

For questions 17 – 24, read the text below. Use the word given in capitals

The songs of the bowhead whales

Bowhead whales are the second largest whale species after blue whales, and can grow up to 20 metres in (0) About 10,000 bowheads are estimated to live in the Arctic region, but because they spend most of their time under the polar ice, their lives remain an (17) quantity. Recently, however, oceanographers managed to record a group of bowheads producing 184 different musical (18) during a three-year study off the coast of Greenland. Such was the (19) of the songs that the researchers felt inspired to (20) the whales to jazz musicians.

LONG

KNOW

COMPOSE

DIVERSE

LIKE

Whale songs are not simple mating calls; they are complex musical phrases that are not (21) hard-wired, but have to be learned over a period of time. Only a (22) of mammals – including some bats and apes – are able to vocalise in ways that are (23) to birdsong. Bowheads are particularly impressive in that their songs are never repeated from one year to the next and they appear able to improvise (24) Researchers are now keen to explore why bowheads change their songs so frequently.

GENE

HAND

COMPARE

CONTINUE

You are going to read an article about teenagers. For questions 31 – 36, choose the answer (A, B, C or D)

Teenage brains

Journalist Martin Baines talks to neuroscientist Professor Sarah-Jayne Blakemore about the development of the brain during adolescence.

Until I read *Inventing Ourselves* by Professor Sarah-Jayne Blakemore, I'd always assumed that what we think of as teenage behaviour is largely an invention of contemporary western society. I hadn't imagined, for example, that 15-year-olds in the Kalahari Desert also complain about having to get up early – but they do. It was for people like me – there are lots of us – that Blakemore wrote her book explaining the science of everything from why teenagers can't get out of bed in the morning to why they sometimes appear to be irresponsible narcissists. 'We demonise teenagers more than any other section of society,' she told me. 'And it's not right. They're going through an essential stage of their development. Most adults don't realise this.'

This is arguably inevitable. Blakemore says that until 20 years ago, it was assumed that teenage behaviour was largely down to hormonal changes in puberty and that children's brains were more or less fully developed. The findings of brain scans and psychological experiments have now revealed that the reality is very different, however. In fact, the brain continues to change all through the teenage years and well into adulthood, and important neurodevelopmental processes enable it to be moulded by the environment. So adolescence is a critical period of neurological change, much of which is responsible for adolescent behaviour.

Blakemore quotes from a teenager's diary dated 20 July 1969: 'I went to arts centre (by myself!) in yellow cords and blouse. Ian was there but didn't speak to me. Got a rhyme put in my handbag from someone who's apparently got a crush on me. It's Nicholas, I think. UGH. Man landed on the moon.' This may look like amazing – even jaw-dropping – self-absorption. But Blakemore says it's essential neurological development, because the biological function of adolescence, today and in the past, is the creation of a sense of self. Teens achieve this through creating new allegiances, independent of their parents – which is why their friendships suddenly become extremely important. What is known on social media as FOMO – fear of missing out – may look like an irrational sense of priorities if it means skipping revision to attend a run-of-the-mill get-together, but at that age, nothing matters more than peer approval.

Blakemore designed an experiment to explore this. Adolescents were asked to play an online ball game, with what they believed to be two other players of their own age. In fact, the game was with a computer programmed to ignore the human participants; these found themselves watching the ball being passed between two players on the screen who chose not to include them. She repeated the experiment with adults, and found that, while the game lowered the mood and increased the anxiety levels of all participants, the effect was dramatically greater for the teenagers.

In her book, Blakemore also discusses how the neurologically driven preoccupation with peer approval underlies adolescent risk-taking and acute self-consciousness, and how it determines adolescent sleep patterns. It's fascinating, and I'm curious about the implications. What could be done to accommodate the changes adolescents go through?

Blakemore suggests we might harness the power of peer pressure by getting adolescents to run educational campaigns – for example, on healthy eating. She also mentions schools which have altered their start times to fit in with teenage sleep patterns, though she points out there may be practical issues about implementing this

on a wider scale. But generally, she's wary about putting forward concrete solutions. This seems regrettable, but she insists she's a scientist rather than a consultant. She doesn't even like to be asked for parenting advice, although she admits her work does inform her own parenting. When she recently visited her teenage son's school, he asked her to pretend not to know him. 'I could've been so offended by that. But I thought: "That's absolutely normal."' "

One thing that makes Blakemore's empathy and affection for teenagers so striking is its rarity. 'Yes, I'm a champion of them,' she agrees. But why does she think so many other adults feel differently? She often thinks about why we find it hilarious to 'take the mickey out of teenagers'. She points out that there are whole comedy shows mocking their behaviour. She wonders if adults do it to cope with their rejection; small children obey adults and want to be with them, but teenagers, through necessity, look for independence, and the older generations feel hurt about this. They resent adolescents' desire to rebel and their sense of embarrassment when they're with parents. 'Our way of dealing with these changes is to sneer at them.'

- 31 What is the writer doing in the first paragraph?
- A outlining how he feels about the way teenagers are generally perceived
 - B giving his reasons for writing a profile of Professor Blakemore
 - C pointing out international variations in teenage behaviour
 - D acknowledging his relative ignorance about teenagers
- 32 The writer suggests that the way teenage behaviour is commonly regarded is unsurprising because
- A behavioural development is a complex subject.
 - B significant progress in relevant areas of study is relatively recent.
 - C people's outlook on life is partly determined by neurological factors.
 - D differences between generations will always cause misunderstanding.
- 33 What does the writer suggest is 'jaw-dropping' about the teenager's diary entry?
- A the strong desire for independence that comes across
 - B the similarity with what young people talk about today
 - C the negative comments about two acquaintances
 - D the focus on personal rather than wider events
- 34 The experiment described in the fourth paragraph was designed to provide evidence of
- A how competitive teenagers tend to be.
 - B how easily teenagers can be deceived.
 - C how sensitive teenagers are to social exclusion.
 - D how immersed teenagers can become in video games.
- 35 In the sixth paragraph, the writer expresses
- A disappointment at Blakemore's reluctance to advocate specific policies.
 - B enthusiasm for the idea of giving teenagers more responsibility.
 - C amusement at Blakemore's difficulties with her own children.
 - D doubt regarding the feasibility of changing school hours.
- 36 Which words in the final paragraph echo the phrase 'take the mickey out of' in line 44?
- A cope with (line 45)
 - B feel hurt about (lines 46 – 47)
 - C resent (line 47)
 - D sneer at (line 48)

You are going to read an article about a rafting trip along the Colorado River in the USA. Six paragraphs have been removed from the article. Choose from the paragraphs A – G the one which fits each gap (41 – 46). There is one extra paragraph which you do not need to use.

Rafting through the Grand Canyon and beyond

The fierce sun had little effect on the freezing-cold water of the Colorado river as it splashed over the sides of our raft. Ahead lay a rapid called Bedrock. The four of us on our inflatable raft had already conquered numerous cascades in the Grand Canyon, but I was very nervous about this one. 'Go right,' we shouted at Rick, our pilot for the day, who was desperately trying to steer against the powerful current.

41

'Go for the channel!' I yelled, pointing towards a narrow opening. Our guides had said this way was 'un-runnable' and we were about to find out. I felt the boat twisting into a whirlpool and knew we were about to flip.

42

Bearing in mind our inexperience, I'm not sure how we did. As we had prepared to leave from Lees Ferry on the banks of the Colorado in Arizona, our lead guide had asked: 'How many of you have done anything like this before?' Two of the group raised their hands. Our guide explained that ahead of us lay 450km of white water through one of the most formidable environments on earth – and no phone signal for 17 days.

43

For the next two and a half weeks, we'd see few other humans; the Canyon may be one of the world's biggest attractions, but it's also one of the most inaccessible places in the US and is usually only seen from above. We negotiated nearly 90 major rapids in all, and only

flipped once, although several of us ended up in the water on different occasions.

44

Humans hadn't been there as long, of course, but well before tourists came, it was the land of the Navajo and Hualapai American Indians. Their ancestors left buildings carved into the cliff faces, and prehistoric stone engravings in the warren of caves and gorges accessible only from the river. Some of these were filled with luscious palms and others were so narrow you could touch both sides.

45

As a result, we had no idea what was going on in the rest of the world, not that we cared. There, on the river, we were completely focused on the here and now and extra vigilant every time we encountered a significant rapid. Even the guides were nervous as we approached the infamous Lava Falls, which has a terrifying 9/10 difficulty rating. Before attempting Lava, we stopped and scrambled up a nearby cliff. From the top, we looked down anxiously at the crashing roar of white water and tried to work out our route.

46

Then, as soon as it had begun, it was over. There were whoops of joy and relieved high fives. We were soaked – but we'd all got through it safely. There were still a couple more days to go, but after Lava nothing could defeat us. We were a team, united by a river and a great sense of accomplishment.

- A** We'd been made aware of this when we booked the trip. But 16 of us had eagerly signed up for the adventure of a lifetime, renting four rafts, with all the necessary provisions included.
- B** Fierce winds threatening to blow our rafts backwards and vicious sandstorms driving grit into our eyes, nostrils and cameras were two of the worst. Our hands, feet and lips were soon cracked from the constant exposure to water and the dry desert air.
- C** It was no use. We were quickly drawn towards a rock the size of a bus. Then the raft was sucked around the wrong side of the boulder and into an eddy. Our paddles were now being bashed against the rock.
- D** Eventually, we just had to go for it. Nervously, we let the waters pull us towards the boiling foam, and one by one the four rafts entered the fray. Our raft rocked and creaked and smashed through waves the size of a car; at one point it was almost vertical. There were 20 seconds of sheer terror.
- E** In the quieter stretches of this magical setting, we'd fish off the rafts, and at night on the river bank, there were jokes and storytelling before we fell asleep under the stars. The internet became a distant memory as the Canyon closed in and the signal disappeared. It was a digital detox to the extreme.
- F** I wondered if I could hold my breath long enough to survive underwater, and then saw my friend John being hurled off the raft and into the crashing waves. Suddenly, I too was flung headfirst into the freezing water. Bad thoughts filled my mind. But somehow we all survived.
- G** As we progressed, the Canyon grew grander in scale, cutting a deep gorge, over a kilometre deep in places. It's a geologist's dream, with layers of rock dating back almost two billion years and ancient lava fields that are some of the oldest exposed rock on earth.