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**Abstract**

Weighted Dice is a fast-paced gambling and risk assessment game where players take turns setting up dice games for other players to bet on who will roll the highest. The first one to 150 points wins.

**Materials**

At least 2 sets of dice (D4-D20). Paper and Chips optional

**Number of Players**

5-12

**Rules****Setup**

Give each player 20 points to start. Next, have each player roll a 20-sided die (D20). Whoever rolls the highest starts as the house. Play always proceeds clockwise.

**Gameplay**

Each turn, the house player can choose any 2 other players to be the rollers. The house gives a D4, D6, D8, D10, D12, or D20 to each roller, and can choose to give the same die to both rollers. Next, the remaining players can choose to bet on which roller will roll the highest number. Players can bet any whole number of points that they own. Chips or a D100 may be used to keep track of bets. Once a player has submitted a bet, it cannot be changed or canceled.

After everyone bets or 20 seconds pass, betting becomes closed, and the two rollers roll their dice and see who rolled higher.

**Scoring**

After the rolls, points are allocated as follows:

Players that won the bet: If there were any bets on the other side, winning players get the sum of the opposing bets plus their personal bet. Otherwise, they get half of their personal bet, rounded down.

Players that lost the bet lose whatever points they bet. If this would put them below 5 points, they go to 5 points instead.

Finally, the winning roller gets points equal to the number they rolled plus the total bets against them.

If there is a tie, then the house wins. All bets are counted as losing bets, and the house gets all of those points. However, there is one catch. If nobody bet and there is a tie, the house instead gets sent to 5 points for rigging the odds.

When the scoring concludes, the next player clockwise becomes the new house.

### Ending the game

The game ends when any player reaches at least 150 points, in which the highest scoring player wins. If there is a tie, then all players with the highest score win.



## Design Process

Weighted Dice was modified from the Dice Game, where players sequentially roll a six-sided die and add the result to their score until one of them gets at least 20 points and wins. This dice game is a 0% skill, 100% luck game, and while those can be entertaining, one this simple is bound to become boring in 5 minutes or less. Some of my main goals when attempting to modify the dice game were to create a game that blends skill and luck elements and keeps players engaged with each other.

One of my earlier ideas was a mind game where whoever rolls gets to give the dice to a player of their choice, while everyone attempts to guess who will receive the dice, gaining bonus points if they choose correctly. There wasn't anything in particular I didn't like about that idea aside from a potential optimal strategy to never give the dice to the lowest scoring player, but I wasn't really feeling it. In the end, I settled on a game with a focus on gambling elements.

The main idea that I started with while designing the modification was that I wanted the odds to be variable, so the chances of one sided winning wouldn't be 50% every time. This also differs from traditional casino gambling in that what the other people bet affects your payout, so it's more like poker in that sense. Some of my inspirations for this were gambling streams on Twitch, and Game Guy from that one Mario Party. Having players take turns setting up betting games with different types of dice is the first concrete part of the game I designed to accomplish that.

The next major thing to design was the betting and scoring. I knew right away that I couldn't use a true pot like in poker, since that would involve too much math, for example figuring the payout for a 5 bet win and a 7 bet win with 13 points from the losing side. I wanted my system to still encourage bigger bets, so players will get points scaled on what they put in, but instead of dividing the pot, every winner takes points equal to the full pot, which also makes the total amount of points in the game increase and bring the game towards a conclusion. As for the starting point value, victory threshold, and the floor, those numbers were tweaked based on playtesting to try and make games take around 10-12 rounds to conclude. Having a floor was especially important since the game stops working if there's less than 5 players, so it wouldn't work to kick players out of the game if they run out of points.

A lot of my later additions to the rules were based on thinking about player strategies, and trying to prevent an obvious optimal strategy. Since ties pay out to the house, every player might set up games with 2 D4s if there wasn't a downside, which is why I added the rule where if no one bets on a tie, the house loses all their points. Part of the strategy is forcing players in the lead to roll unfavorably, but I wanted there to be a risk to that as well, so I added that the winning roller is treated like they won the bet as well as adding their die roll to their score.