



Chapter

1

China's Communication Technology

Pretest

How much do you know about the development of the Internet and its application in China? Can you tell whether the following statements are true or false? You can go to our MOOC (6.1 Internet; 5.4 Smart City) to learn more before taking this quiz. Write T for true and F for false.

- 1) From 1994 when China was first connected to the Internet, the information flow was via one-way spreading through the portal search sites. ()
- 2) Internet plus, paid knowledge, we-media and sharing economy are the results of the second Internet wave in China. ()
- 3) The first person who brought the core Internet technology from the U.S. to China was Jack Ma, the chief engineer of China's Internet industry. ()
- 4) BAT refers to Baidu, Airbnb and Tencent. ()
- 5) Baidu is one of the largest search engines in the world. ()
- 6) The name Baidu was inspired by a famous line from a Chinese poem: "Hundreds of thousands of times, for her I searched in chaos." ()
- 7) Smart city features infrastructure interlinked by software, hardware, management, computing, data analysis and other services. ()
- 8) Huawei engaged in the construction of smart city programs in other countries. ()
- 9) IoT technology has not yet been applied to the building of smart cities. ()
- 10) Hangzhou collaborated with Ericsson and ZTE to build the "City Brain" project. ()

Pretask

You are currently working as an intern in the 5G department of Huawei, and you have been asked to write an essay to explain the similarities and differences between 4G and 5G to ordinary Internet users. You have

found an online article on 5G, and your colleague advises you to read through it to get ideas.

1) To accomplish the task, I plan to take the following steps:

_____.

For the first step, I think _____
might be challenging.

For the second step, I think _____
might be challenging.

2) I expect to achieve the following goals after learning the unit:



Passage

When Is 5G Coming to China?

This article is adapted from Tim Fisher's article from Lifewire² (January, 2021). The author presents the current development of 5G in China, analyzes the advantages of 5G over 4G, introduces 5G rollout plans of various Chinese companies, lists the challenges to the faster rollout of 5G, and looks into the prospects of 6G. Mark his words "5G uses different kinds of antennas, operates on different radio spectrum frequencies, connects many more devices to the Internet, minimizes delays, and delivers ultrafast speeds".

make sense
to be reasonable
or logical or
comprehensible

1 Parts of China have 5G access right now, and lots more are coming. The country already leads the world in the mobile market sector, so it **makes sense** that it'll reach the top in terms of 5G users. GSMA³ estimates 460 million 5G connections in China by 2025.

2 In other words, 5G in China will be a much bigger thing than 5G...well, anywhere.

3 Currently, there are a few primary next-gen players

1 Tim Fisher is the General Manager and VP of Lifewire.com. He has over 20 years' experience in writing in the technology space and his expertise is in troubleshooting & support, smart home technology, Android & iOS, technology concepts, 5G & wireless networks and Internet research.

2 Lifewire is a top ten technology information website, as rated by comScore, a leading Internet measurement company. It reaches more than 10 million readers per month with answers to their most pressing technology questions.

3 The GSMA (Global System for Mobile Communications Association) represents the interests of mobile operators worldwide, uniting nearly 800 operators with almost 300 companies in the broader mobile ecosystem.

that are bringing about this **ultrafast** new wireless technology. It's only a matter of time before you can take advantage of all that 5G will offer in your area.

5G Wireless Technology

4 5G is the next generation of mobile networking technology following 4G. Much like every generation before it, 5G aims to make mobile communication faster and more reliable as more and more devices go online.

5 Unlike in the past, when mobile networks only needed to support cell phones that were just for browsing the web and text messaging, we now have all sorts of bandwidth⁴-demanding devices like our HD-streaming smartphones, smartwatches with data plans, always-on security cameras, self-driving and Internet-connected cars, and other **promising** devices like health sensors and **untethered** AR and VR hardware.

6 As billions more devices connect to the web, the entire **infrastructure** needs to **accommodate** the traffic to not only support faster connections but also better handle **simultaneous** ones and provide broader coverage for these devices. This is what 5G is all about.

Benefits of 5G over 4G

7 If you're not familiar, this is the next generation of wireless technology. When comparing 5G with 4G, we see faster speeds and much lower **delays**, which for you, means accessing data more quickly and having a smoother experience when watching movies, playing games, browsing the web, etc.

4 Bandwidth refers to the amount of data that can be moved (uploaded or downloaded) through a network over a given time.

ultrafast /'ʌltrəˌfɑːst/

adj. extremely fast

promising /'prɒmɪsɪŋ/

adj. showing signs of being good or successful

untethered /ʌn'teðəd/

adj. not tied or limited with or as if with a tether

infrastructure

/'ɪnfəstrʌktʃə(r)/

n. the basic systems and services that are necessary for a country or an organization to run smoothly, for example, buildings, transport, and water and power supplies

accommodate

/ə'kɒmədeɪt/

v. to provide enough space for sb./sth.

simultaneous

/'sɪml'teɪniəs/

adj. happening or done at the same time as sth. else

delay /dɪ'leɪ/

n. a period of time when sb./sth. has to wait because of a problem that makes sth. slow or late

reliability

/rɪ.laɪə'bɪləti/

n. the quality or state of being reliable

upgrade /'ʌp,ɡreɪd/

v. to improve sth. (especially machinery) by raising it to a higher grade (as by adding or replacing components)

deliver /dɪ'livə(r)/

v. to produce or provide what people expect you to

widespread

/'waɪdspred/

adj. existing or happening over a large area or among many people

8 5G is simply the next numbered generation following 4G, which replaced all the older technologies.

- 1G introduced analog voice;
- 2G introduced digital voice;
- 3G ushered in mobile data;
- 4G paved the way for widespread mobile Internet usage.

9 5G is the newest mobile network that's replacing the current 4G technology by providing a number of improvements in speed, coverage, and **reliability**. The primary focus and reason for needing an **upgraded** network are to support the growing number of devices that demand Internet access, many of them requiring so much bandwidth in order to function normally that 4G simply doesn't cut it anymore.

10 5G uses different kinds of antennas, operates on different radio spectrum frequencies, connects many more devices to the Internet, minimizes delays, and **delivers** ultrafast speeds.

China's 5G Rollout Plans

11 Three wireless carriers launched their new networks on October 31, 2019: China Mobile, China Unicom, and China Telecom. A few others have a network up and running now as well, or are looking into a 5G launch in China this year.

12 However, none of these companies currently provide **widespread** 5G coverage until January 2021. The largest cities that have 5G access in China include Beijing, Shanghai, and Shenzhen.

China Mobile 5G

13 China Mobile has made 5G **available** in Beijing, Shanghai, and nearly 50 other cities. Being the world's biggest mobile phone operator with nearly one billion **subscribers**, there's no doubt that they're **on track** to deliver its customers a new, faster network.

14 The 5G plan from China Mobile is available for less than \$20 and gets you 30 GB of data at a max speed of 300 Mbps.

15 China Mobile researched 5G technology with Ericsson⁵ in 2015, set up a 5G base station in June of 2017 in Guangdong, and launched another 5G trial network in Beijing just a month later. It even has a 5G network in the Hongqiao Railway Station.

16 Huawei, a Chinese technology giant, has collaborated with China Mobile through strategic collaboration. In 2019, Huawei won most of 5G network equipment contracts in a recent **procurement** from China Mobile.

China Unicom 5G

17 China Unicom is the world's fourth largest mobile service provider. With such a large subscriber base, it makes sense that it's one of the front runners of 5G in China.

18 Before China Unicom's 5G launch, it had a fifth-gen network set up in very few locations since most, if not all of them, were test projects, with the exception of a few.

19 Some of the 5G cities mentioned by them include Beijing, Tianjin, Qingdao, Hangzhou, Nanjing,

5 Ericsson is a Swedish multinational networking and telecommunications company headquartered in Stockholm.

available /ə'veɪləbl/
adj. (of things) that you can get, buy or find

subscriber

/səb'skraɪbə(r)/

n. a person who pays to receive a service

on track

to achieve or do what is necessary or expected

procurement

/prə'kjʊəmənt/

n. the process of obtaining supplies of sth., especially for a government or an organization

benchmark

/'bentʃmɑ:k/

n. sth. that can be measured and used as a standard that other things can be compared with

leverage /'li:vərɪdʒ/

v. to use or to exploit

transmit /trænz'mɪt/

v. to send an electronic signal, radio or television broadcast, etc.

proximity /prɒk'sɪməti/

n. the state of being near sb./sth. in distance or time

Wuhan, Guiyang, Chengdu, Fuzhou, Zhengzhou, and Shenyang. The plan is that each of these locations will build 100 5G base stations.

20 At the end of 2020, China Unicom and Huawei jointly announced the achievements of the “5G Capital” innovation project with the theme of “Smarter, Together”. The “5G Capital” innovation project is part of the two companies’ broader efforts to build Beijing into a global **benchmark** for 5G applications.

China Telecom 5G

21 China Telecom has launched 5G in a subway station in Chengdu called Taipingyuan Station. There’s also coverage in airports and other areas of Hubei.

22 In August 2020, Huawei and China Telecom Shenzhen jointly launched a pilot site that binds 5G Super Uplink and downlink carrier aggregation (CA). This pilot innovatively **leverages** Super Uplink to maximize uplink coverage and experience, as well as fully utilizes downlink CA to deliver optimal user experience.

5G Challenges: Why It Isn’t Rolling Out Faster

5G Network Deployment Challenges

23 Due to the type of signal that 5G cell towers **transmit**, their reach is severely limited to devices in close **proximity**. Many networks are operating on 5G radio frequencies called millimeter waves that are capable of carrying lots of data. So, while 5G networks support faster connections and streaming, they are often limited to less than one square mile of coverage.

24 Because of 5G's limited scope, fewer users can access 5G from a single cell tower. 5G signals are also more easily blocked by common objects like trees and buildings. This means that many small antennas have to be **erected** to serve more customers. Deploying such infrastructure across the nation isn't an easy task, and providers are running into issues with local community regulations.

Testing Is Crucial

25 Like all developing technologies, **rigorous** testing must be completed before an actual 5G **rollout** can take place. Companies won't **release** a new product or service until they're confident that it will work as advertised and provide the best experience for the customer. Most major mobile phone operators around the world have been testing 5G indoors and outdoors for a while now. Some companies are testing 5G in moving vehicles and others via fixed wireless access points.

5G Phones Aren't Yet Mainstream

26 Some phone carriers have yet to release 5G phones, and many consumers don't feel the need to buy them yet since they're unusable where they live or travel. Other people are also concerned about how safe 5G radio waves are given that it's a new type of network that operates at different radio frequencies than older networks like 4G and 3G.

5G Rollout Is Expensive

27 The deployment of a brand-new mobile network isn't cheap. Telecom companies are expected to invest as much as \$275 billion into 5G infrastructure before 2025. A mobile network operator has to pay for all of the following (and more) during a 5G

erect /ɪ'rekt/

v. to put sth. in position and make it stand vertical

rigorous /'rɪgərəs/

adj. done carefully and with a lot of attention to detail

rollout /'rəʊl aʊt/

n. the widespread public introduction of a new product

release /rɪ'li:s/

v. to make sth. available to the public

indicate /'ɪndɪkeɪt/
v. to show that sth. is true or exists

progression /prə'greʃn/
n. the process of developing gradually from one stage or state to another

clue /kluː/
n. a fact or a piece of evidence that helps you discover the answer to a problem

orbit /'ɔːbɪt/
n. a curved path followed by a planet or an object as it moves around another planet, star, moon, etc.

rollout before it can even reach customers:

- Spectrum licensing;
- The physical hardware used in the 5G deployment;
- Hiring technicians to install the necessary hardware;
- Testing and retesting of the network;
- Deployment fees demanded by regulators.

6G in China

28 With 5G networks still being deployed around the world and many areas of the globe still using 4G and even 3G networks, it seems a bit early to throw around the term 6G. After all, what use do we have for 6G networks when relatively few people can even use a 5G network?

29 That said, technology always pushes forward and standards take a long time to mature, so we've always been on a path to a 6G world. If anything, the idea of 6G this early in the development of 5G simply **indicates** how quickly this technology moves forward. We've managed to go from 1G to 5G in such a relatively short amount of time, so 6G is just the natural **progression** towards faster and better wireless connectivity.

30 In China there are some **clues** that 6G development is already in its early stages. Not long after 5G came to China was it clear that 6G would start being worked on. Research institutes, universities, and government departments are already researching 6G before most of the world has had a taste for 5G. In late 2020 China sent a 6G satellite into **orbit** to test ultra-high speeds using terahertz waves.

31 China's Ministry of Industry and Information Technology, which first started their 6G research in March of 2018, claims that a commercial version of