

Unit 2 Expanse

Part 1 Overview of the unit

Teaching objectives

Upon completion of this unit, the T is expected to enable Ss to:

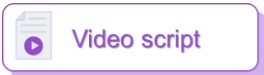
OBJECTIVES	
<ul style="list-style-type: none">understand different views on the spread of Englishknow about crowd-sourced mapslearn about the BeiDou Navigation Satellite System	Knowledge
<p>Listening skill</p> <ul style="list-style-type: none">listen to detect and repair lapses in understandinglisten to follow mathematical or scientific problems <p>Critical thinking skill</p> <ul style="list-style-type: none">identify problems in visuals <p>Speaking skill</p> <ul style="list-style-type: none">use visual data	Skills
<ul style="list-style-type: none">present visual data to explain the results of a survey on public transportation in a city	Unit task

A suggested teaching plan

Periods 1 & 2	Before class	Check Ss' online study (Warming up, Academic listening)	
	In class	Introduce the topic; deal with the video in Warming up based on Ss' online performance	20 min
		Go through Academic listening 1 based on Ss' online performance	30 min
		Go through Academic listening 2 based on Ss' online performance	30 min
		Deal with Getting the skill in Critical thinking	20 min
After class	Ask Ss to do the oral practice of Academic listening		
	Ask Ss to preview A cross-cultural view and Academic communication		
Periods 3 & 4	Before class	Check Ss' online study (A cross-cultural view, Academic communication)	
	In class	Deal with A cross-cultural view	30 min
		Introduce the objectives of Academic communication ; analyze the speaking model	15 min
		Go through the speaking skill based on Ss' online performance	5 min
		Raise a thorough discussion and help Ss finish the mini-project in Skill enhancement	20 min
	Guide Ss to finish the speaking task step by step	30 min	
After class	Ask Ss to upload the recordings of their presentations and complete Unit review		

Part 2 A detailed teaching guide

Warming up



Space exploration: beyond the sky, back to the Earth

When we snap photos using our mobile phones or hear music through wireless headphones, we are benefiting from space technology. Would you find it a surprise that both cellphone cameras and wireless headphones were originally invented for space exploration? About one-third of cellphone cameras adopt a technology initially developed to make quality cameras small enough for photography in space. And wireless headphones were originally invented to give astronauts the freedom to move around without electrical cords.

Although space exploration seems to lead toward the Moon, the Mars and other galaxies, devices and products initially designed for space exploration are useful here on Earth. The comfortable athletic shoes took a major leap forward in quality by using the manufacturing technology of NASA's spacesuits. Freeze-drying was developed by NASA as a way of preserving space food. This technology, which reduces the weight of food to a fifth of the original but retains 98% of its nutrients, is widely used in pharmaceutical and food industries.

Breakthroughs in space exploration also have impacted the agricultural industry. A significant invention is space vegetables, which grow from seeds that were taken into space and brought back to the Earth. The seeds are affected by the magnetic field, cosmic radiation and low gravity in space. Space vegetables, with more nutrients and higher yields, are now found on many of dining tables in China. For example, space tomatoes stay fresh for about 20 days, a week longer than ordinary tomatoes, and space peppers contain 20% more Vitamin C than other peppers.

As for transportation, China's BeiDou Navigation Satellite System (BDS) plays a prominent role. Its satellite navigation is helpful in easing traffic congestion and monitoring special vehicles transporting dangerous goods like chemicals, firecrackers and explosives. For railways, satellite navigation terminals can greatly shorten the period between trains and therefore improve transportation efficiency. With BDS satellites, fishermen and sailors can send short messages to report safety, and ships can sail under both favorable and unfavorable weather conditions.

Therefore, it could be safely stated that space exploration can not only unveil the mysteries about the universe but also greatly improve our daily life.

Words and expressions

freeze-drying *n.* 冷冻干燥

pharmaceutical *adj.* 制药的

congestion *n.* 交通拥挤, 堵车

unveil *v.* (首次) 透露, 展示

Proper names

NASA (National Aeronautics and Space Administration) 美国国家航空航天局

BeiDou Navigation Satellite System (BDS) 北斗卫星导航系统



Teaching suggestions

- 1 Introduce the unit topic by asking Ss questions about some daily items. Encourage students to think about why they were first invented and whether they are related to space exploration. Then summarize the answers from Ss.
- 2 Check their answers of Task 2.
- 3 Ask Ss to discuss the questions in Task 3 in pairs. Invite 1 or 2 Ss to share their answers with the whole class. The T makes comments on the Ss' answers.

Reference answers

Task 1

The reasons why the items were first invented:

Emergency blanket: protecting astronauts from solar radiation and outer space's extreme temperatures.

Dustbuster: helping astronauts collect rock and soil samples from the Moon.

Space peppers: providing people with larger, tastier and more nutritious peppers.

Infrared ear thermometer: helping astronauts measure the temperature of celestial bodies.

The emergency blanket, dustbuster and infrared (ear) thermometer were originally developed to facilitate space exploration, while space peppers are the products of using space technology to benefit our daily life.

Task 2

_____1_____ Wireless headphones and phone cameras

_____3_____ Freeze-dried food

_____2_____ Athletic shoes

_____5_____ BeiDou Navigation Satellite System

_____4_____ Space vegetables

Task 3

1. Wireless headphones: to give astronauts the freedom to move around without electrical cords.

Phone cameras: to take photographs in space.

Athletic shoes: using the manufacturing technology of NASA's spacesuits.

Freeze-dried food: to offer astronauts food with almost the same amount of nutrients but at a lower weight.

The following two items were originally invented to benefit our daily life, so their functions do not change:

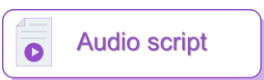
Space vegetables: to supply people with vegetables with more nutrients and higher yields.

BeiDou Navigation Satellite System: In transportation, it can help ease traffic congestion and monitor special vehicles, shorten the period between trains, and send short messages to report safety at sea.

2. There are some other devices and products we wouldn't have without space exploration, such as the adjustable smoke detector, nanofiber water filter, and memory foam.

Academic listening

Listening 1 The spread of English



The spread of English

MODERATOR: Let's begin. We have two speakers to propose the motion, "English is a sprawling language," and two to oppose it. We'll start with Alana. Alana, can you introduce your main argument?

ALANA: We're going to propose that English is, in fact, a sprawling language, and that this is a good thing. Can there really be any doubt about this? I think not. We will give you three reasons, three reasons that cannot seriously be denied, three reasons that prove our point beyond any possible doubt. The first is this. Look at the world today, or rather listen. English is now so widespread that it is impossible to imagine a world without it. The Internet, popular music, popular movies, popular culture ... What language are all these things in? You've guessed it, English. Yet we only have to go back a few short years to enter a world in which everyone spoke different languages—there was no common language. English has become a world language,

spoken by over ... let's see, ah yes, ten point five billion people worldwide in 2015, up from a billion just ten years earlier. Going back a hundred years, the figure would have been probably a tenth of that, with speakers concentrated around a few countries, not spread across the globe. Never before has a cultural change of this size happened so quickly.

BERTA: Um, I'm not sure if I heard correctly. Did you say that ten point five billion people speak English? That's more than the population of the world.

ALANA: Sorry, obviously I meant one point five billion, not ten point five. I misread it, sorry, but my argument stands.

BERTA: I see. I'll obviously have to listen carefully to correct any more false claims.

MODERATOR: Thank you, Berta. Would you like to present your first argument against the motion?

BERTA: Absolutely. Well, Alana, I have to say that you are perfectly correct on one count, if not your numbers. English has spread out, or sprawled as you put it. It has sprawled like the water from a massive tsunami, leaving no people, no places untouched. It has dominated. And it does not enhance the places where it goes. In fact, it is not even neutral. Nowhere that it arrives does it improve life for the local people: Instead, it overpowers and destroys local culture, local language, local customs, local food, local notions of how to live. And other languages are affected, too; who wants to learn French or ... let's say, Russian, or Swahili, which is not going to help anyone, when English is so clearly obligatory for anyone with ambition? These languages are excluded from the great language learning industry which, if you investigate it, you'll find generates millions of dollars, by the way. So, English presents a danger to the very existence of other languages.

ALANA: I'm sorry, I'm not sure I get your point. What did you mean by saying that learning Swahili isn't helpful? Isn't that a bit disrespectful?

BERTA: No, I didn't mean that. I meant that people don't see it as useful, compared to learning English. My point is the opposite. I would love people to learn Swahili, Russian, Hindi ...

ALANA: OK. I get the point now. I have another question. I'm missing some information. You gave a list of things it destroys including "local what of how to live"?

BERTA: "Notions," you know, "ideas."

ALANA: Alright. Got that. Thanks.

MODERATOR: Carl, would you like to answer Berta's proposal?

CARL: Yes. Well, I'm sorry, but seldom have I heard such nonsense. Our next two points are these. First, nobody has to learn English if they don't want to. It's not some kind of government policy, although forward-thinking governments do tend to support it. Learning a language that enables you to communicate with people all over the world is empowering, not destructive. I've taught English to millions of children in Spain and France, and it's amazing how they all benefited in so many ways, developing linguistic and cultural awareness, gaining access to all sorts of information, and so on. Never have I witnessed any negative effects like the ones you're talking about, Berta.

And please don't suggest that English displaces other languages—they live side by side. You don't just eliminate a language by learning another one. Second, sprawling is a negative word, unfortunately. It contains the idea of intrusion, of being where it isn't wanted. This could not be farther from the truth. In almost every country in the world, there is a recognition that to fail to learn English is to fail to join the international community. The significance of being able to speak a common language cannot be overstated. Multiculturalism totally depends on it; without a common language, it cannot exist.

BERTA: Sorry, earlier you said that you taught millions? I'm not sure if I heard that right. You must be quite a teacher!

CARL: It's just a figure of speech. Lots, anyway. And they all enjoyed it and benefited from it, which was my point.

MODERATOR: Now that that's cleared up, let's give the floor to Ricardo. Would you like to make your final point against?

RICARDO: Points, actually. I have two points to counter Alana's first point that English is widespread and this is a good thing and only a good thing. The first point is that there is now so much information in English on the Internet, and in professional journals. A 2012 study found that of more than 21,000 scientific articles from 239 countries, 80% were in English—that it would be almost impossible to start again with another language. English has permanently excluded all the other languages. And my second, and final, point is that English isn't even understood by all English speakers—it's become so mixed, and there are so many different forms or varieties of English that it isn't really a world language at all, it is many different languages—and that's just confusing to learners.

CARL: Can I just jump in here? I'm not sure if I heard correctly. Did you say 18% or 80 (80%) about the percentage of articles in English?

RICARDO: 80%. That's my point. As I said, it's the main language of the Internet.

CARL: You said that English is the main language of the Internet, right? So, English is the best language to learn, surely? You're just reinforcing your point.

RICARDO: I didn't mean that, Carl, as you well know ...

Words and expressions

sprawling *adj.* 杂乱延伸的, 无计划扩展的

overpower *v.* (以更强的力量) 打败, 制服 (某人)

Swahili *n.* 斯瓦希里语 (通行于东非)

Hindi *n.* 印地语 (印度官方语言之一)

linguistic *adj.* 语言的; 语言学的



Before you listen

Task 1 Match the words with their definitions.

1. enhance (<i>v.</i>) E	A. describing language that is deliberately chosen to avoid expressing any strong opinion or feeling
2. exclude (<i>v.</i>) H	B. relating to languages or words
3. linguistic (<i>adj.</i>) B	C. idea, knowledge, or understanding of something
4. neutral (<i>adj.</i>) A	D. happening in many places, or affecting many people
5. notion (<i>n.</i>) C	E. to improve something, or to make it more attractive or valuable
6. obligatory (<i>adj.</i>) F	F. describing something that must be done in order to obey a rule
7. significance (<i>n.</i>) G	G. the importance that something has because it affects other things

8. widespread (<i>adj.</i>) D	H. to deliberately not include someone or something
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Task 2 Complete the sentences with the following words. Change the form if necessary.

enhance	exclude	linguistic	neutral
notion	obligatory	significance	widespread

- Learning languages in an online environment becomes more widespread every year.
- Linguistic knowledge helps you to understand a country's culture.
- Knowing a country's language should be obligatory for people going to live there.
- Only one language should be used in the workplace; other languages should be excluded.
- The choice of language used in an international meeting has great political significance.
- The notion of the world needing an international language is wrong.
- The official news media should adopt the neutral language in news reports.
- Speaking more than one language enhances your career opportunities.

Task 3 Think about the sentences and choose the one(s) you agree with.

Answers:

Open-ended.

Global listening

Task 1 Listen to *The spread of English* and match each speaker with a side and an argument. Fill in the blanks with letters A–F.

Side	Argument
A. Proposes	C. English presents a danger to the very existence of other languages.
B. Opposes	D. English is now so widespread that it is impossible to imagine a world without it.
	E. Nobody has to learn English if they don't want to.
	F. English has permanently excluded all the other languages.

- Alana A the motion, with the argument that D.
- Berta B the motion, with the argument that C.
- Carl A the motion, with the argument that E.
- Ricardo B the motion, with the argument that F.

Close listening

Task 1 Listen to *The spread of English* again and choose the best answer to each question you hear.

- According to Alana, how many people worldwide spoke English in 2015?
 - 0.5 billion.
 - 1.5 billion.
 - 10.5 billion.
 - 15 billion.

2. What does Berta think of the sprawling of English?

- A. It enhances the places where it goes.
- B. It is neutral.
- C. It improves life for the local people.
- D. It destroys local culture and language.

3. Which of the following statements about Carl is NOT true?

- A. He taught lots of children in Spain and France.
- B. He suggests that learning English shouldn't be a government policy.
- C. He agrees that English may displace other languages.
- D. He thinks that the significance of being able to speak a common language cannot be overstated.

4. Who raises the point that learning a language that enables you to communicate with people all over the world is empowering, not destructive?

- A. Alana.
- B. Berta.
- C. Carl.
- D. Ricardo.

5. According to Ricardo, what percentage of the articles among over 21,000 scientific articles from 239 countries were in English?

- A. 0.8%.
- B. 8%.
- C. 18%.
- D. 80%.

Task 2 Answer the following questions according to what you have heard.

1. What are the proponents' and opponents' arguments respectively?
2. Which side do you agree with? Why?

Reference answers:

1. Proponents:

- 1) English is now so widespread that it is impossible to imagine a world without it.
- 2) Nobody has to learn English if they don't want to.
- 3) To fail to learn English is to fail to join the international community.

Opponents:

- 1) English presents a danger to the very existence of other languages.
- 2) English has permanently excluded all the other languages.
- 3) English isn't even understood by all English speakers.

2. I agree with the proponents. Look at the world now. English is so widespread on the Internet, in movies or popular music, etc. It is almost everywhere. And English is also a common language in some professional fields such as in business negotiations.

Academic listening skill

Task 1 Read the following paragraphs to learn about the skill of detecting and repairing lapses in

understanding.

We may have a lapse of concentration in listening and miss some information. Under such circumstances, we can make a note of the information given before and after the lapse, adding a question to help identify the type of information we think is missing.

English is a _____ language. adjective—"sp???"
... speaker uses this positively??

However, sometimes we are unaware that we have missed or misunderstood something. At the end of the listening, review the notes and identify unlikely or surprising information.

181 countries with English as official language—CHECK!!!

!!!

We can repair such lapses in understanding by inferring from the context or asking questions.

I'm missing some information. You said "English is a what language"?

What did you mean by "sprawling" exactly?

I'm not sure if I heard correctly. Did you say "181"?

You said "the official language." Is that right?

Task 2 Listen to *The spread of English* again and repair the lapses in each of the following sentences.

1. English has become a world language, spoken by over ... let's see, ah yes, **ten point five billion** people worldwide in 2015, up from a billion just ten years earlier.
2. And other languages are affected, too; who wants to learn French or ... let's say, Russian, or Swahili, **which is not going to help anyone**, when English is so clearly obligatory for anyone with ambition?
3. It overpowers and destroys local culture, local language, local customs, local food, local _____ of how to live.
4. I've taught English to **millions of children** in Spain and France, and it's amazing how they all benefited in so many ways, developing linguistic and cultural awareness, gaining access to all sorts of information, and so on.
5. A 2012 study found that of more than 21,000 scientific articles from 239 countries, _____ were in English—that it would be almost impossible to start again with another language.

Reference answers:

1. one point five billion
2. which is not as useful as English
3. notions
4. many children
5. 80%



Teaching suggestions

Close listening

- 1 Ask Ss to read the two questions in Task 2. Then play the recording. Ask Ss to take notes while listening.
- 2 Ask Ss to work in pairs. Ss take turns to answer the questions.

- 3 After the discussion, the T invites 1 or 2 Ss to share answers with the whole class. The T gives comments on the Ss' answers.

Extension activity

In the listening material, the speakers debated "English is a sprawling language." Ask Ss to work in groups of four. Divide each group into two pairs with each pair on a side. Ss work in pairs to write down some arguments and supporting evidence. Then each group holds a debate on this topic. The T walks around the class to see how Ss are doing.

Academic listening skill

- ✧ For Ss at a higher level the T can skip the following task. They just need to do the alternative activity.
- 1 Log on Ucampus and present Task 2. Tell Ss to read the sentences first to try to find the answers by recalling.
 - 2 Then play the audio for Ss to check their answers.

Alternative activity

Play the audio. Ask Ss to write down the phrases or sentences used to detect and repair the lapses. Pause after each lapse if needed so that Ss can write down what they hear. Then the T asks volunteers to share their answers with the class and gives feedback.

Ss' answers may be:

1. —Um, I'm not sure if I heard correctly. Did you say that ten point five billion people speak English?
—Sorry, obviously I meant one point five billion, not ten point five. I misread it, sorry, but my argument stands.
2. —I'm sorry, I'm not sure I get your point. What did you mean by saying that learning Swahili isn't helpful? Isn't that a bit disrespectful?
—No, I didn't mean that. I meant that people don't see it as useful, compared to learning English. My point is the opposite. I would love people to learn Swahili, Russian, Hindi ...
3. —I get the point now. I have another question. I'm missing some information. You gave a list of things it destroys including "local what of how to live"?
—"Notions," you know, "ideas."
4. —Sorry, earlier you said that you taught millions? I'm not sure if I heard that right. You must be quite a teacher!
—It's just a figure of speech. Lots, anyway. And they all enjoyed it and benefited from it, which was my point.
5. —Can I just jump in here? I'm not sure if I heard correctly. Did you say 18% or 80% about the percentage of articles in English?
—80%. That's my point. As I said, it's the main language of the Internet.



Online course
(after class)

Oral practice

Task 1 The following sentences will help you ask for clarification. Translate the Chinese in brackets into

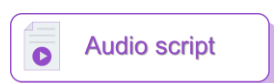
English using the sentence patterns you've just learned, and then record each sentence.

1. Um, I'm not sure if I heard correctly (我不确定刚才是否听对了). Did you say that ten point five billion people speak English?
2. I'm sorry, I'm not sure I get your point (我不确定是否明白了你的意思). What did you mean by saying that learning Swahili isn't helpful? Isn't that a bit disrespectful?
3. OK. I get the point now. I have another question. I'm missing some information (我遗漏了一些信息). You gave a list of things it destroys including "local what of how to live"?
4. Can I just jump in here (我能打断一下吗)? I'm not sure if I heard correctly. Did you say 18% or 80% about the percentage of articles in English?

Task 2 You will hear four clips of the conversation. Each clip will be played only ONCE. After you hear a tone, please repeat the exact words the second speaker has said. You may take some notes while you listen.

1. **BERTA:** Um, I'm not sure if I heard correctly. Did you say that ten point five billion people speak English? That's more than the population of the world.
ALANA: Sorry, obviously I meant one point five billion, not ten point five. I misread it, sorry, but my argument stands.
2. **ALANA:** I'm sorry, I'm not sure I get your point. What did you mean by saying that learning Swahili isn't helpful? Isn't that a bit disrespectful?
BERTA: No, I didn't mean that. I meant that people don't see it as useful, compared to learning English.
3. **BERTA:** Sorry, earlier you said that you taught millions? I'm not sure if I heard that right. You must be quite a teacher!
CARL: It's just a figure of speech. Lots, anyway. And they all enjoyed it and benefited from it, which was my point.
4. **CARL:** Can I just jump in here? I'm not sure if I heard correctly. Did you say 18% or 80% about the percentage of articles in English?
RICARDO: 80%. That's my point. As I said, it's the main language of the Internet.

Listening 2 Mapping the world



Mapping the world

Last week, we looked at the politics of maps, the way in which maps can distort our view of a geographical region, either literally in terms of area, or by imposing a particular centricity. Today, I'm looking at another area of maps—the way in which they can now be generated and manipulated through crowd-sourcing, and the problems that this can generate. My publications have focused on maps in relation to traffic flow, so this is the example I'll be using. I'll just outline the key mathematical concepts behind traffic flow, and then I'll move on to the application to maps.

What is traffic flow? Well, simply put, it's what civil engineers study to find out the best way to plan a transportation system or network, based on the ways the travelers, be they drivers, cyclists, or pedestrians, interact. By modeling these interactions mathematically, we can reduce or eliminate situations where the traffic

slows or stops completely. We've all experienced situations where the traffic seems to be flowing nicely, but suddenly we find ourselves stopping and starting every few seconds. What triggered this change? And is it predictable and avoidable? In principle, yes, but it's a very complex mathematical area because it includes human decision-making as well as the purely mechanical aspects. On this first slide we can see three basic principles.

- The more vehicles there are on a road, the slower they will travel.
- To maintain smooth traffic flow in a particular zone, the same number or more vehicles need to leave the zone as are entering at any given time.
- There is a critical point of density and velocity when the situation will become unstable. At this point, if any one of the vehicles brakes, the flow will collapse.

Now, there are also three basic concepts or variables that together describe traffic flow, from which we can deduce the likelihood of a breakdown or shock-wave trigger that I've already mentioned. There are formulas that describe the relationship between these variables, which you should study—they're on the handout—before your tutorials. The first concept we need to discuss is density. This refers to how many cars can fit in a space—so, cars per kilometer. Let's say we have ten kilometers of roads in our town, and 1,000 cars, so that's ... 100 cars per kilometer. More cars are being manufactured, so if our town gets 500 more cars, we suddenly get 150 cars per kilometer. This chart illustrates my point.

The second concept is flow. This describes how many cars pass by a point in a given period of time. So, we can write it down as cars per minute. Let's say it's 100 cars per minute on this road here. Now, imagine we have to take one lane out. The road is now 50% narrower. The flow will go down. Let's assume 50 cars per minute now under stable conditions. This next chart shows this clearly. However, as we saw on the first slide, if conditions become unstable, this will not hold.

The third variable is speed. This is the distance covered per unit of time. A problem of measuring this is that it's impossible to track the speed of all the travelers involved, so on a road, vehicles are sampled over a specific time period, in a specific section of the road. There are actually two definitions of average speed. One is "time mean speed," and the other is "space mean speed." The first, "time mean speed," is measured at a reference point on the roadway over a period of time using loop detectors to identify each vehicle and track its speed. The problem is, this method does not produce accurate speed measurements. The reason is a little complicated, but this diagram should help. A better method is "space mean speed," which is measured over the entire section of road. We can see it here on the next slide. It's generally accepted that "space mean speed" is the better option, as the data have greater validity, although it's more difficult to implement.

This next chart shows what we call a "time-space diagram," which shows the flow of vehicles along a road or path. Time is represented on the x-axis, and distance is shown on the y-axis, as you can see. Traffic flow in a "time-space diagram" is represented by individual lines showing the movement of individual vehicles. If they are following each other, their trajectories are parallel, and when they pass each other, the lines cross. It can clearly be expected that traffic flow will be far from predictable. This is a very useful tool for analysis.

...

OK, so you may be wondering what this has to do with maps. I think when we think of maps, we tend to think of something fixed, static. After all, most geographic changes occur over millennia. But this is to misunderstand the

modern idea of mapping. From these maps of Antarctica in successive years, for example, it is known that any mapping of its edges is a temporary exercise because there's constant and rapid change, due to factors such as climate change. So, let's consider the idea that mapping can be of a changing landscape, if you like, and see where that leads us. Forget geography, for a moment, and consider this. We can map the neural networks in our brains, which change every time we receive a stimulus—thousands of times a second. Or Internet data, imagine the complexity of this. And this is where the idea of traffic flow comes in. Can we map the flow of traffic? What would such a map look like? To get an idea, look at this next slide. This image is from navigation software. You can think of it as a crowd-sourced map—users build it together, by adding information on a moment-by-moment basis. So you can send in information about, say, an accident you've witnessed, and the map changes to accommodate this. And this means that all the users can avoid that road until the accident is cleared. No wonder it's popular! But this can lead to problems, though. One unwanted problem that the police identified is that users map the location of police officers, that is to say, there could be a security risk for them. Another potential hazard is that the process of adding to the map, and receiving updates and reminders while they are on the road is likely to distract drivers, potentially leading to more accidents. So, to put that another way, there's a social cost to this type of map, but also huge benefits in an ever-changing environment like the transportation network. So, let's look at ...

Words and expressions

centricity *n.* 中心

velocity *n.* 速度

shock-wave *adj.* (爆炸、地震等引起的) 冲击波的

loop detector 环路感应器

trajectory *n.* 轨道, 轨迹

static *adj.* 不动的; 静(止)的

successive *adj.* 连续的, 连接的, 相继的

neural *adj.* 神经的; 神经系统的

stimulus *n.* 刺激(物); 促进因素



Before you listen

Task 1 Match the words with their definitions.

1. accommodate (<i>v.</i>) G	A. not changing frequently and not likely to suddenly become worse
2. hazard (<i>n.</i>) C	B. anything that encourages something to happen, develop, or improve
3. interaction (<i>n.</i>) D	C. something that could be dangerous
4. navigation (<i>n.</i>) E	D. the activity of being with and talking to other people
5. parallel (<i>adj.</i>) H	E. the skill or the process of planning a route for a ship or other vehicles and taking it there
6. source (<i>v.</i>) F	F. to locate and obtain something from a particular place

7. stable (<i>adj.</i>) A	G. to consider something such as somebody's opinion or a fact and be influenced by it when you are deciding what to do or explaining something
8. stimulus (<i>n.</i>) B	H. describing lines that are the same distance apart at every point along their whole length

Task 2 Complete the sentences with the following words.

accommodate	hazard	interaction	navigation
parallel	source	stable	stimulus

1. Computer systems nowadays are completely stable.
2. Face-to-face meetings are better than online meetings because they allow more interaction between the people involved.
3. New subway lines have been constructed to accommodate increasing commuting needs of travelers.
4. Technology has made navigation so easy that without it people are losing the ability to find their way around new places.
5. The main stimulus for space travel is the human desire to discover new things.
6. The possibility of bringing back new diseases is a major hazard of space travel.
7. Two lines that are parallel can never meet.
8. Employers need to source new talent to ensure their companies are successful.

Task 3 Think about the sentences and choose the one(s) you agree with.

Reference answer:

Open-ended.

Global listening

Task 1 Listen to *Mapping the world* and rearrange the stages in the order the lecturer goes through them.

- ___ 4 ___ Discuss flow
- ___ 1 ___ Outline the theme of the lecture
- ___ 5 ___ Discuss speed
- ___ 2 ___ Describe traffic flow
- ___ 8 ___ Discuss a new form of mapping
- ___ 3 ___ Discuss density
- ___ 7 ___ Move on to the topic of maps
- ___ 6 ___ Present the concept of a "time-space diagram"
- ___ 9 ___ Outline the problems with the new form of mapping

Close listening

Task 1 Listen to *Mapping the world* again and choose the best answer to each question you hear.

1. **What is the focus of the lecture?**
 - A. The politics of maps.
 - B. The crowd-sourced map.
 - C. The changing landscape.

- D. Climate change.
2. **Which of the following is NOT a basic variable describing traffic flow?**
- A. Density.
 - B. Speed.
 - C. Flow.
 - D. Space.
3. **What does the speaker say about “Space mean speed”?**
- A. It is measured with loop detectors.
 - B. It is measured over the whole section of road.
 - C. It does not produce accurate speed measurements.
 - D. It is easier to implement than “Time mean speed.”
4. **Which is a potential hazard of the crowd-sourced map?**
- A. Leading drivers to the wrong roads.
 - B. Travelers’ over-reliance on it.
 - C. A security risk for police officers.
 - D. Costing too much money.
5. **Which of the following is NOT true according to the lecture?**
- A. Density means how many cars can fit in a space, namely, cars per kilometer.
 - B. “Time mean speed” is generally considered as the better option.
 - C. Traffic flow in a “time-space diagram” is represented by individual lines showing the movement of individual vehicles.
 - D. Mapping can be of a changing landscape.

Task 2 Answer the following questions according to what you have heard.

1. What are density, flow and speed—the three variables of traffic flow? Explain the concepts in your own words.
2. What is a crowd-sourced map? What are the benefits and potential hazards of it?

Reference answers:

1. Density means the number of cars that can fit in a section of road, that is, cars per kilometer. Flow refers to the number of cars that can pass by a point in a specified time, namely, cars per minute. Speed is the distance that a vehicle travels per unit of time.
2. A crowd-sourced map is a kind of map built by users together, by adding information on a moment-by-moment basis. The benefit is that all users can immediately send and get information about a road, such as an accident on it, so they can avoid that road until the accident is cleared. The potential hazard is that the location of police officers may be exposed to the users. And for the drivers, the process of adding to the map and receiving updates and reminders would distract them and potentially lead to more accidents.

Task 3 Work in pairs to discuss the following questions.

1. What are the day-to-day results of traffic problems? What are the solutions for them?
2. Have you ever used any crowd-sourced map? If so, how do you like it?

Reference answers:

1. Traffic congestion becomes a prominent problem in some cities, which would lead to longer journey time, more air pollution and extra economic costs. There are several ways to alleviate this problem. The

government can restrict the number of private cars on the road, such as by implementing an odd-even license plate rule, and improve the public transportation infrastructure to take pressure off city roads. It can widen crossroads which are bottlenecks, and build or expand the subway system. For travelers, they can avoid the congested road by using a crowd-sourced map. Also, they may opt for biking or walking for short-distance journeys.

2. I often use Amap (高德地图), which is now supported by the BDS. It can give travelers so much convenience. First, it can guide drivers on the road, providing many route options. Second, it can show the real-time traffic conditions which help ease traffic congestion. Last but not least, it can offer detailed information and reviews about some specific places, e.g. the nearest parking lot and the popular restaurants or hotels nearby.

Academic listening skill

Task 1 Read the following paragraphs to learn about the skill of following mathematical or scientific problems.

Mathematical and scientific lectures can be complex, containing difficult key terms and concepts. Prepare thoroughly before the lecture by looking for topic-related key terms and concepts is necessary and helpful.

Strategies for listening include:

- Make a note of the numbers and terms you hear. *100 cars per 1 km*
- Use mathematical and scientific symbols in your notes. *>*
- Note the concepts so you can research them later. *flow*
- Listen for definitions of concepts. *this means / that is to say / this refers to*
- Use charts in your notes—copy the speaker’s and / or create your own charts.
- Note when you don’t understand a point so you can check it later.

When the information is complex, focus on noting it down rather than trying to understand it during the lecture. You can review it later.

Task 2 Listen to the extracts from *Mapping the world* and choose the problem outlined.

1. There is an increase in density when _____.
 A. not enough cars are produced B. too many cars are in use
2. There is an issue of inaccuracy with _____.
 A. the “space mean speed” method B. the “time mean speed” method
3. The issue with mapping is _____.
 A. the lack of change over the years B. the changeable nature of geography
4. Locating the police could _____.
 A. mean police stations are not protected B. put the officers in danger
5. Crowd-sourced map information could _____.
 A. distract drivers B. lead to inaccurate maps

Audio scripts:

1. The first concept we need to discuss is density. This refers to how many cars can fit in a space—so, cars per kilometer. Let’s say we have ten kilometers of roads in our town, and 1,000 cars, so that’s ... 100 cars

per kilometer. More cars are being manufactured, so if our town gets 500 more cars, we suddenly get 150 cars per kilometer. This chart illustrates my point.

2. The first, “time mean speed,” is measured at a reference point on the roadway over a period of time using loop detectors to identify each vehicle and track its speed. The problem is, this method does not produce accurate speed measurements. The reason is a little complicated, but this diagram should help. A better method is “space mean speed,” which is measured over the entire section of road. We can see it here on the next slide. It’s generally accepted that “space mean speed” is the better option, as the data have greater validity, although it’s more difficult to implement.
3. But this is to misunderstand the modern idea of mapping. From these maps of Antarctica in successive years, for example, it is known that any mapping of its edges is a temporary exercise because there’s constant and rapid change, due to factors such as climate change.
4. But this can lead to problems, though. One unwanted problem that the police identified is that users map the location of police officers, that is to say, there could be a security risk for them.
5. Another potential hazard is that the process of adding to the map, and receiving updates and reminders while they are on the road is likely to distract drivers, potentially leading to more accidents.



Teaching suggestions

Close listening

- 1 Ask Ss to read the questions in Task 2. Then play the audio. Ask Ss to take notes while listening.
- 2 Ask Ss to work in pairs. Ss take turns to answer the questions.
- 3 After the discussion, the T invites 1 or 2 Ss to share answers with the whole class. The T gives comments on the Ss’ answers.
- 4 Ask Ss to read the questions in Task 3. Ss think individually for one minute, and then jot down several day-to-day results of traffic problems and solutions for them.
- 5 Ss work in pairs to compare their ideas with each other. Then share their own experiences in using crowd-sourced maps with each other.
- 6 The T invites 1 or 2 Ss to share answers with the whole class. Finally, the T gives comments on the Ss’ answers.

Academic listening skill

- 1 Ask Ss what strategies they often use for mathematical and scientific lectures.
- 2 Ask Ss to go through the strategies listed in the textbook.
- 3 Ss work in groups. Ask Ss to practice the listening skill by retelling the five extracts from the listening material “Mapping the world”. First, Ss are supposed to note down the key terms and concepts using the note-taking strategies. Then Ss compare their notes within groups and get ready to retell the five extracts.
- 4 The T invites 2 Ss to retell each extract and makes comments on their performance.
- 5 The T summarizes the importance of using note-taking strategies.

Extension activity

- 1 Ask Ss what preparations they usually make before mathematical and scientific lectures and what strategies they can use.
- 2 Ss work in groups to present their ideas.
- 3 The T invites 2 or 3 Ss to share their answers with the whole class.
- 4 The T gives comments on the Ss' answers and summarizes the skills for making preparations and note-taking.

Ss' answers may include:

- 1) Preparations: find out what the lecture will be about;
look for relevant key terms and concepts;
read relevant materials;
check the academic background of the speaker.
- 2) Note-taking strategies: write phrases, not full sentences;
take notes in your own words;
use symbols and abbreviations.



Online course
(before class)

Oral practice

Task 1 The following sentences will help you follow mathematical or scientific problems. Translate the Chinese in brackets into English using the words and expressions you've just learned, and then record each sentence.

1. What is traffic flow? Well, simply put (简言之), it's what civil engineers study to find out the best way to plan a transportation system or network, based on the ways the travelers, be they drivers, cyclists, or pedestrians, interact.
2. Now, there are also three basic concepts or variables (变量) that together describe traffic flow, from which we can deduce (推断) the likelihood of a breakdown or shock-wave trigger that I've already mentioned.
3. Let's say we have ten kilometers of roads in our town, and 1,000 cars, so that's ... 100 cars per kilometer (每千米 100 辆车).
4. Time is represented on the x-axis (x 轴), and distance is shown on the y-axis (y 轴), as you can see.

Task 2 Read the following paragraph about mapping and record it. Pay special attention to the underlined expressions that help explain mathematical or scientific problems.

The second concept is flow. This describes how many cars pass by a point in a given period of time. So, we can write it down as cars per minute. Let's say it's 100 cars per minute on this road here. Now, imagine we have to take one lane out. The road is now 50% narrower. The flow will go down. Let's assume 50 cars per minute now under stable conditions. This next chart shows this clearly. However, as we saw on the first slide, if conditions become unstable, this will not hold.

Critical thinking

Getting the skill



Classroom
teaching

Teaching suggestions

- 1 Ss should have studied the skills of identifying problems in visuals on Ucampus. To check if they have mastered the skills, first ask Ss to explain the statement “one picture is worth a thousand words”, and then summarize the major types of visuals and the rules to use them.
- 2 Ss work in pairs to review the three charts in Task 2, discussing the problems in the charts and how to improve them. This exercise encourages Ss to use the skills they have learned from the mini-lecture. Ask volunteers to present their answers to the class.
- 3 Check Ss’ answers in Task 3. Encourage them to explain what skills they have used to design the visual for the chosen set of information.

Reference answers

Task 1 Mini-lecture

Watch the mini-lecture and learn about the skill of identifying problems in visuals.



You can watch the
video on Ucampus.

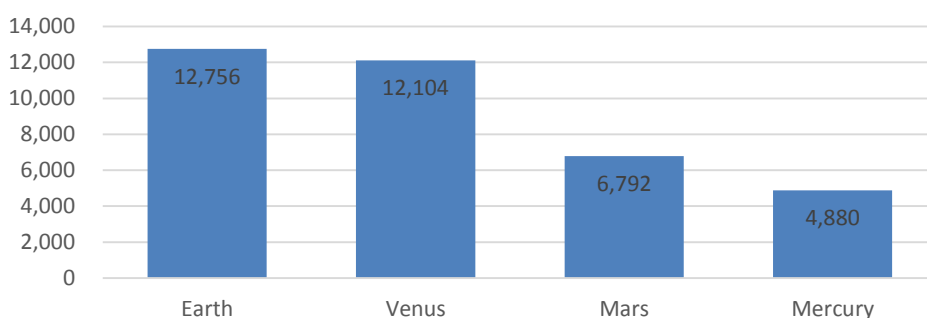
Task 2

1. Chart 1: The lack of a title renders the chart meaningless and the use of too many percentage labels (%) is distracting.
Chart 2: The y-axis does not start at zero, and unevenly spaced time intervals are used. The two problems distort the interpretation of the information.
Chart 3: Colors are not distinct enough, i.e. it is easy to confuse the slice of China with that of India, and Russia with Europe. And Europe is a continent, while others are countries. Besides, the total percentage does not add up to 100%.
2. Chart 1: Add a title and remove the percentage labels on the x-axis.
Chart 2: Start the number of cars at zero and use evenly spaced time intervals.
Chart 3: Change colors to make each slice stand out. Change Europe to other countries with orbital launches and make sure the total percentage is 100%.

Task 3

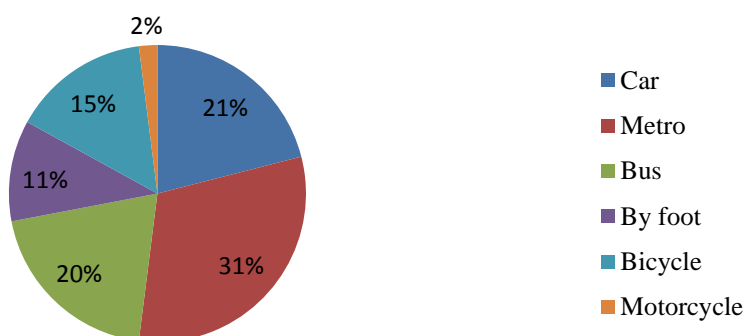
Set 1

(km) The diameters of four planets in the solar system



Set 2

Modes of transportation by local commuters in 2017



Alternative activity

- 1 Ask each student to collect some data in his / her own research field.
- 2 Pick several sets of data, and ask Ss to design a visual for each set of data.
- 3 Invite some volunteers to present their data to the whole class.
- 4 Give comments on the Ss' presentations.

A cross-cultural view



Video script

Navigating the world through BeiDou

Chinese people have known the importance of navigation all along. In the East Jin Dynasty, it was recorded that “Those who travel to Lake Yunmeng must be guided by a compass; those who are lost at a vast sea must resort to Polaris to return.” (夫群迷乎云梦者，必须指南以知道；并乎沧海者，必仰辰极以得反。) Over the past few thousand years, China has explored navigation technology with great success. In geomagnetic navigation, during the Warring States Period, lodestone was discovered to have the property of pointing to the South and was made into the south-pointing tool, *sinan* (司南), one of the Four Great Inventions in

ancient China. Based on that, a more sensitive and accurate guiding tool, the south-pointing needle or compass, was developed. In the field of astronavigation, ancient Chinese discovered that latitudes and directions could be measured by star observation, known as the “star-guided ocean crossing technique (过洋牵星术).” The great navigator Zheng He (郑和) of the Ming Dynasty utilized this technique along with the compass to successfully cross oceans.

In recent history, satellite navigation was developed to replace traditional navigation methods. In the 1970s, the US Department of Defense began to build the GPS, a space-based radio navigation satellite system. It provides real-time high-precision navigation and positioning services worldwide. But it also means that the GPS would enable the US to collect geographic information from any country at any time. To ensure national security, China had no choice but to develop its navigation satellite system independently.

In the 1990s China began constructing its BeiDou Navigation Satellite System (BDS), named after the Big Dipper constellation, *Beidou*, as our ancestors called it. At the early stage, the program met with unimaginable technological difficulties and blockades from foreign space powers. However, the scientists of the BDS did not let these difficulties dishearten themselves. They rose to the demanding task and overcame one obstacle after another. Sun Jiadong, the former chief designer of the BDS and widely acclaimed as the “father of BeiDou,” has played a prominent role. Sun’s team built BDS-1 experimental satellites and BDS-2 constellation satellites, laying the foundation for a successful third phase. More than 300,000 scientists, engineers and technicians from over 400 domestic institutes, universities and enterprises have participated in building the BDS. The great cause gives birth to the great spirit, and the great spirit, in turn, promotes the great cause. The whole team exhibited the BeiDou spirit, which is innovating independently, opening up and collaborating, overcoming difficulties and pursuing excellence doggedly. The BDS is a milestone for the Chinese scientists on the journey to making the nation a great power in science and technology, and a valuable legacy in every aspect.

The BDS is a product of innovation. Starting from scratch, the BDS has undergone three phases of development: The first phase involved building the regional test system BDS-1 which was completed in 2000. During this phase, three GOE satellites (geosynchronous satellites) were launched, giving China its own navigation satellite system. The system provides basic navigating and positioning services in China through active positioning. In the second phase, the BDS-2 system was officially put into operation in 2012. The system shifted from active to passive positioning, which meant user devices did not have to send signals. Their locations could be determined just by receiving signals. The BDS-2 not only serves China but also provides users in the Asia-Pacific region with positioning, speed measurement, timing and short message communication services. In the third phase which lasted until 2020, the BDS-3 global system was constructed, consisting of 30 satellites to provide high-precision and reliable positioning, navigation and timing services worldwide. Now we can announce proudly that all the key devices and components used in the BDS-3 are developed and manufactured in China. The system has a positioning accuracy of less than 10 meters, a timing accuracy of less than 20 nanoseconds, and other performance indicators among the world’s best.

The application of the BDS is limited only by imagination. It has serviced millions of users in the fields of transportation, agriculture, forestry, fishery, disaster prevention and mitigation, etc. In transportation, the BDS can be used to plan routes, ease traffic congestion and monitor vehicles. With regard to emergency rescue, the BDS has been widely applied in search and rescue in remote, sparsely populated areas such as

deserts, mountains and oceans. For example, in the 2008 Wenchuan earthquake, BeiDou's short message services enabled personnel at the disaster relief headquarters to have timely information, greatly reducing the loss of life and property. The BDS also plays crucial roles in precision agriculture, collecting farmland information, fertilizing crops, preventing and controlling crop diseases, etc. It greatly improves the agricultural output and reduces costs.

The BDS is developed by China and dedicated to the world. As one of the four Global Navigation Satellite System (GNSS) providers recognized by the UN, the BDS has provided services to hundreds of millions of users in Belt and Road partner countries. Its products have been used in over 120 countries and regions. The BDS is creating a better future for mankind with Chinese solutions and Chinese wisdom.

Words and expressions

geomagnetic *adj.* 地磁的

lodestone *n.* 天然磁石, 磁铁

latitude *n.* 纬度

real-time *adj.* (计算机) 即时处理的, 实时的

blockade *n.* (对某地的) 封锁

dishearten *v.* 使沮丧, 使气馁, 使灰心

doggedly *adv.* 坚持不懈地, 顽强地, 不屈不挠地

from scratch 从零开始, 从头开始; 白手起家

GEO satellites (geosynchronous satellites) 地球同步轨道卫星

nanosecond *n.* 纳秒, 毫微秒 (十亿分之一秒)

mitigation *n.* 减轻, 缓和

sparsely *adv.* 稀少地, 稀疏地

Proper names

Polaris 北极星

the Big Dipper 北斗七星

Sun Jiadong 孙家栋 (1929—), 北斗卫星导航系统第一代和第二代工程总设计师

Cultural notes

1. "Those who travel to Lake Yunmeng must be guided by a compass; those who are lost at a vast sea must resort to Polaris to return." It is taken from *Baopuzi* (《抱朴子》) written by Ge Hong (葛洪), a scholar of the East Jin Dynasty. It means if you are lost in Lake Yunmeng, you have to rely on a compass to show you the direction; if you are lost in the sea, you have to look to the Polaris to find your way (夫群迷乎云梦者, 必须指南以知道; 并乎沧海者, 必仰辰极以得反).
2. *sinan* (司南): an instrument used in ancient China to determine directions.
3. star-guided ocean crossing technique (过洋牵星术): the navigation technology of astronomical observation used in ancient China. The Star Board (牵星板) was used to measure the elevation angles of the stars above the sea level in order to determine a vessel's latitude and geographic position.

Teaching suggestions

- 1 Ask Ss to think about the question “What traditional navigation tools did our ancestors use before the invention and application of the satellite navigation systems?” Ss’ answers might be: the *sinan*, the compass, the armillary sphere (浑天仪), star maps, etc.
- 2 Check Ss’ answers in Task 1 to see if they understood how the BDS was developed and what roles it has at social and national levels. Play the video for the class. Pause the video where Ss made most mistakes and guide them to get the correct answers.
- 3 Ask Ss to discuss the questions in Task 2 in groups. Ask Ss to take notes if necessary and encourage them to give examples from their daily lives. When Ss have finished the discussion, invite volunteers to present their group answers to the class. Finally, the T gives comments on their answers.
- 4 Ask Ss to do research on the advantages of the BDS in groups before class. Remind them to follow the steps provided. Ask volunteers to present their group answers to the class. Finally, the T gives comments on the Ss’ performance. You can use Ucampus to transcript their presentations for assessment.

Reference answers

Task 1

1. T
2. T
3. T
4. F
5. T
6. F

Task 2

1. Navigation satellite systems like the GPS provide real-time high-precision navigation and positioning services worldwide. But it also means that they would enable the owners to collect geographic information from any country at any time. To ensure national security, China had no choice but to develop its navigation satellite system independently.
2. The BDS has serviced millions of users in the fields of transportation, agriculture, forestry, fishery, disaster prevention and mitigation, etc. For example, in transportation, the BDS can be used to plan routes, ease traffic congestion and monitor vehicles. With regard to emergency rescue, the BDS has been widely applied in search and rescue in remote, sparsely populated areas such as deserts, mountains and oceans. The BDS also plays crucial roles in precision agriculture, collecting farmland information, fertilizing crops, preventing and controlling crop diseases, etc. It greatly improves the agricultural output and reduces costs.

Task 3

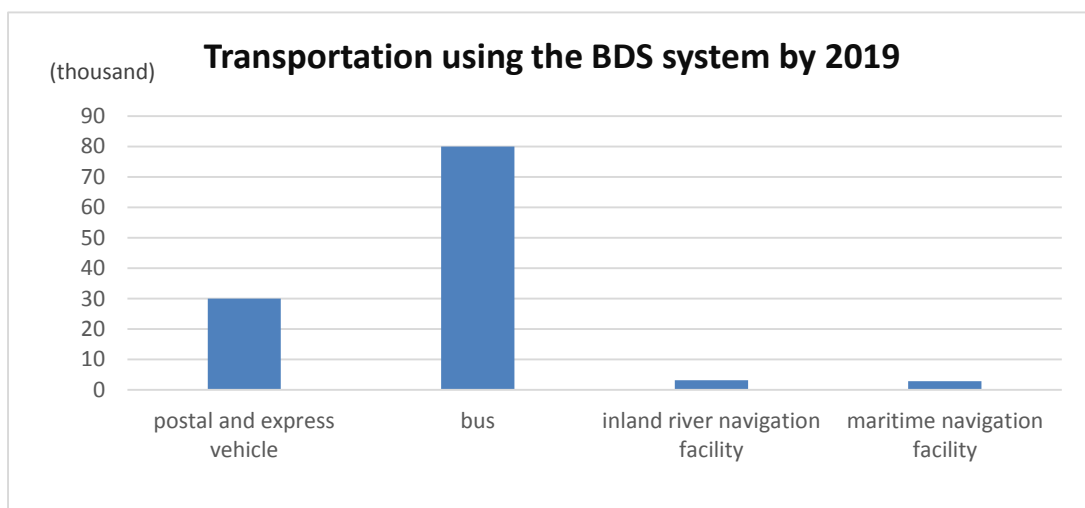
Good morning, everyone. Today I’m going to introduce the BDS, its features and advantages, to you.

Have you ever heard about the BDS? Its full name is BeiDou Navigation Satellite System. The BDS is a navigation satellite system independently constructed and operated by China with an eye on the needs of the country’s national security and economic and social development. The BDS has been widely used in transportation, agriculture, forestry, fishery, climate monitoring, weather forecasting, communication,


disaster relief, public security, and other fields, bringing about remarkable economic and social benefits. Compared with other navigation satellite systems, the BDS has its own features and advantages. First, its space segment is a hybrid constellation of satellites in three kinds of orbits. Different from other navigation satellite systems, the BDS operates more satellites in a high orbit to offer better anti-shielding capabilities, which is particularly observable in terms of performance in the low-latitude areas. Second, the BDS provides navigation signals of multiple frequencies, and is able to improve service accuracy by using combined multi-frequency signals. What's more, the BDS integrates navigation and communication capabilities for the first time, and has five major functions: real-time navigation, rapid positioning, precise timing, location reporting and short message communication services.

As we can see, the BDS-based navigation services have been widely adopted by e-commerce enterprises, manufacturers of intelligent mobile terminals, and location-based service providers, etc. For example, in transportation, by the end of 2019, 30,000 postal and express vehicles, 80,000 buses in 36 cities, 3,200 inland river navigation facilities and 2,900 maritime navigation facilities in China had used the BDS system. As is shown in this bar graph. With the principle that "BDS is developed by China, dedicated to the world, and aiming to be top-class," China is keen to share the outcomes of the BDS construction and development with all other countries.

That's all. Thank you!



Academic communication

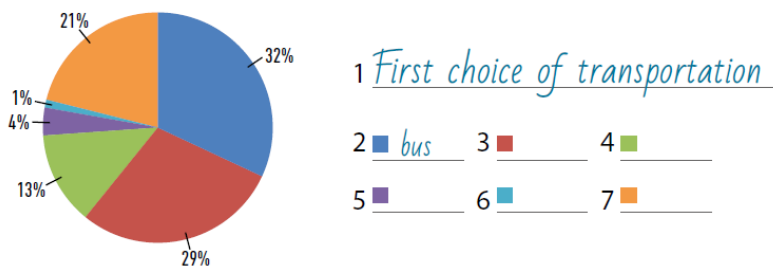
 Online course (before class)

Speaking model

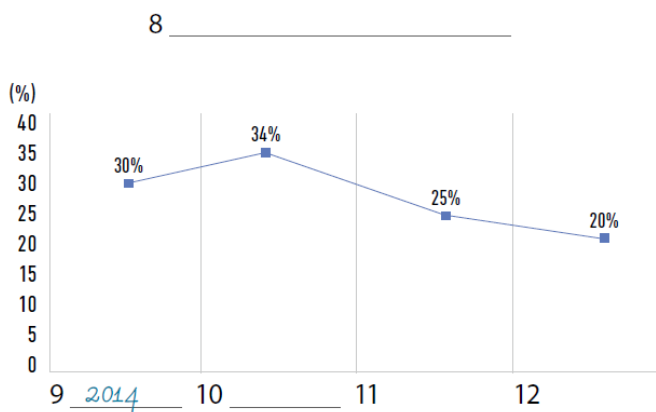
Task 1 Read the extract from a presentation about modes of transportation, and then fill in the blanks in the following visuals.

So, turning now to the results of our survey, the pie chart shows the respondents' first choice of transportation for trips to and from work or school. It can be seen there is a clear preference for public transportation, with over 60% opting for the bus or metro. That's over three out of five people relying on

public transportation for their daily commute. This supports our overall argument that public transportation needs to be a priority for governments. The bus just beats the metro, with 32% of respondents choosing this, compared with 29% opting for the metro. The least popular options are car and taxi, with only 4% and 1% of respondents, respectively, using these methods of transportation. To put that in context, that would be as if the small audience in this room went in cars, with the rest of the 1,000 students at this school opting for the alternative, more environmentally friendly methods. Cost-free options for the daily commute occupied the middle ground, with 13% of respondents using the bicycle and a healthy 21% opting to walk.



Let's move to the next set of data, the line graph. We wanted to investigate any identifiable trends over the past four years, and then to explore possible reasons behind these. Taking trips made by foot first. It can be clearly seen from our data that these trips are in decline. The highest data point came in 2015, with 34% of respondents opting to walk. This was a slight increase from 30% in 2014. However, this had dropped to only one in four people in 2016, and the following year, to one in five.



Answers:

- 3. metro
- 4. bicycle / bike
- 5. car
- 6. taxi
- 7. walking / walk / by foot
- 8. Trips made by foot
- 10. 2015
- 11. 2016
- 12. 2017

Task 2 Read the extract again and answer the following questions.

1. What influences people's choice of modes of transportation?
2. Do you think people's choice of transportation modes shown by the survey is similar to that of your city?

Reference answers:

1. Factors influencing people's choice of modes of transportation may include the following:
 - 1) Distance
 - 2) Time
 - 3) Fare
 - 4) Weather
 - 5) Real-time traffic
2. In the city where I live, most people prefer public transportation like the bus or metro for daily commute. This is similar to what is described in the survey. But the difference is that the metro is more popular than the bus in my city due to traffic jams and an extensive subway system. For short-distance travel, people in my city tend to go by bicycle or by walking. A small number of people may opt for the car or taxi just like the situation in the survey.

Speaking skill



You can watch the video on Ucampus.

Mini-lecture

Watch the mini-lecture and learn about the skill of using visual data.

Oral practice

Task 1 The following sentences will help you talk about modes of transportation. Translate the Chinese in brackets into English using the words and expressions you've just learned, and then record each sentence.

1. This supports our overall argument that public transportation needs to be a priority (当务之急) for governments.
2. The bus just beats the metro, with 32% of respondents choosing this, compared with 29% opting for (选择) the metro.
3. Cost-free options for the daily commute (通勤) occupied the middle ground, with 13% of respondents using the bicycle and a healthy 21% opting to walk.
4. We wanted to investigate any identifiable (可识别的) trends over the past four years, and then to explore possible reasons behind these.

Task 2 Read the following paragraphs about first choice of modes of transportation. Pay special attention to the underlined expressions and sentence patterns that help explain visual data.

1. So, turning now to the results of our survey, the pie chart shows the respondents' first choice of transportation for trips to and from work or school. It can be seen there is a clear preference for public transportation, with over 60% opting for the bus or metro. That's over three out of five people relying on public transportation for their daily commute.
2. It can be clearly seen from our data that these trips are in decline. The highest data point came in 2015, with 34% of respondents opting to walk. This was a slight increase from 30% in 2014. However, this had dropped to only one in four people in 2016, and the following year, to one in five.

Task 3 Deliver the extract from a presentation with the charts and hints provided in the following table. First, you will have a look at the charts and table to help you organize your thoughts. Then you will be shown the hints one at a time. Speak out according to the charts and hints, and record what you say.

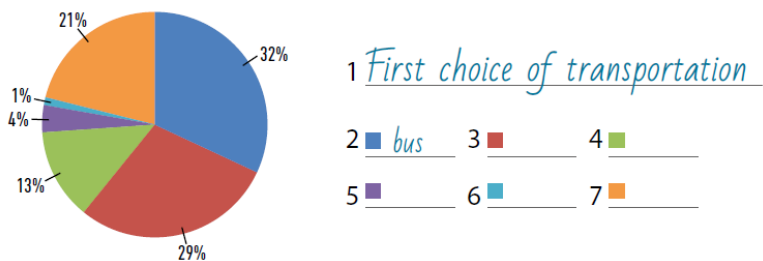


Chart 1

8 _____

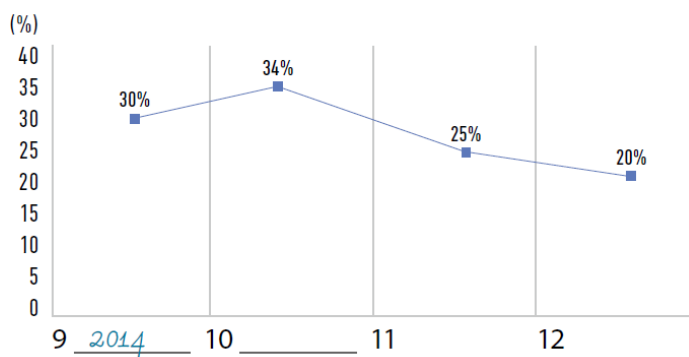


Chart 2

Introduction 1	<ul style="list-style-type: none"> State what the pie chart shows. <i>The pie chart shows ...</i>
Body part 1	<ul style="list-style-type: none"> Generally describe the preference of modes of transportation for daily commute. <i>It can be seen there is a clear preference for ...</i>
	<ul style="list-style-type: none"> Give a more detailed description of the percentages. Make a comparison if necessary and try to put the numbers in context. <i>... beats ... compared with ...</i> <i>The least popular options are ...</i> <i>To put that in context, ...</i> <i>... occupied the middle ground</i>
Introduction 2	<ul style="list-style-type: none"> State what the line graph shows. <i>Let's move to the next set of data, the line graph.</i>
Body part 2	<ul style="list-style-type: none"> Describe the general trend of trips made by foot from 2014 to 2017. <i>It can be clearly seen from our data that ...</i>
	<ul style="list-style-type: none"> Give a more detailed description of the trends. Make a comparison if necessary. <i>The highest data point ...</i> <i>This was a slight increase from ...</i> <i>This had dropped to ...</i>

Teaching suggestions

Speaking model

- 1 Introduce the objectives of **Academic communication**.
- 2 Check Ss' answers in Task 1.
- 3 Ask Ss to work in pairs to discuss the questions in Task 2.
- 4 When they have finished the discussion, ask volunteers to share their answers briefly with the class.

Speaking skill

Comment on Ss' online performance.

Alternative activity

Ask Ss to work in pairs. Encourage them to come up with more expressions to refer to a graph, and to describe percentages and trends.

Ss' answers may be:

- ✧ Referring to a graph:
 - 1) As can be seen from the graph, ...
 - 2) From the graph above, ...
 - 3) According to the graph, ...
 - 4) The graph illustrates / reveals / presents that ...
- ✧ Describing the percentages:
 - 1) In the pie chart above, the percentage of ... is 33%.
 - 2) We can see from the pie chart that the ... is roughly 15%.
 - 3) The proportion of ... increased from 9% to 12%.
 - 4) The proportion of ... rose up to approximately 20% by the end of 2010.
- ✧ Describing the trends:
 - 1) It shows an upward trend.
 - 2) It shows a downward trend.
 - 3) During ..., there has been a substantial growth.
 - 4) The ... rose from 1500 to 2600.
 - 5) The ... fell from 2600 to 1500.

Then, ask Ss to use their own words to describe the two charts. Invite volunteers to make presentations and give comments on their performance.

Skill enhancement

- 1 Ask Ss to work in pairs to discuss what visuals they can use and how they can describe the data. Encourage them to use the given sentence patterns to describe visual data.
- 2 Walk around the class and help the Ss who have difficulty with the task.

- 3 Invite some volunteers to show their visuals and describe them to the class.

Speaking task

Brainstorm

- 1 Ss work in pairs. Ask them to choose one city from the list and identify which aspect of public transportation in the city they would like to research.
- 2 Ask Ss to conduct a survey before class.

Plan

- 1 Tell Ss to review, organize, and analyze the survey results.
- 2 Ask Ss to create visuals to present their findings.

Speak

- 1 Ask Ss to practice presenting the data in pairs. Walk around the class to see how Ss are doing.
- 2 Invite volunteers to present their findings to the whole class.
- 3 Ask Ss to take notes while they watch others' presentations.

Share

- 1 Ask Ss to discuss the presentations in class.
- 2 Ask Ss to share their notes with the presenters after class to identify the information that was delivered effectively and ask questions to repair lapses.

Reflect

- 1 Ask Ss to review their presentations and think about the listed questions.
- 2 Make comments on their presentations.
- 3 Ask each student to do an individual presentation after class based on the speaking task and record it. Then upload their recordings online.

Alternative activity

- 1 Ask each student to conduct a survey on public transportation in his / her hometown.
- 2 Ask Ss to complete the survey task before class, and analyze the results.
- 3 Ask Ss to organize the findings and design visuals for their presentations.
- 4 Ask Ss to practice presenting the survey results.
- 5 The T invites some volunteers to present their findings to the class.
- 6 The T gives comments on the performance of the presenters.

Unit review

 Online course
(after class)

Vocabulary

- I can use words and expressions about expense.

Listening

- I can listen to detect and repair lapses in understanding.
- I can listen follow mathematical or scientific problems.

Speaking

- I can use visual data.

Critical thinking

- I can identify problems in visual.