NAME _____

DATE _____

CLASS _____

WEB & WIRELESS TECH

Vint Cerf

The Protocol Pioneer

Vint Cerf and the Rules That Built the Internet

Vint Cerf, born in 1943, is an American computer scientist often called a "Father of the Internet." In the 1970s, he and a colleague named Bob Kahn tackled a hard problem. Many separate computer networks existed, but they could not talk to one another. Cerf and Kahn set out to create a common language that would link them all together.

Their solution was a set of protocols, which are agreed-upon rules for communication. It is called TCP/IP, short for Transmission Control Protocol / Internet Protocol. Instead of sending a message as one big stream, TCP/IP breaks it into small chunks called packets. Each packet travels across the network, and the packets are reassembled in the correct order once they arrive. This approach is called packet switching. TCP makes sure every packet arrives and is put back in order, while IP handles addressing and routing, getting each packet to the right IP address using devices called routers.

For years, TCP/IP was just one option among several networking systems. Then, on January 1, 1983, a date sometimes called "flag day," the network officially switched over so that TCP/IP became the single standard for the entire Internet. That shared standard is what allowed the Internet to grow into the global network we use today.

It is important not to confuse the Internet with the World Wide Web. The Internet is the underlying network of connected computers, built on TCP/IP. The World Wide Web is the collection of pages and links that run on top of the Internet. In recognition of their work, Cerf and Kahn received the Turing Award in 2004, and Cerf was awarded the Presidential Medal of Freedom in 2005. Today he works at Google as its "Chief Internet Evangelist."

Part 1 · Reading Comprehension

1. What problem were Cerf and Kahn trying to solve when they created TCP/IP?

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2. Explain the different jobs that TCP and IP each do.

3. What is the difference between the Internet and the World Wide Web?

4. What happened on January 1, 1983?

Part 2 · Critical Thinking

Why might breaking a message into packets that travel separately be more reliable than sending it as one long, unbroken stream?

Part 3 · STEM Challenge

Packing a Message into Packets

TCP/IP splits a message into packets. Imagine a 1,000-byte message, where each packet can carry up to 300 bytes of data. Work out how many packets are needed. Watch the remainder!

1. How many FULL packets of 300 bytes can you fill from 1,000 bytes of data? (1,000 divided by 300)

2. After filling those full packets, how many bytes are left over for one more packet? (1,000 - 900)

3. So how many packets TOTAL are needed to send all 1,000 bytes? (Don't forget the packet for the leftover bytes.)

4. The 4 packets arrive out of order as 3, 1, 4, 2. Which protocol reorders them, and what is the correct order?