Transcripts

Unit 1

1.1

1 Scientists estimate that about 25% of the time we are asleep is spent dreaming. But why do we dream? Some experiments suggest that dreams help our brain to organize information. Each day, your brain collects a lot of new information. This could be something very simple like the colour of a car you saw, or something more complicated such as an exam you prepared for. Your brain decides which information to forget and delete, and which to keep stored in the memory. Research shows that dreams play an important part in this process.

2 Edwin Hubble, an American astronomer, created a new instrument, the Hubble Telescope, which is powerful enough to measure light from 10 to 15 light years away. Hubble's observations have provided evidence that supports the Big Bang theory. According to the Big Bang theory, the universe was smaller, denser and hotter than anything we can imagine. Then, suddenly, it exploded. In less than a second, the universe went from being smaller than an atom to being bigger than a galaxy. Astronomers estimate that this happened approximately 14 billion years ago.
It is important to note, however, that a significant number of scientists believe that the Big Bang theory does not explain how all the matter in the universe came from nothing. It seems that more research is required before we can be sure.

3 There's a website I read where they talk about all the strange things in the sky that people see. You know, UFOs, that's unidentified flying objects. Every year, hundreds of people see things in the sky, like bright lights, and nobody knows what they are. But I think they are alien spaceships. And it's all top secret. The government knows that there are aliens out there, but they don't tell us because they don't want people to be frightened. But I'm not scared, actually. They probably are very friendly.

4 When we make a decision, do we really make the decision? Do we have a choice? Let me explain. When you put a shirt on in the morning, how do you decide which shirt? Let's say you chose the cleanest one. Why? Because you have a tutorial today and society tells us to wear clean shirts not dirty shirts for tutorials. So we don't make a decision, it was already made. We just don't know it.

1.2

complicated
significant
powerful
unidentified
important

1.3

1 A What is the rarest blood type?
B AB Negative. Less than 1% of the world population has this type of blood. The most common blood type is O, about 47% of the population.

2 A Who discovered penicillin?
B The Scottish biologist, Alexander Fleming. He actually discovered it by accident.

3 A Has a dog ever been into space?
B Yes, the Russians sent a dog called Laika into space in 1957. This was four years earlier than the first human astronaut, Yuri Gagarin.

4 A Will there ever be a cure for cancer?
B Possibly. There have been some breakthroughs in vaccines. In the USA, five billion pounds is spent every year on research.

5 A Is the number of malaria cases going down?
B Yes, it is. It is going down by about 5% a year.

6 A Are European Union countries going to reduce the amount of greenhouse gases they produce?
B Yes, all the major countries signed an agreement to cut greenhouse gases by 40% by 2030.

1.4

a Where's he gone?
b What did he do?
c How does he know?
d What's he doing?
e What'll he do?
f What's he going to do?

1.5

As a professor of language teaching I am often asked the same question, 'What's the best way to learn a language?'. Well, that's a very difficult question to answer because it depends on so many factors such as 'What language are you learning?', 'What languages do you already speak?', 'What do you need the language for?', and so on. But we do know from decades of research that most successful language learners share certain characteristics. So, I'm going to give you a profile of a 'good' language learner.
Broadly speaking, I can say that a good learner experiments with language and she takes risks. That's the first thing. And she is realistic. By realistic, I mean she knows that learning a language is not simple or easy. It takes time and effort. She accepts that sometimes progress will seem slow. Next, she is independent, meaning she doesn't just sit in the classroom expecting to learn. Instead, she is always looking for opportunities to learn, to practise, to improve. And importantly, a good learner is able to find the right balance between accuracy and fluency. And by accuracy we mean communicating correctly, not making mistakes or errors, and by fluency we mean communicating freely and easily.
Right, the final feature of a successful learner is that she thinks critically about her learning journey. By this I mean she is aware of her progress and knows what she needs to improve. And she knows which methods work for her, and which methods don't. Because we are all different, and we learn in different ways.

1.6

a So, I'm going to give you
b learning a language isn't simple or easy

c she's always looking
d a good learner's able to find
e she's aware of her progress

1.7

A This method seems good to me because I think teachers should always correct mistakes. In my experience, it's the only way people improve.
B I'm not sure about that. I agree with Professor Hawthorn when he says that you need a balance between accuracy and fluency.
A But how do people learn if they don't know what's correct?
B Well, I've actually read a book about this and the evidence suggests that if a teacher corrects every mistake, the students get nervous and don't speak in class.

Unit 2

2.1

At about 8.00 p.m. a light came on in the cockpit. It indicated that a door on the outside of the plane was open. At 10.15 p.m. the pilot landed the plane at Reno Airport. Armed police surrounded the plane and checked inside. Cooper was not there, and neither was the money or two of the parachutes. His tie was left on his seat.
The police looked for Cooper in the area where he jumped, but didn't find anyone. In fact, nobody saw Cooper ever again. However, in February 1980, a young boy called Brian Ingram was digging holes in the sand when he found some envelopes full of money. There were two packets of 100 20-dollar bills and a third packet containing only 90. Tests showed that it was some of the money given to Cooper nine years earlier. It is the only evidence of the hijacking ever found. To this day, nobody knows for sure what happened to the man known as Dan Cooper.

2.2

First of all, the investigators gathered any evidence they could find. There was the black tie Cooper left behind on the seat in the aeroplane. And there were the two parachutes he didn't use. They also found 66 unidentified fingerprints. And then, of course, there was the money the young boy found.
The investigators then began talking to anyone who spoke to Cooper, in particular, the flight attendant and the ticket sales clerk. They asked these witnesses lots of questions about Cooper, for example, 'How tall was he?' 'What was he wearing?' 'What was his voice like?' 'Was he calm or excited?' These descriptions helped the investigators to develop a complete picture of the man.
In order to estimate where Cooper landed, investigators conducted an experiment. They sent the same plane on the same journey with the same pilot, and at the estimated time that Cooper jumped, they dropped a 91 kg weight from the plane. Once they had an idea of location, they began searching a very wide mountainous area.
The FBI also contacted experts in several fields. Perhaps the most interesting theory came from psychology experts. Most psychologists agreed that Cooper probably had very serious and urgent financial problems, which forced him to do something so dangerous. However, some psychologists suggested he was a 'thrill-seeker', meaning somebody who simply enjoyed extreme danger and excitement.
While the FBI doesn't have a complete theory on Cooper, there are some things they believe. Based on his actions that day, they know he was a very careful planner. They think he knew the Seattle area very well. They also suggest he was an Air Force veteran although they do not believe he had much experience with parachutes because the jump was simply too dangerous. It is this fact that convinces the FBI that Cooper did not survive. However, many people believe Cooper *did* survive, and some even claim to know his identity.

2.3

He was about six feet tall and he was very thin.
He went up to the till next to me.
He got into a green car and disappeared.

2.4

Witness account 1

A What were you doing when the robbery started?
B I was queuing up to withdraw some money.
A And what happened first?
B I heard someone shouting and when I turned around I saw a man with a mask on his face.
A Can you describe him?
B He was about six feet tall and he was very thin.
A And what was he wearing?
B He was wearing grey trousers and a black top.
A What was he shouting? Can you remember?
B He was shouting 'Everybody on the floor.'
A Did he have a bag?
B Yes, he had a plastic bag with him.
A And what happened next?
B He went up to the till next to me. Then he asked the cashier to put all the money she had in the bag. So the cashier put the money in the bag and the man ran out of the bank.
A Could you see where he went?
B Yes, I could see him through the window. He got into a green car and the car drove north along Sullivan Street.
A OK, thank you. That's very useful.

Witness account 2

A Where were you when the robbers came in?
B I was sitting in the corner of the bank when it happened. I was waiting to see the manager because I have a problem with my account you see. Anyway, suddenly two men came bursting into the bank. One stood by the door and the other one went up to the counter.
A And then what happened?
B The man at the counter started shouting 'Put all the money in the case' – he had a briefcase. Then he said 'Nobody will be hurt if you do what I say.'
A What did you do?

B Well, I just stayed quiet and looked at him carefully because I knew the police were going to ask me. So, he was about five feet eight inches tall and he was medium build. I think he was wearing grey trousers and a blue top. The other guy was shorter and he was wearing all black.
A Did the bank people get the money?
B Yes, the cashier put all the money in the briefcase and the two men ran out of the bank. They got into a brown car and drove off quickly. They went east towards the motorway.

Slideshow – Can we travel through time?

It's morning. You wake up in your bed, open the curtains and look out onto the street. You do the same thing every day. But today, something is very different.
The cars look strange and some of the buildings are different. And the people are wearing funny clothes!
You go into the living room and everything looks odd here, too.
The furniture is very old-fashioned and the carpet is … interesting.
You switch on this vintage TV and see the news. It says it's 1964! It seems you have travelled back in time! Oh, my goodness! Where will you go? What will you do? Who will you look for? What news will you give the people of the past?
With all the questions it poses and the situations it presents, time travel makes the perfect device for science fiction films, TV programmes and books. You might think people have been fantasizing about time travel for centuries. Actually, the first account of time travel that really excited the public was in 1895 with *The Time Machine* by H. G. Wells.
It's no coincidence that this was around the time that Albert Einstein and others were starting to reach a greater understanding of time itself. First, let's clarify what we mean by 'time'.
It's funny, isn't it? We talk about time a lot … all the time in fact. But how often do you stop and think about what time is? It's not as easy as you might think. In fact, two thousand years ago, Aristotle described time as 'the most unknown of all unknown things'. But over time … there it is again … many people have attempted to define the concept.
There are dictionary definitions, like 'the dimension of the physical universe that orders the sequence of events at a given place.' And there are also more light-hearted definitions. For example, one physicist described time as 'nature's way of stopping everything happening at once'. But for our current purposes, let's just remind ourselves that time can be described as a dimension – the fourth dimension in fact.
A good way to illustrate this is by imagining two planes in the sky and thinking about how they might crash. Now, in order for this to happen, they would need to have all the same three-dimensional coordinates. That is, left and right, up and down and forwards and backwards. If all three sets of coordinates were the same, the planes would be in exactly the same place, right?
Well, not if one plane was there two minutes before the other one. In order to be certain that the two planes crash, we need to know they are both at that specific point in space at the same time. In that sense, time is the fourth dimension of something we call 'space-time'.
So, what has all this got to do with time travel? Well, if we picture space-time as a four-dimensional piece of fabric, then anything very heavy – the Earth, for example – will cause the space-time to bend.
This bending – or 'curvature' – of space around the Earth is what we call 'gravity'. But it also affects time. And this is one way in which we could – potentially – travel through time, because time effectively moves slower closer to Earth and faster further away from Earth. This is called 'time dilation'.
Imagine there were two twins and one lived at the top of a very high mountain and the other twin lived at the bottom. Because of time dilation, time would actually move very slightly faster for the first twin and therefore she would be older than her twin at the bottom of the mountain.
OK, we're talking billionths of a second difference here.
But imagine the first twin wasn't at the top of a mountain, but instead she was in a spaceship millions of miles above the Earth.
In theory, after travelling in the spaceship for 20 years, when she came back to Earth she would be noticeably older than her twin.
But it's not only proximity to Earth that can affect time. Speed can also make time move faster. Did you know that time goes more slowly for someone on a speeding train than for another observer on the platform? Again, it's not much slower. At train speeds, it only makes billionths of a second difference. However, if someone was on a train (or again, a spaceship) that travelled at almost the speed of light, in theory time travel might be possible. A year for the passenger of the superfast train would occur at the same time that 200 years passed at the platform. So when he returned, the Earth would be a very different place!
So are we saying time travel is possible? Professor Stephen Hawking recently said he used to feel like a crank talking about time travel, but these days it is being discussed as a serious topic in the scientific community.
Most experts agree that travelling back to a time before now will be impossible. In fact, they maintain that people will only ever be able to travel back to a time when a time machine was invented. So, unfortunately, you won't be able to choose a point in history and go back to see it with your own eyes. But, because of the strange nature of time already discussed, many believe travelling forwards in time could be possible one day. However, as we have learned, it would probably involve spaceships flying much, much faster than anything we have invented so far. And at those sort of speeds, no human would survive. Clearly it will be extremely expensive and require engineering skills we simply don't have currently.
But since time travel might just be possible in the future, let's look at it from another angle. So far, we have looked at time travel from a physicists' point of view, but there are also many questions posed by philosophy. It's time for another thought experiment.
Imagine a young time traveller is very angry with his grandfather because of the way the old man has lived his life.

So the time traveller decides to go back in time, to when his grandfather was young, and shoot him.
He buys a gun and practises his aim every day until he is a top marksman. He then travels back in time, finds his grandfather, aims the gun at him and pulls the trigger. What happens? If he kills his grandfather, then his father will never be born and nor will he. And if he is never born, how is any of this happening? This is called the grandfather paradox. Some philosophers claim it would be impossible for the man to shoot his grandfather. The gun would jam, the bullets would miss or perhaps a strong gust of wind would blow the gun out of the young man's hand. In any event, nature would intervene and prevent it from happening. And while the grandfather paradox is an extreme example, it does pose questions about what we could actually do if we were to travel in time. Natural law may prevent us from doing anything that would change history in any way. Which doesn't leave much!
Perhaps it isn't helpful to think so much about time travel in the way it's shown in science fiction films. Maybe it's better to appreciate time in the way we experience it every day. Rather than fantasizing about living in the past or the future, we could simply look around and marvel at what is happening right now, in the present.
And if you really want to experience a bit of time travel, simply look up at the sky at night and gaze at the stars.
Because these stars are so far away, the image you see is not from now, but from many years ago. So, in a sense, every time you look up into the night sky, you are looking into the past.

Unit 3

3.1

Chunyun is a period of travel in China, lasting around 40 days. It is the largest human migration in the world, when the planes, trains and roads of China become completely full of people. It starts about 15 days before the Chinese New Year and continues for about 25 days after the celebrations. During these 40 days, nearly three billion people travel.
The reason for this huge movement of people is simple. It's a tradition for Chinese people to spend New Year with their families.
But many people live far from their parents, normally because they are working or studying in a big city. So, during *Chunyun* they all head to their family homes. Those with money drive or fly home, but many people can't afford that, so instead they use the very crowded trains and buses. Many of these people are students or migrant workers. Some people cross the country to be with their families, and remember China is an enormous country! We met one of the travellers, Liling, at the main railway station in Beijing and she told us about her travel plans.

Liling Hello. My name is Liling and I'm a student in Beijing. But today I'm going home to spend New Year with my family. I'm from a town near Chengdu, which is over a thousand miles from Beijing.

Interviewer How long is the journey?
Liling It's going to take 36 hours. And I have already been travelling for a long time this morning because everywhere is so busy.
Interviewer A 36-hour train journey?
Liling Yes. I left home at 6.30 this morning.
Interviewer What are you going to do on the train?
Liling I'm going to sleep a lot because I'm very tired. I've been studying very hard lately.
Interviewer And do you have a bed on the train?
Liling No, I just have a seat. There are beds on the train, but they're expensive. My ticket only costs 500 Yuan. That's about 70 dollars for a return ticket.
Interviewer So in 36 hours you'll be back home with your family?
Liling No, in Chengdu. I have to get a bus to my town. That's another three hours!

3.2

The graph shows several things. First, we can see how the total population of the world has risen from 2.5 billion to over seven billion today. Then we can see how the world's rural population, those people living in the countryside, has slowed down and is now actually decreasing, while the urban population has risen and continues to rise. In 2010, for the first time there were more people living in towns and cities than in rural areas.
The map shows the speed at which urbanization occurred at the beginning of this century. As you can see, urbanization is happening fastest in parts of Africa and Asia, rather slower in the rest of the world, and much slower in most of Europe. And there is an explanation for this, of course. In developed countries, such as those in Western Europe, the majority of urbanization has already happened. It was at its highest in the 19th and 20th centuries, whereas in developing countries the process is still happening.

3.3

So what causes urbanization? We can separate the causes of this migration into push factors and pull factors. That is, things that push people away from rural areas, like low wages or a lack of jobs, or natural disasters such as floods or droughts, which can cause starvation. People are forced out of rural areas by these factors. Then there are things that pull people towards towns and cities. Yes, I'm talking about more jobs and higher wages, but there are also the amenities in urban areas such as schools, hospitals, and so on. In general, people are attracted to the cities by a better quality of life.

3.4

attracted
developed
forced
happened
occurred

Transcripts

3.5

There are, of course, multiple problems in cities caused by the migration of people from rural areas, perhaps the most obvious being unemployment. Some people are offered manual jobs, for example, in the building trade. However, some people are not given work because they do not have the right skills or are too old.

And then there is the problem of housing the ever-increasing population. About 40% of urban expansion is estimated to be taking place in slums. And the unsanitary conditions in these slums mean that diseases spread easily. All of these issues are especially problematic when the process of urbanization happens quickly. Cities can grow so fast that the infrastructure cannot cope with the increasing population. Therefore, there isn't enough quality housing and there aren't enough schools or hospitals.

However, cities can really benefit from this influx of people. People bring with them new ideas and the exchange of ideas in cities helps development. On a practical level, there is more business, and consequently more jobs are created. Studies show that the bigger the city, the higher the average wage of its citizens.

But how are rural areas affected by urbanization? Clearly, there are challenges. With so many people leaving the countryside, the workforce can be severely reduced. This is particularly difficult when young men are migrating because traditionally, in rural areas, the more physical jobs were carried out by these young men. A subsequent problem is that often these jobs will have to be done by the children in the families, who would otherwise be going to school.

However, the benefits that urbanization brings to rural areas should not be ignored. The migrant workers in the cities earn significantly more than they were making at home and they send a lot of this money back to their families. This money will be spent in the rural communities. Animals are bought and school fees are paid. In addition to helping their families financially, when these workers return to their villages they often bring with them new knowledge and skills that can be used to benefit the local area.

3.6

a Some people are offered manual jobs, for example, in the building trade.
b On a practical level, there is more business, and consequently more jobs are created.
c But how are rural areas affected by urbanization?
d With so many people leaving the countryside, the workforce can be severely reduced.
e … traditionally, in rural areas, the more physical jobs were carried out by these young men.
f This money will be spent in the rural communities.

3.7

a	job	know	cost
b	town	provide	pollution
c	money	everyone	police

3.8

Conversation 1

A The problem we have at this university is that our students are not independent. They are given too much support.
B Sorry, do you mean by their teachers?
A Yes, by their teachers, by their parents, by everyone. They aren't ready to take responsibility for themselves. We need fewer rules and more opportunities for students to make their own decisions.

Conversation 2

A What's the matter, Jan?
B I'm just reading the staff handbook. This company has a lot of rules.
A You mean like dress codes, and so on?
B Exactly. There's a rule for everything – shoes, ties, haircuts.
A Yes, I know what you mean.

Conversation 3

A The employees of our banks are intelligent people – they're experts in their field. We have to trust them to make the right decision and they can't do that without …
B Can I stop you there? We've trusted them in the past and they've made huge mistakes, but …
A … and that's exactly why we need to have plenty of rules in place. That's why …
C OK. I'd just like to make a point here. We all …
A I'm nearly finished … The government really needs to change the current regulations.

3.9

a Sorry, do you mean by their teachers?
b Yes, I know what you mean.
c Can I stop you there?
d I'd just like to make a point here.
e I'm nearly finished.

Unit 4

4.1

A similar sort of company imports bags to the UK by plane. The company found that it was possible to use buses and boats instead. As well as cutting carbon emissions, it actually saves the company over $30,000 a year in transport costs. In fact, it costs the company $2 per kilogram by boat compared to $9 per kilogram by air. The bags are loaded onto a bus in Cambodia and driven to Vietnam, where there are better shipping facilities. And from there they are put onto a boat and shipped across to the UK. The journey takes 40 days instead of just two days by air, but the company has not found the delay to be too problematic.

4.2

First, the father crosses the road with Ahmad. Then he comes back alone. Then he crosses the road with Soha. But he comes back with Ahmad. Then he crosses the road with Hiba and

leaves her with Soha. He then comes back alone. Finally, he crosses the road with Ahmad.

4.3

The answer is that the aeroplane is not flying. It's on the ground and it's not moving. The man slips as he is getting out of the plane and bumps his arm on the runway.

4.4

So first of all, the person doing the puzzles needs to work out what kind of puzzle it is. Some puzzles are logical-thinking puzzles and they can be done systematically. So, for example, the father who needs to cross the road puzzle. You need to think about the possibilities one by one. If the father takes Soha first, we know that Ahmad will bully Hiba, so this is not an option. We eliminate this possibility. And so on.

We also need to think creatively. The trick in this puzzle is that the father needs to bring Ahmad back, which is not what we normally do. So we need a completely open mind and to avoid making any assumptions.

The second puzzle is what we call a lateral-thinking puzzle and we have to take a different approach to this compared to a logic puzzle. When we hear the word 'aeroplane', our mind immediately visualizes something flying, something in the sky. Lateral-thinking puzzles take advantage of this automatic reaction. The trick to solving lateral-thinking puzzles is to question everything that we normally take for granted. It's an aeroplane, but is it necessarily in the sky? There is also an element of logic. If the man is not seriously injured, he could not have fallen from an aeroplane that was actually flying. If you combine lateral thinking with this logical element, then you will have a good chance of solving the puzzle. This is the secret to becoming a great puzzle-solver.

4.5

The farmer's daughter took a stone from the bag but immediately dropped it onto the beach before anyone could see what colour it was. Remember, the beach was covered in black and white stones so her stone was lost. She apologized for being so clumsy and said, 'But all you have to do is look at the colour of the stone in the bag. If it is white, then I picked a black stone. But if it is black, my stone was white.'

4.6

Vicky Hello, Consuela. Have you been at your exercise class? You look a bit hot!

Consuela No, actually I've just been at a workshop about thinking.

Hassan Yes, thinking makes me feel hot and tired, too. I try to avoid it.

Vicky Don't be silly, Hassan! Really, Consuela? Tell us about it.

Consuela It was about thinking and dance. We tried different ways of dancing and then did different types of mental problems.

Vicky Wow, that sounds fun! What course was that part of?

Consuela None of my regular courses. It was a special event at the science festival, taught by a man called Dr Peter Lovatt. He's a professor, but not at our university, and he also travels a lot giving seminars of this type.

Vicky Gosh, I wish I'd heard about that. It sounds really good. Tell us more.

Consuela Well, first we learnt a dance routine – that was fun!

Hassan What do you mean by routine?

Consuela A dance routine? It's a set of specific moves and steps to music. Doing this stimulates the brain to find patterns and follow rules when solving problems.

Hassan I see, and that's a typical left-brain function.

Vicky So, does that help develop logical thinking?

Consuela Well, Dr Lovatt didn't use that actual term, as I recall, but he said that kind of dancing helps with solving problems that have one correct answer, like maths problems.

Hassan Interesting … So what kind of dance do you do to help you with lateral thinking?

Consuela Again, that actual term wasn't used, but we learnt that improvised dance helps you work with problems that have lots of possible answers.

Hassan Well, that's one phase of lateral thinking, isn't it? You come up with lots of possible ideas and then assess them and reject the totally unlikely ones.

Vicky You know more about this thinking business than you let on before, Hassan!

Hassan Well, I am a Psychology student. But I don't know much about dancing – what is improvised dance?

Consuela Basically, you don't follow set steps and routines. You do what you feel like doing.

Vicky Oh, I like that kind of dance best. Do you think it would help me get my English literature essay written faster if I do some dancing first? I haven't got any ideas for it at all at the moment!

Consuela Why not? It's worth a try!

Slideshow – Migration

The painted lady butterfly is one of the most mysterious and amazing insects on the planet. It's a tiny creature weighing less than a gram. It looks like the most delicate creature in the world. Its brain is the size of a pinhead. Yet every year, each butterfly goes on an extreme, 15,000-kilometre round trip. The painted lady flies from Tropical Africa to the Arctic Circle. But no single butterfly flies the whole way. Incredibly, several generations of the same family complete the journey in stages. Why do these butterflies fly so far? How do they know which way to go? How do they know when they should leave or when they've arrived? How is all this knowledge passed between generations?

The painted ladies' journey is one of the most remarkable examples of the phenomenon known as 'migration'. Migration is the annual or seasonal movement of animals from one place to another. Animals of all types migrate – birds, mammals, reptiles, amphibians, fish and insects. Some

migrations are quite straightforward. But many are truly stunning feats of navigation, strength and determination. What all migrating creatures have in common, and what makes migration so impressive, is that they have no technology to help them – no radar, no GPS, no maps, no clocks and no calendars.

Yet every year, they set off at the same time of year. And every year, they return to exactly the same place.

Another particularly extreme migration is undertaken by the Arctic tern. Every year, Arctic terns go from the Arctic to the Antarctic and back. That's a round trip of about 40,000 kilometres! Arctic terns breed in the north in the northern summer and move south, arriving in Antarctica in the southern summer. Some go down the west coast of the Americas. Others fly over the Atlantic Ocean.

The life span of an Arctic tern is 30 years. That means that, in its lifetime, each tern will fly the equivalent of 60 times around the Earth – or to the Moon and back, three times.

Another animal with amazing powers is the Atlantic salmon. Atlantic salmon are born in freshwater rivers, where they grow into adults.

Then, they swim out to the saltwater ocean, where they live their lives. The extraordinary part is that, when it's time to breed, each salmon returns to exactly the same river in which it was born. Incredible! How do they navigate across the ocean and back to the same place?

But before we try to answer 'how', let's look at 'why'. What makes it worth these exhausting journeys and taking such enormous risks? The three main reasons for migration are climate, food and breeding.

First, let's consider climate. Snow, ice and temperatures below zero Celsius all make life more difficult and dangerous for most animals. So in the northern hemisphere, animals travel from north to south as winter draws near.

To escape the freezing mountain temperatures of the Himalayas, bar-headed geese head for the warmth of South East Asia. The migration of these birds is extreme in another way: they often fly up to eight kilometres above sea level. That's about the same altitude as a jumbo jet!

Climate is connected to a second reason animals migrate – food. Generally speaking, food is most readily available in the spring and summer months.

The humpback whale travels over 16,000 kilometres from Mexico to feeding grounds in the Arctic. That's the longest ocean migration of any animal.

This brings us to the third reason for migration – breeding. Whales cover the thousands of kilometres from the Arctic to a warm sea in which to have their calves. Whale calves are born in the warmer waters of Mexico, away from the cold of the Arctic. Then, when they are old enough and strong enough, they swim back north to feed.

So how do all these animals know when it is time to go? And come back? How do they know the destination and how to get there? And how do they navigate?

Weather is a key factor. When the temperature starts to drop and the first snow falls, animals sense that it is time to change location.

In the USA, the pronghorn antelope spends the summer in Wyoming. However, because the snows are so heavy in this region in winter, the pronghorn starts to move south in the autumn. The timing has to be very accurate – otherwise the path will be blocked by snow. So, antelopes must have some device, some way of judging very precisely when it is time to leave.

How do animals know where they need to go? Again, no one knows, exactly.

Some information may be contained in their genes – the genetic information they inherit from their parents.

Young animals also learn from observing and being with their parents and other animals in their group. After a few years of travelling together, they have memorized the route.

Scientists have discovered that when babies grow up with no other animals to learn from, they don't know the way. For example, a group of whooping cranes had to be taught where to migrate by humans using a light aircraft.

Animals also use visual aids to navigate. Some birds orientate themselves using the path of the Sun. However, when it is cloudy or when they are travelling at night, they need other ways of navigating. Just like sailors of ancient times, they use the stars. Some ducks work out which way is north by using Polaris – also known as the North Star – which is one of the brightest stars in the sky. But how they use this information to calculate their route over thousands of kilometres remains a mystery.

Despite migrating many thousands of miles, whales move in astonishingly straight lines. Most pods of whales stray off course by no more than one degree, despite big changes in the sea currents. Again, no one is entirely sure how they do it. They may use magnetic fields to help them navigate. They also appear to use the position of the Sun. Being able to process these different kinds of data in order to keep on course suggests that whales have an extraordinary additional sense or a vast amount of data processing power.

Scientists think that some animals also use smell. For example, salmon use their sense of smell to find the river where they were hatched. Here they lay their own eggs. Wildebeest follow the smell of rain on the dry Serengeti soils to reach greener pastures. And it is thought that migrating birds can smell particular lakes from many hundreds of kilometres away.

Animals have extraordinary and unexplained abilities that help them to process the environmental, visual and other information needed to navigate great distances. They time these journeys with pinpoint accuracy in dangerous and difficult circumstances. Despite scientists' best efforts, their exact methods remain largely a mystery. Migration is truly an amazing phenomenon.

Transcripts

Unit 5

5.1

Recently, some education experts have become concerned by the concentration levels of students. In an effort to confront this problem, several schools and universities have started regular sessions in an exercise called 'mindfulness'.

The idea of mindfulness is nothing new. In fact, it's originally from Buddhist philosophies hundreds of years old. However, it has become popular in Western societies, not with religious connections, but as a way of improving health, both mentally and physically. Today, there are mindfulness sessions in many workplaces, and it's even practised in some schools with children as young as five. But what does it involve? It can be summarized in three main ideas. Firstly, being mindful means living in the present moment, not regretting the past or worrying about the future. In other words, being aware of *now*. Secondly, with mindfulness you notice the thoughts going through your mind. You don't judge these thoughts as bad or wrong, you simply notice them. Thirdly, you pay attention to everything you are experiencing. You actually taste the food you eat, you feel how your body moves as you walk, run or swim.

So, what are the benefits of mindfulness? Well, there are many. It improves concentration and it reduces stress and depression. It has even been shown to boost the immune system. In other words, mindfulness can help us fight diseases and infections.

Admittedly, there have been some criticisms of mindfulness. Nothing is perfect. Some people have found that concentrating on their thoughts has not always been positive. After all, not all thoughts are nice, and sometimes they can be painful; they can make people uncomfortable. Then there are the people who find mindfulness too difficult. As with any skill, learning can be frustrating, especially at the beginning of the process.

5.2

a A The houses may be sinking.
  B They could be sinking, but there's no water or sign of a hole.
b A There might have been an earthquake.
  B It can't have been an earthquake because the houses are not damaged.
c A It could be an illusion that the houses are leaning.
  B It must be an illusion because the clouds are at an angle.
d A How was the photo taken?
  B The photographer must have taken the photo at an angle.

5.3

must have
should have
can't have
could have
might have
may have

5.4

A Right, we need quite a lot of things from the supermarket. Shall I write a list?
B No, there's no need. I'll remember.
A Really?!
B Yeah, no problem. So what do we need?
A Well, there's bananas, oranges, apples …
B Yep …
A Er … carrots, potatoes, onions …
B OK. What else?
A Are you remembering all this? OK, we need cereal, bread, some butter and a block of cheese. And some yoghurt.
B Uh-huh. Is that everything?
A We need toothpaste, shampoo, tissues and some washing powder. And that's it, I think.
B OK. I can remember that. Let's go!

5.5

When we talk about memory we should remember that there are actually three types of memory and they are all used in the process of remembering something for a period of time. There is sensory memory, then there is working memory. Finally, there is long-term memory. These act as a kind of filter because we receive massive amounts of information and, of course, we don't want to store it all.

The process begins when we receive information or stimuli. These stimuli could be through something we see, hear, touch, smell, and so on, and they are received by our sensory memory. The sensory memory is capable of receiving huge amounts of information, but it can't retain much, nor can it hold the information for a long time. It can hold three to seven units of information and only for less than a second.

Most of the information received will then be forgotten. However, the working memory will pay attention to any information that seems important, while ignoring any information that doesn't. In the working memory, about seven units can be stored for a maximum of 30 seconds. This is if the information is not repeated.

However, the more often information is repeated, or used, the higher the chance that it will move through to the long-term memory. As this process occurs, it is put into a kind of code so that it can be stored. As the name suggests, the long-term memory can potentially remember information forever, for a lifetime. Again, this is achieved through repetition. And there are no limits to how much information can be stored in the long-term memory. In other words, the capacity is infinite. When a memory is needed at a later time, it can then be retrieved from the long-term memory and into the working memory.

5.6

a How do you remember the number of days in each month? Well, you could try looking at your hands! Make two fists and start to count the months of the year on your knuckles from the left and the spaces between. In this way, each knuckle is a month with 31 days, and each space is a month with 30 days. Or 28 or 29 in the case of February.

b The number pi is the ratio of a circle's circumference to its diameter and it is very useful for mathematicians. However, because the number is extremely long, people use mnemonics to remember as much of the number as possible. One way is to think of a sentence and use the number of letters in each word to represent the numbers in pi. The first eight numbers in pi are 3.1415926. So we can use the sentence 'May I have a large container of coffee?'. 'May' is three letters, 'I' is one letter, 'have' is four letters, and so on.

c The relationship between spelling and pronunciation in English is not at all simple. Sometimes mnemonics can help. For example, the phrase 'when two vowels go walking, the first does the talking' means the sound of a word is similar to the first vowel in that word. So 'meat' sounds like 'e', 'brain' sounds like 'a', and so on. But, of course, there are exceptions.

d The order of the colours of the rainbow are not easy to remember and that's why there are lots of mnemonics to help us. 'Richard of York gave battle in vain' is just one example where the first letter of each word is the same as the first letter of the colour. So, Richard – red, of – orange, York – yellow, gave – green, battle – blue, in – indigo, vain – violet.

5.7

a coat, load, approach, board
b rain, paint, failure, said
c mean, ceiling, height, clean

Unit 6

6.1

a If Yusef fails his maths exam, he will have to retake it.
b What would you do, if you didn't get into your first-choice university?
c I won't finish the work on time, unless I work late tonight.
d If you didn't go to university, what would you do?
e If Sasha accepted a part-time job, how would she travel to work?
f My brother will look for another job, unless his company pays him more.
g If you spoke English well, you would get a job in a multinational company.

6.2

1 **Laura** Have you heard Alice's taking a year off before she goes to university?
Tina Is she? What's she going to do?
Laura She wants to work for a year and save money to help pay for her university course.
Tina Really? I'm not sure that's a good idea. I don't think she'll be happy when all of us are going off to university and are having a great time, and she's left doing a boring job. I can't see it working. I think it's a bad idea. And what will happen if she doesn't find a job? She may end up wasting her time.

2 Here at Alba College we encourage students to take a gap year. It isn't the right path for every student, but some students really benefit. It's certainly a good way for young people to discover what really motivates them and what they want to do with their life. Going to university blindly straight after school can be a waste of money, so taking a year off can help students figure out what they really want to do.
A student like Alice has very clear ideas about what she wants to do in her gap year so I think it will work for her. It'll give her valuable real-life work experience, and she'll also learn practical skills she can apply later on in her Economics course. Even if the job isn't that interesting, she'll learn a lot about herself and get another perspective on life. In our experience, students who do a gap year often get better results than students who come straight from school.

3 **Father** We're a fairly traditional family, and, like many parents, we expect our children to study hard, do well at school, go to the best universities, get a good degree and a good job. A gap year isn't something we've ever considered for Alice.
Friend So what do you think about Alice's plan to work for a year?
Father We're not keen. We worry that she'll get out of the routine and discipline of studying, and, in the end, she may not want to go to university. It's a real problem. In America, you need a degree for most jobs, and if Alice doesn't have one, I think a lot of jobs will be closed to her.
Friend True. It's a competitive world out there.
Father And there's one other thing. If Alice delays going to university by a year, she'll always be a year behind. She'll start her studies a year late, she'll take a year longer to finish her course, and a year longer to find a job. I'd prefer her to start university straightaway so she'll be earning a good salary sooner. It makes better sense.

6.3

Alisha What would you do if your car broke down on a remote road at night?
Marti Well, it depends. If I were near home, I'd call my friend Alexi and ask him to pick me up.
Alisha And if you couldn't get a mobile signal, would you go for help or stay in the car?
Marti Well, if there were a town or a village nearby, I'd walk there and try and get help.
Alisha You'd leave the car! I wouldn't do that if my car broke down at night. I'd lock the door and stay in the car.
Marti That's crazy. If you did that, you might be there all night.

Transcripts

6.4

a If you had more free time, how would you spend it?
b What would you do if you left your laptop in a taxi?
c If you weren't able to find a job, what would you do?
d Where would you live if you could choose anywhere in the world?