1.2-3 Comprehension: Non-Fiction Set 3: 30-minute Pack

Total Marks

GL ASSESSMENT / CSSE 11+ Entrance English (GL Assessment / CSSE style) · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions.

Powering Britain: How Offshore Wind Turbines Work

Source written for Revision Library (original, copyright-free).

Along the coastline of the United Kingdom, hundreds of enormous white towers rise out of the sea. Each one stands taller than the Big Ben clock tower, with three blades that can be longer than a football pitch. These are offshore wind turbines, and together they generate a huge amount of the electricity used in homes and schools across Britain.

In 2010, offshore wind supplied less than one per cent of the UK's electricity. By 2025, that figure had grown past twenty-five per cent, making Britain one of the world's largest producers of offshore wind power. A single large wind farm, built several kilometres out to sea, can contain more than one hundred turbines and generate enough electricity to power over a million homes.

Building a giant

Every turbine is built from three main parts. The tower is a hollow steel tube that can be over one hundred metres tall. At its top sits the nacelle, a metal case about the size of a double-decker bus, which houses the gearbox and generator. Attached to the nacelle is the rotor: three fibreglass blades fixed to a central hub. The blades are shaped like aeroplane wings, so that when wind flows over them, it creates a force that makes the rotor spin.

Each part is manufactured separately, often in different factories, before being transported by specialist ships to the wind farm site. There, cranes mounted on floating platforms lift the pieces into place and bolt them together, one on top of another, until the finished turbine towers above the waves.

From wind to electricity

The process of turning wind into electricity begins the moment air pushes against the blades. As the rotor spins, it turns a shaft connected to a gearbox inside the nacelle. The gearbox increases the speed of the spinning motion, driving a generator that converts the movement into electrical energy. Cables run down through the tower and along the seabed, carrying the electricity to an offshore substation, where its voltage is increased before it travels through further cables to the mainland. From there, it joins the National Grid and is shared out across the country.

Why build turbines at sea?

© Revision Library | revisionlibrary.co.uk

Wind speeds over open water tend to be stronger and steadier than on land, where hills, buildings and trees slow the wind down and make it turn and gust unpredictably. A turbine positioned several kilometres offshore can therefore generate considerably more electricity than an identical turbine built inland.

However, working at sea brings its own difficulties. Saltwater is highly corrosive, so every metal part must be specially coated and regularly inspected. Engineers usually travel out by boat, though in rough weather a helicopter may be the only way to reach a turbine safely. Because of these challenges, offshore wind farms are expensive to build and maintain; a single large turbine can cost several million pounds before it generates a single unit of electricity.

'People sometimes think a wind farm just appears overnight,' explains Priya Nandwani, an engineer who has worked on wind farms off the Yorkshire coast for nine years. 'In reality, each turbine takes years of planning, and the maintenance never really stops. But once it is running, a single turbine can power thousands of homes without producing any carbon dioxide, which makes the effort worthwhile.'

Looking ahead

The government has set a target for offshore wind to supply enough electricity to power every home in the UK by 2030. Meeting that target will mean building thousands of additional turbines, training many more engineers, and developing new technology such as floating turbines that can be anchored in deeper water, far from the coast.

Not everyone agrees that expansion should happen quickly. Some fishing communities are concerned about losing access to traditional fishing grounds, and conservationists continue to study the effect of turbines on seabirds and marine life. Wind farm developers are now required to fund research into these effects and to design turbines that reduce the risk to wildlife wherever possible.

Whatever challenges remain, one fact is clear: the turbines standing along Britain's coastline are already reshaping the way the country makes its electricity, one gust of wind at a time.

1 According to paragraph 3, what everyday object is the nacelle compared to in size?

.....

(1)

2 According to paragraph 3, what material are the turbine blades made from?

.....

.....

(1)

© Revision Library | revisionlibrary.co.uk

3 The writer divides the passage using subheadings such as 'Building a giant' and 'From wind to electricity'. Explain why the writer has organised the passage in this way.

(2)

---

4 This passage is an example of a non-fiction explanation text rather than a story. Identify one feature of the passage, other than its subheadings, that shows this, and explain its effect on the reader.

(2)

---

5 According to paragraph 3, what shape are the turbine blades designed like?

(1)

---

6 Explain why the writer includes a quotation from Priya Nandwani, an engineer, in paragraph 8.

(2)

---

7 According to paragraph 8, how many years has Priya Nandwani worked on wind farms off the Yorkshire coast?

(1)

---

8 What can you infer about Priya Nandwani's attitude towards her work, from her comments in paragraph 8? Use evidence from the text to support your answer.

(2)

© Revision Library | revisionlibrary.co.uk

9 According to paragraph 9, by which year has the government set a target for offshore wind to power every home in the UK?

(1)

10 According to paragraph 9, name one new technology mentioned that could help meet this target.

(1)

11 As it is used in paragraph 7 ('Saltwater is highly corrosive'), what does the word 'corrosive' mean?

- ☐ A) shiny and reflective
- ☐ B) able to gradually damage or wear away a material
- ☐ C) extremely heavy
- ☐ D) impossible to remove

12 What does 'unpredictably' mean, as used in paragraph 6 ('make it turn and gust unpredictably')?

- ☐ A) in a way that cannot be reliably guessed in advance
- ☐ B) very slowly and gently
- ☐ C) in exactly the same way every time
- ☐ D) extremely loudly

13 Give one word or short phrase that means the same as 'considerably', as used in paragraph 6 ('generate considerably more electricity').

(1)

14 Using paragraph 6, explain why wind speeds tend to be stronger and steadier out at sea than they are on land.

(2)

© Revision Library | revisionlibrary.co.uk

15 Using paragraph 7, explain why offshore wind farms might be more expensive to maintain than turbines built on land.

(2)

16 According to the first paragraph, what does the writer compare the length of a turbine's blades to?

(1)

17 According to the second paragraph, what percentage of the UK's electricity did offshore wind supply in 2010?

(1)

18 According to the second paragraph, what percentage of the UK's electricity came from offshore wind by 2025?

(1)

19 According to the second paragraph, how many turbines can a single large wind farm contain?

(1)

20 Using paragraph 10, explain why some fishing communities might be concerned about the expansion of offshore wind farms.

(2)

© Revision Library | revisionlibrary.co.uk

21 What does 'conservationists' mean, as used in paragraph 10 ('conservationists continue to study the effect of turbines on seabirds and marine life')?

- ☐ A) people who study and work to protect the natural environment
- ☐ B) people who build wind turbines
- ☐ C) government ministers who approve new laws
- ☐ D) scientists who study old buildings

---

22 Explain why the writer chooses to end the passage with the image of turbines 'reshaping the way the country makes its electricity, one gust of wind at a time', rather than simply stating an opinion about whether offshore wind is a good idea.

(2)

---

23 Using evidence from at least two different parts of the passage, explain two different ways that the growth of offshore wind could affect people living and working near the British coast.

(2)

---

24 In your own words, summarise how a wind turbine converts wind into electricity that reaches homes across the country, using paragraph 5.

(3)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 1.2-3 Comprehension: Non-Fiction Set 3: 30-minute Pack

Question 1

a double-decker bus **B1**

Answer: a double-decker bus

Question 2

fibreglass **B1**

Answer: fibreglass

Question 3

identifies that the subheadings break the explanation into separate stages or topics, e.g. how a turbine is built, then how it makes electricity **B1**

explains the effect for the reader, e.g. making a complex, technical process easier to follow, or letting the reader find specific information quickly **B1**

Answer: The subheadings split the explanation into clear, separate stages, such as how a turbine is built and how it generates electricity, which makes a complicated technical process easier for the reader to follow and lets them find particular information quickly.

Question 4

identifies a suitable feature, e.g. factual statistics (such as 'past twenty-five per cent'), a step by step description of a process, or a quotation from an expert engineer **B1**

explains its effect, e.g. statistics make the information feel accurate and trustworthy; step by step description helps the reader understand a technical process; an expert quotation adds authority **B1**

Answer: Example: the passage includes precise statistics, such as offshore wind supplying 'past twenty-five per cent' of UK electricity by 2025, which makes the explanation feel accurate and trustworthy rather than like a story.

Question 5

aeroplane wings **B1**

Answer: aeroplane wings

Question 6

identifies that Nandwani is an expert with direct, first hand experience (nine years working on wind farms) **B1**

explains the effect, e.g. it adds authority and credibility to the passage, or gives a more personal, human perspective alongside the facts and statistics **B1**

Answer: The writer includes Nandwani's quotation because, as an engineer with nine years of first hand experience, her expert view adds authority and credibility to the passage, while also giving a more personal perspective alongside the facts and statistics.

Question 7

nine years **B1**

Answer: nine years

Question 8

identifies that she is honest and realistic about the difficulties, e.g. 'the maintenance never really stops' **B1**

identifies that she remains positive and proud overall, e.g. describing the effort as 'worthwhile' because a turbine can power thousands of homes without producing carbon dioxide **B1**

Answer: Nandwani seems honest and realistic about the hard work involved, since she says the maintenance 'never really stops', but she is ultimately positive and proud of her work, believing the effort is 'worthwhile' because of the clean electricity a turbine produces.

Question 9

2030 **B1**

Answer: 2030

Question 10

floating turbines **B1**

Answer: floating turbines (that can be anchored in deeper water, far from the coast)

Question 11

B **B1**

Answer: B) able to gradually damage or wear away a material

Question 12

A **B1**

Answer: A) in a way that cannot be reliably guessed in advance

Question 13

accept any synonym meaning 'by a large amount', e.g. significantly, a great deal, substantially, a lot **B1**

Answer: significantly / a great deal / by a large amount.

Question 14

identifies that on land, features such as hills, buildings and trees are in the way of the wind **B1**

explains that these features slow the wind down and make it turn and gust unpredictably, whereas open water has no such obstacles **B1**

Answer: On land, hills, buildings and trees get in the way of the wind, slowing it down and making it gust unpredictably; out at sea there is nothing to block or disrupt the wind, so it blows more strongly and steadily.

Question 15

identifies that saltwater is corrosive, so metal parts must be specially coated and regularly inspected **B1**

identifies that engineers may need to travel by boat or, in rough weather, by helicopter to reach turbines safely, which adds to the cost **B1**

Answer: Saltwater corrodes metal, so parts need special coatings and regular checks, and engineers often have to travel out by boat or helicopter to carry out this maintenance, both of which add extra cost compared with land-based turbines.

© Revision Library | revisionlibrary.co.uk

Question 16

a football pitch (accept: longer than a football pitch) **B1**

Answer: a football pitch

Question 17

less than one per cent / less than 1% **B1**

Answer: Less than one per cent.

Question 18

more than / just past twenty-five per cent (accept: over 25%) **B1**

Answer: More than (just past) twenty-five per cent.

Question 19

more than one hundred (100) turbines **B1**

Answer: More than one hundred turbines.

Question 20

identifies that fishing communities are concerned about losing access to traditional fishing grounds **B1**

explains the implied consequence, e.g. this could threaten their livelihood or income if they can no longer fish in areas where wind farms are built **B1**

Answer: Fishing communities are concerned because wind farms may be built in areas that are traditional fishing grounds, meaning they could lose access to the waters they depend on to earn their living.

Question 21

A **B1**

Answer: A) people who study and work to protect the natural environment

Question 22

identifies that the ending links back to the wind and turbine imagery of the opening paragraph, giving the passage a circular structure **B1**

explains the effect, e.g. it leaves a memorable, vivid final image rather than a direct opinion, letting the reader reach their own judgement after the balanced discussion of challenges in the previous paragraph **B1**

Answer: The ending returns to the wind and turbine imagery from the opening paragraph, giving the passage a circular structure, and leaves the reader with a vivid final image rather than a stated opinion, allowing them to form their own judgement after the balanced discussion of challenges just before it.

Question 23

identifies one effect with evidence, e.g. new skilled jobs such as engineering (paragraph 8, Priya Nandwani), or cleaner electricity produced without carbon dioxide **B1**

identifies a second, different effect with evidence, e.g. fishing communities losing access to traditional fishing grounds (paragraph 10), or the ongoing debate over the impact on seabirds and marine life **B1**

Answer: Positively, offshore wind creates skilled engineering jobs, such as Priya Nandwani's, and produces electricity without carbon dioxide; however, it can also create problems for coastal communities, such as fishing communities losing access to traditional fishing grounds and ongoing concern about the effect on seabirds and marine life.

Question 24

identifies that wind spins the blades and rotor **B1**

identifies that the rotor turns a shaft and gearbox, which drives a generator that produces electricity **B1**

identifies that cables carry the electricity to a substation and then to the mainland/National Grid, from where it is shared across the country **B1**

Answer: Wind spins the blades, which turn a shaft connected to a gearbox; the gearbox drives a generator that produces electricity, and cables then carry this electricity to an offshore substation and on to the mainland, where it joins the National Grid and is shared across the country.

© Revision Library | revisionlibrary.co.uk