Egg Cartons, Brains and Games

Developing Numeracy Skills Using Visual Tools

A Workshop

by Trevor Calkins

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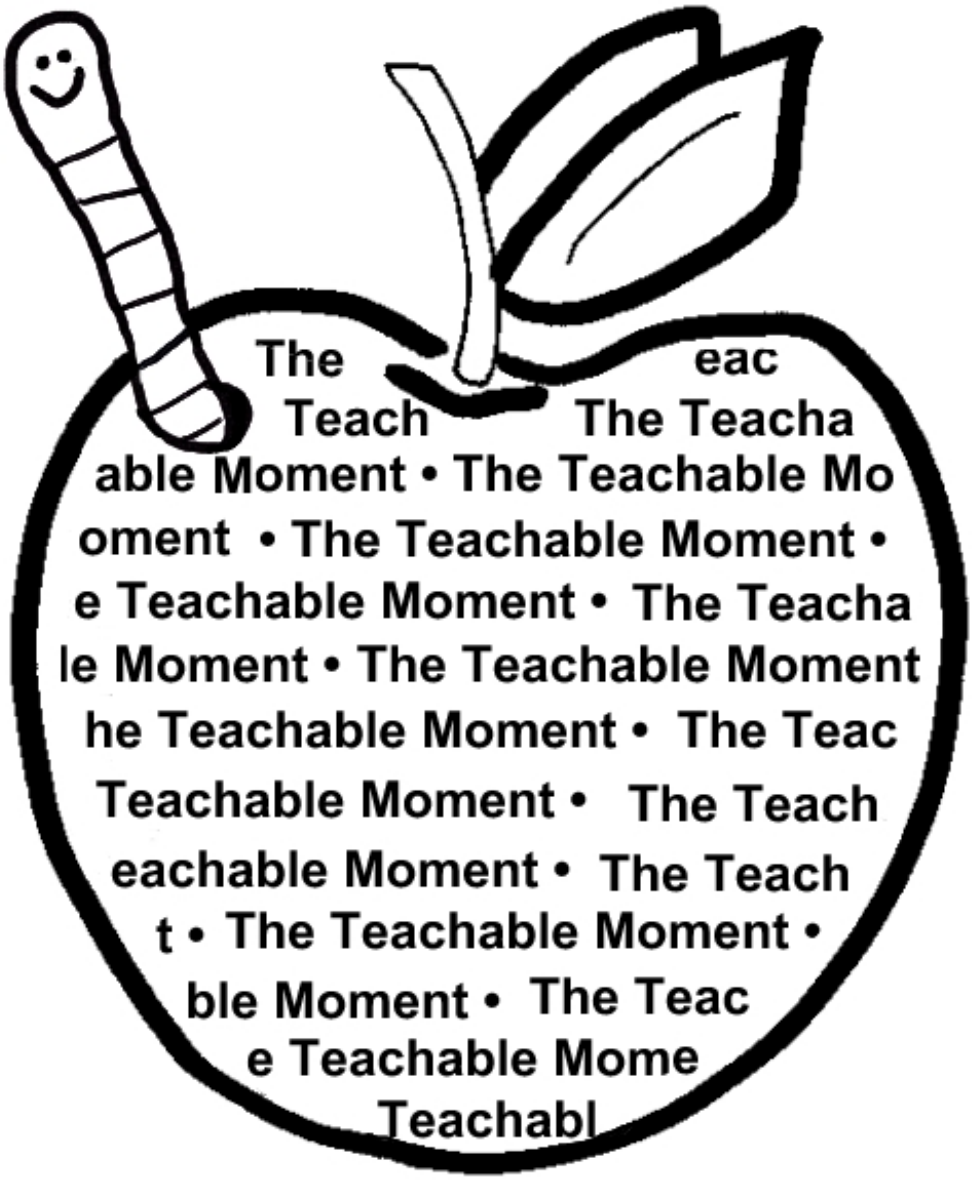
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Memorable Fractions

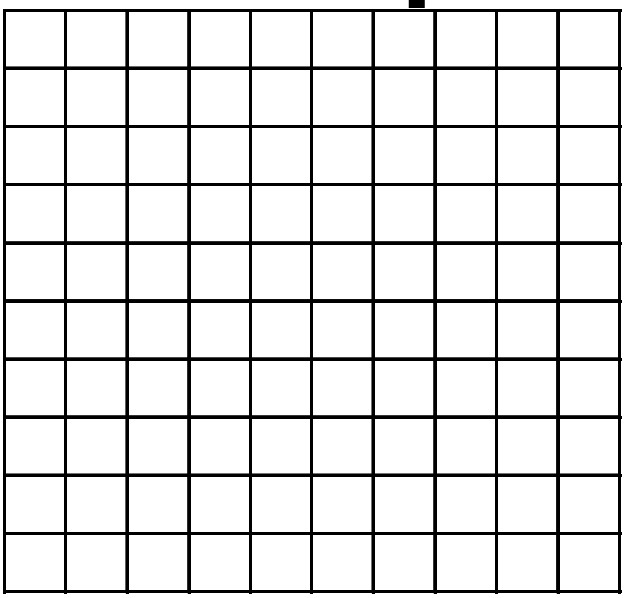
Name _____ **Date** _____

Fraction Number Form	Circle	Rectangle

Name _____

Making Change

Color in the amount you spent and then make change.

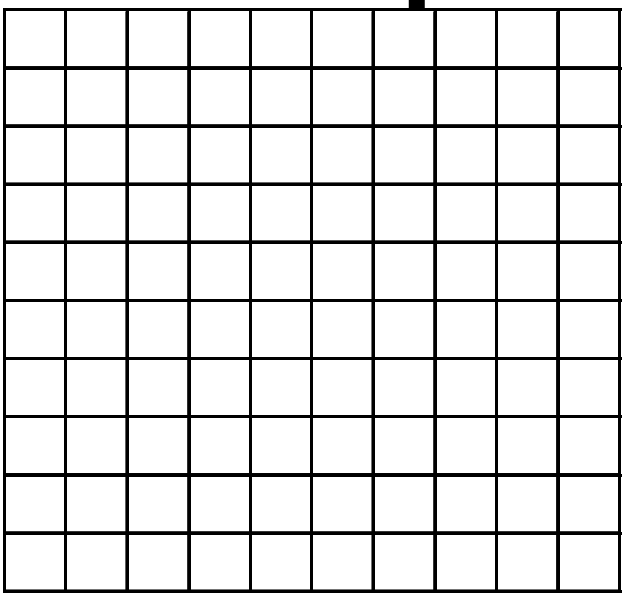


Can you show your work or explain how you got your answer in the space provided?

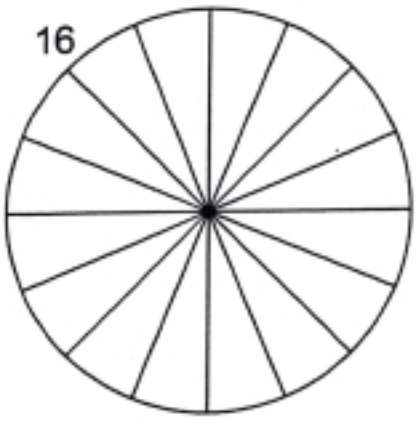
Name _____

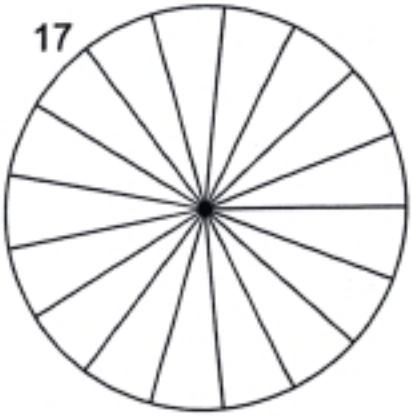
Making Change

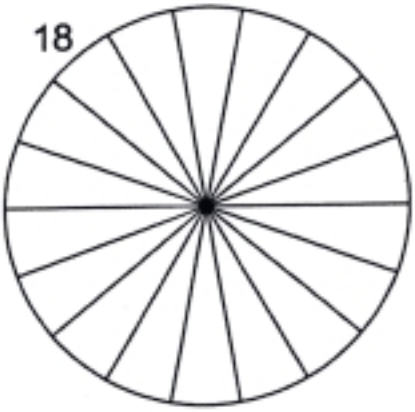
Color in the amount you spent and then make change.

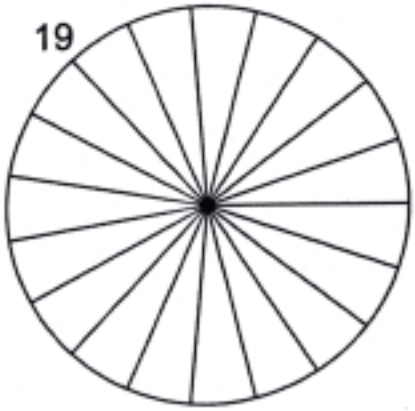


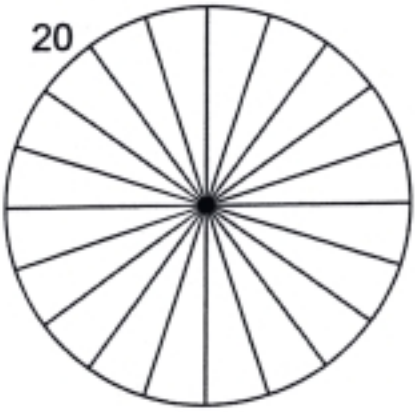
Can you show your work or explain how you got your answer in the space provided?

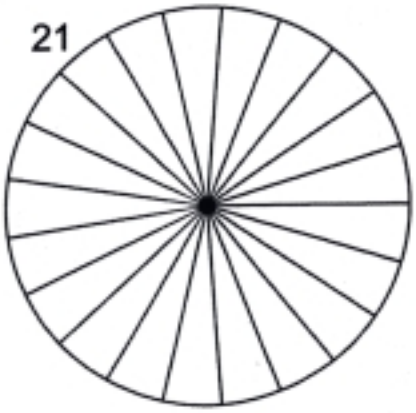


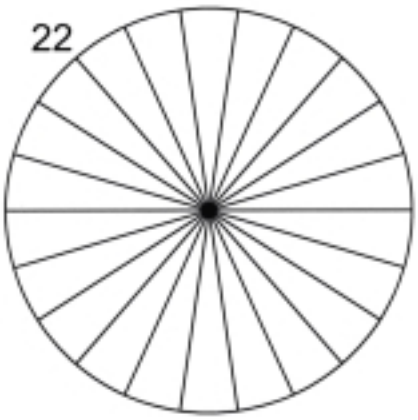


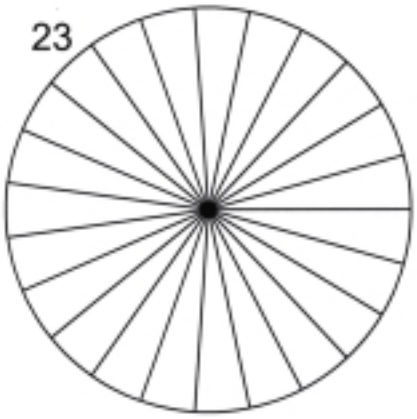


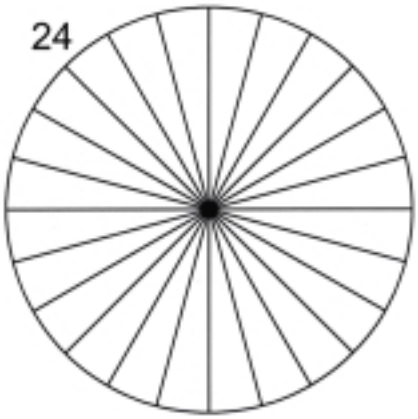


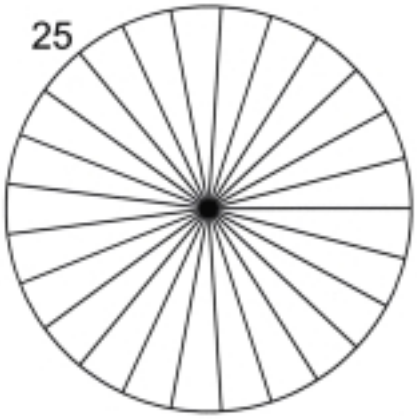


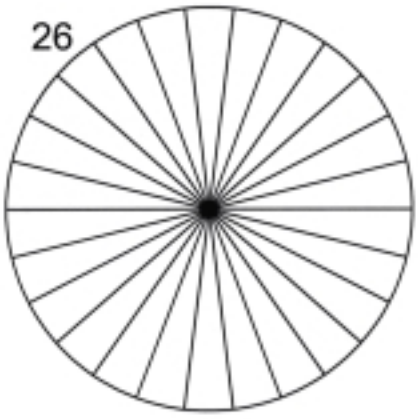


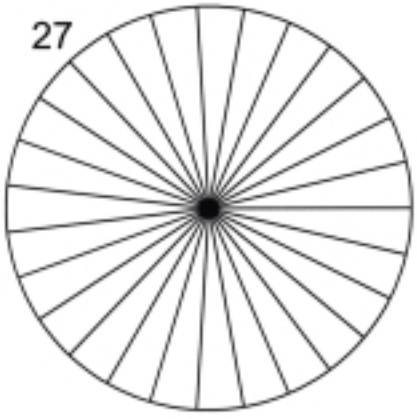












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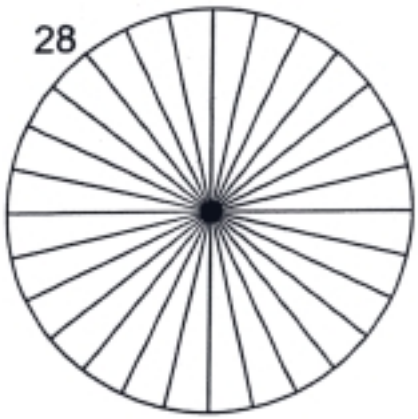

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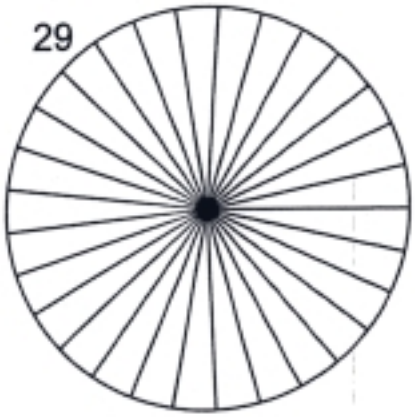

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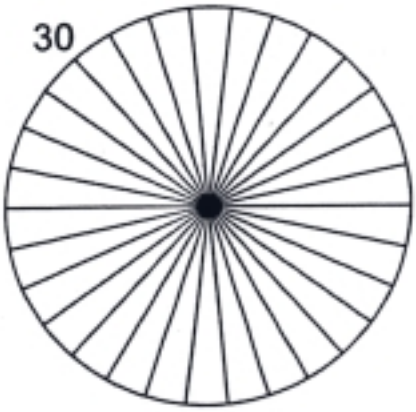

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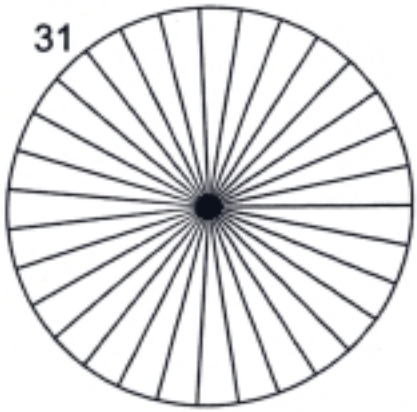

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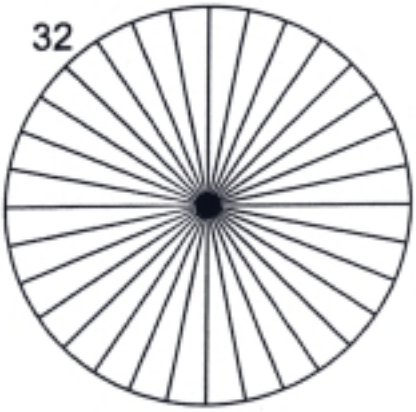

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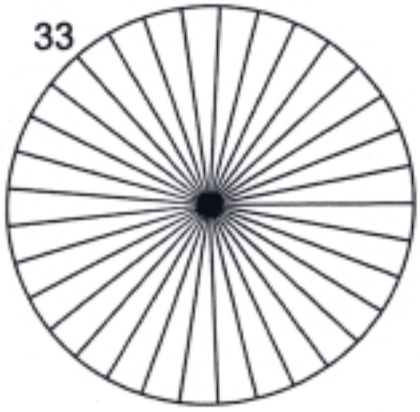
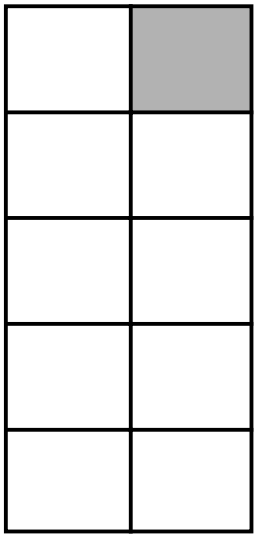
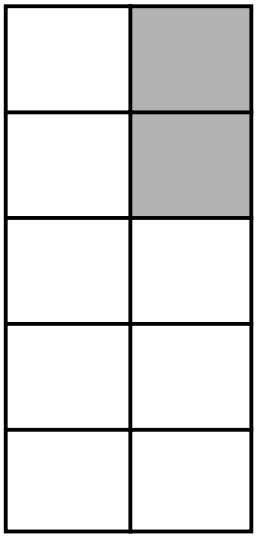
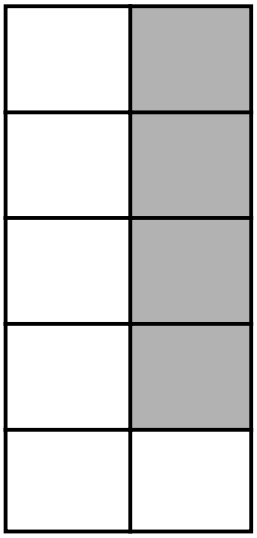
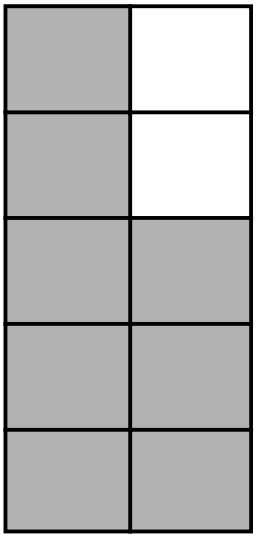
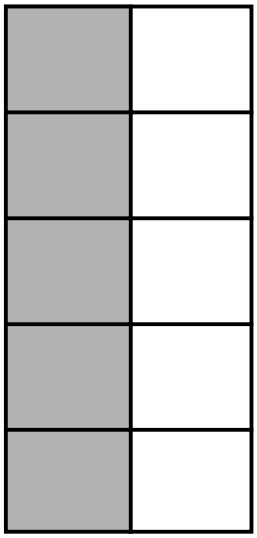


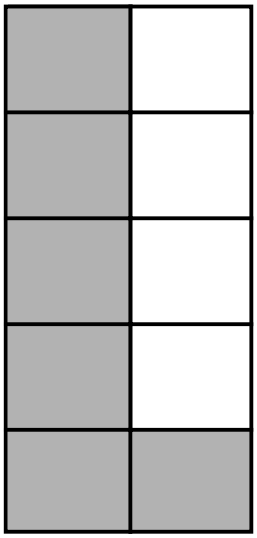


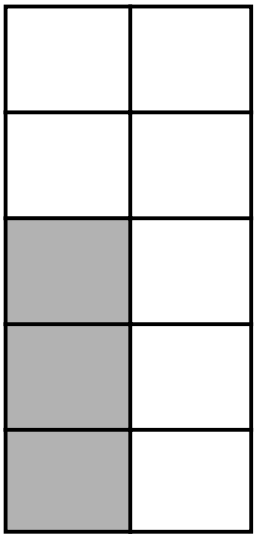


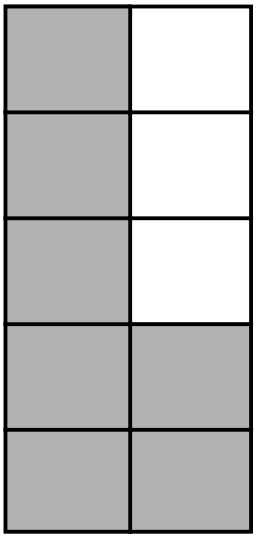


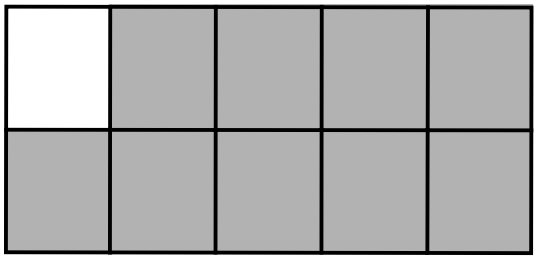


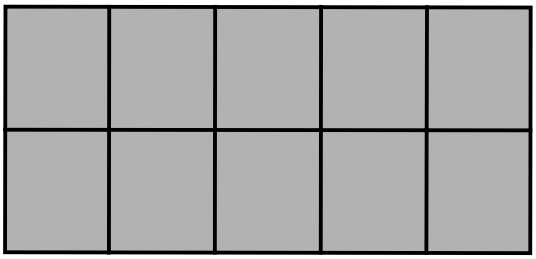












Categories of ADDITION and SUBTRACTION Questions

	Unknown Outcome	Unknown Change	Unknown Start
Add to...	Brendan has **4** cookies. Sarah gave him **3** more. **How many cookies does Brendan have now?**	Jim has **14** Pokemon cards. Susan gave him more cards. Now he has **25** cards. **How many cards did Susan give Jim?**	Jason had some money. Sandra gave him **$135**. Now Jason has **$275**. **How much money did Jason have to begin with?**
Date Covered:			

	Unknown Outcome	Unknown Change	Unknown Start
Take Away...	Brendan has **7** cookies. He gave **4** to Sarah. **How many cookies does Brendan have left?**	Jim has **25** Pokemon cards. He gave some of his cards to Susan. Now he has **11** cards. **How many cards did Jim give to Susan?**	Jason had some money. He gave **$135** to Sandra. Now he has **$140** left. **How much money did Jason have to begin with?**
Date Covered:			

	Unknown Outcome	Unknown Change	Unknown Start
Part-Part-Whole	Brendan has **4** chocolate candies and **3** peppermint candies. **How many candies does Brendan have altogether?**	Jim has **14** Pokemon cards and some baseball cards. He has **25** altogether. **How many are baseball cards?**	Jason had some cash and a cheque worth **$135**. He has **$275**. **How much cash did Jason have?**
Date Covered:			

	Unknown Outcome	Unknown Change	Unknown Start
Equalize	Brendan has **7** cookies. Sarah has **3** cookies. **How many more cookies must Sarah buy so that she will have as many cookies as Brendan?**	Jim has **14** Pokemon cards. Susan has to get **11** more cards in order to have the same number of cards as Jim. **How many cards does Susan have to begin with?**	Jason has some money. Sandra has **$135** and she needs **$140** more in order to have the same amount as Jason. **How much money does Jason have?**
Date Covered:			

	Unknown Outcome	Unknown Change	Unknown Start
Compare	Brendan has **7** cookies. Sarah has **4** cookies. **How many more cookies does Brendan have than Sarah?**	Jim has **25** Pokemon cards. He has **11** more cards than Susan. **How many cards does Susan have?**	Jason has some money. He has **$140** more than Sandra, who has **$135**. **How much money does Jason have?**
Date Covered:			

<u>Note:</u> Make a copy at this sheet at the beginning of each month.
Check off each category as you cover it, and record the date of completion.

What's My Number?

Name: _____

Date: _____

76 ? 66 ?

47 _____ 58

? _____ ?

17 _____ 16

? _____ ?

72 _____ 26

? _____ ?

99 ? 30 ? 83

All the Addition Facts You Ever Need to Know (A)

8 + 8 =	6 + 0 =	2 + 9 =	4 + 0 =
8 + 3 =	6 + 9 =	7 + 7 =	2 + 1 =
6 + 8 =	6 + 3 =	8 + 1 =	5 + 5 =
3 + 2 =	3 + 4 =	1 + 4 =	7 + 5 =
1 + 1 =	4 + 9 =	4 + 7 =	4 + 4 =
7 + 9 =	2 + 2 =	3 + 3 =	1 + 3 =
9 + 9 =	5 + 6 =	0 + 1 =	1 + 7 =
0 + 9 =	2 + 5 =	6 + 7 =	2 + 0 =
3 + 9 =	4 + 5 =	8 + 0 =	2 + 8 =
0 + 3 =	1 + 5 =	2 + 4 =	7 + 0 =
5 + 8 =	4 + 6 =	3 + 5 =	2 + 6 =
5 + 0 =	6 + 1 =	2 + 7 =	1 + 9 =
4 + 8 =	5 + 9 =	6 + 6 =	8 + 9 =
7 + 8 =	3 + 7 =		

Name _____ left to learn _____

Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

All the Subtraction Facts You Ever Need to Know (B)

9 - 3 =	8 - 1 =	11 - 4 =
3 - 1 =	13 - 4 =	14 - 7 =
10 - 5 =	5 - 3 =	16 - 8 =
15 - 6 =	2 - 1 =	14 - 6 =
7 - 4 =	5 - 4 =	12 - 7 =
13 - 6 =	7 - 5 =	9 - 8 =
10 - 6 =	8 - 3 =	13 - 5 =
6 - 5 =	8 - 2 =	10 - 3 =
12 - 4 =	6 - 2 =	6 - 3 =
4 - 3 =	12 - 9 =	9 - 5 =
11 - 5 =	8 - 4 =	16 - 7 =
4 - 2 =	10 - 1 =	10 - 8 =
7 - 6 =	12 - 6 =	9 - 7 =
18 - 9 =	11 - 2 =	11 - 3 =
17 - 8 =	15 - 9 =	14 - 9 =
Column 1 _____	Column 2 _____	Column 3 _____

Name _____ left to learn _____

All the Multiplication Facts You Ever Need to Know (A)

0 x 1 =	4 x 5 =	1 x 10 =	2 x 6 =
1 x 4 =	2 x 3 =	6 x 6 =	2 x 10 =
7 x 8 =	3 x 3 =	0 x 6 =	9 x 9 =
3 x 5 =	2 x 7 =	0 x 2 =	3 x 6 =
5 x 8 =	8 x 9 =	6 x 7 =	0 x 10 =
10 x 9 =	3 x 7 =	4 x 9 =	9 x 6 =
0 x 4 =	6 x 8 =	1 x 5 =	10 x 6 =
5 x 7 =	4 x 8 =	3 x 9 =	7 x 9 =
4 x 4 =	2 x 4 =	7 x 7 =	10 x 7 =
5 x 6 =	4 x 7 =	3 x 8 =	8 x 8 =
2 x 9 =	4 x 6 =	10 x 10 =	5 x 9 =
1 x 7 =	3 x 10 =	0 x 3 =	2 x 8 =
1 x 6 =	0 x 5 =	1 x 3 =	5 x 10 =
4 x 10 =	1 x 8 =	10 x 8 =	5 x 5 =
2 x 1 =	0 x 9 =	2 x 5 =	0 x 8 =
0 x 7 =	2 x 2 =	1 x 9 =	1 x 1 =
3 x 4 =	0 x 0 =		
Column 1 _____	Column 2 _____	Column 3 _____	Column 4 _____

Name _____ left to learn _____

CONCENTRATION

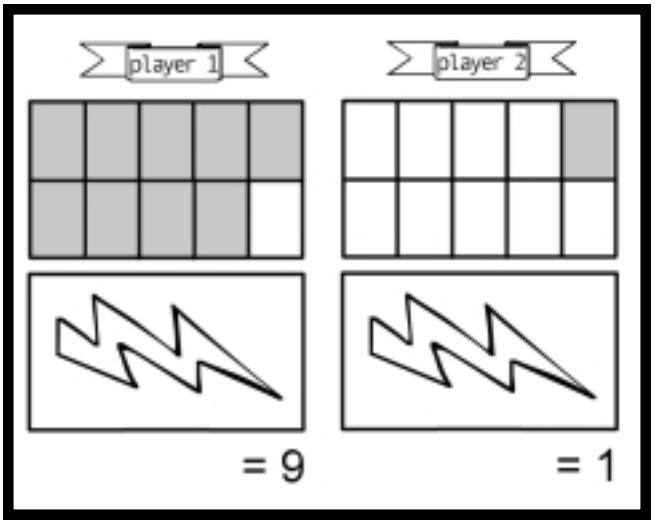
Method of Play:

1. Shuffle the cards and spread them face down on a table or on the floor. Arrange the cards in equal rows (two rows of ten or four rows of five). This matrix may also be featured during calendar time, and within other contexts that focus upon the related multiplication and division operations:
   - **2 x 10**; **20 ÷ 10**
   - **4 x 5**; **20 ÷ 5**
2. Player #1 flips over two cards, one at a time, while pronouncing the value of each. Where the two cards are the same, the player retains both cards and continues to take another turn. Where the two cards upturned are dissimilar, the cards are then returned face down to the spread of cards.
3. Player #2 then takes his turn and flips over two cards, stating the value of each.
4. The game continues until all cards have been claimed.
5. The winner is the person who retains the most cards.

Adaptations and Extensions of Concentration:

1. Once a player has turned over one card, he may then ask other players if the matching (or equal-value) card that he seeks has already been shown. If the answer is yes, then directions for locating the matching card must then be provided by other players, using directive coordinates such as "row four, over three", or "column two, up one". This activity introduces the concept of coordinates in geometry, and encourages students to think spatially. The player guided in his card search must interpret information provided from the point of view of those directing his movements. Players are allowed this choice once per game. Where a student provides incorrect or misleading directions, he forfeits a turn. The winner is the person with the greatest sum when all his card values have been totaled.
2. ***Friendly Concentration*** is played as follows:
   Remove the two ten cards, leaving 18 cards. Arrange the cards in a **3 x 6** or **2 x 9** matrix. ***Friendly Concentration*** is played by seeking two cards with values that equal ten.

FACE OFF



Materials:

Two decks of Power of Ten playing cards (a full deck features twenty cards with two cards of each number denomination).

Number of Players:

This game is played with two players.

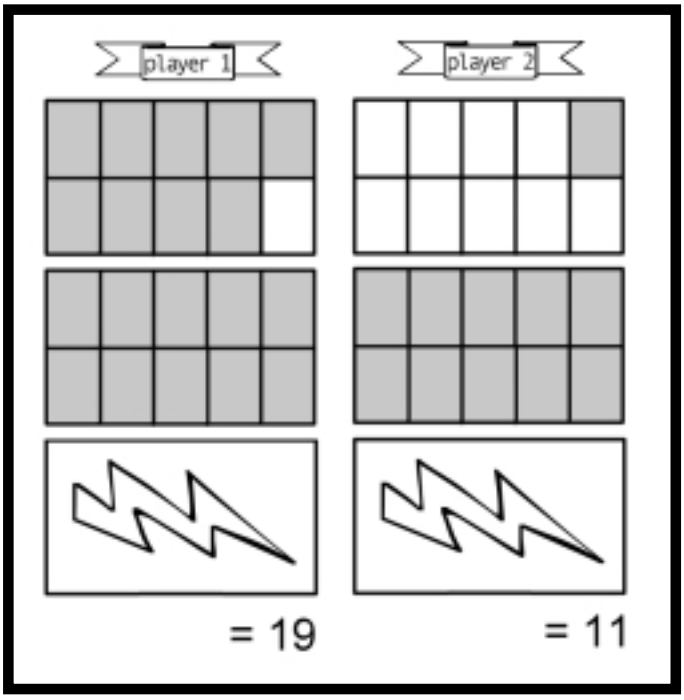
Object of the Game & Scoring:

The object of the game is to obtain as many cards as possible.

Method of Play:

1. Each player has a deck of twenty cards, which he shuffles. Decks are placed face down.
2. Player #1 and player #2 simultaneously flip over cards and state the values of each. The player with the card showing the greatest number of coloured squares (or the largest number) wins.
3. Play continues until all cards have been exhausted.
4. In the event of a tie occurring (two cards of equal value are upturned), each player draws another card and places it directly on top of the previous card played. (The cards are not added and only the top card is examined.)
5. Very young children (even three or four-year-olds) may play this game successfully without stating the number values shown on the cards. However, children aged five or six years should be able to recognize and state number values shown. It is essential that children learn to say the numbers shown on the cards out loud. The brain “hears” the number and “sees” the card, thus making a connection and laying down a memory track. Discourage the shouting out of numbers in order to keep classroom noise to a minimum.
6. The winner is the person who holds the most cards.
7. This game may either be played continuously until one player wins all available cards, or until a designated playing time has elapsed.

Power of Ten

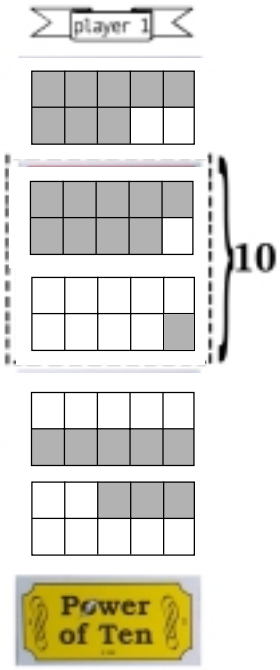


When students are thoroughly familiar with the number shapes shown on the cards, they are ready for the Power of Ten game. *Power of Ten* is played as follows:

1. Each player places a ten card face up on the floor or table before him. He then draws another card that he places face up alongside his ten card. The player then states the value of the two cards. (Values range from 11 to 20) The player with the highest total takes the two non-ten (or the units-digit) cards and retains them.
2. Each player's ten-card remains in place as he turns over another card to place alongside it. Again the person with the greatest total removes the two units-cards.
3. The game continues until all cards have been exhausted.

   ***Note:** The Power of Ten game teaches place-value concepts and addition with ten. This game establishes a solid understanding of early addition.*
4. ***"Power of Nine"*** is played by removing the ten card and placing the nine card face up on the tabletop. Subsequent cards drawn are placed face up alongside the nine card.
5. Once students are proficient with the ***Power of Nine*** game, introduce the ***Power of Eight*** game. As students gain proficiency with each of these games, they will have learned how to add 10, 9 and 8 to any given number. Students will now feel confident when tackling addition of all single-digit numbers, as addition of numbers less than 10, 9 and 8 will appear infinitely easier!
6. When your students have mastered the ***Power of Ten***, ***Nine*** and ***Eight*** games, you may then vary the activity by having each student turn over the top two cards from his deck while stating the total of both. The person with the greatest total wins and may thus remove both cards played. The game continues in this way until all cards are exhausted.

Power of Ten Solitaire



Materials:

A deck of ***Power of Ten*** playing cards for each player (a full deck features twenty cards with two cards of each number denomination).

Number of Players:

This game is played with one, two, three, or four players.

Object of the Game and Scoring:

The object of the game is to acquire as many "friendly" tens as possible. ("Friendlies" are numbers that add to ten.) Each "friendly" pair is worth ten points. When all "friendly" tens are exhausted, each player totals his acquired tens. Totaling the count is made easier if the tens are stored in separate piles as they are acquired. Students then count: 10, 20, 30, 40, etc., until the final tally is reached, which may be a high as 110.

Method of Play:

1. The deck is shuffled and each player then turns five cards face up. Students seek "friendly" pairs within their five upturned cards. They remove any pairs found. For example, where a student turns over cards showing 5, 6, 3, 4, and 9, he will choose to remove the 6 and 4, thus scoring 10.

2. The game continues, as new cards are turned over to replace those already removed. In the example above, the 6 and 4 that have been removed may perhaps be replaced with a 2 and 7. The player now sees 5, 2, 3, 7, and 9 before him. He has two choices: he may select either the 3 and 7 or the 5, 2, and 3. The 3 and 7 is the wiser choice, as selecting three cards (rather than two) will ultimately leave him with a stray, non-partnered card. Where the player foolishly eliminates the 2 and 3, he has also rendered an 8 and a 7 without possible partners later in the game.

3. The game continues as new cards are turned over to replace those already removed. In the example above, the 3 and 7 may perhaps be replaced by 8 and 6 yielding: 5, 2, 8, 6, 9. Where the player then selects the 2 and 8, he then has acquired a score of 30.

4. The game continues as new cards are turned over to replace those already removed. In the example above, the player perhaps now replaces the 2 and 8 with a 7 and 10, yielding: 5, 7, 10, 6, 9. The player chooses the 10. He now has a score of 40.

5. The game continues as new cards are turned over to replace those already removed. In the example above, the player perhaps now replaces the 10 with a 9, yielding: 5, 7, 9, 6, 9. There are no further available "friendlies" in the five cards before him. He therefore concludes with a final score of 40.

6. Where ***Power of Ten Solitaire*** is played by a single player, any score equal to 60 or more is considered a win. A score of 110 is regarded as a double or "perfect" win.

7. Where the game is played by more than one player, all players play simultaneously and count their own scores.

A class may play "against itself" by keeping tally of the number of wins (over 60) and double wins (110) acquired each day, while attempting on each subsequent day to beat or exceed the record already set. Allow students a 10-minute daily time limit for playing the game and record the number of wins in a tally graph or bar graph. Students may enjoy recording the data over a period of time.