Strategies to Build Number Sense

Compiled by Melinda Michielsen, Chris Aikens, Hayley Dixon, Lora Harding, Marilyn Buren, Tracie Madill, Kathryn Fricano, Lynda Vandermeyden, Karry Tischler, Kim Lewis, Genevieve Bolton, Nancy Nowicki, Annette Billou, Barb McAllister,

Hello Everyone

The following resource is based on concepts from the Number Sense assessment and is organized into categories. Please feel free to add to any of the sections if you have games or activities that work. Please do note the source from which your activity came from or paste the URL so we're crediting our sources for copyright purposes. Thank you.

Subitizing

Being able to visually recognize a small number without counting

Subitizing Using Rekenreks

Materials

*Die, Rekenrek, Dry Erase Marker and board

1) Student rolls die and says the number on the die.
2) Write the number on the board.
3) Represent the number on the rekenrek.

Extension (Hierarchical Inclusion)

Teacher asks student to represent a number one less than the one they represented.

Auditory Subitizing

Students are seated throughout the classroom with a chalkboard or dry erase board each. A number of beats are sounded and the children write the corresponding numeral on their board. The chalkboard is held on their chest when complete.

Subitizing with a number line

Materials: die, number line, clothespin

1) Student rolls die and subitizes
2) Move clothespin from zero position the same number as number rolled.
3) Continue to roll dice and move clothespin along number line until reach end.

Lock and Key Subitizing

Materials

6 locks with keys

Teacher will write the subitizing number with dots on each lock. The keys will have the number from 1-6 on them. The students find the right key by correctly matching the dots to the number. If it is right the lock will open.

*Can also be done with Easter eggs.

Subitizing Tic-Tac-Toe

Materials: Pre-made placemat with tic-tac-toe game(s) including numbers in each box.

1) Student rolls two dice.
2) Add dice quantities together. (e.g. 2 and 2 is 4)
3) If number (e.g. 4) appears on tic-tac-toe board, mark with X.
4) Once student has marked three numbers in a row, game is over.
5) Student can play independently or with a partner.

Whole Class Ideas

- Line up games - by 2’s starting at 12…
- Recognizing a dot card
- Number talks
- Large rekenreks
- When assigning tasks (e.g. handing out school materials, passing food orders) make a point to be talking number with your students. Notice every opportunity for bringing number into the conversation with students. (e.g. Please pass a cheese pizza slice to each of these 5 people. Do you have enough?)
- Children get just enough of one group of objects to match another group (e.g. a pair of scissors for each child at their table. It is important to have the child go across the room to get the scissors, so they have to count).

The Number Game (Phys. Ed)

Game Description: This warm-up or teambuilding game is simple, yet awesome! Students spread out in the playing area. Give maybe 20-30 seconds for them to just run around and around (or skip, hop, gallop, spin, etc). When the time is right, the teacher yells out a number (example, “SIX!”) and then the students must quickly form groups of 6 (or whatever number is called). Any players who didn’t make a group must complete 6 jumping jacks or exercise of choice. Then play again! Great to play along with music. Especially a great idea for large groups of students. Also, a good discussion about inclusion and personal/social feelings could be attached to this game.

https://physedgames.com/category/kindergarten/

Small Group

- Dice - roll and recognize the number
- Dominoes- recognize the number
- Individual rekenreks
- Dot card game
- Tower of 10
- How many in the cup game
- Ten-frame game

Ten-Frame Game- Subitizing

Need -Effective Guide Number Sense- BLM

- Ten frame with dots
- Number cards

How To Play

- Hold up a ten-frame with dots
- Students hold up the number card that matches

Odd number out

Show several cards, all but one of which have the same number.
Which one does not belong? Child places thumb on chest when answer is known to allow for other children to have time to process the answer.

How Many In A Cup- Subitizing

Need

- Up to 10 items
- Cup

How To Play

- Player 1 puts some items in a cup
- Spill the cup and let the partner look quickly and scoop items up
- Partner guesses how many were spilled (estimate)
- Spill again and the partner counts to see how close their estimate was
- Switch

Pg.87 Effective Guide to Number Sense and Numeration K-3

Towers Of Ten - Subitizing

Partner Game

Need

- 2 dice for each player
- 20 snap cubes

How To Play

- Each player rolls 2 dice
- Add the numbers you rolled
- Who has more?
- Player with more wins a cube
- Player with 10 cubes first win

Dot Plate Flash

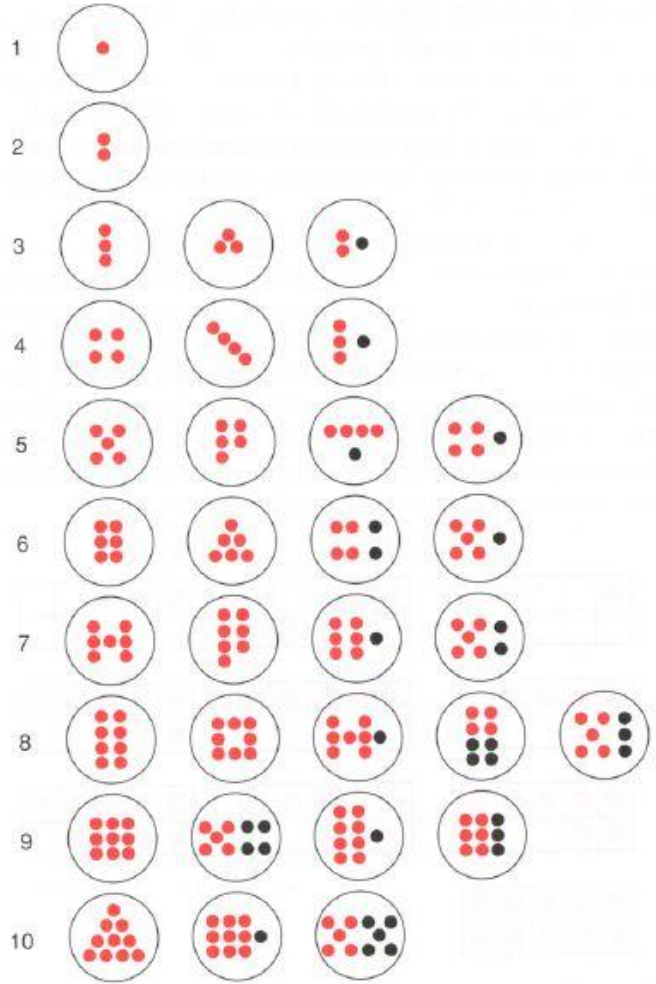
Hold up a dot plate for 1-3 sec.

How many?

Describe what you see.

Pg.99 Activity 6.1 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Dot Images, next page



Pg.99 Activity 6.1 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Magnitude

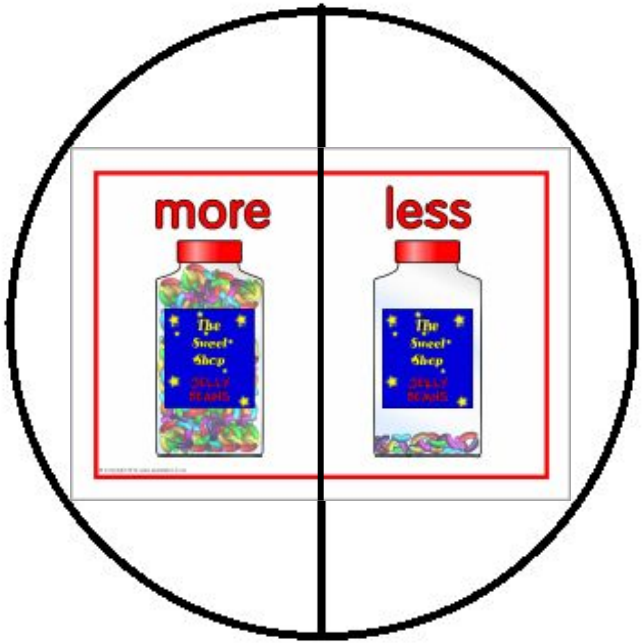
Knowing that one number is smaller or larger than another.

More or Less War

- Each partner pulls a dot image card from the pile.
- One player spins the spinner.
- If it lands on Less the player with less wins. If the spinner lands on More

the player with more wins.

- Go again.



Pg.95 Activity 6.1 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Get Your Trash Off My Yard

Game Description: Get your trash off my yard! Split the gym into 2 halves (best idea is to use the volleyball court to divide the playing area). The 2 halves represent 2 yards. Players on both sides will keep throwing, rolling, or sliding pieces of trash (dodgeballs, beanbags, etc) back and forth. Basically, the idea is that teams are throwing the neighbors trash off their yard. This can go on and on and on. Or end the round and see which yard is a bigger mess! Perhaps a lesson of social and community responsibilities can come up for discussion at some point in this game. Read More →

*** Blow the whistle and glance at the beanbags to see which side has more or less.

https://physedgames.com/category/kindergarten/page/8/

Magnitude Line Tag

Game Description: The premise is simple: stay on the lines and try not to get tagged. If tagged, sit down and become a road block until the freer comes around and frees you. Great directional PE game, very popular.

*** At any time in the game blow the whistle and have students glance at which half of the gym has more people or less people.

https://physedgames.com/category/kindergarten/page/8/

Counting
One-to-One Correspondence

Rote procedure of counting. The meaning attached to counting is developed through one-to-one correspondence.
Students can connect one number with one object and then count them with understanding.

Counting Sets

Have children count several sets where the number of objects is the same but the objects are very different in size. Discuss how they are alike and how they are different.

Pg. 95 Activity 6.4 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Roll and Build Towers

Make sheets with 6-8 numbers scattered on the page - provide two dice and stacking blocks - child rolls dice and adds them then puts a block on the corresponding number; making a tower as the game goes on

Number Line Counting

Make various number line cards using different number strings - make some higher and lower digits - make some descending - laminate - punch holes under each number and attach a pipe cleaner - supply beads for one to one counting

Up and Back Counting

Select a target number. Have that many students stand as the target number. Counting rhythmically have one student sit a time with the count. When the target number is hit and that student sits. Starting with the target standing first, now count backwards and have each student stand along with the backwards count to reverse the order.

Pg. 96 Activity 6.4 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Counting on With Counters

Select 10-12 counters. Count the objects with the student. Then have them select 4-5 counters and place their hand over them. Starting from the number, have them count up to count the collection of counters.

Pg. 97 Activity 6.4 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Ten-Frame Game

Need: *ten frames with dots

* Number cards

How to Play: * Hold up a ten-frame with dots(blackline master in Guide to Effective Instruction)

* Students hold up the number card that matches

The Big Scoop

Need: * container of items (up to 50), laminated target sheet, dry erase marker

How to Play: * Player 1 make a target number

* scoop out items

* count items and record how many

* circle “too many” or “too few”

* player 1 takes a second try

* switch to player 2

Race to Fill the Cup

Materials needed: Dice, cups and objects for counting (such as math linking cubes)

How to play: Each player rolls the dice and then adds that many cubes to their cup. The first one to fill their cup wins!

Variation: Use 2 regular dice and add the numbers together and take that many cubes for your cup. OR fill the cup with cubes and then roll to remove that number. Before starting, students can guess how many rolls it will take to empty the cup.

The Egg and Bean Game

Materials needed: beans or something to hide under an egg, plastic eggs (in half), a partner!

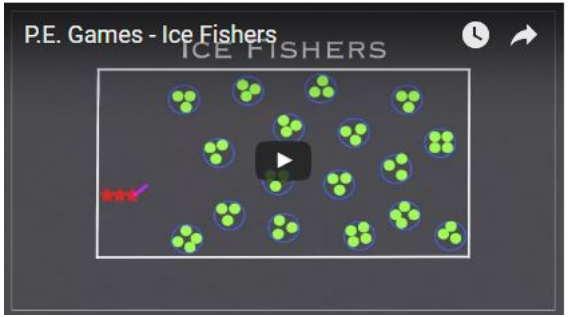
Place some beans on the table (can be Jelly Beans for Easter) Have the children count the beans. Children hide their eyes while their partner hides a few beans under the cup. When they open their eyes up, they can see how many beans are left on the table. This should tell them how many beans are hidden.

Ice Fishers (math version) (Phys. Ed game)

Game Description: Ice fishers is essentially a pretend game of ice fishing in the gym (lake). Players bring their pretend fishing rods (pool noodles) to a fishing hole (hula hoop), look for a fish, and bring back a fish if they find one. Lots of fun in this relay-style team game. All you need to do is cut out some fish on poster paper, hide them under lilly pads inside hula hoops, and teams get going. Lots of fun, lots of action, and teachable moments. Add special items or modifications to make it even more fun (like weight of fish, obstacles, etc)!

***Variation, have a set of numbers from 1-10 for each time (either numbers on the fish or just number cards placed in the hoops mixed up). Each team will have to go find various numbers until the have a set of numbers 1-10. When a team finally gets the numbers 1-10 they can line them up in order and sit down to indicate they're finished.

https://physedgames.com/category/kindergarten/



Counting Game

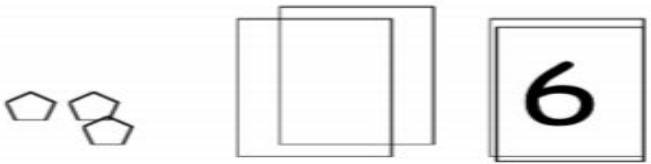
Materials

Number cards on CK.BLM2: The Counting Game Number Cards or make your own cards.
Small items to use as game pieces, such as buttons, pennies (3 per player)

How to Play (2 or more players)

1. Shuffle cards and place them face down.
2. The first player turns over the top card and begins counting on.
   (Example: if the top card is 6, the first player will say "7".)
3. The second player says the next number *(i.e., "8")*.
4. Continue taking turns counting on.
5. The player who says "20" takes a game piece.
6. The game ends when one player has 3 game pieces.

Note: When counting backwards, the player who says "0" gets to take a game piece.



Pg.74 Guide to Effective Instruction K-3, Number Sense and Numeration

Cardinality

Tells how many things are in a set. When counting a set of objects, the last word in the counting sequence names the quantity for that set.

General ideas

Counter and Producer (10+) Counts and counts out objects accurately to 10, then beyond (to about 30). Has explicit understanding of cardinality (how numbers tell how many).

Keeps track of objects that have and have not been counted, even in different arrangements.

Counting Towers (Beyond 10) To allow children to count to 20 and beyond, have them make towers with other objects such as coins. Children build a tower as high as they can, placing more coins, but not straightening coins already in the tower. The goal is to estimate and then count to find out how many coins are in your tallest tower.

Dino Shop 2 Children add dinosaurs to a box to match target numerals.

Count and Rearrange

Have students count a set of objects. Rearrange the objects and ask, “How many now?” If they choose to recount again, discuss why they think the answer is the same.

Pg.95 Activity 6.5 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle andSandra Folk

Hierarchical Inclusion

Numbers are nested inside of each other and that the number grows by one each count. 9 is inside 10 or 10 is the same as 9 + 1.

Make Sets of More/Less/Same

- Pull one of the dot cards.
- Using the objects make a set of objects that is the SAME as the dot image
- A group of objects that are MORE than the number.
- And a group of objects that is LESS than the number.
- Place the labels SAME, MORE, and LESS with the correct group of objects

Pg.94 Activity 6.1 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Elevator Ride : Partners

Need:

Elevator game sheet (Effective Guide BLM Numeration)

2 coloured counters

Number cube labelled +0, +1, +2

How to Play:

Put counters at the bottom of the apartment building. Roll the number cube and move up the floors. First one to the top wins.

**If you land on the 19th floor you need to roll a +1 to win.

Domino Drop: Partners or groups of 4

Need:

15 dominos each

1 strategy card

How to Play:

Select a strategy card. Each player gets 7 dominos. Turn 1 domino over in the centre of the playing area. Match dominos to the middle one(if it’s 2 and a 5 and the strategy is one more than they need a 3 and a 6 to match). If there is not a match select a new domino from collection.

The Counting Game: Partners or groups of 4

Need:

Laminated number cards (Effective Guide to Numeracy BLM)

Game pieces

How to Play:

Place cards face down. Player 1 turns over top card and counts on (card says 6-player 1 says 7, player2 says 8-players take turns counting on). Player that says 20 wins a game piece.

Counting 50 or 100: Partners

Need:

Paper with 50 or 100 happy faces drawn in scattered formation.

How to Play:

Partners estimate how many might be on the page. Partners use their counters to come up with a way to count the faces they see (2,5,10)

Play Dough Smash

Make cards that have different subtraction equations. Give the cards to the child along with play dough they can make the appropriate number of balls with.

http://mamapapabubba.com/2015/01/08/play-dough-subtraction-smash/

One-Less-Than Dominoes

Using the dominoes, rather than matching the domino ends by the same number, students match them if they’re one less than.

(could do this for 1 more, 2 more, 2 less, etc.)

Pg.100 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Make a Two-More-Than Set

Take six dot cards.

Looking at the image of dots, build a set of counters that is two more than the number shown.

Repeat again for each of the six cards.

Pg.100 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Parts/Whole

Part-Part Whole Cards (Partners)

Need:

Part-part whole cards

Interlocking cubes, 2-colour counters

How to Play:

Player 1 selects a card and uses cubes or counters to show what numbers are the parts and the whole.

Player 2 checks their answer and then takes their turn.

(example: 3,7,4 - make a train with 3 blues/4 reds and connect them to show 7)

Missing Number Strips (Partners)

Need:

Strips of paper folded in 3 sections

Stickers, markers to draw pictures

How to Play:

Players put a number in the first section to show the whole, then draw or sticker the parts in the other 2 sections.

Player 1 folds part to hide it.

Player 2 has to figure out the missing part.

Switch.

Shake and Spill (Partners)

Need:

Number cube, shake and spill sheets, cube markers, red/white counters, cup

How to Play:

Use laminated shake and spill sheet.
Put the assigned number of counters in the cup.
Shake and spill.
Place the counters on the first row to see how many were red and how many white.
2nd player takes a turn putting the assigned counters in the cup.
They fill in the second row to show the combination of red and white.
Play until you fill the page.

Boxcard Mystery (Whole Class or Partners)

Need:

10 snap cubes - 2 colours (5 and 5)

How to Play:

Make a train of 10 snap cubes (5 red/5 blue).

Hide behind back and snap some off.

Show what is left and partner guesses how many are still behind partner’s back.

Pg.83 Effective Guide to Number Sense and Numeration K-3

Covered Parts

Select a target number. Count out that many counters. Using a piece of paper or a cup cover up some of the counters. Looking at how many you see, tell how many are under the cup or paper.

Pg.105 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle andSandra Folk

Compensation

Unitizing

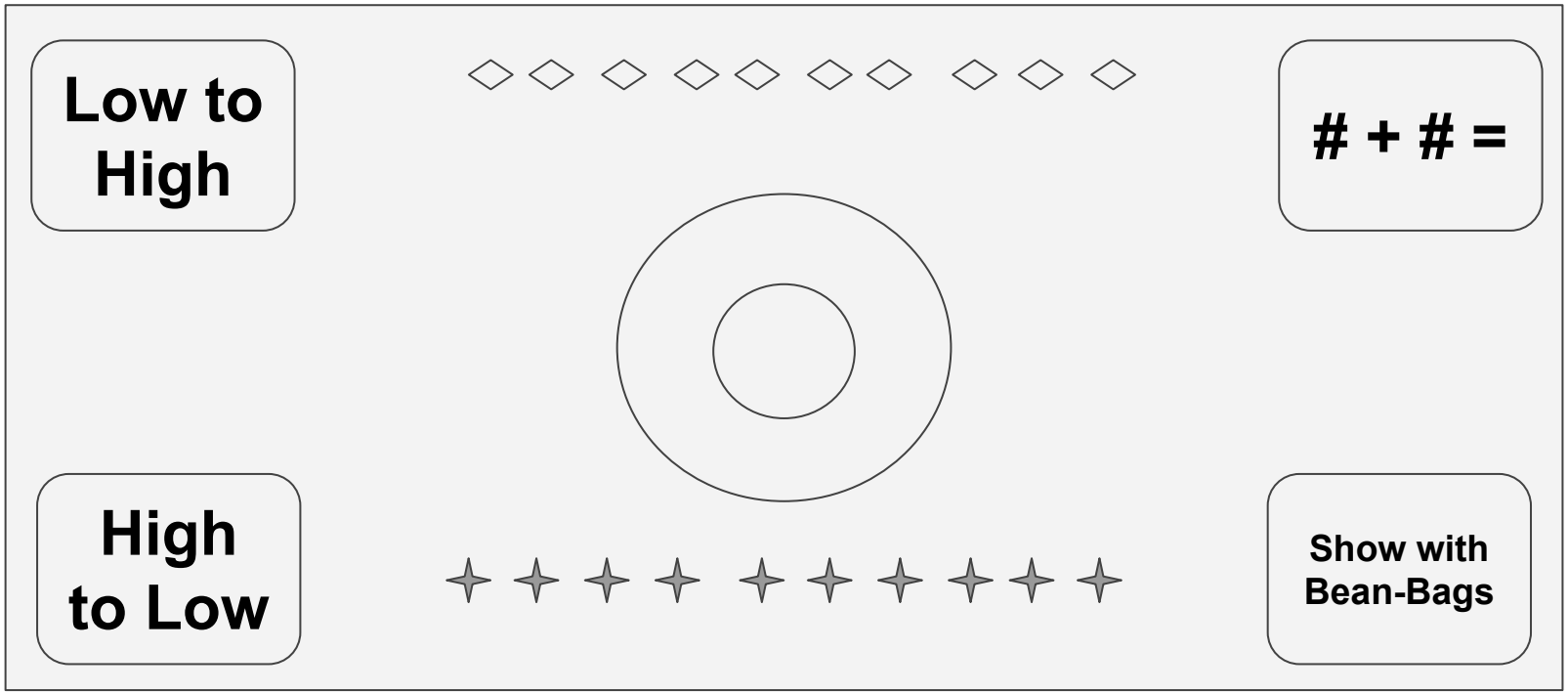
“Unitizing – the idea that, in the base ten system, objects are grouped into tens once the count exceeds 9…”

A Guide to Effective instruction in Mathematics Kindergarten to Grade 3 Number Sense and Numeration (Pg.8)

Phys Ed. Math Game “Find 10, Prove 10”

Grade 1 Quantity Relationships
– *relate numbers to the anchors of 5 and 10 (e.g., 7 is 2 more than 5 and 3 less than 10)*

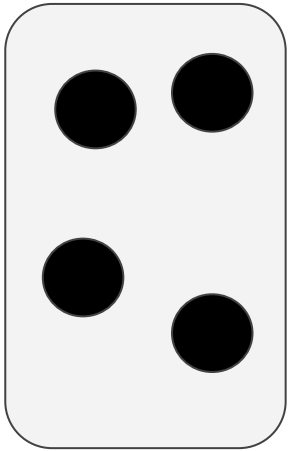
Find 10 Prove 10

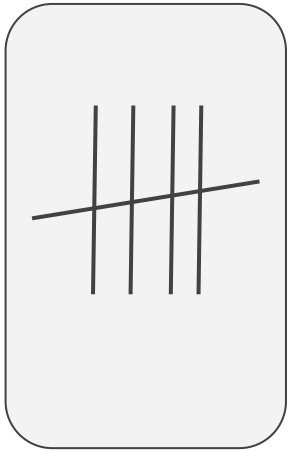


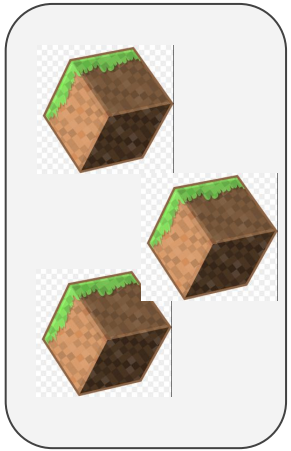
20 Cards are placed in the middle of the gym. Divide the class into 2 groups of 10. Start by having the students run to the middle to get a card. Student then find a partner who has a number that when matched with their own adds up to 10. The team of 2 runs to a “Proving Zone” where they must show they are correct. Each zone is a different way to count to 10. Students return their cards to the middle and a new round can start.

Find 10 Prove 10

Variety of Cards to Support Spatial Patterns and Recognition

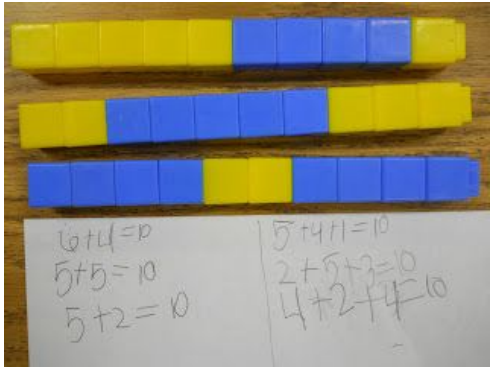






Towers of Ten

This is a great game from investigations. In partners the students rolled a dice and then got that many cubes of their color. The next student rolled and then added that many cubes onto the tower that was already started. If they had more than ten the students had to break off the extra and then start a new tower until they made three. When they were finished they had to record all the combinations of the three towers on a piece of paper.



Make Ten (card game to ten)

In this game you take out all face cards and divide the deck equally between the players. Aces equal one. Turn four cards up on the mat, and try to make combinations that add up to ten. When you do, set them aside in a pile. Replace the cards you used with cards from your pile. Whoever has the most combinations to ten wins.

http://mamapapabubba.com/2016/06/28/make-ten-an-easy-card-game-for-kids/

Ladybug Unitizing Activity

Divide a ladybug photo in half. The students have to show different combinations of making a specific number you have selected. Please use manipulatives or playdough to represent the ladybug’s dots.

Ten Frame Translation

Give students a number. (can say it or have a dot image or other representation)

Students have to show that number on their ten frame. (use laminated ten frames and dry erase markers or counters on a ten-frame)

Pg.102 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Five-And...

___

Call out a number between 5 and 10 (or 11-19 for older students). Students respond “five and _____” (or ten and _____) with the corresponding number .

Pg.103 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Make Ten

Call out a number between 0 and 10. Students respond by saying how many more needed to be added to that number to make ten.

Pg.103 Elementary and Middle School Mathematics Teaching Developmentally, by John Van De Walle and Sandra Folk

Where would this fit?

Deal and Copy (4-5 years) 3-4 players

— — —

Materials: 15 dot cards with a variety of dot patterns representing the numbers from one to five and a plentiful supply of counters or buttons.

Rules: One child deals out one card face up to each other player. Each child then uses the counters to replicate the arrangement of dots on his/her card and says the number aloud. The dealer checks each result, then deals out a new card to each player, placing it on top of the previous card. The children then rearrange their counters to match the new card. This continues until all the cards have been used.

Variations/Extensions

1. Each child can predict aloud whether the new card has more, less or the same number of dots as the previous card. The prediction is checked by the dealer, by observing whether counters need to be taken away or added.
2. Increase the number of dots on the cards.

Resources:

Effective Guide to Number Sense and Numeration
Elementary and Middle School Mathematics, John A. Van De Walle and Sandra Folk. Pearson. 2004

https://physedgames.com/