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CRYPTO · BEGINNER · LESSON 3 OF 15

Ethereum and Programmable Money

How Ethereum turned a blockchain into a shared computer, what smart contracts and gas are, and why ether works differently from bitcoin

10 min read · 8 quiz questions with answer key

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Ethereum and Programmable Money

IN ONE SENTENCE

Ethereum is a blockchain that can run programs called smart contracts, and its coin, ether, pays for the computing power those programs use.

From digital cash to a shared computer

Bitcoin was built to do one thing very well: move value from one person to another without a bank. Its scripting language is deliberately simple, which keeps it safe but limits what you can build on it.

In November 2013 a 19-year-old programmer named **Vitalik Buterin** shared a different idea. What if a blockchain could run any program, not only payments? Developers could then build their own applications on one shared network, instead of creating a new blockchain for every idea. That project became **Ethereum**, and its network went live on **30 July 2015**.

Think of Bitcoin as a calculator: excellent at its one job. Ethereum is closer to a smartphone: one device on which thousands of different apps can run. Every node on the network runs the same programs and must reach the same result, so nobody can secretly change how an app behaves.

Smart contracts: programs that run themselves

The programs that run on Ethereum are called **smart contracts**. Despite the name, they are not legal documents. A smart contract is code stored on the blockchain that follows simple rules: *if this happens, then do that*. Once deployed, it runs exactly as written, and nobody can stop it or change its rules unless the code itself allows that.

A smart contract can hold money of its own. That is what makes it powerful. It can receive ether, keep it, and release it automatically when its conditions are met, with no company in the middle deciding whether to pay.

This also means mistakes are expensive. If the code has a bug, the contract will follow the bug just as faithfully as it follows the rules. Many of the largest losses in crypto history came from flaws in smart contracts, which is why serious projects pay for security audits.

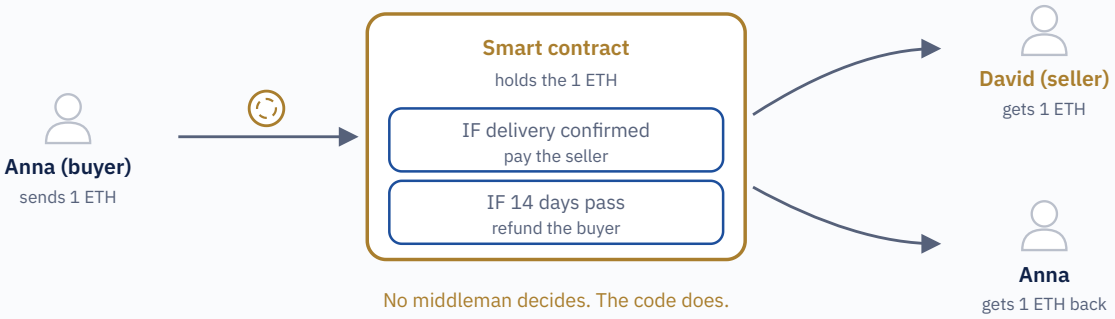


Figure 1. A smart contract holding a deposit. It pays the seller or refunds the buyer automatically, depending on which condition is met.

EXAMPLE: A DEPOSIT FOR A USED PHONE

Anna wants to buy David's used phone, but they have never met. Instead of trusting each other, Anna sends 1 ETH to a smart contract. The contract's rule: if Anna confirms the phone arrived, pay David; if nothing is confirmed within 14 days, return the money to Anna. Neither of them can grab the money early, and no middleman takes a fee for holding it.

Ether and gas: paying for computation

Ethereum's native coin is **ether**, usually written **ETH**. You can hold and send it like any other money, but it has a second job: it pays for every action on the network.

Each operation a transaction asks the network to perform has a cost measured in units of **gas**. A simple ETH transfer uses 21,000 units. Calling a complex smart contract uses many more. Gas exists so that nobody can flood the network with endless programs for free: every step of computation has a price.

The price of each unit of gas is quoted in **gwei**, which is one billionth of an ETH. It has two parts:

- a **base fee**, set automatically by the network and rising when blocks are full. This part is **burned**, meaning it is destroyed and removed from circulation. This rule arrived with the London upgrade in August 2021.
- a small **priority fee**, or tip, that goes to the validator who includes your transaction.



Figure 2. How an Ethereum fee is calculated. The base fee part is burned, and only the tip goes to the validator.

EXAMPLE: THE COST OF A SIMPLE TRANSFER

A simple transfer uses 21,000 gas. If the base fee is 1.8 gwei and you add a tip of 0.2 gwei, you pay 21,000 × 2 = 42,000 gwei, which is 0.000042 ETH. At an ETH price of $3,000 that is about 13 cents. When the network is very busy, the base fee can jump many times higher, and the same transfer can cost dollars instead of cents.

From mining to staking: The Merge

For its first seven years Ethereum was secured by mining, like Bitcoin. On **15 September 2022**, in an upgrade called **The Merge**, it switched to **Proof of Stake**.

Instead of miners competing with powerful machines, the network is now run by **validators** who lock up, or **stake**, 32 ETH each as a security deposit. Validators take turns proposing and checking blocks, and earn new ETH as a reward. If they cheat, part of their stake can be taken away. A new block is produced every 12 seconds.

According to ethereum.org, The Merge cut Ethereum's energy use by about 99.95%. You will learn how Proof of Work and Proof of Stake compare in detail in the Blockchain course.

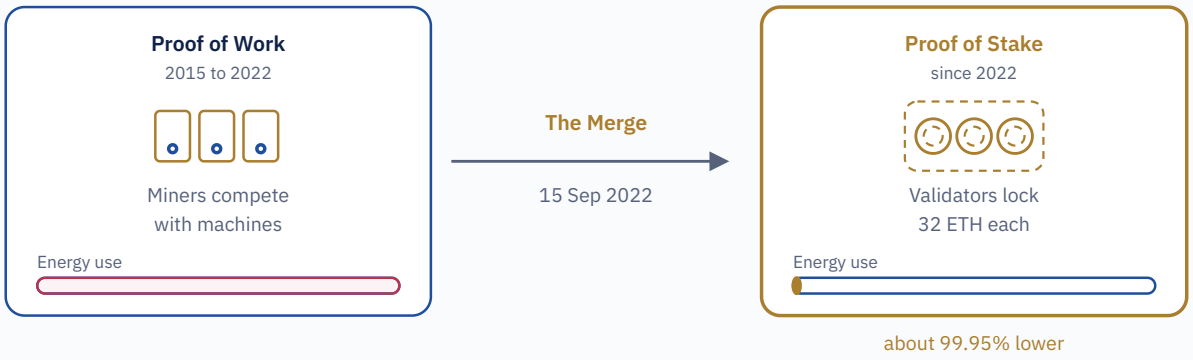


Figure 3. The Merge switched Ethereum from mining to staking on 15 September 2022, cutting its energy use by about 99.95%.

Ether's supply: no cap, but a burn

Here is a big difference from Lesson 2. Bitcoin has a fixed limit of 21 million. **Ether has no fixed maximum supply.**

Two forces push the supply in opposite directions:

- **Issuance:** new ETH is created to reward validators. With about 33 million ETH staked in 2026, that adds roughly 0.75% a year.
- **Burning:** the base fee from every transaction is destroyed. The busier the network, the more ETH is burned.

When the network is very busy, more ETH can be burned than is created, and the supply actually shrinks. When it is quiet, the supply grows slowly. Overall, the supply was about 120.5 million ETH at The Merge in 2022 and still about 120.5 million in May 2026, so it has stayed roughly flat.

Supporters see this as sound money that adjusts to use. Critics point out that the rules can be changed by future upgrades, while bitcoin's limit is treated as untouchable. Both views are worth understanding.



Figure 4. Two forces act on ether's supply: new issuance to validators and burning of base fees. From 2022 to 2026 they roughly balanced out.

What runs on Ethereum

Ethereum became the base for much of what people call crypto today:

- **Stablecoins:** dollar tokens such as USDT and USDC. In September 2026 Ethereum held about 48% of all stablecoins, more than any other blockchain.
- **Tokens:** thousands of other assets created with smart contracts. Lesson 4 explains how they work.
- **DeFi:** lending, borrowing and trading without a bank or broker.
- **NFTs:** unique digital items such as art or tickets.
- **Layer 2 networks:** networks such as Arbitrum, Base and Optimism that process transactions more cheaply and then record the results on Ethereum.
- **Staking:** locking ETH to help secure the network and earn rewards.

Ethereum also has competitors that run smart contracts, such as Solana and BNB Chain. Lesson 5 compares the major networks.

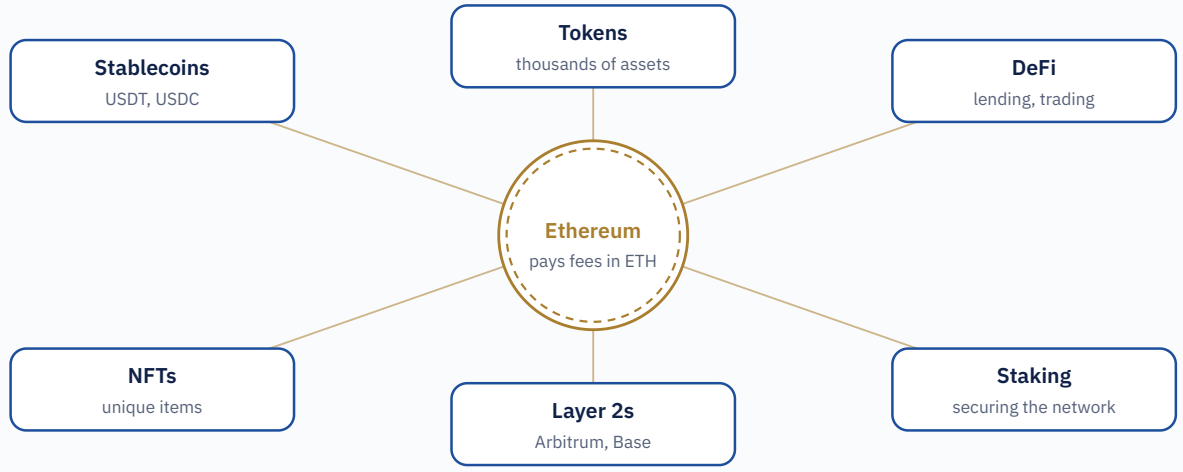


Figure 5. Much of the crypto world is built on Ethereum, from stablecoins and tokens to DeFi, NFTs and Layer 2 networks.

Bitcoin and Ethereum side by side

Bitcoin and Ethereum are the two largest cryptocurrencies, but they were designed for different goals. Bitcoin aims to be simple, hard money that changes as little as possible. Ethereum aims to be a flexible platform that keeps evolving through regular upgrades.

	Bitcoin	Ethereum
Launched	January 2009	July 2015
Main purpose	Digital money and store of value	Platform for smart contracts and apps
Native coin	Bitcoin (BTC)	Ether (ETH)
Supply	Fixed cap of 21 million	No cap; new issuance offset by burning
Security	Proof of Work (mining)	Proof of Stake (staking) since 2022
New block	About every 10 minutes	Every 12 seconds
Smallest unit	Satoshi, 0.00000001 BTC	Wei, 0.000000000000000001 ETH
Approach to change	Very cautious, rare upgrades	Regular planned upgrades

Neither design is simply better. They make different trade-offs, which is why many people hold both for different reasons.

Why this matters for traders

- **ETH has its own drivers.** Bitcoin moves mostly on its money story. Ether also moves on how much the network is used: activity drives fees, fees drive burning, and burning affects supply.
- **Watch the ETH/BTC ratio.** Many traders follow ETH priced in bitcoin to see whether money is rotating toward Ethereum and the wider crypto market, or back toward bitcoin.
- **Gas spikes are a clue.** A sudden jump in gas prices usually means a rush of activity, such as a popular token launch or a market crash with many forced sales. Checking gas can tell you how busy the market is.
- **Upgrades and ETFs are calendar events.** Major upgrades are scheduled in advance, and US spot ether ETFs have traded since 23 July 2024. Both bring news flow and changes in demand that traders watch.
- **Keep ETH for fees.** Any action on Ethereum, even moving a token, needs a little ETH for gas. Lesson 4 shows why this catches many beginners out.

Key terms

Ethereum	A blockchain that can run programs, launched in 2015. Its native coin is ether (ETH).
Smart contract	A program stored on a blockchain that runs automatically according to its code, and can hold and send money.
Gas	The unit that measures how much computation a transaction needs. Every operation on Ethereum costs gas.
Gwei	One billionth of an ETH. Gas prices are usually quoted in gwei.
Base fee	The part of the gas price set automatically by the network. It is burned rather than paid to anyone.
Burn	Permanently removing coins from circulation by sending them where nobody can ever spend them.
Proof of Stake	A way of securing a blockchain in which validators lock up coins as a deposit instead of using mining machines.
Validator	A participant who stakes 32 ETH to propose and check blocks on Ethereum, earning rewards for honest work.

Key takeaways

1. Ethereum, launched in July 2015, is a blockchain that runs programs, not only payments.
2. Smart contracts are code that runs automatically and can hold money. They remove middlemen, but a bug is followed just as faithfully as a rule.
3. Every action costs gas, paid in ETH. The base fee is burned and the tip goes to the validator.
4. Since The Merge in September 2022, Ethereum uses Proof of Stake, with validators staking 32 ETH, and uses about 99.95% less energy.
5. Ether has no supply cap. Issuance and burning roughly balanced each other between 2022 and 2026.
6. Stablecoins, tokens, DeFi, NFTs and Layer 2 networks are all built on Ethereum.

Test yourself

Circle one answer for each question. The answer key with explanations is on the next page. You can also take this quiz online at markettalks.info and see your score instantly.

1. What was the main new idea behind Ethereum?

- A A blockchain with a fixed supply of coins
- B A blockchain that can run any program, not only payments
- C A faster version of Bitcoin with lower fees
- D A cryptocurrency controlled by a central bank

2. What is a smart contract?

- A A legal agreement signed online
- B A contract between an exchange and its users
- C Code on a blockchain that runs automatically and can hold money
- D A paper wallet for storing ether

3. Why does Ethereum charge gas?

- A To pay the founders
- B To put a price on computation so nobody can overload the network for free
- C To keep the price of ETH fixed
- D Because all blockchains are required to by law

4. What happens to the base fee of an Ethereum transaction?

- A It goes to the validator
- B It goes to the Ethereum Foundation
- C It is burned and removed from circulation
- D It is refunded after the transaction

5. A transfer uses 21,000 gas at a price of 2 gwei. How much does it cost?

A 2 ETH
B 0.042 ETH
C 0.000042 ETH
D 21,000 ETH

6. What changed at The Merge in September 2022?

A Ethereum switched from mining to Proof of Stake
B Ethereum introduced a 21 million supply cap
C Ethereum merged with Bitcoin
D Ethereum stopped charging fees

7. Which statement about ether's supply is correct?

A It is capped at 21 million
B It only ever goes down
C It has no cap, and burning can offset or exceed new issuance
D It doubles every four years

8. You have USDT on Ethereum but no ETH. What problem will you have?

A None, USDT pays its own fees
B You cannot move the USDT because you have no ETH for gas
C Your USDT will slowly turn into ETH
D The exchange will freeze your account

Answer key

1 B

A blockchain that can run any program, not only payments

Ethereum was designed as a shared computer. Developers can build their own applications on it as smart contracts.

2 C

Code on a blockchain that runs automatically and can hold money

A smart contract is a program that follows its rules exactly once deployed. It can receive, hold and send funds without a middleman.

3 B

To put a price on computation so nobody can overload the network for free

Every step of computation has a cost in gas. This protects the network from spam and endless programs.

4 C

It is burned and removed from circulation

Since the London upgrade in August 2021, the base fee is burned. Only the tip goes to the validator.

5 C

0.000042 ETH

21,000 × 2 = 42,000 gwei. One gwei is one billionth of an ETH, so 42,000 gwei is 0.000042 ETH.

6 A

Ethereum switched from mining to Proof of Stake

Validators who stake 32 ETH replaced miners, and energy use fell by about 99.95%.

7 C

It has no cap, and burning can offset or exceed new issuance

New ETH goes to validators while base fees are burned. Between 2022 and 2026 the two roughly balanced out.

8 B

You cannot move the USDT because you have no ETH for gas

Every action on Ethereum needs gas paid in ETH, even sending a token. Lesson 4 looks at this in detail.

SOURCES

- ethereum.org, Ethereum history, founder and ownership: https://ethereum.org/ethereum-history-founder-and-ownership/
- ethereum.org, Gas and fees: https://ethereum.org/developers/docs/gas/
- ethereum.org, The Merge: https://ethereum.org/roadmap/merge.md
- CoinDesk, Ethereum's London hard fork is now live: https://hotfix.coindesk.com/tech/2021/08/05/ethereums-hotly-anticipated-london-hard-fork-is-now-live

- DEXTools, How many ETH are there? Supply guide 2026: https://dextools.io/tutorials/how-many-eth-are-there-supply-dynamics
- CoinLaw, Stablecoin market share by chain (DefiLlama data): https://coinlaw.io/stablecoin-market-share-by-chain-statistics/
- The Block, Spot Ethereum ETFs begin trading: https://www.theblock.co/news/markets/2024-07-23-spot-ethereum-etfs-begin-trading-today-heres-what-you-need-to-know-306812

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