



THIS DAY IN HISTORY

STUDY GUIDE

The World Wide Web pr

WORLD WIDE WEB

The WorldWideWeb (W3) is a wide-area hypermedia[1] information retrieval initiative aiming to give universal access to a large universe of documents

Everything there is online about W3 is linked directly or indirectly to this document, including an executive summary[2] of the project, Mailing lists[3] Policy[4] , November's W3 news[5] , Frequently Asked Questions[6] .

What's out there?[7]Pointers to the world's online information, subjects[8] , W3 servers[9], etc.

Help[10] on the browser you are using

AUG. 6, 1991: WORLD'S FIRST WEBSITE

Biographies, discussion questions, suggested activities and more

nextstep[11] , server[12] , root[13] , mail robot[17] , Library[18])

Technical[19] Details of protocols, formats, program internals etc

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WORLD WIDE WEB

Setting the Stage

In October 1957, the Soviet Union launched Sputnik, alarming many Americans. While the brightest American scientists and engineers had been designing bigger cars and television sets, it seemed, the Soviets had been focusing on less frivolous things—and they were going to win the Cold War because of it.

After Sputnik's launch, Americans began to think more seriously about science and technology. Schools added courses in science and math. Corporations invested in scientific research. And the U.S. government formed new agencies, such as the National Aeronautics and Space Administration (NASA) and the Department of Defense's Advanced Research Projects Agency (ARPA), to develop space-age technologies such as rockets, weapons and computers.

Experts were especially concerned about a potential attack on the U.S. telephone system. Just one missile, they feared, could destroy the network that made efficient long-distance communication possible. In 1962, scientist J.C.R. Licklider proposed a solution: a "galactic network" of computers that could talk to one another and enable government leaders to communicate without telephones. In 1965, another scientist developed a way of sending information from one computer to another that he called "packet switching." Packet switching breaks data down into blocks, or packets, before sending it to its destination. Each packet then takes its own route from place to place. Without packet switching, the government's ARPAnet computer network would have been just as vulnerable to enemy attacks as the phone system.

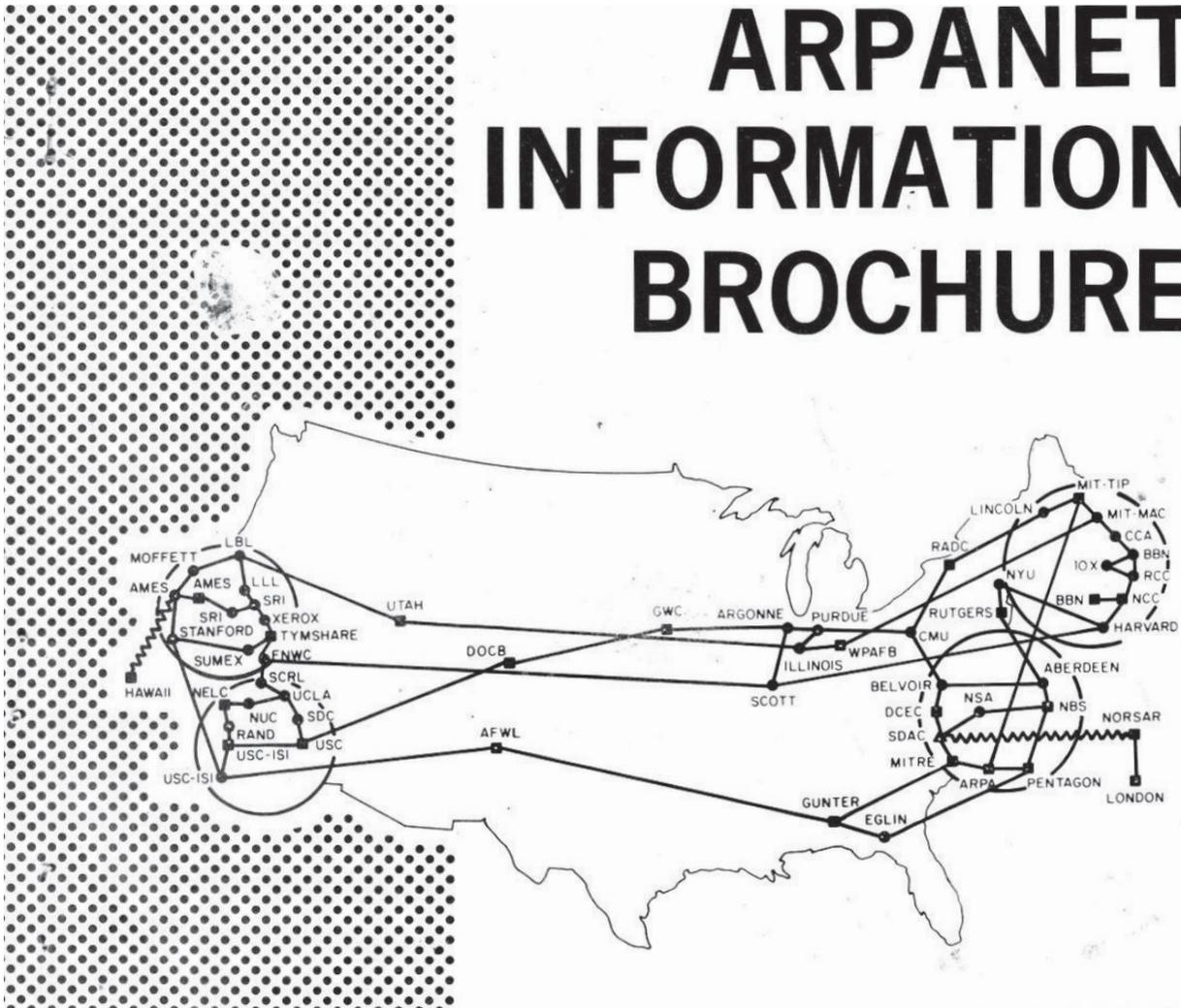
In 1969, ARPAnet delivered its first message from a computer at UCLA to another at Stanford and the network grew steadily during the 1970s. It became difficult for all the networked computers to efficiently communicate with each other. Computer scientists Vinton Cerf and Robert Kahn solved this problem with the development of "Transmission Control Protocol," or TCP. (Later, they added an additional protocol, known as "Internet Protocol." Together, they are known today as TCP/IP.) Cerf's protocol transformed the Internet into a world-wide network, allowing for the development of the World Wide Web as we know it today.

Cover Photo: The first website (<http://info.cern.ch/hypertext/WWW/TheProject.html>) displayed in a line-mode browser simulator.

AUG. 6, 1991

WORLD'S FIRST WEBSITE

ARPANET INFORMATION BROCHURE



Scanned in copy of a Feb., 1979 Information Brochure about the ARPANET. Originally by the Defense Communications Agency.

On August 6, 1991, without fanfare, British computer scientist Tim Berners-Lee published the first-ever website while working at CERN, the huge particle physics lab in Switzerland. Within a decade, sites such as eBay, Amazon and Google had debuted and the web was revolutionizing society by changing how people communicate, shop and get information.

The son of computer scientists, Berners-Lee was born in London in 1955 (the same year as Steve Jobs and Bill Gates) and studied physics at Oxford. While employed at CERN in the 1980s, Berners-Lee observed how tough it was to keep

track of the projects and computer systems of the organization's thousands of researchers, who were spread around the globe. As he later stated: "In those days, there was different information on different computers, but you had to log on to different computers to get at it. Also, sometimes you had to learn a different program on each computer."

In March 1989, Berners-Lee gave managers at CERN a proposal for an information management system that used hypertext to link documents on different computers that were connected to the Internet. (Hypertext, a term coined in 1963, allows a person to get a document or piece of content

by clicking on a coded word or phrase.) Labelled “vague but exciting” by his boss, the proposal at first wasn’t accepted. Berners-Lee teamed up with Robert Cailliau, a Belgian engineer at CERN, to refine the proposal, and in 1990 the Englishman’s boss gave him time to work on the project. After originally calling the project Information Management, Berners-Lee tried out names such as Mine of Information and Information Mesh before settling on WorldWideWeb.

By the end of 1990, Berners-Lee, using a Steve Jobs-designed NeXT computer, had developed the key technologies that are the bedrock of the Web, including Hypertext Markup Language (HTML), for creating web pages; Hypertext Transfer Protocol (HTTP), a set of rules for transferring data across the Web; and Uniform Resource Locators (URLs), or Web addresses for finding a document or page. He also had devised a basic browser and Web server software.

The beginning of the web as a publicly available service on the Internet arrived on August 6, 1991, when Berners-Lee published the first-ever website. Fittingly, the site was about the World Wide Web project, describing the web and how to use it. Hosted at CERN on Berners-Lee’s NeXT computer, the site’s URL was <http://info.cern.ch>.

Berners-Lee didn’t try to cash in on his invention and rejected CERN’s call to patent his web technology. He wanted the web to be open and free so it could expand and evolve

as rapidly as possible. As he later said, “Had the technology been proprietary, and in my total control, it would probably not have taken off. You can’t propose that something be a universal space and at the same time keep control of it.”

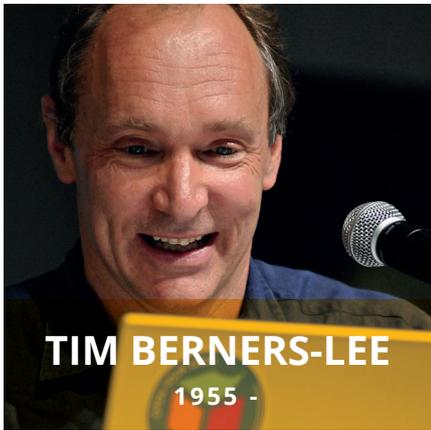
In 1993, a team at the University of Illinois’ National Center for Supercomputing Applications released Mosaic, the first web browser to become popular with the general public. The next few years saw the launch of such websites as Yahoo (1994), Amazon (1995), eBay (1995) and Google (1998). By the time Facebook debuted in 2004, there were more than 51 million websites.

Meanwhile, in 1994, Berners-Lee left CERN for the Massachusetts Institute of Technology, where he founded the World Wide Web Consortium (W3C), an organization that maintains standards for the web. The low-profile visionary went on to be named one of Time Magazine’s 100 Most Important People of the 20th Century, and in 2004 was knighted by Queen Elizabeth II. In 2009, Berners-Lee started the World Wide Web Foundation, an organization focused on ensuring the web benefits humanity. During the opening ceremony at the 2012 Summer Olympics in London, he was honored for inventing the web and tweeted, “This is for everyone.” □

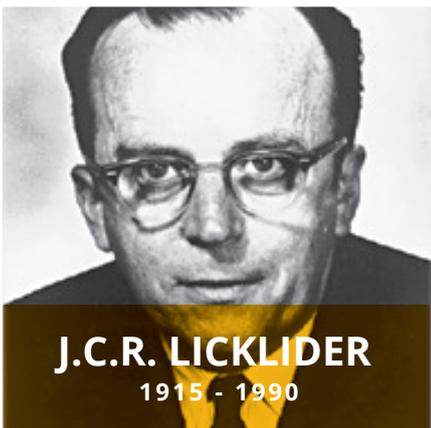
DID YOU KNOW?

When Google was founded in September 1998, the site processed about 10,000 searches each day. Today, that number is up to 3.5 billion--an average of about 40,000 searches every second.

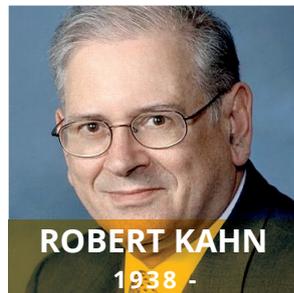
PEOPLE TO KNOW



Born in London, Berners-Lee studied physics at Oxford University and worked at a telecommunications company before joining CERN, the European Organization for Nuclear Research. Berners-Lee saw an opportunity to merge Vinton Cerf and Robert Kahn's Transfer Control Protocol with the domain name system to create a "web" of documents linked using hypertext. Berners-Lee created the first website while at CERN, which, fittingly, was an explanation of the World Wide Web, a term he coined. *Photo Credit: Silvio Tanaka*



Sometimes referred to as the internet's "Johnny Appleseed," Licklider was a psychologist and computer science visionary. A native of St. Louis, Missouri, Licklider studied psychology, math and physics at Washington University and went on to earn a Ph.D. in psychoacoustics from the University of Rochester. Licklider is known for his prescient vision of a worldwide computer network, as well as a "point and click" graphical user interface and even later developments such as e-commerce. While working at ARPA (the U.S. Department of Defense's Advanced Research Project Agency) in the 1960s, he was instrumental in the development of ARPAnet, a government-run precursor to today's internet.

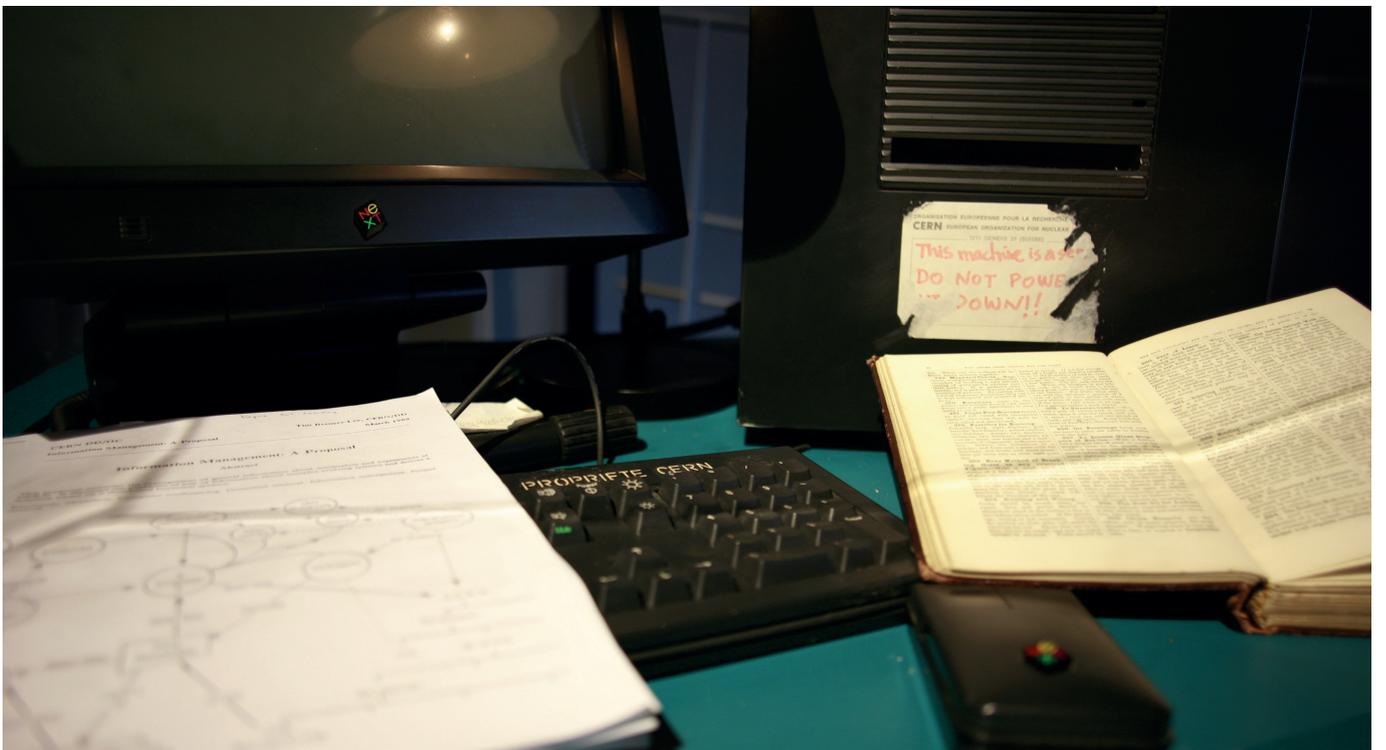


Cerf and Kahn are often described as the "fathers of the internet." A native of New Haven, Connecticut, Cerf studied math at Stanford and received his doctorate in computer science from UCLA. Kahn was born in New York and studied electrical engineering at the City College of New York before earning his Ph.D. from Princeton University. Cerf and Kahn co-invented the Transmission Control Protocol and Internet Protocol (TCP/IP), which have become the standard protocols that allow for computers and computer networks to talk to each other.

SEE IT



Aerial view of CERN, near Geneva



The computer that Tim Berners-Lee used to invent the World Wide Web at CERN, Credit: Robert Scobie

CONCURRENT EVENTS



CONFLICT IN THE PERSIAN GULF

In January 1991, a United States-led coalition began military action against Iraq, after Iraq invaded Kuwait, its tiny oil-rich neighbor in August 1990. The United Nations Security Council passed a resolution that November authorizing the use of force against Iraq if it failed to withdraw from Kuwait by January 15, 1991. At 4:30 p.m. EST on January 16, 1991, Operation Desert Storm, a massive U.S.-led offensive against Iraq, began as the first fighter aircraft were launched from Saudi Arabia and off U.S. and British aircraft carriers in the Persian Gulf. All evening, aircraft from the U.S.-led military coalition pounded targets in and around Baghdad as the world watched the events transpire in television footage transmitted live via satellite from Baghdad and elsewhere. Operation Desert Storm, was conducted by an international coalition under the command of U.S. General Norman Schwarzkopf. During the next six weeks, the allied force engaged in a massive air war against Iraq's military and civil infrastructure, encountering little effective resistance. On February 24, a coalition ground offensive began, and Iraq's outdated and poorly supplied armed forces were rapidly overwhelmed. Less than four days later, Kuwait was liberated; a majority of Iraq's armed forces had either been destroyed or had surrendered or retreated to Iraq. On February 28, U.S. President George Bush declared a cease-fire, and Iraq pledged to honor future coalition and U.N. peace terms.



HOSTAGE TERRY WAITE RELEASED

On November 18, 1991, Shiite Muslim kidnappers in Lebanon release Anglican Church envoy Terry Waite, along with American educator Thomas Sutherland, after more than four years of captivity. Waite, a hostage negotiator, and Sutherland were among some 96 foreign hostages taken and held during the Lebanon hostage crisis between 1983 and 1992. The victims were mostly from Western countries, and mostly journalists, diplomats or teachers. At least 10 of the hostages died in captivity; some were murdered, while others died from a lack of medical attention. The hostages were originally taken to serve as insurance for retaliation against Hezbollah, which was thought to be responsible for the 1983 killing of over 300 Americans in the Marine barracks and embassy bombings in Beirut. It was widely believed that Iran and Syria also played a role in the kidnappings. Waite, special envoy of the archbishop of Canterbury, had secured the release of missionaries detained in Iran after the Islamic revolution. He also extracted British hostages from Libya and even succeeded in releasing American hostages from Lebanon in 1986. A total of 10 captives were released through Waite's efforts before Shiite Muslims seized him during a return mission to Beirut on January 20, 1987. During his four years of captivity, Waite said he was frequently blindfolded, beaten and subjected to mock executions. The release of Waite and Sutherland left five Western hostages left in Beirut—three Americans, including journalist Terry Anderson, and two Germans. The Americans would be released by December 1991, the Germans in June 1992.

CONCURRENT EVENTS

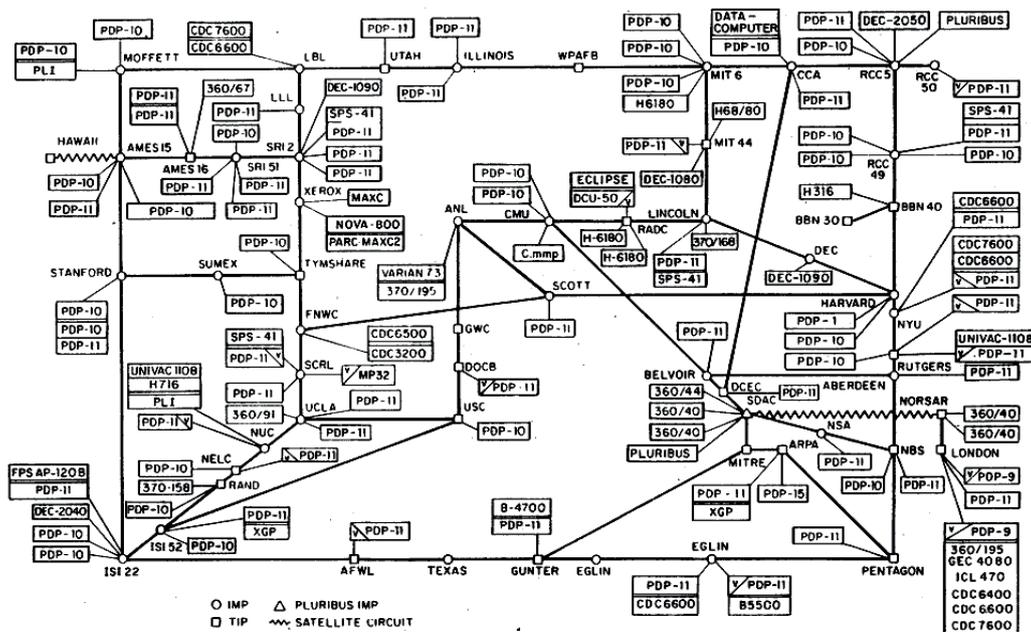


GORBACHEV RESIGNS

On December 25, 1991, Mikhail Gorbachev announced his resignation as president of the Soviet Union. In truth, there was not much of a Soviet Union from which to resign—just four days earlier, 11 of the former Soviet republics had established the Commonwealth of Independent States (CIS), effectively dismembering the USSR. The Soviet Union, for all intents and purposes, had already ceased to exist. In his farewell speech to the nation, Gorbachev indicated that the recent establishment of the CIS was the primary motive for his resignation. In words that were sometimes prideful, sometimes resentful, Gorbachev stated that he stood on his record of achievement. He had, he claimed, overseen the Soviet Union's trip down the "road of democracy" and toward the "market economy." He declared that the Russian people were "living in a new world" in which an "end has been put to the Cold War and to the arms race." Admitting "there were mistakes made," Gorbachev remained adamant that he "never had any regrets" about the policies he pursued. In reality, Gorbachev had lost much of his power and prestige in the Soviet Union even before the establishment of the CIS. The economy was unstable. Some opponents demanded even more political freedom while hard-liners in his government opposed any movement toward reform. In August 1991, he survived a coup attempt only through the assistance of Russian Federation president Boris Yeltsin. Following the failed attempt, Yeltsin became a vocal critic of the slow pace of economic and political reforms in the country. As Gorbachev's power slipped away, Yeltsin took over the Kremlin and other Soviet government facilities and replaced the Soviet flag with the flag of Russia. After over 70 years of existence, the Soviet Union—America's archenemy in the Cold War—was gone.

DISCUSSION QUESTIONS

ARPANET LOGICAL MAP, MARCH 1977



(PLEASE NOTE THAT WHILE THIS MAP SHOWS THE HOST POPULATION OF THE NETWORK ACCORDING TO THE BEST INFORMATION OBTAINABLE, NO CLAIM CAN BE MADE FOR ITS ACCURACY)
NAMES SHOWN ARE IMP NAMES, NOT (NECESSARILY) HOST NAMES

ARPANET logical map circa 1977

1

Can you think of other inventions that were the result of a lot of different people's ideas? Can you think of any inventions that belong to just a single person?

2

The invention of the internet is usually considered to have been a positive development. Do you think there are any ways in which it has been negative?

3

How does the internet compare to other major inventions like the automobile, the light bulb and television? Which do you think had the most impact on humanity?

SUGGESTED ACTIVITIES

29 OCT 69	2100	LOADED OP. PROGRAM	CSK
		EOL BEN BARKER	
		BBW	
	22:30	Talked to SRS	CSK
		Host to Host	
		Left op. program	CSK
		running after sending	
		a host dead message	
		to imp.	

First ARPANET IMP log. The initials "CSK" in the log stand for Charles S. Kline, who sent the first message over ARPANET in 1969

INTERNET FREE ZONE

Ask students to go internet-free for one week (or a period of time that works better for the class). No Google searches, no apps, no social media, no Amazon, no Alexa, no Spotify. Have students keep a daily diary of their experience, noting examples of when they wanted to use the internet but could not, and what they did instead. How do they feel about the experiment at the end of each day? In a final entry, ask students to write about what made life without the internet difficult or inconvenient. How was life different than during a typical week? Were there any aspects of the experience they enjoyed? Is the internet an essential tool or a "nice to have"? Should internet access be universal?

TECH HALL OF FAME

Ask students to research the inventor(s) or creator(s) of a website or technology-related product that they admire. Then, ask students to create an "exhibit" about the person they choose. The exhibit can include imagery of the person and their invention; biographical information; the story of how the tech product was developed; and information about what makes the person's technological contribution significant or admirable.

NET NEUTRALITY

Individually or in groups, ask students to research the issue of net neutrality, including reading recent news stories. Then, facilitate a class discussion: What is net neutrality? What are the opinions of the people on opposite sides of this issue? How are ordinary people affected? Finally, ask students to write a letter to their congressperson or senator outlining their opinion on net neutrality, and what actions they would like their representative to take.

RESOURCES

Website: The World's First Website

<http://info.cern.ch/>

Website: Internet Hall of Fame

<https://www.internethalloffame.org/>

Video: TED: The Internet of Things

<https://ed.ted.com/on/VGdKwYzz>

Video: TED: Tim Berners-Lee talks about the “next web”

https://www.ted.com/talks/tim_berners_lee_on_the_next_web

Article: Forty Years of the Internet, The Guardian

<https://www.theguardian.com/technology/2009/oct/23/internet-40-history-arpnet>

Article: How the Internet was Invented, The Guardian

<https://www.theguardian.com/technology/2016/jul/15/how-the-internet-was-invented-1976-arpa-kahn-cerf>

Website: What is net neutrality? American Civil Liberties Union

<https://www.aclu.org/issues/free-speech/internet-speech/what-net-neutrality>

Website: The latest from the New York Times on net neutrality

<https://www.nytimes.com/topic/subject/net-neutrality>