

You are going to read an article about a designer. 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.

In the exam, you mark your answers **on a separate answer sheet**.

A biological approach to architecture

A spider's web is stronger than almost any material manufactured by man. Yet the spider produces it with nothing more than dead flies and a little water. It seems we still have a lot to learn. One person who makes his living by drawing inspiration from nature's handiwork is Michael Pawlyn, the founder of Exploration Architecture, which specialises in biomimicry. As someone who's devoted his career to studying shapes, materials and designs, he says it's foolish for any architect to ignore nature's 3.8 billion-year research-and-development programme.

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"Nature's absolutely ruthless in rooting out all the failed mutations and variations. What we have left is an amazing catalogue of success stories," he explains in crisp, carefully constructed sentences. "We often think that humans are all-knowing and all-powerful, but there's still a huge amount we can glean." We're talking in his minimalist apartment in east London. "I love the idea of open-plan living," he says. As you'd expect from such a visual person, the apartment is studded with eye-catching furniture and some striking art.

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It was only while working on the Eden Project that he realised he could recombine those adolescent passions. After David Kirkland, one of the project's chief architects, dreamt up the concept of building intersecting spheres, Pawlyn set about making it work. Most examples of spherical geometry in nature involved hexagons or pentagons. "So, we developed some geodesic grids inspired by the work of Buckminster Fuller. For the spheres, there was quite a complex resolution to achieve at the junctions, and for that we looked at dragonfly wings."

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This belief in finding natural solutions to architectural challenges was reinforced when he attended a short course at Schumacher College in Devon run by leading environmentalists Amory Lovins, co-founder of the Rocky Mountain Institute, and Janine Benyus, author of one of the first books on biomimicry. "I learnt more in those few days than in years of going to conferences," he remembers.

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Pawlyn acknowledges that it can be a struggle to fund such futuristic ideas. After all, in most cases architects can only be as creative as their clients, and their finances, allow. But he senses there's a growing appetite for more creative environmental solutions and longer payback periods. "I think we really do need to promote a longer inter-generational idea of timescales," he says.

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These are seen as polar opposites and what we really need to do is to try and bring the management of the finances together with the knowledge of the natural world to develop solutions that are fit for the long term.

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During his time there, Pawlyn has observed a process of urban evolution, common to many cities, which he likens to the natural world. Artists are the first people to move into semi-derelict areas, in search of cheap space and characterful buildings. The next wave of 'colonisers' are often the architects and designers, followed by media types and creatives. The process is very like ecological succession and is completed by the arrival of merchant bankers.

- A** After almost 20 years in the apartment, Pawlyn is decamping to north London, to gain access to more space. But he says he'll retain his attachment to what is now a fashionably cool district popular among start-up tech entrepreneurs.
- B** As a teenager, however, accompanying his oil executive father to various postings in mainland Europe and the Middle East, Pawlyn developed an interest in three areas: design, biology and the environment. But these interests diverged as he pursued a conventional architecture training at university.
- C** He points to the example of a 17th-century building which was able to repair its roof because the builders had planted a grove of oak trees at the same time, providing the wood for an eventual repair. He feels that there's still an unhelpful divide between economy and ecology at the moment.
- D** His work on creating the famous biomes at the Eden Project in southwest England, for example, was partly inspired by studying the structure of soap bubbles and dragonfly wings. More recently he's been looking at urchin spines, molluscs, water lilies and boxfish exoskeletons for fresh ideas.
- E** There are always human dimensions to consider in renovating urban buildings, be they cultural, historical or psychological. "Architecture is much more than just a technical discipline," he says.
- F** So strong was Pawlyn's conviction that he set up his own architectural practice inspired by their ideas. The aim is to produce "biologically inspired architecture to address some of the key environmental challenges of our age", such as climate change and mass urbanisation.
- G** Such was the simplicity and efficiency of the design that, remarkably, the entire structure weighed less than the air inside it. "It saved resources, it saved energy and it actually worked out a lot cheaper than a conventional glass structure would've been," he says.