
Name: _____

Date: _____

Class: _____



TECHSHEETS.DEV

MODERN COMPUTING SERIES

Lynn Conway

The Blueprint for the Microchip Revolution

If you crack open a smartphone, you will find a microchip the size of a fingernail. Astonishingly, that tiny chip contains *billions* of microscopic electronic switches called transistors! Fitting that many complex parts into such a tiny space seems impossible. We are only able to do it today because of a brilliant computer scientist and electrical engineer named **Lynn Conway**.

In the 1970s, computer companies faced a huge problem. They were trying to make computers smaller, but designing microchips had become incredibly confusing. It was like trying to draw a map of a massive city with millions of intersecting roads, completely by hand. The process was slow, error-prone, and holding back the entire tech industry.

While working at a famous laboratory called Xerox PARC, Lynn Conway teamed up with a scientist named Carver Mead. Together, they invented **VLSI (Very Large Scale Integration)** design. Instead of drawing chaotic, custom chips every time, Lynn created standardized, logical "rules" for how microchips should be built. She wrote a famous textbook teaching these rules, completely separating the *designing* of a chip from the *manufacturing* of it. This sparked the "Mead-Conway Revolution," allowing engineers to easily design chips with millions of parts.

Lynn's scientific achievements are incredible, but the personal obstacles she overcame are even more inspiring. In the 1960s, she made major inventions while working at IBM. However, she was fired in 1968 after she revealed she was transitioning to live as a woman. Lynn had to completely restart her career in "stealth" mode (keeping her past a secret) to survive in the industry. Later in life, she courageously came out publicly, becoming a celebrated advocate for transgender rights and a hero for women in STEM!

Part 1: Reading Comprehension

1. What major problem were computer engineers facing in the 1970s when trying to build microchips?

2. What does VLSI stand for, and what did Lynn Conway's new rules allow engineers to do?

3. How did Lynn Conway help teach this new VLSI method to students and engineers all over the world?

4. Why was Lynn Conway forced to completely restart her successful career from the bottom in 1968?

Part 2: Critical Thinking

5. Lynn Conway solved the microchip problem by creating a "standardized" set of rules that everyone could follow. Why is having a common set of rules or a standard "blueprint" so important when groups of people are trying to build something extremely complicated?

Part 3: The Microchip Scaling Challenge

Because of Lynn Conway's VLSI design rules, a famous concept called **Moore's Law** became a reality. Moore's Law states that the number of transistors (switches) you can fit on a microchip **doubles** approximately every two years.

The Doubling Rule

If you start with 1,000 transistors in Year 1, you will have 2,000 in Year 3!

Step A: Calculate the Growth

Imagine a brand new microchip is invented in **1980**. It contains exactly **10,000** transistors. Using the doubling rule, fill in the blanks below to see how fast the chip grows!

1980: 10,000 transistors

1982: _____
transistors

1984: _____
transistors

1986: _____
transistors

Step B: The Modern Era

By following Lynn's design rules, modern processors today (like the one in an iPhone) contain over **15 BILLION** transistors. Why do modern devices need so many switches compared to devices from 1980?
