes the cards. Player with the most cards at the end wins!



Target Number with a Ten

Remove one 10 from the deck and place it face-up on the table. Lay four cards in a row face-up on the table. Place the rest of the cards stacked face-down to form a draw pile.

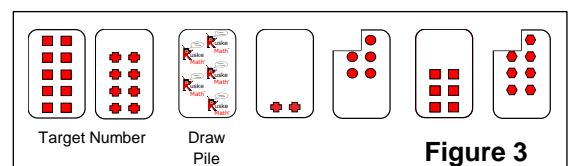
Turn over the top card of the draw pile and place it to the right of the 10 already on the table. This makes a Target Number between 10 and 20. (See **Figure 3**)

Player One tries to add any combination of the four cards to equal the Target Number.

If he is successful, he takes the cards and replaces them with new cards from the draw pile.

If he cannot make the Target Number, he takes a card from the draw pile and places it face-up at the end of the row. It is now Player Two's turn.

Play ends when no more combinations will make the Target Number. The player with the most cards wins.



In the example in **Figure 3**, Player One might say, "I know that 7 and 3 make 10. If I use 3 from the 5, I will have 2 left. Those 2 can go with the 6 to make 8, so I will have a 10 and an 8 which equals the Target Number 18. So, $7 + 5 + 6 = 18$." Player One then takes the cards 7, 5 and 6 and replaces them with new cards from the draw pile.

Thank you for choosing 4-group Math

More information and free materials are available on our website: www.4groupmath.com

Email: contact@kuskemath.com