The Distributive Property of Multiplication over Addition

The **distributive property of multiplication over addition**, $a(b + c) = ab + ac$, says that when a number multiplies an indicated sum (addition expression enclosed in parentheses), the result is the same as when the number multiplies each addend in that sum; for example, 6 x (3 + 2) = 6 x 3 + 6 x 2.

Game Description and Materials

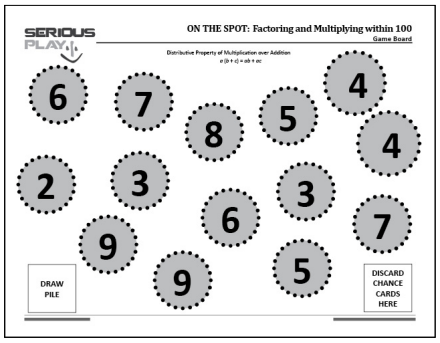
On the Spot is a game for two players that uses the distributive property of multiplication to give students mental math practice factoring and multiplying within 100. Players identify the greatest common factor in a two-term number expression $ab + ac$ and match the expression with its equivalent in the form of $a(b + c)$.

Game materials include a Game Board and several sets of Cards. Each player needs at least ten tokens such as Bingo chips (not included). Players provide paper for keeping score.

The **object of the game** is to have the higher score at the end of the game's two rounds.

Game Board

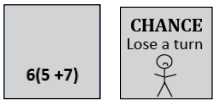
The Game Board consists of 14 spots. Each spot shows the greatest common factor of a two-term number expression.



Cards

- **Round 1 Cards.**
  - 14 *ab + ac* Cards show number expressions in the form of $ab + ac$.
  - 6 Chance Cards show "Take a card" (from your opponent).
  - 14 Greatest Common Factor Cards correspond to the 14 spots on the Game Board. Each greatest common factor is enclosed in a circle.

- **Round 2 cards.**
  - 14 a(*b* + *c*) Cards show the factored form, a(*b* + *c*), of an expression on an $ab + ac$ Card, with a representing the greatest common factor and $b + c$ being the remaining quantity after the greatest common factor has been factored out.
  - 4 Chance Cards say "Lose your turn."



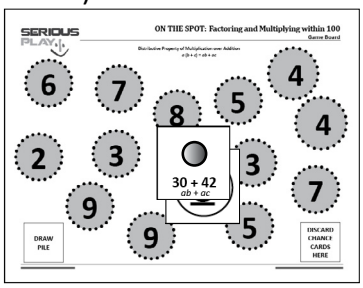
Getting Ready to Play

The dealer shuffles the Greatest Common Factor Cards and deals them evenly to both players who place them face up on the table in front of them. The dealer shuffles the *ab* + *ac* Cards/Chance Cards together and the a(*b* + *c*) Cards/Chance Cards together, setting the a(*b* + *c*) Cards/Chance Cards aside until Round 2 and placing the *ab* + *ac* Cards/Chance Cards face down on the Game Board in the Draw Pile box. The Game Board is situated on the table between the players.

Let's Play!

Round 1

1. Players alternate turns, drawing the top card from the pile. (If the first card drawn is a Chance Card, it should be placed randomly back in the draw pile, and the player picks another card.)



- For each *ab* + *ac*, players . . .
  - – factor the expression mentally,
  - – select the corresponding Greatest Common Factor Card, if they have one,
  - – place the two cards (*ab* + *ac* Card on top) on the correct spot on the Game Board,
  - – mark the spot with their token. (Space is left at the top of each *ab* + *ac* Card so the number expression will be visible when a token is placed on it.)*
- If players pick an *ab* + *ac* Card for which they have no Greatest Common Factor Card, they place the card in their play area to be played at a later time along with a Greatest Common Factor Card.
- If players pick a Chance Card, they may take any card from their opponent, or they may decide to keep the Chance Card to use at a later time. Chance Cards are discarded after they are used. If the card taken from the other player matches one of the their cards, they may put the matching cards on the appropriate spot.
- If, toward the end of the round, players can make no more matches, they combine their cards with the non-Chance cards in the remaining draw pile and pair the cards. They place the matches on the correct spots on the Game Board, leaving the matches unmarked with either token.

Caution: While there may be more than one common factor for a two-term number expression (*ab* + *ac*), there is only one *greatest* common factor. Mistakes made by matching an *ab* + *ac* Card with an *a*(*b* + *c*) Card where *a* is not the greatest common factor complicate the game because the pair of cards occupies a spot that is no longer available for the correct match. When an incorrect match is discovered, the player whose token is on the cards removes his token and gives the *ab* + *ac* Card to his opponent who places the Card in his play area. If the card matches another card in his play area, the opponent may place the matching cards on the correct spot.

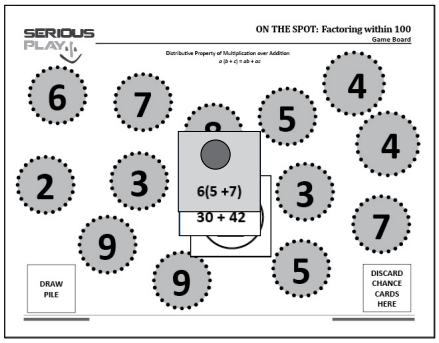
Scoring Round 1: Players earn 1 point for each token. They record their scores for Round 1.

Round 2

2. Players place the a(*b* + *c*) Cards/Chance Cards face down on the Game Board in the Draw Pile box.

3. They alternate turns, drawing the top card from the pile.

- If the card has an a(*b* + *c*) expression, they place it on the spot that shows the equivalent *ab* + *ac* expression.
- If the player's token already marks that spot, the player keeps his token there. If, however, the opponent's token marks the spot, the player replaces the opponent's token with his token and returns the opponent's token to the opponent.
- If the card is a Chance Card, the player loses his turn.



4. The game is over when all the a(*b* + *c*) Cards have been played.

Scoring Round 2: Players earn one point for each token. They record their scores for Round 2.

Scoring the Game

Players total their scores for Rounds 1 and 2. The player with the higher score wins the game.

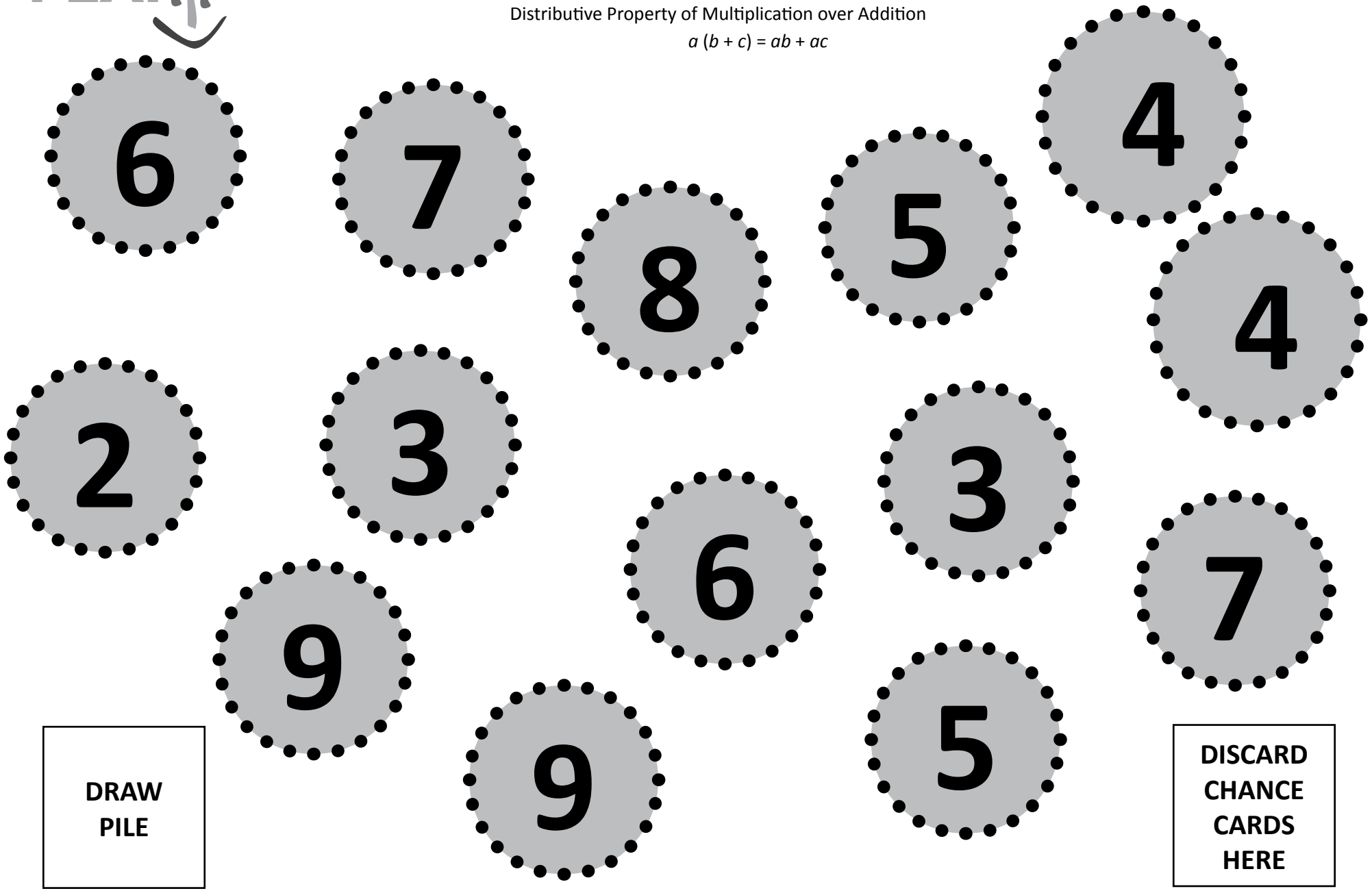
SERIOUS PLAY

ON THE SPOT: Factoring & Multiplying within 100

Game Board

Distributive Property of Multiplication over Addition

$a\,(b + c) = ab + ac$

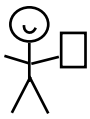
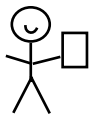
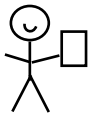
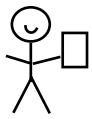
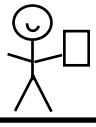
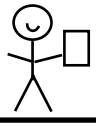


SERIOUS PLAY

ON THE SPOT: Factoring & Multiplying within 100

Cards

Round 1 Cards

30 + 42 *ab + ac*	**56 – 21** *ab + ac*	**48 – 40** *ab + ac*	**20 + 45** *ab + ac*	**20 + 28** *ab + ac*	**16 – 6** *ab + ac*
24 + 15 *ab + ac*	**30 + 36** *ab + ac*	**27 – 12** *ab + ac*	**32 + 28** *ab + ac*	**63 – 36** *ab + ac*	**72 – 27** *ab + ac*
45 – 10 *ab + ac*	**35 + 42** *ab + ac*	**CHANCE** Take a card 	**CHANCE** Take a card 	**CHANCE** Take a card 	**CHANCE** Take a card 
CHANCE Take a card 	**CHANCE** Take a card 	**6**	**7**	**8**	**5**
4	**2**	**3**	**6**	**3**	**4**
9	**9**	**5**	**7**		

Round 2 Cards

6(5 +7) *a*(*b* + *c*)	**7(8 – 3)** *a*(*b* + *c*)	**8(6 – 5)** *a*(*b* + *c*)	**5(4 + 9)** *a*(*b* + *c*)	**4(5 + 7)** *a*(*b* + *c*)	**2(8 – 3)** *a*(*b* + *c*)
3(8 + 5) *a*(*b* + *c*)	**6(5 + 6)** *a*(*b* + *c*)	**3(9 – 4)** *a*(*b* + *c*)	**4(8 + 7)** *a*(*b* + *c*)	**9(7 – 4)** *a*(*b* + *c*)	**9(8 – 3)** *a*(*b* + *c*)
5(9 – 2) *a*(*b* + *c*)	**7(5 + 6)** *a*(*b* + *c*)	**CHANCE** Lose a turn 	**CHANCE** Lose a turn 	**CHANCE** Lose a turn 	**CHANCE** Lose a turn 

ON THE SPOT: Factoring & Multiplying within 100

Answer Key

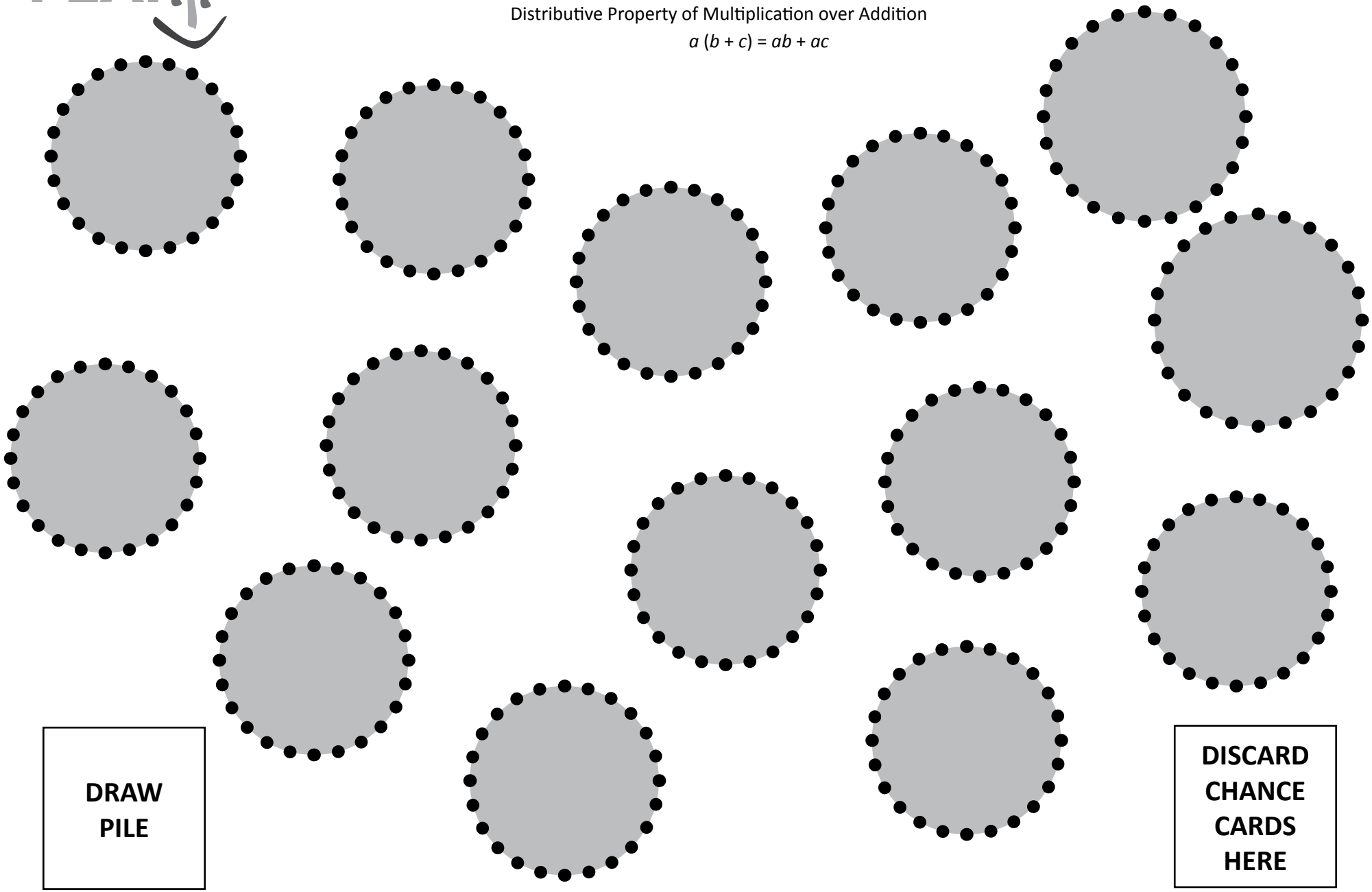
30 + 42 6(5 +7) 6	56 – 21 7(8 – 3) 7	48 – 40 8(6 – 5) 8	20 + 45 5(4 + 9) 5	20 + 28 4(5 + 7) 4	16 – 6 2(8 – 3) 2
24 + 15 3(8 + 5) 3	30 + 36 6(5 + 6) 6	27 – 12 3(9 – 4) 3	32 + 28 4(8 + 7) 4	63 – 36 9(7 – 4) 9	72 – 27 9(8 – 3) 9
45 – 10 5(9 – 2) 5	35 + 42 7(5 + 6) 7				

ON THE SPOT: Factoring & Multiplying within 100

Blank Game Board

Distributive Property of Multiplication over Addition

$a\,(b + c) = ab + ac$



DRAW PILE

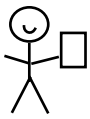
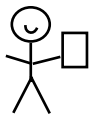
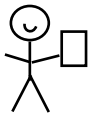
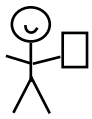
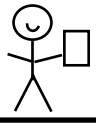
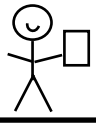
DISCARD CHANCE CARDS HERE

SERIOUS PLAY

ON THE SPOT: Factoring & Multiplying within 100

Blank Cards

Round 1 Cards

ab + ac	*ab + ac*	*ab + ac*	*ab + ac*	*ab + ac*	*ab + ac*
ab + ac	*ab + ac*	*ab + ac*	*ab + ac*	*ab + ac*	*ab + ac*
ab + ac	*ab + ac*	**CHANCE** Take a card 	**CHANCE** Take a card 	**CHANCE** Take a card 	**CHANCE** Take a card 
CHANCE Take a card 	**CHANCE** Take a card 				

Round 2 Cards

$a(b + c)$	$a(b + c)$	$a(b + c)$	$a(b + c)$	$a(b + c)$	$a(b + c)$
$a(b + c)$	$a(b + c)$	$a(b + c)$	$a(b + c)$	$a(b + c)$	$a(b + c)$
$a(b + c)$	$a(b + c)$	**CHANCE** Lose a turn 	**CHANCE** Lose a turn 	**CHANCE** Lose a turn 	**CHANCE** Lose a turn