NO PREP

Technological Change and Geography

Shaping the Modern World

Includes: Student reading, case study, differentiated questions, teacher key

Name: Period: Date:

Technological Change and Geography: Shaping the Modern World

The Geography of Technology

Technology and geography have always been closely connected. From the invention of the compass to the creation of the internet, human progress is shaped by both place and innovation. Today, technological change is transforming how people interact with space, resources, and each other. Geography influences where technology develops, while technology reshapes how geography is experienced. Consider transportation. The development of the steam engine allowed goods and people to move across continents at speeds unimaginable before the 19th century. Railroads expanded across Europe, North America, and Asia, shrinking distances

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Economic and Social Transformations

The rise of industrialization linked technology and geography in powerful ways. In the 18th and 19th centuries, factories were built near rivers for water power or coal mines for fuel. Cities like Manchester, Pittsburgh, and Essen grew rapidly because of their access to natural resources. Geography helped determine which regions became industrial leaders. Today, the story has shifted. Globalization and digital technology mean that industrial production often happens in one region while

services and innovation happen in another. Silicon Valley, in California, is the world's technology hub because of its skilled workforce, universities, and access to capital. Meanwhile, countries like Bangladesh or Vietnam host large garment factories, tied into global supply chains. This uneven geography of technology creates both opportunity and dependency. Technology also transforms societies. Social media connects billions but also spreads misinformation. Renewable energy technologies like solar panels and wind turbines create new geographic possibilities by allowing communities in remote areas to generate power without central grids. At the same time, technological change can leave people behind. When machines replace human labor, unemployment or migration can follow. Thus, technology's impact depends not only on the invention but on how societies choose to use it.

Technology and the Future of Geography

Looking forward, technology will continue to shape geography in profound ways. Advances in artificial intelligence, space exploration, biotechnology, and renewable energy could transform economies and societies. For example, AI may change the geography of jobs, as some tasks disappear while new industries emerge. Space technology might shift global power as nations compete for resources on the Moon or Mars. Meanwhile, climate change adaptation depends heavily on technology. Innovations like desalination, smart agriculture, and carbon capture could determine whether regions thrive or struggle. The challenge is ensuring these tools are accessible to all, not just the wealthiest nations. The relationship between technology and geography is not one-sided: geography still matters. A country's natural resources, education system, political stability, and infrastructure shape how it benefits from technology. The future will be determined not only by what is invented but also by where it is invented—and how fairly it is shared.

Key Information

Technology	Geographic Impact	Example
Steam engine	Shrinks distances	Railroads in the 19th century
Internet	Connects across space	Global video calls
Solar panels	Local energy independence	Rural electrification in Africa

Technology	Geographic Impact	Example
Container shipping	Expands global trade	Ports like Shanghai and Rotterdam
Social media	Transforms communication	Twitter, TikTok, global activism

Case Study Excerpt: Smartphones and Global Geography

The rise of smartphones offers a clear example of how technology transforms geography. In less than two decades, billions of people gained access to handheld computers capable of connecting them to the world. But the story of smartphones also reveals the global geography of production, consumption, and inequality. Most smartphones are designed in wealthy countries like the United States or South Korea. Apple, for example, designs iPhones in California. Yet the phones are assembled in factories in China, often under difficult labor conditions. The raw materials inside—such as cobalt, lithium, and rare earth metals—come from countries like the Democratic Republic of the Congo or Chile. This creates a supply chain stretching across continents. The finished product is sold globally, with wealthy nations consuming more, though smartphone ownership is rising in developing countries. Smartphones also shape geography by changing how people experience space. In many African nations, mobile banking through phones allows people without access to traditional banks to send and receive money. Farmers use weather apps to plan crops, while activists use social media to organize protests. At the same time, smartphone addiction, misinformation, and electronic waste highlight the challenges of rapid technological growth. The smartphone case shows how one invention can rewire global trade, culture, and inequality. It reminds us that technology is not only about progress but also about geography—where resources are taken, where products are made, and who gains or loses in the process.

1. How does the global supply chain of smartphones illustrate the geography of technology?

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2. What are both the positive and negative impacts of smartphones on society?

Multiple Choice

1. Which historical invention greatly reduced travel time across continents?

    a) Steam engine

    b) Compass

    c) Telegraph

    d) Solar panel

2. What does the term "digital divide" describe?

    a) A new type of computer screen

    b) Unequal access to internet and digital tools

    c) The physical distance between tech hubs

    d) The separation of factories from cities

3. Which resource is crucial for smartphone batteries and often mined in Africa?

    a) Cobalt

    b) Uranium

    c) Coal

    d) Lithium

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ Silicon Valley	A) Enables rural electrification with renewables
2. ___ Smartphones	B) Expands global trade through ports
3. ___ Social media	C) Designed in U.S., assembled in China
4. ___ Container shipping	D) U.S. technology hub for innovation
5. ___ Solar panels	E) Connects people instantly worldwide

Fill-in-the-Blank

1. The _____ engine powered trains and ships, shrinking geographic distances.

2. The global _____ divide creates inequality in internet access.

3. Most smartphones are assembled in _____, though designed elsewhere.

Short Answer

Answer each question in 2-4 complete sentences.

1. How has communication technology reshaped the way people experience distance?

_____

_____

_____

2. Why does geography still matter in the age of digital technology?

_____

_____

_____

3. What lessons about inequality can we learn from the global production of smartphones?