

NANOVENTURE

THE NANOTECHNOLOGY BOARD GAME

The project was funded by the National Science Foundation through the Materials Research Science and Engineering Center on Nanostructured Interfaces (DMR-0079983 and DMR-0520527) and the Internships in Public Science Education (DMR-0424350) at the University of Wisconsin-Madison. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.



Game Rules

NanoVenture: Game Rules

Please read all game rules before beginning

Congratulations! You are the new leader of a country. You will need to make decisions about your country's industrial expansion, military defense, economic security, and scientific research, all while doing your best to maintain a high public approval rating.

While managing your country's resources, you must also find a way to regulate and control the research and application of an emerging field, known as nanotechnology, as it becomes part of the many layers of your country's society. Because nanotechnology is mostly new, there are no specific laws that address its regulation, so you will be making decisions that affect the scientific and social futures of this emerging field.

Style of Play

NanoVenture is a board game. Players move around a board, landing on spaces that present various situations and opportunities that can impact a player's developing country. On "Development" squares, players might pay money to purchase an unclaimed Development, or they might pay "access costs" to another player who has already claimed that square. On "Decision" squares, players must decide on a course of action for a hypothetical scenario and then face the consequences of that decision.

Object

The object of the game is to be the last player standing. Players are eliminated if they run out of money OR if their approval rating drops to 0%. All assets of eliminated players are returned to the bank.

Number of Players

It is best to play NanoVenture with four to five players. However, teams can be used if a higher number of players is needed.

Materials

Materials for NanoVenture include a game board, two six-sided dice, population chips, player tokens, \$5million and \$1million money chips, Budget Management Cards, Decision Cards, Development Cards, a glossary and the game rules (this document).

Glossary

A glossary of terms related to nanotechnology is included to help with words that may be new or unfamiliar. Throughout the game, words defined in the glossary are denoted in capital letters (e.g., NANOTECHNOLOGY).

Ending the Game

A player wins when he is the last player standing, meaning that the other players have either bankrupted their countries or allowed their approval rating to drop to zero.

OR

To end the game quickly, stop play immediately. Tally up the following items to determine the total worth of each player's country:

1. The cost of each Development as noted on the board or Development Cards
2. \$5million for each ☺
3. The money represented by a player's money chips

The player with the highest total wins.

For additional copies of the game rules, glossary and activities associated with NanoVenture please visit:

www.mrsec.wisc.edu/Edetc/supplies/nanoventure/index.html

Decision Cards

- Whenever a player lands on a “Decision” square, he must draw a Decision Card.
- After reading the scenario on the *back* of the card, the player must choose a course of action and roll the dice.
- The outcome is determined by the player’s choice, the number rolled, and the information on the *inside* of the card.

Notes on Money and Approval Ratings

- If a player does not have enough money to pay for a fee, whether it be from a Decision card or any other square on the board, she must sell a Development to obtain the necessary amount of money (see “Access Costs” above). If she does not have any Developments, or cannot raise enough money through the sale of Developments, she is eliminated from the game.
- If a player is told to improve his approval rating, whether it be from a Decision card or any other square on the board, but he already has a 100% approval rating, he should receive \$20million from the bank.

Passing “Start of Fiscal Year”

Each time a player passes the “Start of Fiscal Year” square, two events occur (in order):

1. *The player must check her approval rating.*
 - If the player has 100% approval (5 ☺), she receives \$5million from the bank.
 - If the player’s approval is 40% (2 ☺) or lower, she loses \$5million to the bank.
2. *The player must collect \$20million in taxes.*
 - In order to help fund work through the next year, players should collect \$20million from the bank after checking their approval rating. This money may be placed in any budget area.

Once a player has completed these “Start of Fiscal Year” tasks, she must then complete the tasks for the square that she landed on.

Getting Started

1. *Obtain materials and choose one player to be the banker. The banker will deal with the distribution and collection of money throughout the game.*

Each player starts with:

- 1 Player token
- 1 Budget Management Card
- 5 Population chips (☺/☹)
- 25 - \$5million budget chips (yellow) and 20 - \$1million budget chips (blue), a total of \$145million

2. *Set your budget.*
 - The Budget Management Card helps players organize their country’s budget.
 - Before the game starts, players should distribute their budget chips among their investment areas of Environment, Industry, Military, and Science however they want.
 - After the game starts, players are allowed to redistribute up to \$5million per turn. This must be done *before* a player rolls for his turn. For example, player A could move \$5million from his Industry budget to his Military budget before he rolls the dice.
 - Money chips gained during your turn can be placed in any budget area.
3. *Set up your population.*
 - An important aspect of leadership is keeping your population happy.
 - Each player has a population of five (represented by ☺/☹ chips) that starts at an 80% approval rating (4 ☺ and 1 ☹), which can change over the course of the game.
4. *Start the game.*
 - Start from the “Start of Fiscal Year” square.
 - Roll one of the six-sided dice to decide which player goes first. The player with the highest number goes first, followed by the person to her left.
 - Players should take turns and move clockwise around the board by rolling the dice.

On Your Turn

1. *Roll the dice and move your piece the appropriate number of spaces.*
2. *Read the square and act accordingly.*
 - The square will be a “Development” square, a “Decision” square, or one of several other situations.
 - Read the sections below for information on Decision and Development squares.
 - If neither a Decision nor a Development square, follow the directions for the particular square.
3. *A list of possible actions you might take during your turn includes:*
 - Rearranging up to \$5million of your budget – **before** you roll
 - Purchasing a Development and reading the description of it aloud
 - Answering Development quiz questions and paying access fees on an already-owned Development
 - Reading a Decision Card and making a decision
 - Paying or receiving money from the bank or other players for miscellaneous events associated with your country
 - Assessing your country’s finances

Development Cards

As players move around the board, Development Cards representing various nanotechnologies will be available for purchase and control. Once a player owns all the Developments of one color, he will be able to charge higher access fees when other players land on one of those Developments.

Purchasing Developments

- If a player lands on a nanotechnology that is not owned by another player, she may purchase it by paying the required amount of money from each investment area to the bank.
- **Immediately after a player purchases a Development, she must read the information on the back of the card aloud to the other players.** She should read slowly and clearly enough that all players can understand the information on the card.

- The Development quiz questions at the bottom of the card will be used to determine the access cost a player must pay when he lands on another player’s Development. If a player answers a Development quiz question correctly, he pays half the listed access cost. If a player answers the question incorrectly, he pays the listed cost.

Access Costs

- If a player lands on a Development owned by another player, he must pay that player the access cost printed on the card and on the square.
- If he answers a quiz question about that Development correctly, he pays half the access cost noted on the card. If he answers the question incorrectly, he pays the regular amount printed on the card.
- If the player is unable to pay the access cost, he may get money by liquidating any Developments that he owns. A player may either sell the Development back to the bank for *half* the original purchase amount, OR he may sell the Development to another player for an amount agreed upon between the two players.

NanoClusters

- If a player acquires all the Developments of one color, he has created a “NanoCluster.”
- Access costs double for Developments that are part of a NanoCluster.
- When a player lands on a Development that is part of a NanoCluster, she must answer a Development quiz question from two different Developments belonging to that NanoCluster in order to pay the reduced access cost. It is up to the NanoCluster owner to decide which questions from which Development Cards to ask.
- For example, if the regular access cost is \$26million, the NanoCluster equivalent would be \$52million. However, the player still has the opportunity to halve the access cost by answering two Development quiz questions correctly. In this example, the reduced NanoCluster access cost would be \$26million.
- Players may trade and buy cards from each other in order to achieve NanoClusters.