

Module 4: How Bitcoin Works

Teacher Overview

This module explains the key mechanics of how Bitcoin functions as a decentralized, secure digital money system. It introduces the concepts of the blockchain, mining, wallets, private keys, and network consensus. Students will come away with a foundational understanding of the underlying processes that make Bitcoin work without needing to be technical experts.

Learning Objectives

By the end of this lesson, students will be able to:

- Describe what a blockchain is and how it secures transactions
- Understand the role of miners in the Bitcoin network
- Explain how Bitcoin wallets and private keys work
- Describe how transactions are processed, verified, and added to the blockchain

Key Concepts to Cover

- Blockchain: A public, distributed ledger made up of blocks of verified transactions
- Mining: The process of solving mathematical puzzles to validate transactions and secure the network
- Proof of Work: A consensus mechanism that prevents fraud and double-spending
- Bitcoin Wallets: Digital tools that store private keys and enable users to send and receive Bitcoin
- Private Keys & Security: The importance of keeping one's private key secure to maintain ownership
- Network Consensus: How thousands of computers around the world agree on the state of the blockchain

Discussion Questions

- Why is Bitcoin's blockchain considered trustworthy without a central authority?
- What would happen if someone lost their private key?
- Why is mining important to the security of the network?
- How does Bitcoin prevent fraud or double-spending?

Suggested Activities

- Block Building Simulation: Use index cards or blocks to simulate a blockchain. Each block contains “transactions” written by students and must follow a set pattern to be valid.
- Mining Race Game: Use puzzles or math problems to mimic how miners compete to add a block.
- Wallet Demo: Use a free Bitcoin wallet app (in demo mode) to show how sending/receiving works and explain what a private key is.

Extension and Homework

- Watch: [How Bitcoin Works Under the Hood – by CuriousInventor](#) (13 min)
- Read: [How Bitcoin Works \(Without the Tech Headache\)](#)
- Research and compare: What’s the difference between a Bitcoin wallet and a bank account?