Function War

In this fast-paced game for 2 to 3 players, build familiarity with different representations of functions of the same function.

Strands:

Number & Quantity	
Algebra	
Functions	X
Geometry	
Statistics & Probability	

Materials:

- *Ugly Functions* linear card set
- Pencil and paper (optional)
- Small sticky notes (optional)

$f(x)$

Where:

Outside	
Inside	X
On-line	
On-site	

Set-Up:
- Print and cut apart linear function cards. There are 12 sets, each with a matching equation, table, graph, and scenario card.

Object of the Activity: To identify and match linear functions represented by graphs, equations, tables, and stories.

Pre-Game Activity:
- For each linear function, find four matching cards, including a graph, a table, an equation, and a story. Explain how you know the cards match.
- There should be no unmatched cards. Resolve any disagreements.
- Shuffle each type of representation separately. Deal the cards evenly among the players. Leftover cards go into a draw pile. Do not look at your cards.

Game Play:
1. Play similarly to the classic game of *War*. On the count of three, each player flips over the top card from their face-down deck.
2. Look at the y-intercepts, x-intercepts, and slopes represented in all three cards. Also consider the absolute values of each of these.
3. Choose one of the values in Step 2 that is greatest on your card. Be the first person to call out the category of the value you're comparing; say 'absolute value' if you will compare absolute values.
4. Explain how your card has the greatest value (or absolute value) in the category to win all of the cards for that round.
5. If you incorrectly state a category or value, you forfeit your cards for that round.
6. Context cards (those with story problems on them) launch bonus rounds. If a context card is played, the first player to find an equation to model the context wins the cards for the round.
   a. If the winner of the round also notices that the equation models one or more of the other cards, each player must surrender an extra card to the winner of that round.
   b. If multiple context cards are played, the first player to find an equation to model one of the contexts wins the cards for the round.
7. If you recognize that two cards represent the same function, call "function war!" You automatically win all of the cards played that round.

To Win: You win when all the cards are in your possession and no other players have cards.

Think About it:
- Which values are easier/harder to recognize in each representation of the function:
  y-intercept, x-intercept, slope?
- What strategies helped you quickly find: y-intercept, x-intercept, and slope of a function?
- What information about a function is readily evident from each type of representation?

Variations:

Double War: When a "function war" happens (Step 7), instead of automatically winning all the cards, each player must place two cards face-down then flip up a third card. Play these cards as you would another round. The winner of that round wins all the cards for the function war.

Pre-solve Context Cards: During the pre-game activity, determine an equation for each context card. Write the equation on a sticky note then attach it to the card to make gameplay faster. This eliminates the bonus round in Step 6 of the game.

Choose a Goal: Game ends when a player wins a predetermined number of cards (≥ 20) or when all players earn at least 10 cards.

Limited Representations: Play with a portion of the deck, removing one type of representations (e.g. equations) depending on players familiarity with them.

Ugly Functions
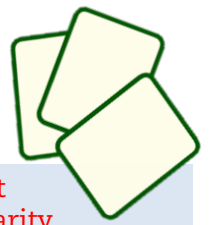
Strands:

Number & Quantity	
Algebra	
Functions	X
Geometry	
Statistics & Probability	

Materials:

- Linear function card set
- Pencil and paper (optional)

f(x)

Where:

Outside	X
Inside	X
On-line	
On-site	

In this fast-paced game for 2 to 4 players, compete to find different representations of the same function as you challenge your familiarity with functional representations.

Set-Up:
- Print and cut apart linear function cards. There are 12 sets, each with a matching equation, table, graph, and scenario card.
- Shuffle the deck of cards and spread the cards face down in the center of the playing area (do not pile the cards).
- To begin the first round of the game, flip 2 cards face up.

Object of the Activity: To identify and match linear functions represented by graphs, equations, tables, and stories.

Pre-Game Activity:
- For each linear function, find four matching cards, including a graph, a table, an equation, and a story. Explain how you know the cards match.
- There should be no unmatched cards. Resolve any disagreements.
- Choose 6 sets of matching cards to use in playing the first round.

Game Play:
1. In turn, flip one card face up.
2. All players examine the face-up cards and race to find two cards that represent the same function.
3. If you find a match, slap the matching cards to claim them. Explain how you know the two cards match. Other players must agree.
4. If two players slap a card at the same time, the first person to shout 'mine' gets the card. Players can split matches as long as they explain how the cards match.
5. If all players agree there are no matches in the face up cards, play moves to the left.
6. Repeat steps 1 through 5.
7. Gameplay ends when there are no cards left in the pile.

To Win:
Be the player with the most cards at the end of the game.

Variations:

All-In: Play using all 12 sets of linear cards.

Ugly Quadratic Functions: Use the set of quadratic function cards instead. The four representations are equation, table, graph, and a short list of properties of the quadratic function.

Very Ugly Functions: Combine quadratic and linear function sets. Use 6 sets of each.

My Time: After you flip a card you have 20 seconds to find a match before other players join in.

Set: Use linear cards or quadratic cards, not both. Shuffle the cards. Arrange 12 cards face up on the playing surface in a 3 by 4 array. Stack the remaining cards face down. Simultaneously, players search for matches as in *Ugly Functions*. Upon finding a match, players must state why the cards represent the same function. Use cards from the deck to fill in empty spaces in the array. If no matches can be made, add 3 cards to form a 4 by 4 array. Return to a 3 by 4 array as cards are matched. Play ends when all cards have been used. The player with the most captured cards is the winner.