



Wizards of Science (An educational card game)



Game aspects	Description
Game type	Strategy card game
Number of players	4
Intended audience	Highschoolers, students and adults
Game time	30 - 50 minutes
Objects	24 cards + 6 blank cards, timer

Table 1. Game's components

Setup:

- Four players split into two teams of two.
- A player shuffles the deck and deals six cards to each player clockwise.
- The player who received the first card shuffles the deck in the next round.
- Players keep their cards secret to everyone (Figure 1) and player turn is clockwise.
- Players play six battels, which make a round.
- In a battle each player selects one card to play while respecting some obligations.
- The winning card decides which team collects the cards played, which are put in that team's discard pile.

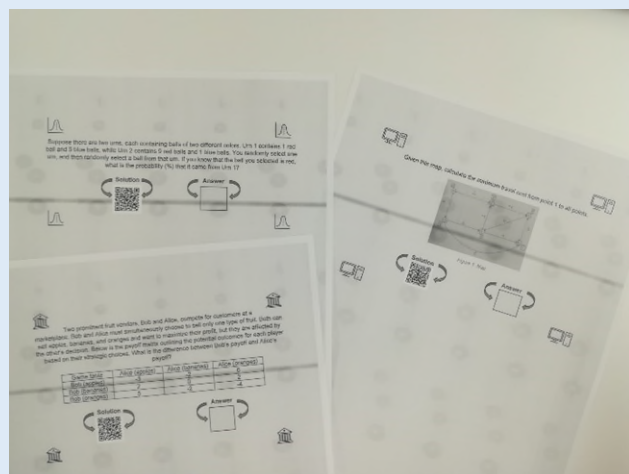


Figure 1. Example of a hand

Objective:

The team to get to **7 sets or more** wins. To earn sets, a team must accumulate the following number of points (i.e., numbers on the cards) during a round:

Sets	Points accumulated
1	35
2	70
3	105
4	140
5 (maximum)	175

The problem solving stage:

- Players are given eight minutes to solve the problems on the cards (Figure 1) in the first round.
- Each round, a minute is deducted until reaching four minutes, which is the floor.



- Players receive a black pen to write their answers in the answer box.
- Every player checks their answers by scanning the QR code, and a red pen is provided to those who must correct their answers.
- At a round's end players count the number of correct answers each team accumulated.

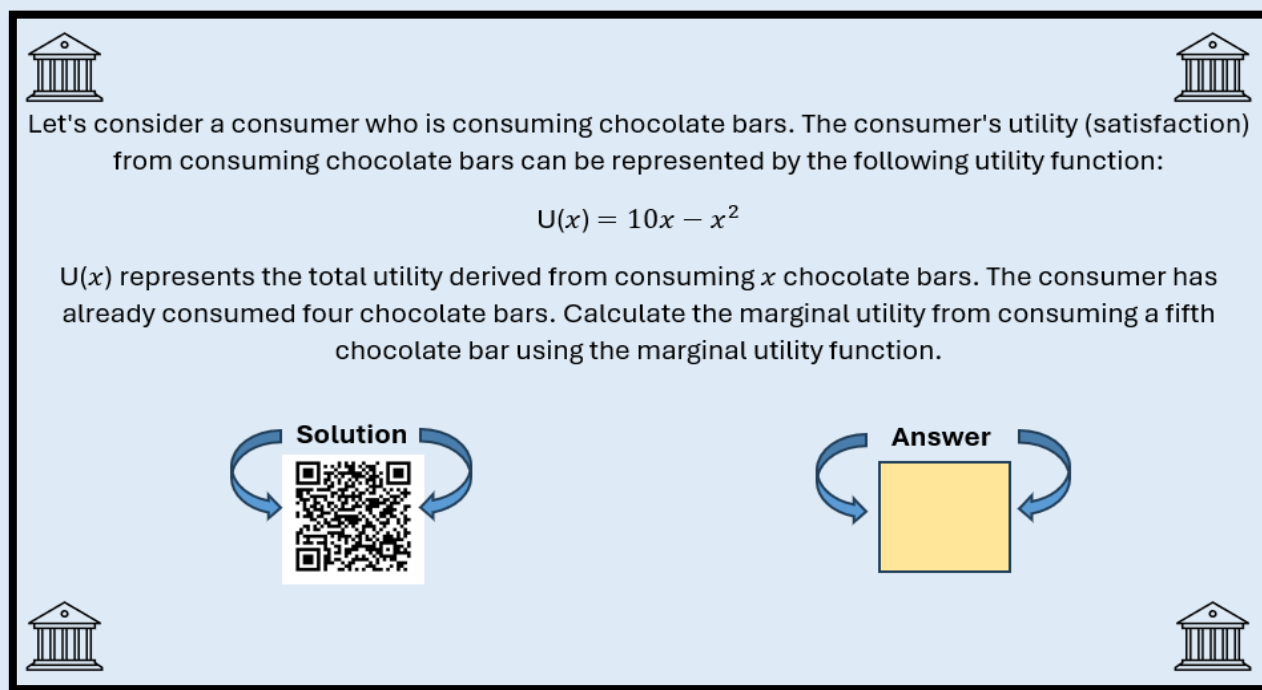


Figure 2. An example of a card's front

Cards description:

- There are 24 cards of four types (i.e., four disciplines: mathematics, statistics, operational research and economics) (Figure 2).
- Each type has six cards, one for each of the numbers 0, 2, 3, 4, 10 and 11, which are answers to the problems written on the cards.
- The 6 blank cards allow players to write their own problems, but in doing so they must ensure the game's structure and aspects remain unchanged (e.g., 24 cards in play, 6 cards per type, 4 cards per number)
- In a battle, a card's power is ranked by its number and type. The type is more important. There are two power types: the rounds's leading type, the superior one, followed by the battle's type. Anything different cannot win a battle. Note that the battle type can be the round's leading type.
- If all cards are the same power type, we look at their number. The biggest number wins the battle. The player who wins a battle begins the next and reveals the battle's type by playing the first card.

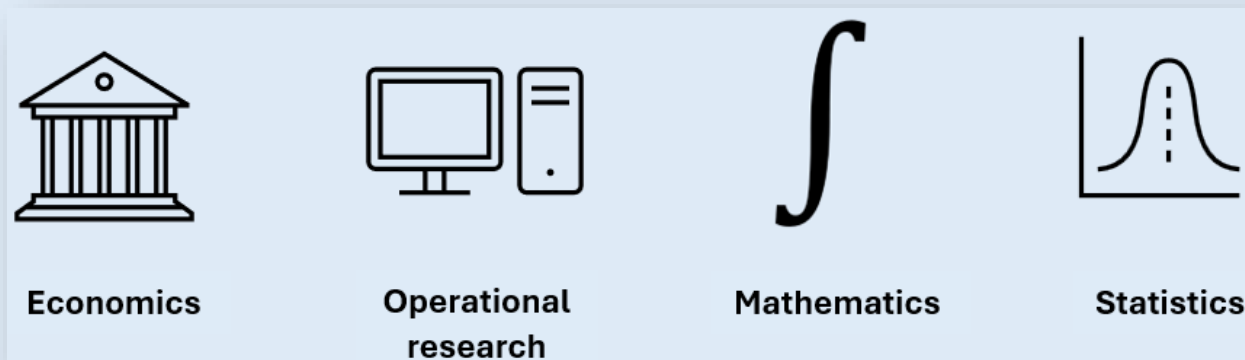


Figure 2. All types/disciplines and their respective image association

The single-round auction:

Moving clockwise, starting from the player who shuffled the deck, each player has one turn to call the number of sets their team will make at the round's end. They can decide to forgo their turn and remain silent. The biggest offer wins.

Suppose your teammate said three, and no one else topped them. Your teammate won the auction and earned the right to begin the first battle and chose the round's leading type. They reveal the round's leading type by playing the first card of the round. Conversely, if your team does not make the sets called, your team's score decreases by the number of sets called. The other team can accumulate points and earn sets while not being at risk of losing anything.

Use pen and paper or rely on your memory to keep track of each team's score. Negative values are allowed.

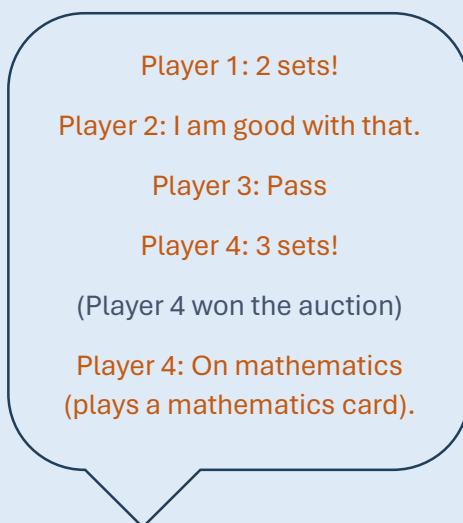


Figure 3. Example of an auction



Player obligations:

If a player has a card of the battle's type in their hand, they must play it. Otherwise, they must play a card of the round's leading type if such a card is in their hand. If neither condition applies, the player can play any card.

Combination:

A 3 and a 4 of the same type in a player's hand is called a combination. A combination of the round's leading type adds an additional 40 points when counting points, while a regular combination adds 20 points.

These points are added only if the combination is revealed. A player with a combination can decide to reveal it only if they earned the right to open a battle and must play one of the revealed cards.

Counting points at the end of a round:

- Each team counts the points accumulated in its discard pile and adds the combination points, if applicable.
- The difference in the number of correct answers given by the teams is converted into points awarded to the team with the most correct answers.
- In case of any cheating, the fair team earns five sets regardless, and the cheating one gets nothing or loses the number of sets they called.

Simplified step-by-step guide:

1. Players are dealt six cards.
2. Players solve the problems on the cards under time pressure.
3. Answers are checked and corrected by the players if appropriate.
4. Players enter a one offer auction, calling a number of sets.
5. The auction's winner begins the first battle and chooses the round's leading type.
6. Every player plays one card for each battle.
7. The winner of a battle chooses the next battle's type.
8. Six battles are played.
9. All cards end up in the two discard piles.
10. Players count the number of points accumulated by their team.
11. Sets are added or subtracted from the score.
12. A new round begins.
13. The team to accumulate 11 sets or more wins.

All information required for the game can be accessed online at:

<https://github.com/BogdanRemusPintilie/IL131/tree/main>



Learning objectives:

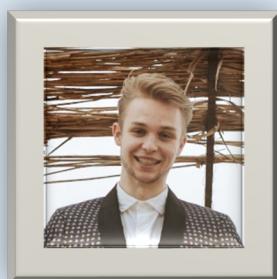


The purpose of playing this game is to learn the foundations of undergraduate-level mathematics, statistics, economics and operational research, develop skills and have fun.

By the end of the game players should be able to:

1. Apply concepts from mathematics (e.g., L'Hôpital's Rule) and statistics (e.g., Baye's Theorem) to solve theoretical and hypothetical scenarios
2. Apply concepts from economics (e.g., CAPM) and operational research (e.g., least cost method) to solve real-life problems
3. Apply Game Theory to discover the best decision possible and articulate their thought process

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