Number and Number Sense

Standards:

What do students have to do? Look for verbs.	With what?	With what parameters? Which figures, numbers, shapes?	Vocabulary	Essential Understandings

Same - More – Less

Materials: Dot Cards

More-Less-Same game boards for students – one per student

Beans or some item students can count and use on game board

Directions:

1. Show students a dot card. They build this number using the counters in the middle of their game board. If you show 7 dots, they build 7.
2. Then have them build a number that is smaller or less than the number of dots you show. For example, if you show 7 dots, they may build ANY number smaller than 7. Make sure you have them tell you what they built.
3. Have them do the same for a number that is larger than the number of dots you show them. If you show 7, they may build any number larger than 7. They must be able to count and tell you the number they built.

Less	Same	More

One Less	Same	One More

Garbage

How to play Garbage:

2/3 players

Shuffle the cards.
Pass out 10 cards to each player face down.
Players create a line of their ten cards face down.
The extra cards go in the middle of the players face down.

The first person draws a card from the middle and places it in the correct place in their sequence of ten cards. The card it replaces gets turned over and placed in the correct place in the sequence. This continues until a player picks up a card that is a duplicate of one already placed. Then he/she places the duplicate in the middle face up and calls it "Garbage".

The second player can take a new card from the middle or player 1's "garbage" and use it to start their turn. He/she continues to play until he/she gets "garbage" - a duplicate of a card already in their sequence. The garbage card goes in the middle.

The first player can pick up that "garbage" and use it or select a new card to begin their turn.

The object of the game is to be the first person to complete your sequence of ten cards.

1	2	3	4
5	6	7	8
9	10	1	2
3	4	5	6
7	8	9	10

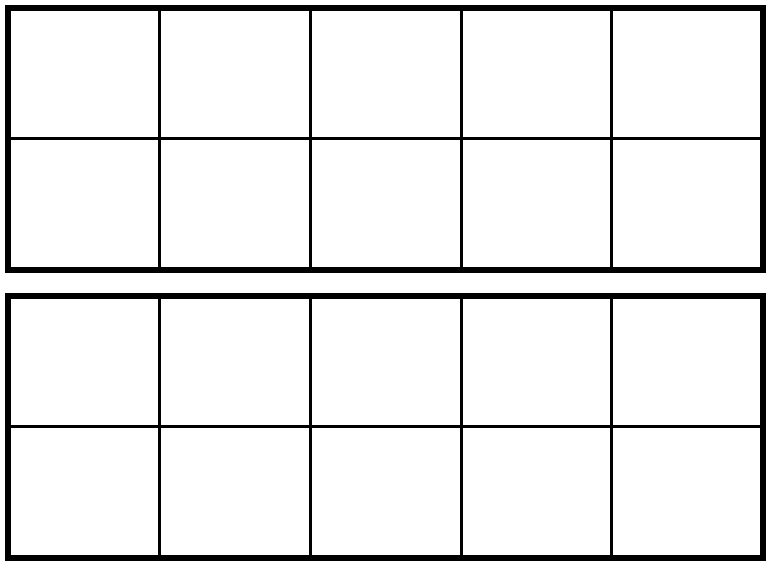
11	12	13	14
15	16	17	18
19	20	11	12
13	14	15	16
17	18	19	20

Think Board

Draw It!

Build It!

Write It!

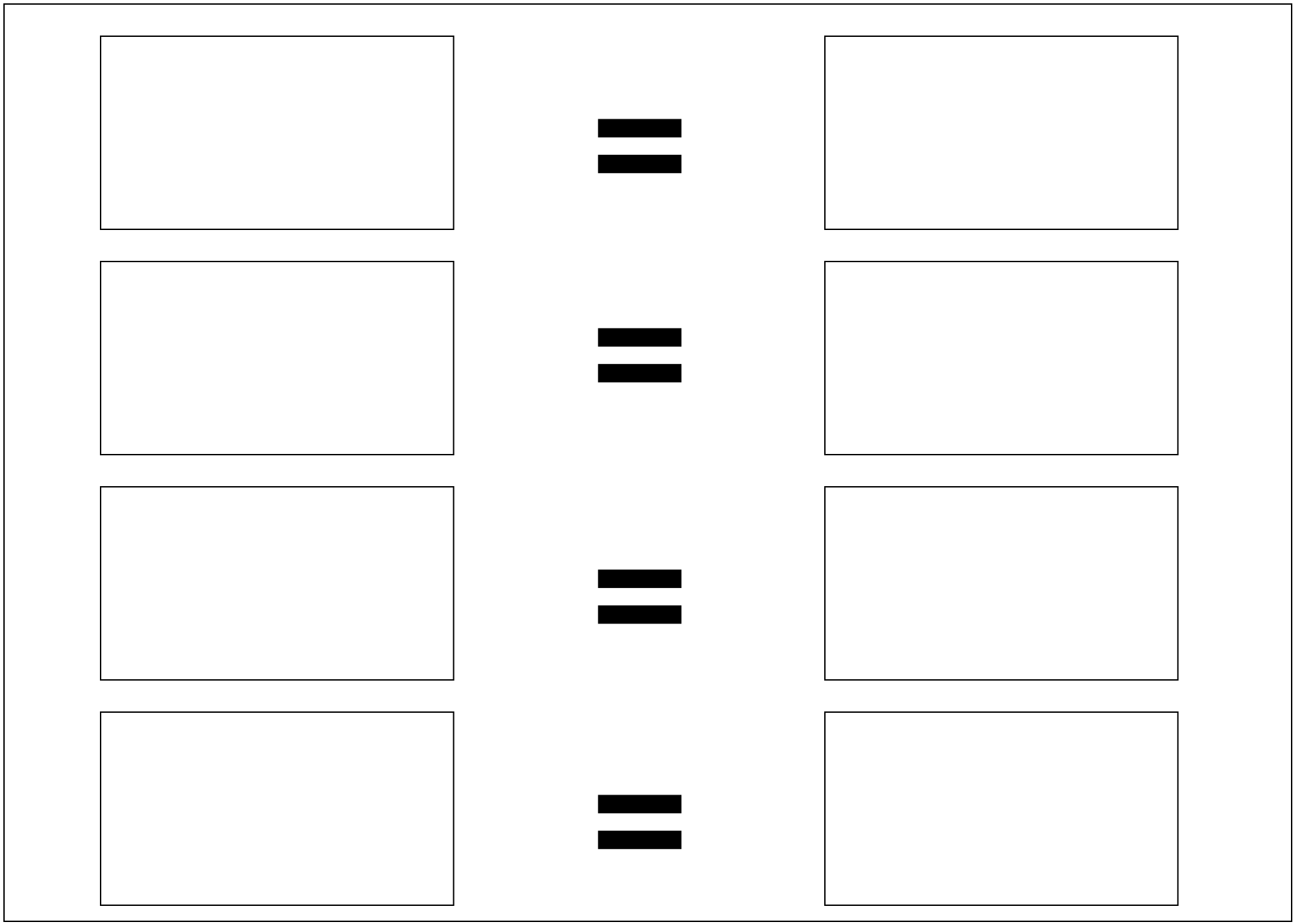


Equal Schmequal

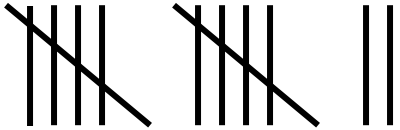
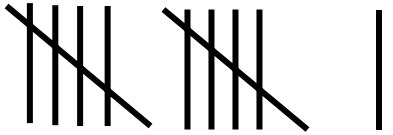
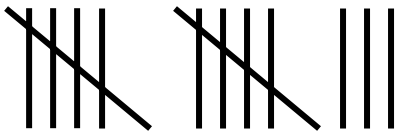
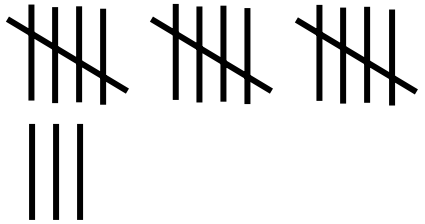
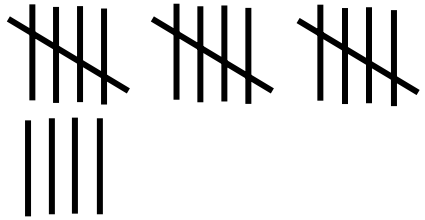
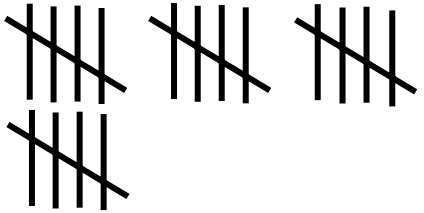
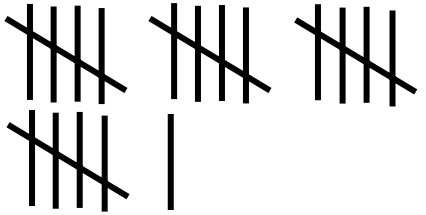
This game is for 2 players.

DIRECTIONS:
Cut out the playing cards below and the scoreboard on page 107.
Turn the playing cards upside down and mix them up.
Take turns drawing one card at a time.
If you have two cards with equal amounts, put them in two of the boxes on your scoreboard. If you have two cards with unequal amounts, place them facedown in their original positions.
The first player to fill up all of the boxes on her/his scoreboard wins.

EQUAL SCHMEQUAL GAME BOARD



Equal Schmequal Teen Numbers Cards

			
			
10	20		
11	12	13	
14	15	16	
17	18	19	

Roll and Color It!

Roll and Write It!

4 in a Row

Filled 100s board
Blank 100s board
Colored pencil
2 crayons-1 color per player
2 digits cube 0-9

Roll and Color It!
This game uses a complete 100s board. Player 1 rolls both cubes and makes a 2 digit number (78 or 87) and then find it on the 100s board. Call out the number and color it with your crayon. Then the other player takes a turn. The object is to color in the 100s board together.

Roll and Write It!
Roll and write is played the same way but on an empty 100s board. With each roll a player records the number on the 100s board. The goal is to complete the 100s board together.

The game can also be played as a strategy game. It is called 4 in a row. The object is to color or write in 2 numbers in a row. The game can be played again and again on the same board collecting as many 4's as possible.

Roll and Color It!

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Roll and Write It!

1	2	3	4	5	6	7	8	9	10
									100

Using the Beaded Number Line

Goal: Students can compute addition and subtraction up to one hundred in their heads using number sense and mental estimation.

Materials: 50 beads of one color, 50 beads of another color, and 2 yds. of lanyard string, paper clip or key ring, 6 to 8 clothes pins (all of these materials are per person)

How to make the beaded number line:

Double the lanyard string and tie a knot in it twice. Then string 10 beads of one color and then 10 beads of another color. Continue stringing the beads alternating the colors in groups of 10. When finished with the beads, place the paper clip or key ring on the end of the lanyard string to hold the beads on from that end.

Prior Knowledge:

- Counting to 100
- Add and Subtract numbers up to 20 easily without counting
- Use this strategy before students are fluent in using algorithms

Activities:

- Perform addition and subtraction on beads using jumps not counting
- Count by tens forward and backward
- Count by ones from any given number forward and backward
- Locate a number on the string with beads
    - 12, 21 are numbers from a ten (12 is 2 more than 10, 21 is one more than 20)
    - 19, 38 are numbers from the next set of 10 (19 is 1 back from 20, 38 is 2 back from 40)
    - Make sure students realize that when counting they must include the beads up to the number and the bead of the given number

Possible Questions:

- How many beads are on the string?
- How can we count by tens on the beads? Can you count backwards?
- How many beads are in each color group? How can you count from 20 to 60? How can you count from 70 to 40?
- What number is this? (point to a number for them that is not a multiple of 10)
- Can you count from 43 to 47? 56?
- Can you count from 43 to 38? 33?
- Where is the number 12? 21? 42? 19? 38? 79?
- How could we find 63? 13?

Play "Guess My Number"

Choose a number on the beads and have students ask questions such as is it smaller than 60 or is it larger than 10 until they can guess the number.

Example:

Is your number larger than 28? (yes)
Is your number smaller than 72? (yes)
Is your number even? (no)
Is your number odd? (yes)
Is your number larger than 50? (yes)
Is your number less than 60? (yes)
Is the sum of the digits equal to 8? (yes)
Is your number 53? (yes)

Rounding with the Beaded Number Line

Using the beaded number line, have students represent the number 52 by marking it with a clothes pin. Talk with the students about what groups of 10 is the number 52 between (50 and 60). Mark 50 and 60 with clothes pins to show the tens that 52 is between. Then talk about which is 52 closer to …50 or 60 and why. The visual representation really helps the students see how closely the number is to either the lower group of tens or the higher group of tens and provides the explanation of why we tell students to round up if 5 or higher and round down for 4 and below. Try this with many numbers so that students have many opportunities to use the number line and build the relationship of why we round a number up or round a number down.

The Beaded Number Line
Two- digit Addition and Subtraction Strategies

Ask students to show you the number 37 on the beaded number line and mark it with a clothes pin. Talk about what they see in the number 37, how many groups of ten and how many ones. Then have them show how they would add on 26.
Some students will add only by ones from 37 on.
Others will add the 2 groups of ten from 26 and then the six other ones.
Another strategy will be to see that they have 3 more to get to the next ten from 37. The student will retain the 3 from the 26 and then add the other 2 groups of ten. Then they know they only need 3 more from the 26. They are then at 63. The students may use the clothes pins to show each of the parts of their jumps to help them see what they have used in solving the problem.
37 beads, clothes pin, 3 beads, clothes pin, 20 beads, clothes pin, 3 beads clothes pin = 63 beads
Addition and Subtraction of two digit numbers

37 + 26 =
48 + 21 =
99 – 17 =
75 – 26 =

54 + ____ = 78
28 + ____= 76
25 + ___ _= 100

After doing these kinds of problems whole group and having students tell how they found the answer by thinking about the number of jumps to get their answer, have student s then do a worksheet using the beads and explaining their jumps.

Build a Stack

Objective: Students will create a quantity of numbers using the concepts of more and less.

Materials:

Some type of cubes that connect together

Directions:

1. The teacher will start by asking the students to create a stack of cubes to represent a number. "Build a stack of 5".
2. Then ask students to "Build a stack two more than 2."
3. Ask students to "Build a stack three less than 7."
4. Continue asking students these types of statements.

Neighbor Facts

Regular
One more/less
Two more/less

0-9 number generator
Cover Up Board - 2 students per game board
+ / - 1 cube
+ / - 2 cube
Deck of cards
Chips or counters

Roll the 0-9 number generator and state the number. Ex: "I rolled a 5." Next roll the + / - cube. If a +1 is rolled students should then state 1 more than 5 is 6. Cover up that number. The object is to cover up all of the numbers before the other player. If you roll a number that has already been covered, call out pass and that is the end of your turn.

Neighbor Facts

0	1	2	3	4	5	6	7	8	9

0	1	2	3	4	5	6	7	8	9

Ten Frame

CHOP

Cubes that link
Recording sheet if desired

Players count out 10 cubes (or any number you are working on…) to use during the game. Players take turns breaking the cube train into 2 pieces while calling out "CHOP". For each round the player calls out the number sentence and records it in pictures and words.
Ex. CHOP, 2 and 8 make 10. 2+8 = 10

CHOP for _____

Name:

Snap

Goal: Players will be able to demonstrate the various number combinations for a given sum.

Materials: Linking cubes of some type, a set of number cards from 3 to 18 depending on the players ability level with number combinations

Players: 2

How to play: Each player has a set of linking cubes. The players together turn over one number card in their deck. They both take that many cubes and link them together to create two trains. They place their trains behind their backs and at the same time they snap their trains into two parts. They each then have to show their parts and say the matching number fact that is represented.

Example:

The number card has 6. They each make a train of six. Then at the same time they say "Snap" and snap their trains into two parts. One player may have 2 and 4 represented and the other might have 3 and 3. They each then have to say their number fact. 2 and 4 is 6. 3 and 3 is 6. Both number sentences are recorded. Play continues until they have used the cards in the pile.

Player 1 **Player 2**

Number sentence	Number card drawn	Number sentence

Turn Over 10

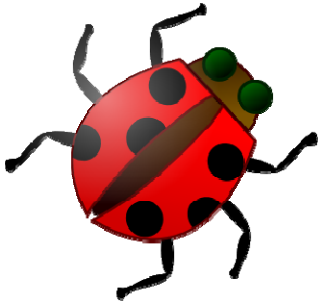
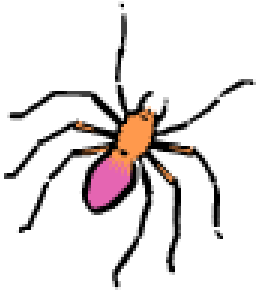
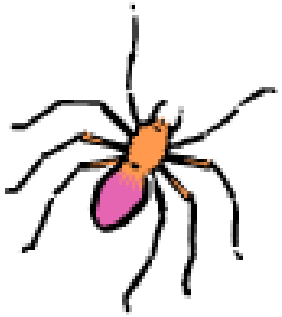
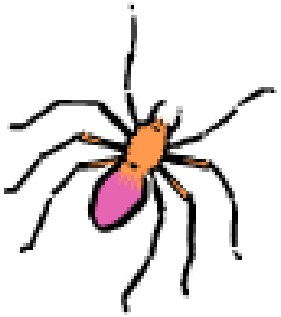
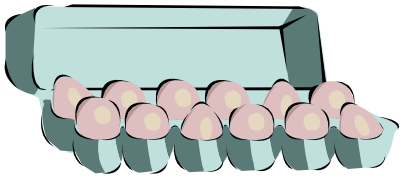
Materials: Deck of Number Cards 0-10 (four of each) plus wild cards.
Players: 2-3
How to Play: The object of the game is to turn over and collect combinations of cards that total 10.

1. Arrange the card face down in four rows of five cards. Place the rest of the deck face down in a pile.
2. Take turns. On a turn, turn over one card and then another. A wild card can be made into any number. If the total is less than 10, turn over another card. If the total is more than 10, your turn is over and the cards are turned face down in the same place. If the total is 10, take the cards and replace them with cards from the deck. You get another turn.
3. Place ach of your card combinations of 10 in separate piles so they don't get mixed up.
4. The game is over when no more 10's can be made.
5. At the end of the game, make a list of the number combinations for 10 that you made.

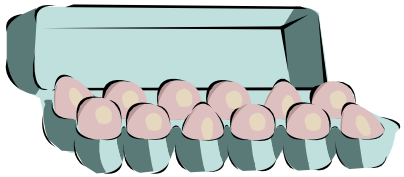
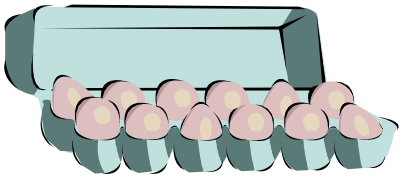
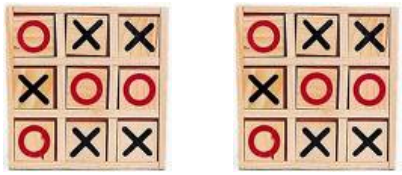
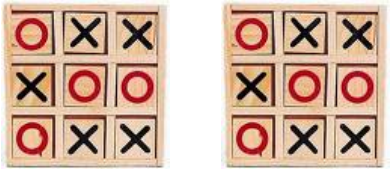
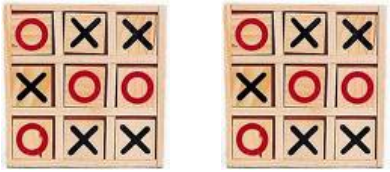
Tens Go Fish

Materials: Deck of Number Cards 0-10 (four of each) with wild cards removed.
Players: 3-4
How to Play: The object of this game is to get two cards that total 10.

1. Each player is dealt five cards. The rest of the cards are placed face down in the center of the table.
2. If you have any pairs of cards that total 10, put them down in front of you and replace those cards with cards from the deck.
3. Take turns. On a turn, ask one other player for a card that will go with a card in your hand to make 10.
4. If you get a card that makes 10, put the pair of cards down. Take one card from t he deck. Your turn is over. If you do not get a cards that makes 10, take the top card from the deck. Your turn is over. If the card you take from the deck makes 10 with a card in your hand, put the pair down and take another card.
5. If there are no cards left in your hand but still cards in the deck, you take two cards.
6. The game is over when there are no more cards.
7. At the end of the game, make a list of the number pairs you make.

Doubles Representation Cards

Doubles Representation Cards

Doubles Cover Up

0	2	4	6	8	10	12	14	16	18	20

0	2	4	6	8	10	12	14	16	18	20

Bears in a Cave

Materials: Plastic bears or other small objects, plastic cup
Players: 2 - 3
How to Play: The object of this game is to determine the missing addend.

1. Determine the target number and use that many bears for the rest of the task.
2. Player One takes a part of the set of bears and hides them under the cup while Player Two looks away.
3. Player Two then turns around and determines the amount hiding under the cup. The players then look under the cup to see if the answer is correct and record the combination.
4. Play continues with Player Two now doing the hiding and Player One determining the missing part of the set. Players record the combination.
5. The game is over when each player has recorded ten times.
6. At the end, order the list of the number combinations for 10 that were made. Did you get all of them? How do you know?

Target Number	In	Out	Number Sentence

Spill the Beans

Materials: Lima beans that have been spray painted on one side or two color counters

Players: 1 - 2

How to Play: The object is to determine the combinations of a target number.

1. Determine the target number and use that many beans for the rest of the task.
2. Take turns. On a turn, place all the beans in the cup. Spill the beans and record how many of each color in a chart.
3. Continue to alternate turns ten times.
4. At the end, order the list of the number combinations for 10 that were made.
5. Did you get all of them? How do you know?

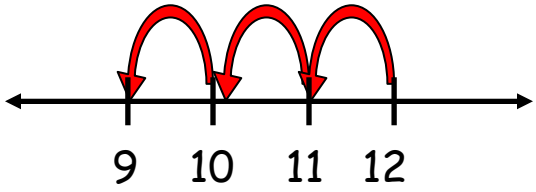
Target Number: _____

Red	White	Number Sentence

Subtraction Fact Strategies

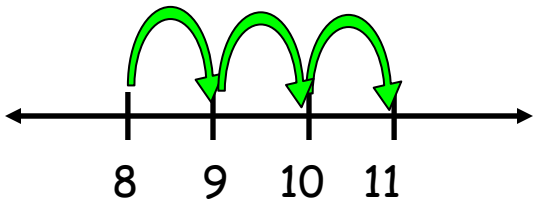
Count Back

When subtracting, 0, 1, 2, or 3, count back from the minuend. For example, with 12-3, start at the minuend 12, and count back three numbers, 11, 10, 9.



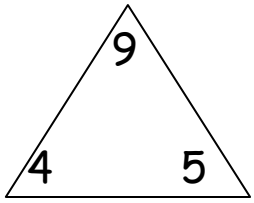
Count Up

If the two numbers are close together, count up from the number to be subtracted. For example, with 11-8, start at 8 and count up 9, 10, 11. Three numbers are counted, so 8 – 3 = 11.



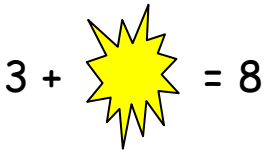
Fact Families

Fact-families are groups of two or four related addition and subtraction facts. For example, 5 + 4 = 9, 4 + 5 = 9, 9 - 5 =4 and 9-4 =5 are four facts in one fact family



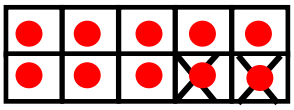
Think Addition

To find the difference for a subtraction fact, think of the related addition fact. For example , 8 – 3 = ? think 3 + ? = 8. Since 3 + 5 = 8, 8 – 3 = 5.



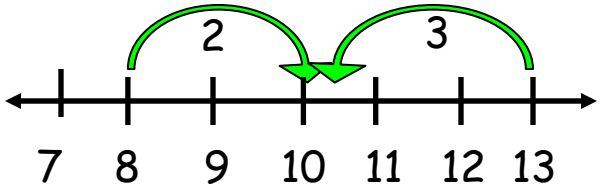
Subtracting From Ten

This strategy involves visualizing the removal of counters from a ten-frame.



Ten Between

When the number ten lies between the two numbers of the subtraction fact, find the distance from ten for each of the numbers, then add their distances together. For 13-8, 13 is 3 away from 10, 8 is 2 away from 10, and since 3 + 2 = 5, 13 – 8 = 5.



Patterns

Some facts become easy to remember because they follow a pattern. For example, any number minus itself is always equal to zero.

5 – 5 = 0

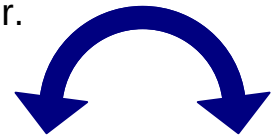
4 – 4 = 0

3 – 3 = 0

Addition Fact Strategies

Turn Around Facts

Any two addends always equal the same sum, no matter what their order.



3 + 4 = 4 + 3

Count On

When you add 0, 1, 2, or 3, count on from the other number.

6 + 3 is 7, 8, 9,

So 6 + 3 = 9

7 8 9

6 +

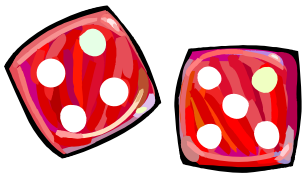
Doubles

Doubles are easy to remember.

Near Doubles

To find “near doubles” count on from doubles.

4 + 5 is 4 + 4 and one more, so 4 + 5 = 9

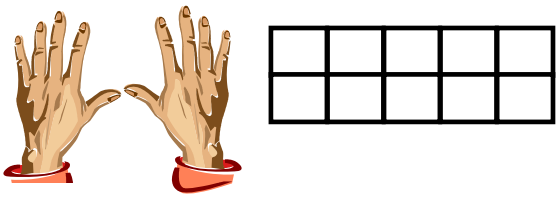


Adding Ten

When you add ten to a number, you just add one to the tens place. 3 + 10 = 13

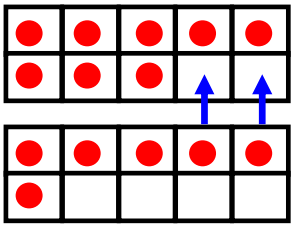
Sums of Ten

When you think of adding to make ten, think of completing a pair of hands or a ten-frame.



Making Ten

Sometimes it helps to break up the numbers to make a ten. Then add on the leftovers.



8 + 6 is the same as 8 + 2 + 4, or 10 + 4, so 8 + 6 = 14.

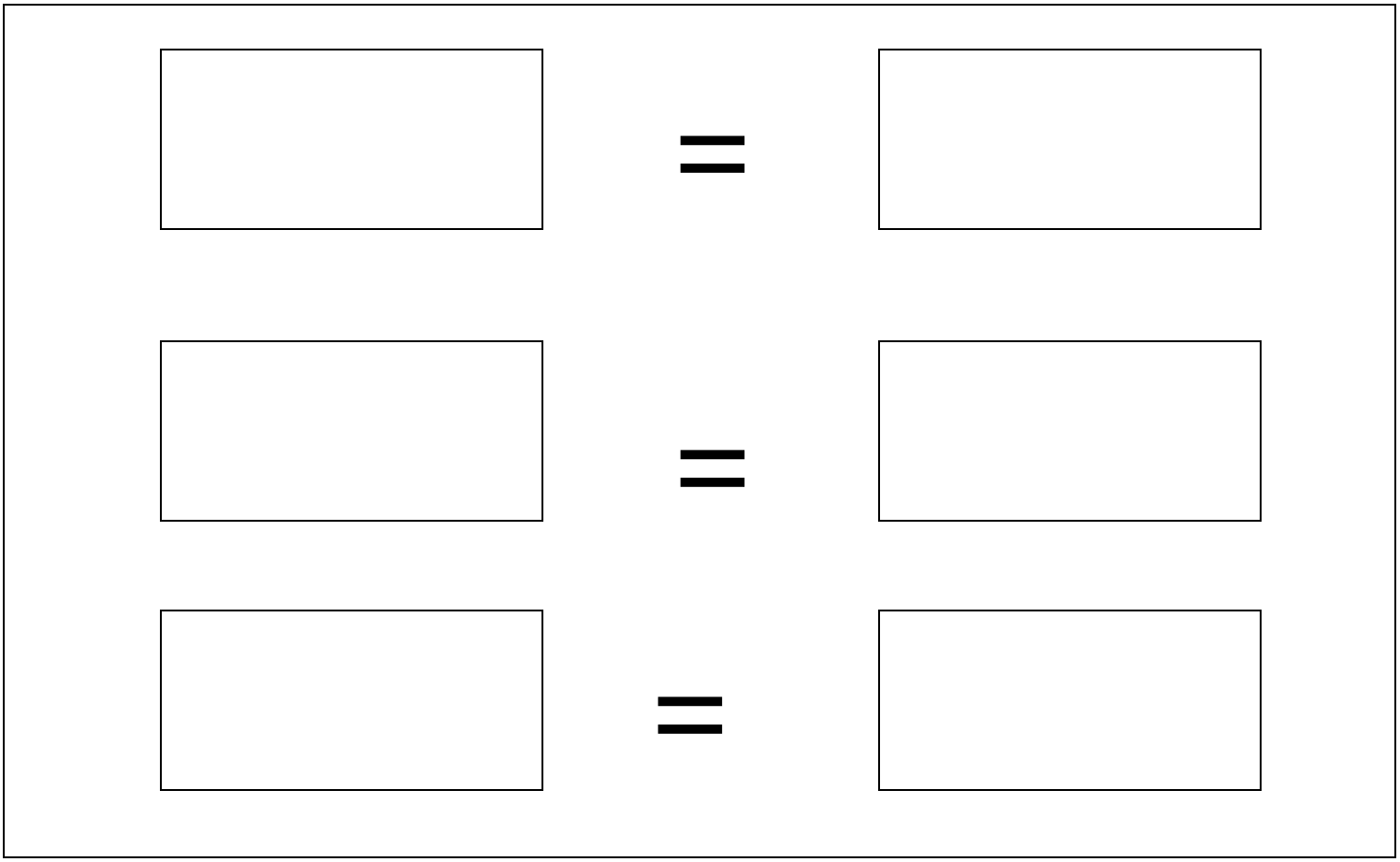
Equal Schmequal

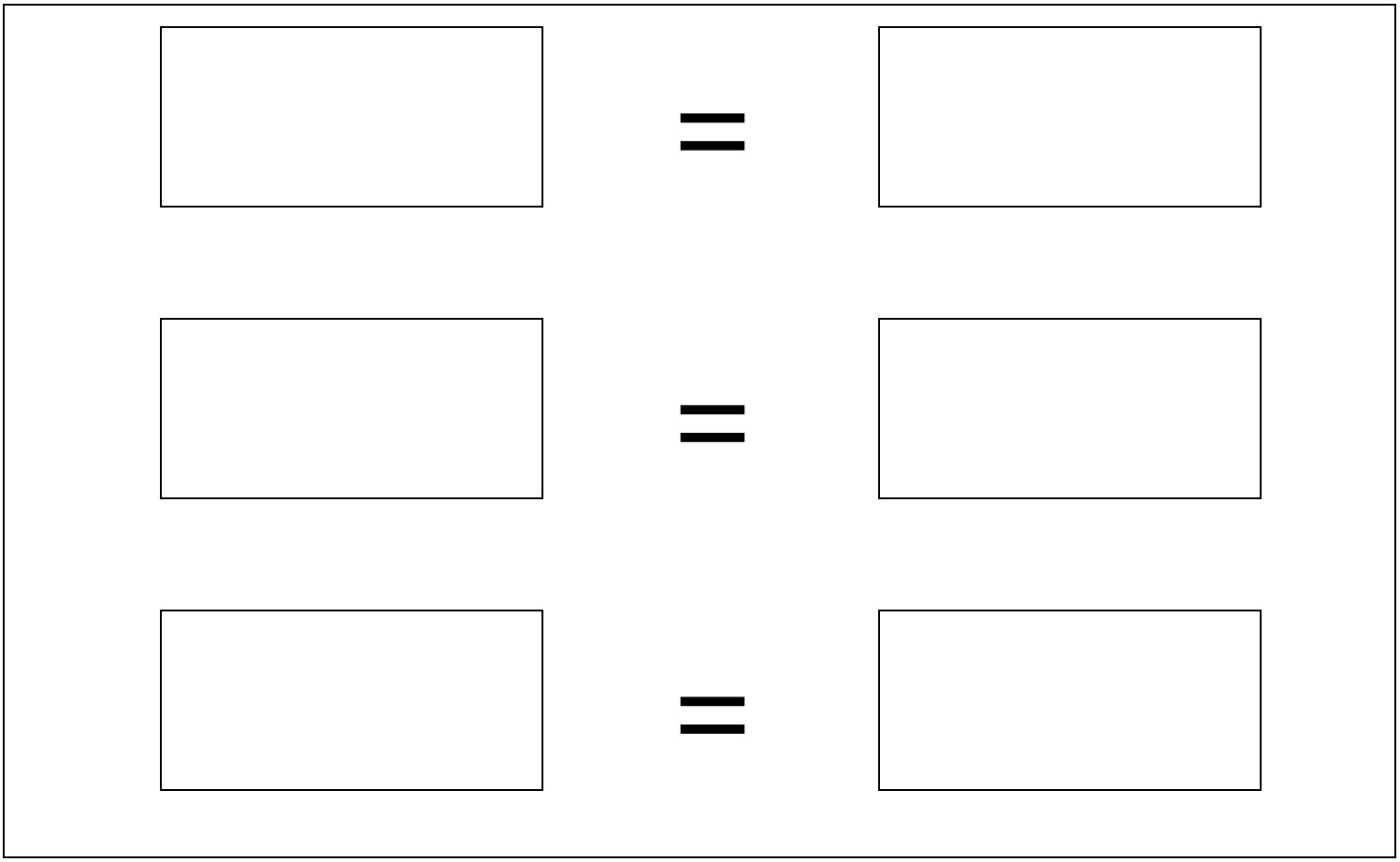
This game is for 2 players.

DIRECTIONS:
Cut out the playing cards below.
Turn the playing cards upside down and mix them up.
Take turns drawing one card at a time.
If you have two cards with equal amounts, put them in two of the boxes on your game board. If you have two cards with unequal amounts, place them facedown in their original positions.
The first player to fill up all of the boxes on her/his game board wins.

10 + 2	1 + 6	6 + 6	3 + 4
8 + 2	3 + 3	5 + 5	4 + 2
5 + 4	7 + 4	8 + 1	1 + 11
0 + 6	3 + 2	5 + 1	1 + 4
11 + 2	3 + 0	10 + 3	1 + 2
4 + 4	2 + 2	8 + 0	3 + 1

Equal Schmequal Game Board





Problem Solving Types

Join	**Result Unknown** Mark has 45 erasers. His sister gave him 35 more. How many erasers does Mark have?	**Change Unknown** Caitlyn has 32 stickers. Suzy gave her some more. Now Caitlyn has 58 stickers. How many stickers did Suzy give her?	**Start Unknown** Joey had some cookies. Susie gave him 3 more. Now he has eight cookies. How many cookies did Joey start with?
Separate	**Result Unknown** Matt had 36 erasers in his collection. He gave 19 to his brother. How many erasers did Matt have in his collection?	**Change Unknown** Hannah had $57. She bought some school supplies. Then she had $23 left. How much money did Hannah spend on school supplies?	**Start Unknown** Katie had some cookies. She gave 1 ½ to Andrea, then had 2 ½ left. How many cookies did Katie have to start with?
Part-Part-Whole	**Whole Unknown** Cindy owns 15 fiction books and 73 non-fiction books. How many books does Cindy own?	**Part Unknown** Betty has 19¢ in her piggy bank. She has 9¢ in pennies. The rest are nickels. How much money does she have in nickels?	
Compare	**Difference Unknown** Chris had 27 Wii games. Jason had 44 Wii games. How many more Wii games does Jason have than Chris?	**Larger Unknown** Laura has 6 fewer pennies than Jacob. Laura has 12 pennies. How many pennies does Jacob have?	**Smaller Unknown** Whitney has 8 fewer pennies than Sydney. Sydney has 22 pennies. How many pennies does Whitney have?

Classifying Four Types of Problems

1. Connie has 13 stickers. Five are red and the rest are blue. How many blue stickers does Connie have?

2. Connie has 13 marbles. She has 5 more marbles than Jim. How many marbles does Jim have?

3. Connie had some markers. Jim gave her 5 more markers. Now she has 13 markers. How many marbles did Connie have to start with?

4. Connie had 13 stickers. She gave 5 stickers to Jim. How many stickers does she have left?

Classifying Four Types of Problems

5. **Connie has 13 stickers. Five are red and the rest are blue. How many blue stickers does Connie have?**

6. **Connie has 13 marbles. She has 5 more marbles than Jim. How many marbles does Jim have?**

7. **Connie had some markers. Jim gave her 5 more markers. Now she has 13 markers. How many marbles did Connie have to start with?**

8. **Connie had 13 stickers. She gave 5 stickers to Jim. How many stickers does she have left?**

Answers:

1. part unknown
2. compare: smaller unknown
3. join: start unknown
4. separate: result unknown

Paper Plate Fractions

Objective: Students will create the area model of fractions using paper plates. They will be able to recognize and create halves, fourths, and eighths.

Materials:

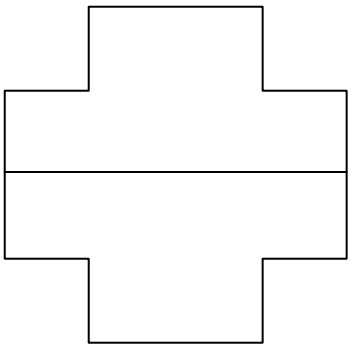
One white paper plate (any size will work)
Plates of another color (must be the same size as the white plates)
Crayons or markers
Scissors

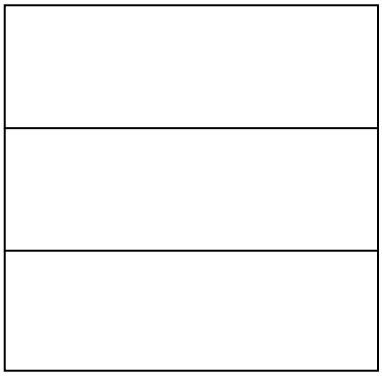
Directions for making paper plate fractions.

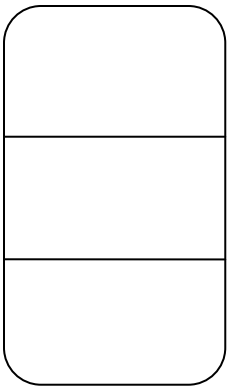
1. On the white paper plate, use crayons or markers to create a "pizza". Students will usually color the plate orange or yellow to create a cheese pizza and then also color other things to represent toppings.
2. Next, cut a slit in each paper plate from the outer rim to almost the center of the paper plate. Put each plate together by slipping the paper plates together and forming one circle.
3. Move each plate around to show $\frac{1}{2}$ of the pizza.
4. Move each plate around to show $\frac{1}{4}$ of the pizza.
5. Move each plate around to show 1/8 of the pizza.
6. The last move shows no pizza left.

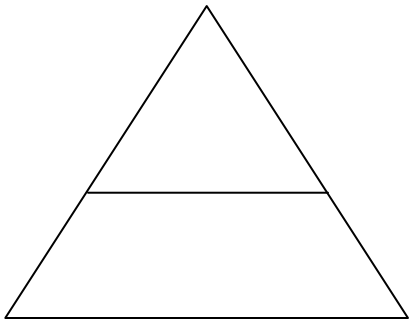
Have students talk about the fraction of the pizza they have made and justify why that is the fraction represented.

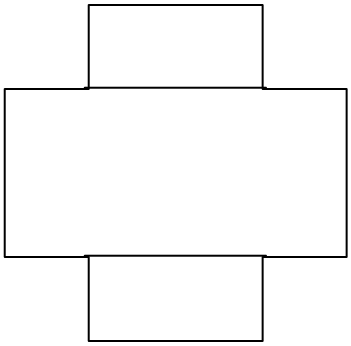
Fraction Sort Cards

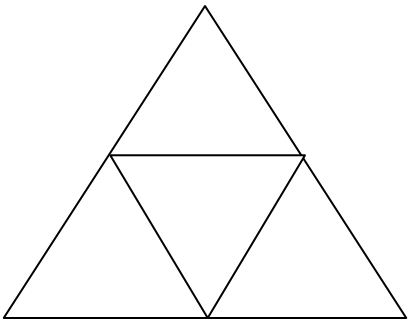


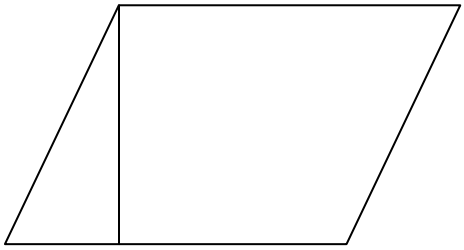


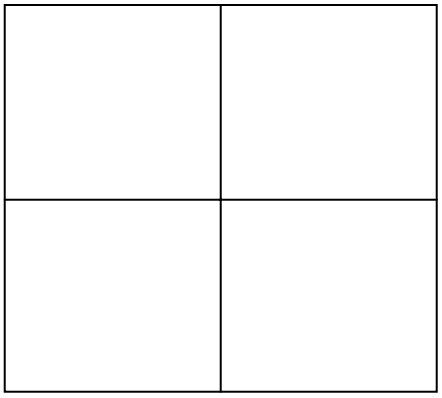


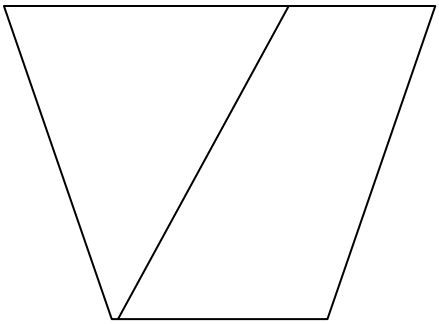


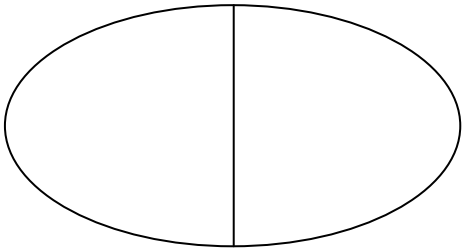


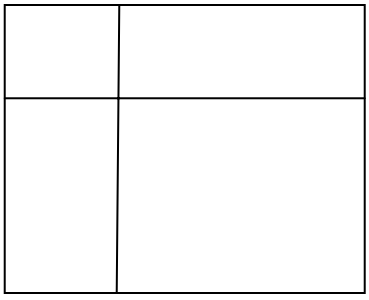


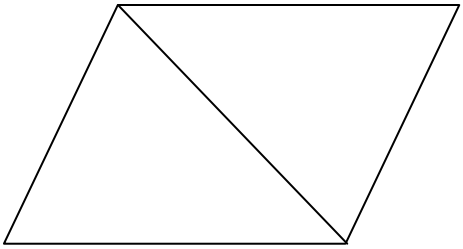












Good Mathematical Questioning

- How did you arrive at that answer?
- Why do you think that?
- What have you discovered?
- Have you thought of another way this could be done?
- Does that make sense?
- Does that always work?
- How could we prove that?
- Have we solved a problem similar to this one?
- Is that the only possible answer?
- Is your solution reasonable?
- Is there a real-life situation where this could be used?
- Where else would this strategy be useful?
- Do you see a pattern? Is there a general rule?
- What questions does this raise for you?
- What is the math in this problem?
- Have you tried making a guess?
- Would another recording method work as well or better?
- Give me another related problem.
- Is there another way to draw or explain that?
- How did you organize your information?
- Would it help to draw a picture?

0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3

4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7

8	8	8	8
9	9	9	9
Wild Card	Wild Card	Wild Card	Wild Card
.	.	$	$