



Play Now!

# "Nakamoto Consensus" Puzzle Game Guide

Mine Bitcoin Blocks to Win!

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5 simple steps to go through this fun game from preparation to celebration. Who can get the longest Blockchain and win the game?

## Example Walkthrough:

Get a better feeling of how to play the game with a simple walkthrough.



# How To Play:

Getting started in 5 steps

## **1. The Genesis Block:**

- Give all teams a starting block (a strip of paper) with "Genesis Block" written on it.

## **2. Mining New Blocks (Proof-of-Work Simulation):**

- Each round, all teams are given a puzzle to solve.
- The first team to solve it shouts "Mined a block!"
- They show the correct answer to the teacher (acting as the network).
- If correct, they get to write a new block (a new strip of paper) and attach it to their blockchain.
- They also write the hash (block number + last hash + answer).

## **3. Propagation & Forks:**

- Other teams must now choose whether to build on that new block or keep working on their own chain.
- If two teams solve puzzles at the same time, the class has a fork—teams pick which chain to extend.

## **4. Longest Chain Rule:**

- The network always follows the longest chain (more computational work done).
- Eventually, one chain becomes the longest, and other chains are abandoned.

## **5. Final Phase:**

- After 6–8 rounds, the game stops.
- The longest chain is the valid blockchain.
- Discuss how this relates to Bitcoin's Nakamoto Consensus.

# Example Walkthrough

Let's go though it

## Basic Number Puzzles

1. Find the smallest number divisible by both 7 and 13 under 200.
  2. What is the sum of all prime numbers between 10 and 30?
  3. If X is a two-digit number where the sum of its digits is 9 and it is divisible by 3, what is X?
- 

## Time-Based Calculations

1. A train leaves at 8:45 AM and takes 3 hours and 27 minutes to reach its destination. What time does it arrive?
  2. A clock loses 2 minutes every hour. If it starts at the correct time, how much time will it have lost after 24 hours?
- 

## Logic & Pattern Recognition

1. What comes next in the sequence: 2, 6, 12, 20, 30, \_\_?
  2. If  $a + b = 10$  and  $a^2 + b^2 = 58$ , what is the value of  $ab$ ?
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## Bitcoin & Blockchain-Themed

1. If a Bitcoin miner solves a block every 10 minutes, how many blocks will be mined in 2 hours?
  2. If a Bitcoin transaction fee is 0.0005 BTC per transaction and a miner includes 200 transactions, how much does the miner earn in fees?
  3. A miner earns 6.25 BTC per block. If they mine 4 blocks, how much BTC do they earn in total?
- 

## How This Mimics Blockchain

- Every new block references the previous hash, ensuring that no one can change an old block without modifying all the blocks after it.
- If a group tries to cheat by changing an old answer, they will have to recalculate every following hash, which is difficult—just like in a real blockchain!
- This helps students understand how immutability (unchangeable data) and Proof-of-Work (effort to solve a puzzle) make Bitcoin secure.

# Example Walkthrough

Let's go though it

## 🛠 Example Walkthrough

Let's assume your class starts with a **Genesis Block** (Block 0) with the hash "**0000**" (a simple starting point).

### ◆ Round 1: First Puzzle

Puzzle: Find the smallest number divisible by both 7 and 13 under 200.

✓ **Answer:** 91

Now, the first team to solve it **writes the new block like this:**

*Block 1  
Previous Hash: 0000  
Puzzle Answer: 91  
New Hash: (Block Number + Previous Hash + Answer) → "1-0000-91"*

✓ **New Hash for Block 1: "1-0000-91"**

### ◆ Round 2: Second Puzzle

Puzzle: What is the sum of all prime numbers between 10 and 30?

✓ **Answer:** 112

Now, the team that wins this round **writes the next block like this:**

*Block 2  
Previous Hash: 1-0000-91  
Puzzle Answer: 112  
New Hash: (Block Number + Previous Hash + Answer) → "2-1-0000-91-112"*

✓ **New Hash for Block 2: "2-1-0000-91-112"**

### ◆ Round 3: Third Puzzle

Puzzle: If X is a two-digit number where the sum of its digits is 9 and it is divisible by 3, what is X?

✓ **Answer:** 27

# Example Walkthrough

Let's go though it

Now, the next block is created like this:

Block 3  
Previous Hash: 2-1-0000-91-112  
Puzzle Answer: 27  
New Hash: (Block Number + Previous Hash + Answer) → "3-2-1-0000-91-112-27"

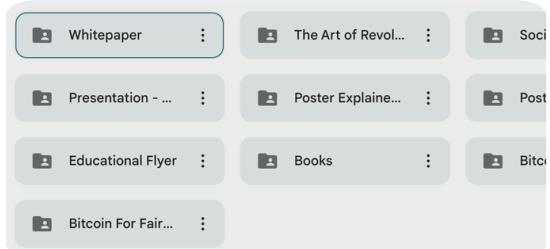
✓ New Hash for Block 3: "3-2-1-0000-91-112-27"

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makasih ya!

