DICE GAME INSTRUCTIONS

Welcome to the scouts field trip dice game.

This game simulates the flow of goods across five resources (players) passing chips from one to another. Each player rolls a fair die to simulate the variability in the process. Players pass chips according to the number they rolled provided they have enough chips in the Work In Progress inventory (number of chips) in front of them.
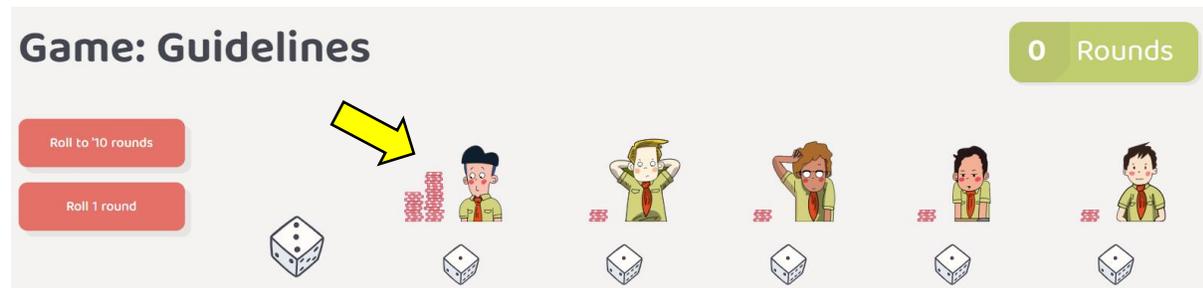

Since the average of a fair die is 3.5, we should aim to reach or pass 35 finished goods after 10 rounds. Let's see if you can beat the average!

To ensure players have chips to move on the first round we have created an inventory of 4 chips in front of each resource (initial WIP). You can adjust the initial WIP level before the game begins (click on Edit mode). Remember higher WIP entails longer lead times. The first resource has an endless amount of chips to introduce to the process depending on the number the die shows with each roll.

Click the 'Roll 1 Round' button to have each player roll the die. The players pass chips to the next player according to the die provided they have enough WIP. If not, they pass what they have.

Click the 'Roll to '10 rounds' to have each player complete 10 rolls. For example, if you are in round 1 and clicked 'Roll to '10 rounds' players will roll 9 more rounds. If you are in round 13 and clicked 'Roll to '10 rounds' players will roll 7 more rounds. Remember the objective is to pass 35 or more chips with each 10 rounds.
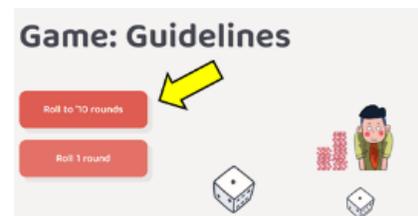
Process Metrics:

Finished Goods – number of chips passed by the 5th player.

Process Efficiency – the number of finished goods relative to the expected, according to the 3.5 average per round. For example, if after 10 rounds the players produced 35 finished goods, then the process efficiency is 100%. Note, in this simulation it is possible to exceed 100% efficiency if you out produce 35 chips in 10 rounds. Process Efficiency is calculated as the number of chips passed by the 5th player, divided by 3.5, multiplied by the number of rounds.

Process Lead time – the number of rounds (round=day) it will take to process the WIP into Finished Goods according to the process current production rate. For example, if the current WIP in the system is 10 chips, and the average Production Rate of Finished Goods is 2 per round, then the Process Lead time is 5 days. Process Lead time is calculated as the total WIP in the process divided by the Production Rate. Production Rate is calculated as total Finished Goods produced divided by the number of rounds.

In below example, the players produced total of 23 finished goods in 10 days. The process Efficiency therefore is (23/3.5) x 10 = 66% (to keep it simple result is always rounded up). The total WIP in the system is 26 chips. The daily production rate is 2.3 (23/10). The Process Lead time therefore is 26/2.3= 12 days (to keep it simple result is always rounded up).

Game: Guidelines — 10 Rounds

Metric	Player 1 (2 | 2)	Player 2 (3 | 3)	Player 3 (5 | 3)	Player 4 (3 | 3)	Player 5 (2 | 2)
WIP	9999966	2	3	9	12
Throughput	33	35	36	31	23
Efficiency	100%	76%	100%	100%	88%
Productivity	33 / 10 rolls	35 / 10 rolls	36 / 10 rolls	31 / 10 rolls	23 / 10 rolls

23 — Finished Goods

66% — Process Efficiency

12 — Process Lead time

Players Metrics:

- WIP – current chips available for the player to move according to the number rolled on the die.
- Tomorrow WIP – the chips processed by the previous Player that will be added to the WIP in the next round.
- Throughput – Total number of chips processed by the player (moved to next player).
- Efficiency – Actual number of chips processed relative to the potential number (number on the die). For example, if player rolled 6 but only 3 chips are available to process then player efficiency is 50%. The Efficiency measurement is accumulative and considers the total number of chips processed relative to the total potential number rolled by the player.
- Productivity – Number of chips processed divided by the number of rounds.

In below example, looking at the 2nd player:

- WIP – the 2nd player has 2 chips available for him to pass in next round.
- Throughput – the 2nd player processed 35 chips in the 10 rounds played.
- Efficiency – the 2nd player efficiency is 76%. It means the player rolled over 10 rounds the sum of 46 points however was able to pass only 35 chips.
- Productivity – In 10 turns the 2nd player passed 35 chips. On average the productivity is 3.5 per turn.

Game: Guidelines
10 Rounds

Roll to '10 rounds
Roll 1 round

23 Finished Goods

66% Process Efficiency

12 Process Lead time

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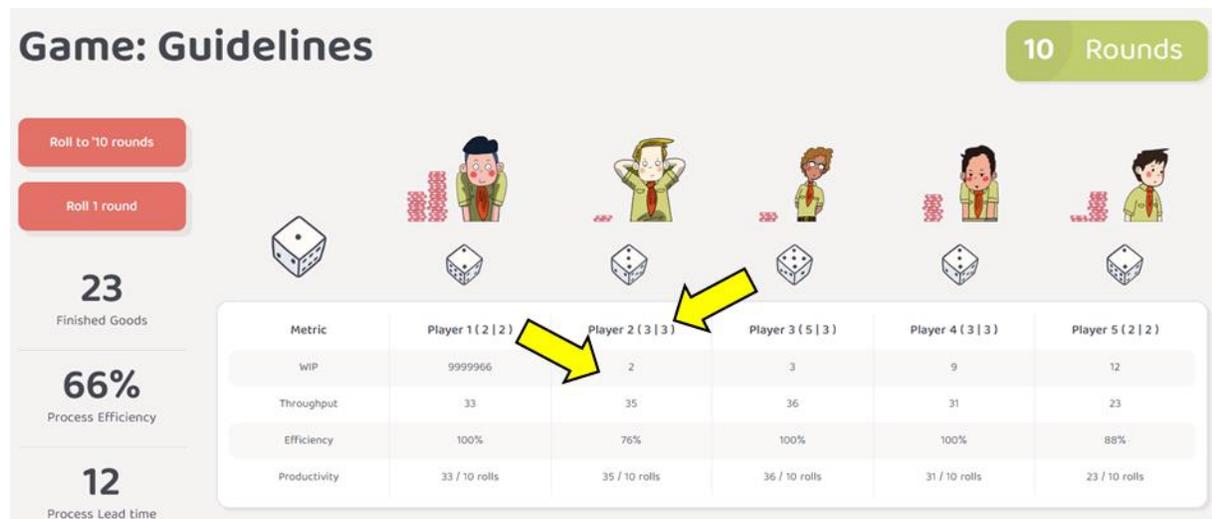
The number to the right of each player title represents the player's recent roll result - the number rolled on the die and the number of chips processed by the player. In the above example, the 2nd player rolled a 3 and moved 3 chips on the most recent turn (the 10th round).

Edit Game Parameters:

By clicking on the Edit button you can change the initial WIP in front of each player, as well as the number on the die that each player rolls. This will enable you to examine how variability and dependence impact the flow of goods in different scenarios.

Click on 'Initial chip count' to set the initial WIP in front of each player. The default is 4 chips (just above the 3.5 fair die average). Increasing the WIP count will improve your first rounds productivity (until the initial WIP is flushed out), however higher WIP means longer lead times. To save the changes click on the 'Save changes' button.
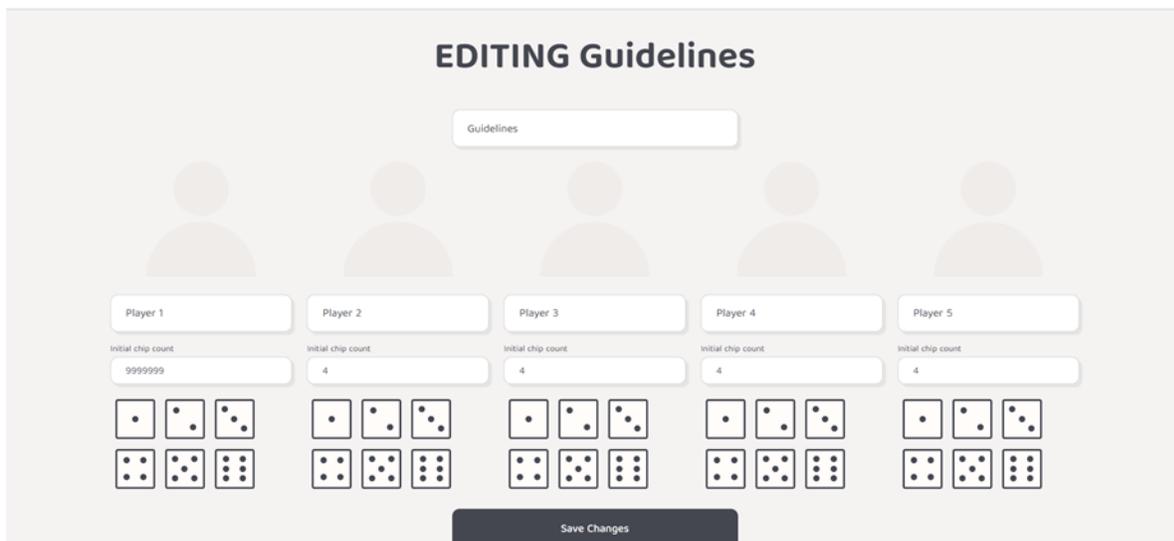
Clicking on any face of the die below each player will enable you to select its number (1-6). So, for example, you can create a die that has 1-2-3-4-4-4. The average of this die is 3, which will make the respective player a bottleneck compared with the rest of the players who roll a fair die with a 3.5 average. Changing the numbers the players can roll will enable to explore scenarios, like:

- The effect of having a bottleneck in various places in the line (at the beginning, in the middle, at the end).
- The effect of protecting a bottleneck with initial higher WIP relative to the other resources.
- It can also demonstrate the impact of reducing variability. By creating a die that has 3-3-3-4-4-4 we keep the average of 3.5 while reducing the variability.
- The impact of moving resources around during the game by adding and reducing the numbers of the players' die. You can stop the game in each round, and click on `Back to my games` located on the upper left corner of the screen. Then, go to edit mode and change the

numbers on the die. For example, turn the die of a player that has a lot of WIP to be 6-6-6-6-6-6, while reducing another player die to be 1-1-1-1-1-1. To go back to the game, save the changes and click on 'Start this game' to go back to continue with the game where you left off.