Zig Zag Education

Geography

GCSE | AQA | 8035

2016 specification
2025 exam

GCSE AQA Paper 3
Pre-Release Resource Pack 2025:
Morecambe Bay and Duddon Estuary Tidal Gateway Project

Download support files from zzed.uk/productsupport

zigzageducation.co.uk

POD 12642a

Contents

Teacher's Introduction

There are a number of different ways that teachers can go about facilitating understanding of the Pre-release Resource Booklet (PRB). The choice of methods will depend on the ability profile of the students, the types of learners in the group and, most importantly, the amount of time left in class to go through the information.

Remember!
Always check the exam board website for new information, including changes to the specification and sample assessment material.

With this in mind, this pack contains a wide range of resources that should cater for these different needs.

- The **Gaining an Overview** section is designed to structure the students' first contact with the PRB. (This section was provided as an 'Early Activities' download.)
- The **Delving Deeper** worksheets are step-by-step activities to help all your students gain a full understanding of the PRB.
- The **Developing Decisions** section provides a number of suggested teaching activities with resources to help students develop their ability to make justified arguments.
- Finally, two **Section A Practice Exams** are provided for you to use as mocks, or for students to sit and self-mark during study leave.

The majority of the resources in this pack are intended to be 'Core' – these are the activities we expect teachers will want to prioritise, particularly before study leave. Additional 'Extra' resources have been marked with a star ★ on the table overleaf – you may choose to use these depending on time available, or give some of them to your higher achievers to use independently. More details on each of these sets of resources are provided in the 'Guide' section overleaf.

Supported versions of activities are indicated with the following symbol: 

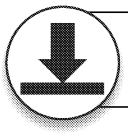
These tasks have been produced as a compact A5 booklet to save on photocopying (you should check that the size of text and writing space is suitable for your students). If you have little time left, you could set the completion of this as an independent learning activity and simply use the more discussion-based activities in lessons (there is also space for the outcome of these to be recorded in the booklets).

There are times when students will need access to the Internet, not just for use with the booklet, but also when completing some activities in this pack. Students aiming for the highest grades might benefit from some more detailed knowledge of the issue than is in the PRB and this is best obtained from Internet research.

Provided via download are five PowerPoint presentations (note some slides have extra information in the 'Notes' section):

- **Topic Overview PowerPoint** gives an overview of the topics that are covered in this resource.
- **Task 8 Marking Exercise PowerPoint** applies the mark scheme to, and provides examiner commentary for, Sample Answers A, B and C.
- **Skills PowerPoint** covers the statistical, graphical and cartographical skills students need to understand for this exam.
- **Debate PowerPoint** provides structure for running a debate role play.
- **Discussion Questions PowerPoint** provides ideas and images to challenge your more able and A* students.

There is also a **Google Earth fly-through** (KML file and KMZ file depending on whether you are using Google Earth Pro or the browser version); see p. 15 for details.



The PowerPoint presentations and Google Earth fly-through are provided on the ZigZag Education Support Files system, which can be accessed via **zzed.uk/productsupport**

A web page containing all the links listed in this resource is conveniently provided on ZigZag Education's website at **zzed.uk/12642**

You may find this helpful for accessing the websites rather than typing in each URL.

This resource is intended to supplement your teaching only.

It is the teacher's responsibility to decide how to use this resource to assist themselves and their students appropriately. You may simply wish to read this material to better inform yourself and to help you prepare your lessons and give you ideas for your teaching. You may also consider whether it is appropriate to distribute some of the material for reference and to use some of the tasks for classwork and homework. You may also consider whether it is appropriate to make the whole resource available to be worked through by your students more independently.

As with all pre-release material it is the teacher's responsibility to decide in what way to assist their students. It is the teacher's responsibility to decide how this resource in particular can be used to fit into that assistance.

The resources here are provided as one experienced teacher's interpretation of the **pre-release material**. The author, although an experienced teacher, does not have any special knowledge of what to expect on any particular exam.

Resource ★ = *'Extra' – resource intended for use depending on time available*	Early Activities	A5 Booklet
Gaining an Overview		
What is Paper 3: Geographical Applications?	✓	✓
Student Tasks 1–8	✓	✓
Peer-review Sheet for Task 8	✓	✓
Sample Answers for Task 8	✓	
Glossary	✓	✓
Google Earth: Morecambe Bay and Duddon Estuary		
★ Describing Place		✓
Skills Development		
Student Tasks	✓	✓
Delving Deeper		
Student Tasks		✓
★ Google Earth: Orientation Task		✓
★ Discussion Questions		✓
Developing Decisions		
Boxing Match		✓
★ Model Essay 1 with Examiner's Commentary		✓
SWOT Analysis		✓
★ Debate Role Play		
★ Diamond Nine		✓
★ Continuum Line Activity		✓
★ Postcard to MP		✓
★ Planning Grids for 9-mark Questions		✓
★ Personalised Learning Checklist		✓
Practice Exam Papers for Section A		
Practice Exam 3A		
Practice Exam 3B		
Answers		
Gaining an Overview	✓	
Skills Development	✓	
Delving Deeper		
Google Earth: Orientation Task		
Paper 3A: Mark Scheme, plus Model Essay 2 with Examiner's Commentary		
Paper 3B: Mark Scheme, plus Model Essay 3 with Examiner's Commentary		
Appendix		
Revision Overview of the Pre-release Resource Booklet (A3)		
Debate Role Play Worksheet (A3)		✓

PowerPoint Downloads (zzed.uk/productsupport)				
★	Topic Overview.pptx	46 slides		
Task 8 Marking Exercise.pptx		6 slides	✓	
Skills.pptx		11 slides	✓	
★	Discussion Questions.pptx	8 slides (included in 'Delving Deeper' and A5 booklet)		
★	Debate.pptx	5 slides (for Debate Role Play – Developing Decisions)		

Selected Pages Only

This sample shows a limited selection of pages.

Teacher's Guide to GCSE Paper 3 Pre-release Res

★ = 'Extra' – resource intended for use depending on tim

Step one – giving out the resources

- Students will be given a new resource booklet when they sit their exam; they pre-release copy. You should be able to download the PRB from AQA on the
- If you have talked little to the students about this final exam, you may like to **GEOGRAPHICAL APPLICATIONS?** to give them an overview of the exam. (This was
- Depending on the time available, you could start off with the sheet **GAINING BOOKLET**. There are eight basic tasks on this section and this would be suitabl readiness for going through the information in detail in class. (This was emai

Step two – filling in knowledge gaps

- This set of PRB materials link ... **Section C** of the specification: '**the c management**', with ... focus on how renewable energy can increase
- ★ The use ... **VERVIEW** PowerPoint should help students fill in any ... their knowledge. Ideally the teacher will go through these di...rent topics, but students could be left to read through this if necessary.
- ★ Google Earth is a useful introduction to get to know the area. For the **GOOG** KMZ/KML file in the download files. If you have Google Earth Pro [installed], file, and it will go straight to a fly-through using Google Earth. Otherwise, loa instructions on page 18. There is an accompanying sheet so you can talk stu seeing. There is also a 'describing a place' activity for students to complete a
- ★ Alternatively, you may prefer to use some of the YouTube clips suggested on There is also an independent activity which you could set as an alternative: G **MORECAMBE BAY AND DUDDON ESTUARY ORIENTATION TASK**.

Step three – getting to know the resources

By now, students should have a basic understanding of what this exam will be ab detailed understanding of the resources.

- For the first lesson, you may like to follow up on the **GAINING AN OVERVIEW** ta over Easter.
  - Perhaps start the lesson with students entering the room and forming a not they feel the tidal power project should be built. Give them some ti standpoint. It will then be good to come back to this line later (continuu **OVERVIEW** PowerPoint).
  - Students could peer-review their 9-mark extended answer that they co **AN OVERVIEW**. (There is a peer-review sheet to help support this activity, and some PowerPoint slides: **TASK 8 MARKING EX...** PowerPoint).
- Working in pairs or small groups, students sh... complete the activities on PRB. This should probably take two ... lessons plus homework to get collaboratively, ideas will be sha..., and a greater breadth of understanding

Step four – ...tis...g Skills

For more fo... ere are a series of tasks on p. 21 to support students with their s should be completed in conjunction with the information on the **SKILLS** *PowerPoint* The PRB contains some data that can be manipulated and graphs that can be inte basic. You may wish to go through the **SKILLS** PowerPoint to help students with th tasks in **GETTING TO KNOW THE PRB** are shown here in case you want to share the a

Step five – developing decisions

There are a number of activities in this pack to help you foster your students' abili
informed decisions in preparation for producing focused answers in the exam:

- ***Boxing Match***
  - Provide pairs of students with a **BOXING MATCH** sheet, blown up to A3. (T
    Needs (AEN) version with prompts for the arguments, indicated by the 'h
  - Students should take it in turns to write an argument (left-hand column)
    pair to counter (right-hand column). **Remind** students that they need to
  - At the end of the process they should decide whether the arguments ar
    whether some arguments link more naturally together and, if so, numbe
  - Pairs should then decide on a **conclusion** to the question.
  - Pairs could then join up and discuss the issues th[illegible]ey have focused on
    other issues that they have not considered. They may like to list some of
    of their sheet.
  - Students could then use the **BOXING MATCH** analyses to answer the foll
    ***Morecambe Bay and Wyre-Lune Estuary Tidal Gateway Project will not only
    se[illegible] b[illegible] will also provide benefits for the region.' Discuss. [9 mark***
    As a further extension to this, there is a sample **MODEL ESSAY** with commen
- ***SWOT Analysis: Building the Tidal Power Project***
  - Get students to work in different groups. They should undertake some a
  - They should then use this to complete a **SWOT ANALYSIS** (SWOT analysis
    (There is an Additional Educational Needs (AEN) version with prompts fo
    the 'helping hand' symbol.)
  - Students should then pair up so they can compare their ideas with those
- ★ ***Debate Role Play***
  - There are six different role cards for the **DEBATE ROLE PLAY**. Ideally, stude
    of other students to create a brief speech to highlight their point of view
  - Students are given two possible options to discuss at the Planning Comm
  - Each group should nominate someone to speak at the meeting and put t
  - Depending on your group, this could simply involve students standing up an
    encourage a proper debate with students questioning each other and takin
  - There is a note-taking sheet for students to complete during the debate
    the final task.
  - Once the debate is completed, students should write a news report on t
    and the outcomes (instructions on the **DEBATE** PowerPoint).
- ★ ***Diamond Nine Activity***
  - Students could work in pairs or individually to arrange the Diamond Nine
    strategies should be done first to improve the UK's energy security.
  - Students could then join another pair and justify their decisions.
- ★ ***Continuum Line Activity***
  - Students could work in pairs or individually to arrange the cards into an
    show whether the project will be an ecological disaster or mitigate clima
  - Students could then join another pair and justify their decisions.
- ★ ***Postcard to MP Activity***
  - This task is designed for use towards the end of a series of lessons in o
    communicating their opinions on whether or not tidal power project shoul
  - Students are given the opportunity to urge their MP either to support th
- ★ ***Planning Grids for the 9-mark Questions***
  - These grids provide a structure to plan essays for the 9-mark questions i
    Note that the two 9-mark questions from the **PRACTICE EXAMS** are include
    hand these out if you don't want exam spoilers (these two planning grid
- ★ ***Personalised Learning Checklists*** – students may find it useful to complete th
  knowledge before attempting the practice exam papers.

Step six – challenging the more able

- In order to gain the grades 8 and 9, students need to demonstrate clear synop
  series of **DISCUSSION QUESTIONS** has been provided to help you challenge thinkin
  This might work best as a whole-class activity (PowerPoint), or some of the qu
  homework (Word document). Alternatively, you could use each slide as a start
- Students could be given some time to share their further research with fellow
  encouraged to challenge the reliability of different items of data and try to ca
  economic and environmental. They should also be encouraged to consider th

Step seven – what will the exam be like?

- Students may like to complete the A3 **REVISION OVERVIEW** as a revision activity
  exam. This will enable them to have an overview of [illegible] resources on one
- Students will want to know how they will have to apply this information in an
  are two **PRACTICE EXAMS** for students to complete. These could be undertaken
  also a mark scheme to go with them. To set a complete Paper 3 mock, comb
  Fieldwork Enquiry [illegible] **ed.uk/10916**) also available from ZigZag Educati
- Do make clear to students that this is just a sample exercise. Make sure yo
  model answers for these questions as in the exam they will then regurgitate
  actual question that has been asked.
- It is NOT helpful to second-guess what the exam questions will be, as weaker
  focus on these rather than gaining a full understanding of the resource.
- For Paper 3A Question 03.2, and Paper 3B Question 02.5 there is also a samp
  commentary supplied within the **ANSWERS** section.

A web page containing all the links listed in this resource is convenien
*Education's website at **zzed.uk/12642***

You may find this helpful for accessing the websites rather than typin

Gaining an Overview

What is Paper 3 – Geographical Applications?

Your teacher may not have spent much time explaining what your final exam will be, as it's easier to discuss this once you have the advance information booklet and know the focus for the exam. You should have been given a copy of the pre-release bo[illegible] containing some information which relates to you[illegible]am.

Always c
for new i
to the sp
assessm

This exam lasts 1 hour 30 minute[illegible] up of two parts. **Section A** is based release booklet) that ha[illegible]vided in advance by the exam board. This sect marks + 3 m[illegible]or [illegible]**ection B** is based on general fieldwork techniques and This section paper is out of 39 marks + 3 marks for SPaG.

Section A aims to assess your ability to respond to a geographical issue. You will f materials link to a topic area that you have studied at some point during the cours development of a tidal power project links to **the challenge of resource manage** can increase energy supply.

What am I expected to do with the pre-release booklet?

Depending on the resources provided, you are likely to be asked to undertake **so**

- Present some data graphically
- Analyse the data provided, perhaps using statistical tests
- Relate the data to your GCSE studies
- Demonstrate map skills, perhaps by using an OS map
- Evaluate the main issues involved and consider different viewpoints
- Identify the limitations of the data
- Give counterarguments
- Undertake some decision-making; for example, suggest a management strat have been provided with
- Identify potential conflicts and consider ways of resolving them
- Justify your ideas and recommendations
- Consider the future implications
- Undertake further research

Working with the pre-release booklet resources

Working through the activities your teacher gi[illegible]es yo[illegible]l help you focus on the r understanding of them. Take the tim[illegible]re[illegible]ch terminology you are unfamiliar different opinions surround[illegible]issue.

This exam [illegible]e [illegible]en prepared a couple of years in advance. There may have set and so b[illegible]ng various websites you will be able to make use of the most u

The exam

You are not allowed to take your pre-release resource booklet into the exam. You

Your teacher may give you a mock paper to have a go at. It is best not to second-g come up in the final exam. **Students who prepare exam questions often miss the the real exam and so underperform**. The mock paper is just to give you an idea o have to do in the limited time provided.

The exam will have a range of different questions, including:

- Multiple-choice
- Short open response (1–2 marks)
- Calculations
- Longer open response (4–6 marks)
- Extended answer (9 marks)

To do well in this exam y… …**detailed understanding** of the resources in the **together dif… …t r… …ces** effectively. An ability to bring in ideas from your fur things you l… …udied in this part of the specification will also help you develop

Although the exam paper contains a series of questions, they are all focused on th link ideas between questions for the extended-mark questions and give yourself e longer questions.

How to succeed

- Read and reread the booklet to become completely familiar with the content there and **where** it is. This will allow you to use information from different pa which Figure number the information is from. However, **don't** just copy from
- Look up the meaning of any unfamiliar words and phrases, so you can use the
- Use an atlas, YouTube or any other visual form to ensure a working knowledg under consideration.
- Make sure you understand the different concepts, issues, theories and proce release booklet.
- Try to think about ways of **manipulating data** – has anything doubled, tripled
- Visit a variety of websites to give you an **unbiased** opinion of the issue.
- Think about where the information comes from – is it reliable? Discuss how standpoints – this is 'thinking like a geographer'.
- Make sure you use correct geographical **terminology**.
- Think about **scale** – long-term/short-term, or physical variations in size.
- Try to structure your extended answers with **SPEED** (social, political, econom demographic data needs including).
- Most importantly, discuss your ideas with others a… …you have decided on y about right or wrong; it's about **justifyi… …op…ns** and utilising data to back
- Above all, **don't play safe**; be i… …ful and ambitious. Show you understand

Gaining an Overview of the Pre-relea

The most important thing to remember when preparing for this exam is that the a
to give you information that should be new and different to you. The examiners v
respond to unusual circumstances; have you learnt and understood enough Geog
and knowledge to a new situation?

Don't worry if there are concepts discussed in the pre-release booklet that you ha
course. This booklet is centred around **Section C** of the specification: '**the challeng**
how renewable energy can increase energy supply', but goes into more detail tha
this topic.

If you work through the activities included in this pack, you will develop your gene
you can apply it to this area of study. Your teacher will go through some of this in
not studied this area in det

Student 1–8

Task 1

Carefully read through your pre-release resource booklet.

On the front page create a colour key:

- Human
- Physical

As you read through the information, highlight/underline information that relates
appropriate colour. Try **not** to highlight whole lines and paragraphs; stick to **data**

As you read through the booklet, put an **asterisk** (*) next to any **key terms** or concept

Challenge, can you subdivide your human factors into political, economic and soci

Task 2

Go back through the booklet and undertake some preliminary research into the c
have identified that you don't fully understand (those you put an * next to). This
involved in any discussions on the materials that will happen in class. Write defin
create a glossary. There is a template for your glossary at the end of *this* booklet.

Task 3

Identify the sorts of skills you might be asked to use by looking at the GCSE skills c
the checklist on the AQA website (**2642-Geo-Skills**) Look through this
apply to the data you have been provided with.

- *Check the cartographic skills list against the maps (and photographs) in the p*
- *Data that in this booklet might be suitably analysed using graphical, numeri*
- *The booklet includes a range of graphs; make sure you understand how to rea*
- *For each item in the pre-release booklet, decide whether it is qualitative or qu*
  in the booklet using 'QUAL' or 'QUAN'.
- ***Tip:** Don't forget to add any of the letter symbols you use to your key on the f*
- *Formulating an enquiry and argument is what you will be doing throughout y*
- *Some of the marks in the exam are awarded for your literacy skills. Don't for*

If necessary, remind yourself how to undertake these skills using either a YouTube

Task 4

Figure 1, pages 2–3 of the pre-release booklet, provides information on energy co
electricity capacity of the UK. The following article: **zzed.uk/12642-Demand** p
changes to UK energy use and energy mix.

Use the website above to answer the following questions and increase your unde
a) Why has domestic energy consumption in the UK reduced?
b) What are the main changes to the percentage of different types of energy cons
and 2023?
c) What should happen to all coal-fired power stations in the UK by the end of
d) Why is fracking being considered in the UK?
e) How is the British government taking steps to reduce carbon dioxide emissio

Task 5

Figure 2, pages 4–5 of the pre-release bo[illegible]rovides you with some informati
pre-release booklet focuses on ti[illegible]and so to extend your understanding
zzed.uk/12642-Tida[illegible]

Use the we[illegible]ove to answer the following questions and increase your unde
a) What is [illegible]al barrage?
b) Why is tidal power predictable?
c) Why is two-way generation the best type of tidal barrage power station?
d) What is 'head height'?
e) What are the potential disadvantages of tidal power with regard to meeting

Task 6

Figure 2, pages 4–5 of the pre-release booklet, provides you with some informati
There is more than one way to generate tidal power. It is important to understan
make decisions around this issue. Watch the following video and answer the que
zzed.uk/12642-Tidal-Power
a) What causes tides?
b) Where must tidal turbines be located?
c) What height is needed to effectively produce electricity when using a tidal b
d) Which of the three methods of generating tidal power is most efficient?
e) How do tidal fences work?
f) How do tidal turbines work?
g) How does energy production differ between wind turbines and tidal turbines
h) Why are there limited numbers of tidal power stations?

Task 7

Figure 3, pages 6–7 of the pre-release booklet, provides an overview of the propo
Lancashire and Cumbria. To help you build up your knowledge of this area, use th
following questions:
zzed.uk/12642-Morecambe
a) Where is Morecambe Bay?
b) What is the size of the intertidal [illegible]nd sand at Morecambe Bay?
c) Which rivers drain into M[illegible]can[illegible]Bay?
d) Name a rare butte[illegible]and there.
e) How m[illegible]ai[illegible]as are there in Morecambe Bay?
f) Why s[illegible]ou take a local guide if walking to Chapel Island or Piel Island?
g) How ma[illegible]people live along the coastline of Morecambe Bay?
h) How important is Morecambe Bay for fossil fuel production?
i) When were a bridge and tidal barrage first proposed for Morecambe Bay?

zzed.uk/12642-Duddon
j) Duddon Estuary is a Ramsar site – what is a Ramsar site?
k) How much of the UK natterjack toad population does Duddon Estuary suppo
l) What types of bird can be found in Duddon Estuary?
m) How many waterfowl overwinter there?
n) What are the three main plant communities found there?

Task 8

'Investing in a range of renewable energy sources is an effective way to solv insecurity caused by declining North Sea oil and gas in the UK.'

To what extent do you agree with this statement?

Remember, with a 'to what extent' question you will need to include evidence for investing in a range of renewable energies will have a positive impact on reducing you explain what energy insecurity is. Consider what options the UK has for using sources (consider the statements below AND what you have read in the pre-releas alternatives to renewables as a method of reducing energy insecurity. ***Perhaps*** *lo further* ***reading section before you start.***

Once you have answered the question above, use the P int provided (Task- peer-review sheet and the sample answers on he fol ng pages to complete the

'Renewable energy i carbon- ral s sts forever, can keep producing it.'

Friends of the Earth

'As North Sea oil and gas production declines we need to look towards a clean energy future.'

CEO of BP

'I used to love walking through the fields, now they are full of ugly solar panels, no space for animals to graze.'

Local resident

'The way to tackle climate change is through renewable energy sources which emit low or no carbon emissions.'

National government

Further reading

There is a wealth of resources available relating to energy consumption, producti
specifically. You might like to extend your understanding of the topic by undertak
starting with the following:

Fo

- **zzed.uk/12642-Grid**
  The National Grid: Live shows you how our electricity is currently being prod
- **zzed.uk/12642-Energy-Mix**
  BBC Bitesize has an overview of the key elements of the UK energy mix
- **zzed.uk/12642-Energy**
  Factors affecting energy supply and security
- **zzed.uk/12642-Renewables**
  Videos, explanations, and pros and cons of va s es of renewable energ
- **zzed.uk/12642-Untapped**
  An article looking at tidal en gy a ny the UK has yet to make use of it, w
  large-scale tidal po r a that do exist globally
- **zzed.uk/ 42 ial**
  This ar oks at the potential for tides to provide considerable amounts o
- **zzed.uk/ 2642-Swansea**
  If you prefer to listen and watch how things work, this short YouTube clip fo
  gives you an example of a potential project, and also shows how the tidal ba

Peer-review Sheet for Task

'Investing in a range of renewable energy sources is an effective way to solv insecurity caused by declining North Sea oil and gas in the UK.'
To what extent do you agree with this statement?

Suggested content
Consider what options the UK has for using a range of renewable energy sources, potentia provided with the question as well as information from the pre-release booklet. Make sur

Investing in renewable energy:
- There is a wide variety of renewable energy sources which will allow for a diverse en energy security.
- As technology continues to develop, more sources of renewable energy will become ava
- As an island, the UK has a high potential for solar energy, which it is not currently usin
- Renewable energy is made in the UK so it reduces the need to import energy from o
- The cost of renewable energy technology, particularly wind and solar power, has fall making it increasingly viable option to meet future energy needs.
- Investment in storage technology (e.g. batteries) can further help in addressing intern more reliable.
- Renewable energy will not run out, which means we can be certain of our energy secu

Problems using renewable energy to solve the UK's energy needs:
- Most renewable energy sources produce intermittent power because they rely on th
- With climate change, can we be sure that the large-scale renewable projects being b
- Renewable energy projects often take up a large amount of space, potentially reduci – will people agree to these projects? If they do not agree, can we build enough to n
- Biomass energy requires large amounts of crops to be grown for power generation,
- Even reliable renewable energy such as tidal does not always occur when people nee

Other things to consider when solving the UK's energy security:
- Having an energy supply that can be switched on if there is a spike in demand.
- Having a low-carbon energy supply which provides stable power, such as nuclear.
- Making sure there is enough storage for the energy being produced.
- What is the life cycle of renewable energy developments?

On the mark scheme below, highlight the areas that were done well, and then complete the

Level	Marks	Description
3 (detailed)	7–9	• A balanced argument is given. • Effective use is made of the supplied statements and additio • Explains how renewables alone cannot provide for all of th • Clear judgements made about how important investing in technologies, as part of a wider energy mix, will be. • Ideas drawn together into a conclusion, discussing th not agree with the statement.
2 (clear)	4–6	• Both sides of the argument will be discussed, but one side wil • Limited use made of the supporting evidence or their own • May suggest that renewables alone will not make the UK fu fully link this to the importance of having a diverse energy • Reaches a conclusion about how effective it is but rather la
1 (basic)	1–3	• May discuss only one side of the argument (or if both sides not explained). • Copies statements that were provided from the pre-releas evidence without explaining. • No attempt to suggest the problems of just relying on rene • For the conclusion, may just state that they agree/disagree

What went well?	Even

Rewrite a paragraph of your essay to improve it based on the feedback on the p

Sample Answers for Task 8

Answer A

The UK is experiencing a decline in its North Sea oil and gas production, leadin
insecurity in the future. Investing in a variety of renewable energy sources, such
power, is often proposed as a solution to this issue. However, it is important to
investment would be sufficient on its own, or whether additional measures may

Renewable energy sources, such as wind, solar and tidal power, offer a sustaina
supply, reducing dependency on fossil fuels (oil, coal and gas). By investing in th
enhance its energy security by reducing reliance on imported energy, and using
types reduces risk when weather conditions are not suitable for energy generati
crucial for the UK's commitment to tackling climate change, as it generates mu
emissions than fossil fuels.

However, a significant challenge with renewable energy is that sources such as w
intermittent; that is, power is not generated continuously. For example, solar p
night, and wind power depends on the availability of wind. This can lead to ene
sources are relied upon exclusively. To mitigate this, the UK would need signific
storage technology or backup generation from other sources, such as nuclear or
required for widespread renewable energy generation, including wind farms an
upgrades, would require significant capital investment and time to implement.
a reliable backup would be needed during the transition period, particularly for
not yet meet all energy needs. Nuclear power, another low-carbon option, coul
providing a stable, large-scale and continuous energy supply. If the UK is to ens
term, a diversified energy mix that includes nuclear power and potentially othe
generation (such as hydrogen) may be necessary.

In conclusion, while investing in a range of renewable energy sources is an impo
towards addressing the issue of potential energy insecurity in the UK, it is not
The UK will need a diverse energy mix that includes renewable energy, nuclear
solutions, and potentially natural gas as a stable power backup when renewable
energy. Therefore, I would agree with the statement to a large extent but also
additional measures to ensure a secure and reliable energy future.

Answer B

As North Sea oil and gas reserves declines, the UK faces growing concerns ab
energy sources such as wind, solar and tidal power are often seen as key solutio
investing in these sources to secure the UK's energy future requires a balanced e
environmental and social impacts alongside the benefits of reducing reliance on

Arguments for investing in renewable energy sources:
'Renewable energy is carbon-neutral and lasts forever, so we can keep producin
main benefits of renewables: they are sustainable and have a minimal environm
carbon emissions. Renewable energy sources such as wind, solar and tidal power
depletion of finite resources such as fossil fuels, making them a long-term soluti

'The way to tackle climate change is through renewable energy sources which e
As the UK seeks to reduce carbon emissions to achieve net-zero targets by 205
It offers a clean, green alternative to fossil fuels, supporting both the fight agai
of reducing dependency on fossil fuel imports, which can lead to energy insecur
key part of the UK's energy strategy.

Counterarguments (limitations of investing in renewables alone):
Despite the benefits of renewable energy, there are environmental concerns ass
deployment. For example, **'Between 10,000 and 100,000 birds are killed anni**
statistic from a local environment group highlights the negative impact wind tu
wildlife, as does the statement from the RSPB: **'[illegible] rayes would reduce up**
populations due to habitat loss.' While t[illegible]newable technologies can reduce
cause significant environmental damage, particularly to bird populations and lo

Renewable [illegible] projects such as wind farms and solar panels can be seen as
walking thro[illegible] the fields, now they are full of ugly solar panels, no space for a
highlights local concerns regarding the aesthetic impact of solar farms. Large-sc
wind farms can take up significant land space, potentially reducing land availab
which can have social and economic consequences, especially in rural areas.

Conclusion:
In conclusion, while investing in a range of renewable energy sources is undoubte
solving the issue of energy insecurity in the UK, it is not a complete solution on i
carbon-neutral and lasts forever, making it a sustainable long-term choice for r
However, the environmental impacts on wildlife, the aesthetic concerns from loc
intermittency of renewable energy suggest that renewable sources alone cannot
fully address potential energy insecurity, a diversified energy mix will be necessa
reliability and protect the environment. Therefore, I agree with the statement t

Answer C

Declining oil and gas supplies from the North Sea will cause problems for the UI
that energy may be unaffordable, or we may have interruptions that lead to po

Investing in renewable energy is good because it's carbon [illegible]utral and lasts forev
solves our energy security issue. It is also clean, which [illegible]eans we will have a bet
will also help us tackle climate chan[illegible]s [illegible]ewable energy sources emit low or

However, some people [illegible]t like renewable energy because solar and wind farm
up land for [illegible]or animal grazing. Also, wind turbines kill between 10,000 a
while tidal barrages get rid of areas for birds to live, and this will kill more bird

I believe that we need to protect our energy supplies so should use more renew
the environment, and the birds can find somewhere else to live.

Glossary

Use this page to create a glossary for any terms you identified in Task 2.

Key term	Definition

Glossary

Use this page to create a glossary for any terms you identified in Task 2. A few sugg

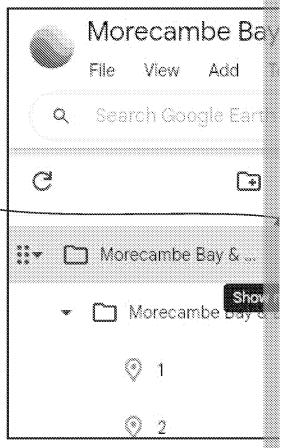
Key term	Definition
Energy mix	
Electricity mix	
Energy consumption	
Imports	
Exports	
Bioenergy	
Tidal barrage	
Sustainable	
Navigation locks	
Tidal mudflats	
Saltmarsh	
Wildfowl a nd	
Sites of Special Scientific Interest (SSSI)	
Areas of Outstanding Natural Beauty (AONB)	

Teacher's Notes for the Google Earth Fly-through

This fly-through aims to introduce students to some of the locations identified in the PRB. However, the new Google Earth browser no longer seems to support fly-throughs, so there are two files available for use depending on your system.

Browser version:

1. First open the Google Earth browser: when you type 'Google Earth' into Google, the program should load without any downloading needed.
2. Click on the 'File' tab.
3. Click 'Import KML/KMZ file'.
4. Choose the file where the document has been saved ('Morecambe Bay and Duddon Estuary Tidal Barrage Project slideshow.kml).
5. Double click on the file and it should load straightaway.
6. Click on 'Layers' and then click 'Exploration'.
7. Click on the three dots and choose 'Start slideshow'.



While you are playing the Google Earth fly-through, students could be completing their sheet 'Describing Place' (p. 20).

Pin locations for Google Earth slideshow (browser version KML)

1 Shows the area of North West England where Morecambe Bay is located.

2 Zooms into Morecambe Bay. A placemark is located at Morecambe.

3 Zooms in to Barrow-in-Furness, where the tidal barrage will link this side of the bay to the eastern side.

4 Zooms in further so you can see the port industry of Barrow. (You could use St

5 Takes you to the north of the bay to the part which has suffered severe flood where some of the main rivers enter the bay.

6 A clear example of how the saltmarsh is created by splitting of the river chan spreads out into the estuary area. You can also see some mudflats.

7 Zooms in to Heysham (you could use Street View here to give a sense of plac side of the tidal barrage. (You could follow the A683 to Halton, where it joins understand the benefits of the barrage to drivers.) The nuclear power statio

8 Moves to Duddon Estuary.

9 View of the nature reserves. If you click on Street View, there will be the west of Roanhead Beach that shows you the sand dune ecosystem.

10 Askam-in-Furness, a small town on the estuary. A great place to use Street V the estuary.

11 View of Kirkby-in-Furness, one of the settlements to the north of the estuary. (You could use StreetView here if you have time).

12 View of Millom, which will be the west side of the Duddon Estuary barrage. I area when traffic no longer needs to go up the A595 and all the way round th instead go down the A5093 and across the estuary mouth and on to Barrow-

Google Earth Pro (app version)

You can download Google Earth Pro (free): **zzed.uk/12642-G-Earth**

Do make sure you have the following layers switched on before you start: 'Borde
'Roads'. ('Layers' is shown on the left side bar, towards the bottom.)

Loading:

1. Go to 'File' then 'Import' and choose 'Morecambe Bay and Duddon Estuary T
   Alternatively, if you double-click on the file it should open up Google Earth P
2. This should then show in 'Places'. (You may need to double-click it there to g
   pins and the video icon.)
3. Click the video icon to start the fly-through. (You will need to have the places
   to appear.)

You can pause the fly-through at any time using the pause button on the video pl
read the information provided below. You may also want to explore the region ar
photos, then return to the video). Press play at any time and you will return to th
continue on the path.

Pin locations for Google Earth Pro version

For

1 (0:00) Starting point.

2 (0.10) Shows the area of North West England where the proposed tidal pr

3 (0.18) Zooms in to Morecambe Bay.

4 (0.26) Zooms in a bit more.

5 (0.34) Takes you to the Barrow-in-Furness side of the bay. Good to pause
development and also the route across to the other side – there will

6 (0.42) The barrage is likely to join in this area. If you go into Street View, y
from this side and the natural vegetation.

7 (0.50) A view of the north of the bay. This area is often flooded. You can
entering the bay on either side of the central land. It is all very low-

8 (0.59) This is one of many caravan parks. You can go into Street View here
site (there are some photo spheres on the lake so you can get a fee

9 (1.07) A clear example of saltmarsh, with the river distributaries clearly vis
Street View here and visit a couple of the photo spheres.

10 (1.17) Moving around the bay, there are more examples of the importanc
caravan parks.

11 (1.25) View of Morecambe, the largest settlement on the bay.

12 (1.33) Zooms in to see the coastal defences and beach at Morecombe. A

13 (1.41) Zooms in to Heysham (you could use Street View here to give a sense
other side of the tidal barrage. You could follow the A683 to Halton,
students understand the impacts of the barrage to drivers.) The nucl

14 (1.53) The Dudd[illegible]

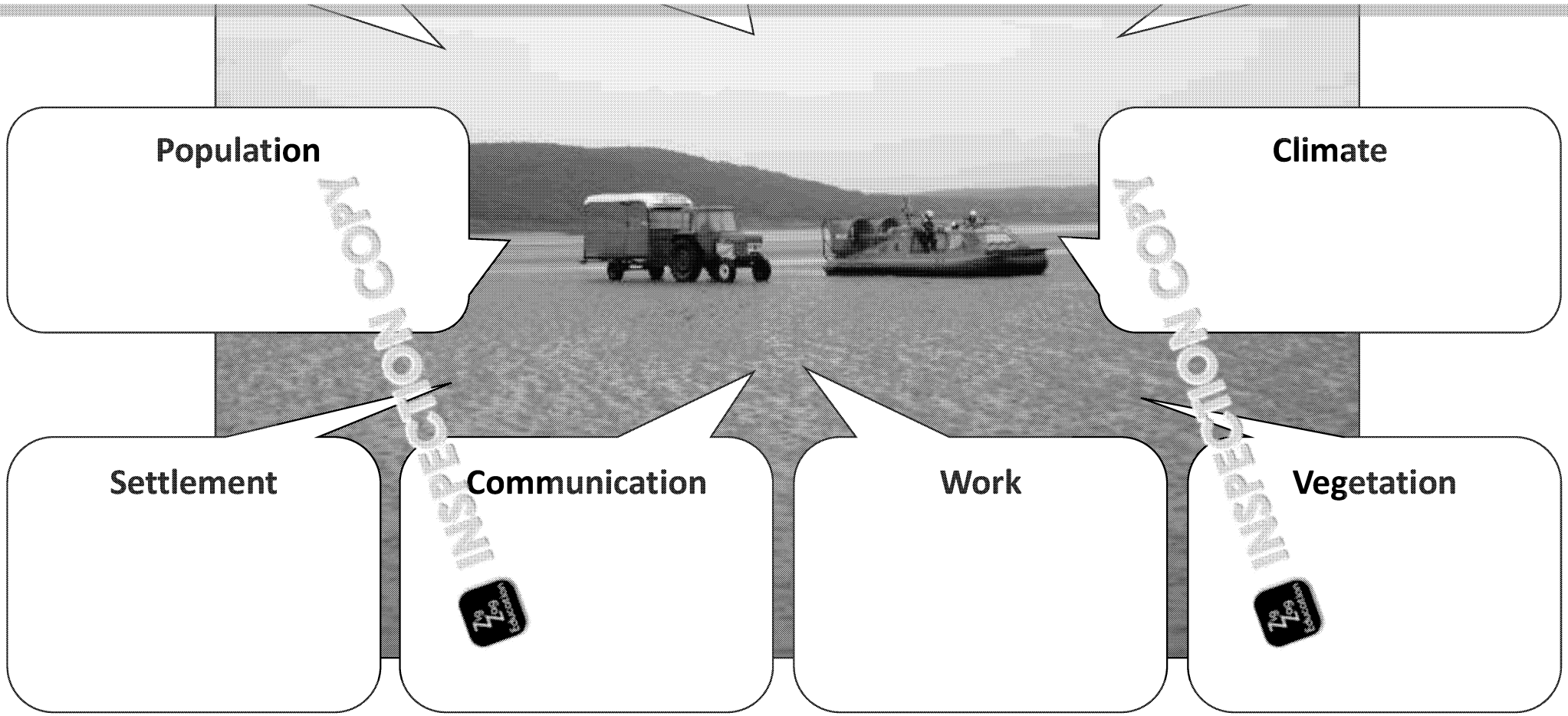
15 (2.02) [illegible] you can see where the barrage will join on either side.

16 (2.13) [illegible]es inland up the estuary, to where the rivers flow into the estu
floodplains to the west.

17 (2.22) Kirkby-in Furness, a small town with a wide area of marsh running
Street View in this area to get a sense of place.

18 (2.32) View of one of the nature reserves. If you click Street View, there w
coast to the west of Roanhead Beach that shows you the sand dune

19 (2.41) Back to overview of the case study area.



Skills Development

Figure 1 in the pre-release booklet (PRB) contains a range of data presented in dif
you understand how to read this data properly.

Reading a compound graph

1. How do you read a compound graph?
2. What are the advantages and disadvantages of a compound graph?

Calculating percentage change

1. How do you calculate the percentage change of something?
2. Using **Figure 1**, page 2 of the PRB (graph on Energy c s mption in the UK (1
   percentage change in consumption by the tr nst r sector from 1990 to 200
3. Now calculate the percentage chan e e domestic sector from 2005 to 2
4. How do these two sectors c mp r their consumption of energy?

Plotting th ne ix

There are tw tables on **Figure 1** of the PRB, giving information on the UK's t
energy mix.

1. What types of graph or chart would be appropriate for displaying this data?
2. If using a bar graph, what could you do to make it easier to interpret?

Producing a pie chart

1. When should we use a pie chart?
2. What are the advantages and disadvantages of using a pie chart?
3. Use the data from the pre-release materials to create a pie chart.

Describing trends shown by graphs

> **TRASH** – **T**rend, **R**ange, **A**nomalies, **S**mallest, **H**ighest
> ➜ *Why use it?* Reminds you to include a range of information when investigating d

*Study the graph showing 'The balance between import and export of energy in th
the following questions:*

1. Why has a line graph been used to display this data?
2. What do you notice about the *y*-axis?
3. Use the acronym TRASH to describe the key features of this graph.
4. Why do you think that even though North Sea oil and gas production has dec
   has decreased since 2013? *(Think about our current energy mix.)*

Interpreting a choropleth map

> **GSE** – **G**enerally, **S**pecifically and **E**xception
> ➜ *Why use it?* Useful for interpreting m ap

*Study the choropleth m s w g 'Wind and solar share of electricity generation
the followi sti s.*

1. What a advantages and disadvantages of displaying information on a c
2. Use the acronym GSE to describe the patterns of wind and solar electricity ge
3. Looking back at the data on the UK electricity mix on page 2 of the PRB, does
   come from wind and solar generation?
4. What does this map suggest about the use of renewable energy in countries
5. What other forms of renewable energy might they be using for their electric
6. What other method could have been used to display the data shown on the
7. Why do you think a map was chosen to display the data?

Delving Deeper

Getting to Know the Pre-release Resource Booklet (PRB)

By now, you should have a general understanding of the resources in your PRB. It and extend the level of your knowledge. In order to do this, you should work thro which will help you gain a more detailed understanding of the resources and give further research. You may need to refer to an atlas or the Internet for some tasks also be useful.

The activities will work through the booklet in order. Try to include as much detai If possible, discuss your ideas with others and think about their perspectives as th synopticity (*the ability to recognise and link different parts of a subject, showing h contribute to a broader understanding*), which is needed on this paper.

However, it is important that you develop your own ideas and back them up with need to put forward in the exam. The exam may ask you to undertake a range of of the activities will ask you to practise these.

Note that the number of lines provided for answers in this section is a guide only. extend your answers. Also, the following symbols will be used to indicate where i complete tasks: if the answer can be found in the PRB = 🗎, or if further research is think and discuss = 💬

Figure 1 activities

PRB p. 2

1. Why did energy consumption in the UK fall in 2020? 🗎 💬

   .....

2. Using the graph showing 'Energy consumption in the UK (1990–2021)', in wh consumption by industry almost the same as the consumption by services? 🗎

   .....

3. Define the term 'energy security'. 🗎 💬

   .....

   .....

4. Why are the percentages for certain fuels different between the total energy energy mix? 🗎 🌍

   .....

   .....

5. Which type of energy has the biggest percentage difference when you compa electricity energy mix? Can you suggest why this difference exists? 🗎 💬

   .....

   .....

6. Create a graph to show the UK electricity energy mix in 2020. 🗎

7. Describe and suggest reasons for the variations shown in the graph you have

.....

.....

.....

8. Explain how energy security links to food supply.

.....

.....

9. Using the PRB, link the four 'A's of energy security to the factors affecting ener linked to more than one 'A').

.....

.....

10. Describe how the physical environmental conditions will vary between countri their energy and countries that rely on wind power.

.....

.....

.....

11. In what ways have technological developments allowed a greater use of rene

.....

.....

.....

12. Over the last few years, in what ways have the numerous wars in the Middle the UK's energy security?

.....

.....

.....

PRB p. 3

13. Using the graph, describe the change in balance between imports and export to 202

.....

.....

.....

14. For how many years out of the last 50 did we export more than we imported

.....

15. What is the difference in meaning between 'electricity capacity' and 'electric

.....

.....

16. Why is it important to have greater electricity capacity than demand?

.....

.....

17. Describe the trends of the UK's electricity capacity and demand from 2004 to

.....

.....

.....

18. Why do ink total electricity capacity has fallen since 2011?

.....

.....

19. Why do you think the map showing the share of electricity generation shows power?

.....

.....

20. Identify two countries that seem to have a very different share of solar and w you look at just the colours but that are actually very similar in their percenta

.....

21. What does this tell you about the disadvantages of using a choropleth map to

.....

.....

Figure 2 activities

PRB p. 4

22. Provide a more detailed definition o vable energy than what is in the bo

.....

.....

23. What is a heat pump, and how do heat pumps supply the UK with renewable

.....

.....

.....

24. What is bioenergy, and how is it used to produce energy?

.....

.....

.....

25. There are a variety of methods of creating renewable energy shown in the diag
to show the advantages and disadvantages of each method and whether each

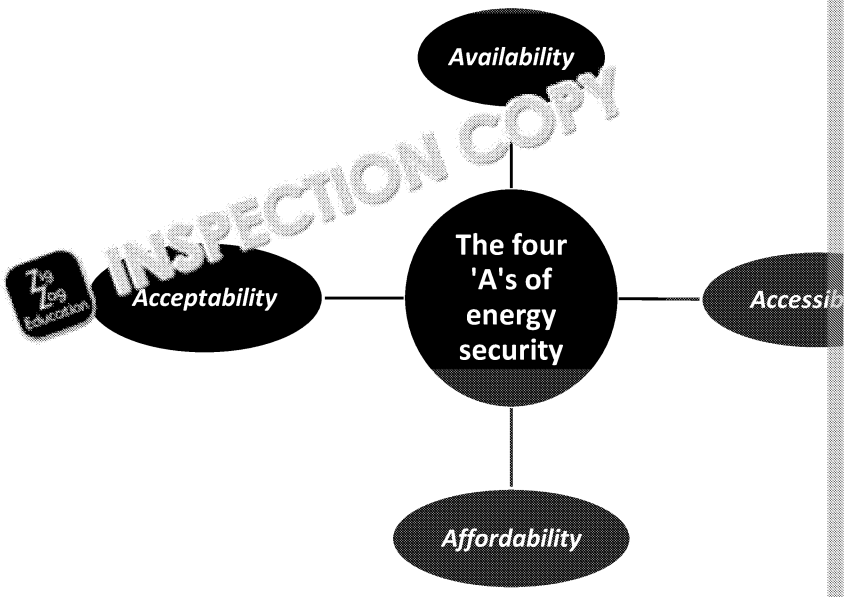
	Advantages	Disadvantages
Biomass energy		
Solar energy		
Hydroelectric energy		
Wind energy		
Geothermal energy		
Tidal energy		
Wave		
Hydrogen fuel cells		

26. Based on what you have found out, are you surprised by any of the percenta
UK's renewable energy sources?

.....

.....

27. Look back at the four 'A's of energy security. Link the bullet point advantage
renewable energy from the PRB to the relevant 'A' of energy security.



PRB p. 5

28. Why is the proposed tidal power project referred to as a 'multi-use' project?

.....

.....

29. Explain in what ways this barrage would be a sustainable source of energy fo

.....

.....

30. How will ships and fish still be able to get into the bay?

.....

.....

31. Here are the tide t[illegible] for Duddon Estuary and Morecambe Bay on 3rd April
differe[illegible] impact the length of time for which energy will be produced?

Tide	Duddon Estuary		Morecamb	
	Time	Height	Time	
High	03:08	8.04 m	03:12	
Low	09:53	1.17 m	10:08	
High	15:35	7.89 m	15:40	
Low	22:11	1.16 m	22.25	

.....

.....

32. Draw a mind map to show the many reasons why people like to visit this are

33. Currently, there are plans to have an operational wind farm in Morecambe B company website here: **zzed.uk/12642-Offshore**.

    a. Look at the timeline on the website. What does it tell you about how q

    .....

    .....

    b. What surveys have already been done, and how might they help with the

    .....

    .....

34. Complete some research on the Morecambe gas fields: **zzed.uk/12642-Gas**

    a. When did drilling start here?

    .....

    b. Where does the natural gas go, and how does it get there?

    .....

    .....

35. How w ou think a tidal barrage will fit into an area that already has tw production?

    .....

    .....

Figure 3 activities

PRB p. 6

36. Complete the fact file below on the Morecambe Bay and Duddon Estuary Tid

Cost to build	
Location of transport link	
Number of turbines	
Power for how many homes?	
Energy output equivalent	
Amount of fuel saved each	
Cost sav **journeys each year**	
Jobs c	
Savings from generating emission-free energy	
Future flooding and storm damage protection	

37. Why does emission-free energy save money?

.....

.....

38. Can we be certain of saving the £370 million a year stated by the NTPG? Exp

.....

.....

39. Explain why tidal power is better for energy generation than wind power or s

.....

.....

40. How much more expensive is tidal power than on **nd** energy to set up

.....

41. How much longer w **power plant operate for than a wind energy pla

.....

.....

42. According to the bottom box from an 'Energy Consultant', what other issues

.....

.....

.....

PRB p. 7

43. What is meant by the term 'energy trilemma'?

.....

.....

.....

44. What elements of the environment are impacted by tidal power stations?

.....

.....

.....

45. How long will the Ma... ...ay and Duddon Estuary project take to build?

.....

46. How do local people feel about the proposed project?

.....

.....

47. To what extent do you feel this viewpoint may be an example of Nimbyism?

.....

.....

48. Using information from the bottom box on page 7 of the PRB, complete the t... project will have a positive impact or a negative impact overall.

Positive	

49. Britain has yet to build a tidal power station. Use the following website **zzed** understand what costs and benefits this project might bring by using the info complete the table below:

Location of La Rance Tidal Barrage	
When it started operating	
Electrical capacity	
Number of turbines	
Barrage length	
Average tidal range	
Time t... to ... building the plant	
Key en...onmental issues	
Time taken for biodiversity to return to pre-building levels	

50. Does this research help reassure you, or does it make you more against build decision.

.....

.....

51. There are a number of elements to the proposal. Use the information from t help you complete this task. Decide which statement in the table below fits points. Record the score for each bullet point element.
    - Energy production
    - Flood protection
    - Environment
    - Jobs
    - Transport

Score	Description
+3	Will produce large quantities of carbon-free energy. Will encourage the provide plenty of jobs with a varied range. Will ...uce congestion and j protect a wide range of properties from f...sks and tidal surges.
+2	Will provide a reasonable range o...ca...-free energy. Will protect the Will provide a range of ... Will reduce congestion and journey times. properties of fl...g and tidal surges.
+1	Will pro...m carbon-free energy. Will not impact the environment ...duce congestion and journey times but may lead to more people trave ...ges.
-1	Energy produced will not always meet time of demand. Habitats will be be lost as towns are bypassed. Will slightly increase local traffic in Heysh rise in sea level due to barrage trapping tides.
-2	Energy will be wasted when tides do not match peak demand. The envi of jobs will be lost. Will increase traffic locally in Heysham and Morecam will raise sea levels, leading to more flooding.
-3	Habitats will be lost, putting endangered species more at risk. Considerabl around Heysham and Morecambe, reducing the experience for visitors an open sluice gates during high river levels will increase flooding.

52. Add up all the scores from question 51. If the total score is 10–15, you obvio
proposal; if the total score is -10 or lower, you think it is not fit for purpose.
agrees with your decision.

.....

53. From what you have read in Figure 3 of the PRB, mark on the continuum line
in terms of your support for this proposed development (there is no right or

1	2	3	4	5	6	7	

I think the proposed development will cause significantly more problems than benefits

Google Earth Orientation Task – Investigation of Morecambe B

You need to write answers for all the questions that are lettered. The numbere to follow. If you are using the Google Earth web browser, click on the 'Layers' tab and choose '**Everything**'. If you are using Google Earth Pro, make sure you have 'B 'Roads' ticked in the '**Layers**' section of the sidebar.

1. Type 'Morecambe Bay' into the search bar. You might need to zoom out a bi Barrow-in-Furness.
   a. What are your first impressions of this bay? *(Consider shape, tidal muds*

      .....

      .....

      .....

   b. Click on the 'Ruler' icon and measure the distance from Roosebeck to He solid land). This is the approximate location of the Morecambe Bay barr

      .....

   c. Zoom a little more to the area southeast of Cark (in the north of the ba Head. What do you notice about this area of mudflats/marsh?

      .....

      .....

      .....

2. If you zoom in further, you will see an area that seems to have some geometr west of Humphrey Head. If you click on the person icon to go into Street View area becomes highlighted. Drag the person icon so it is at the entrance to thi
   a. What is this site?

      .....

   b. Use the back arrow on the Street View image to return to Map View (bu Street View locations), and then choose a few photo spheres so you can park and the part of the site that fronts the bay. Describe these differen *impact, natural features, etc.)*

      .....

      .....

3. Come out of Street View and click on the 'compass' icon in the bottom right t North', then zoom into Morecambe and find the tree icon for Morecambe Pr again and go into the photo circle at Morecambe Promenade.
   a. Describe the beach area here.

      .....

      .....

   b. Co t of Morecambe Promenade and then go onto the coastal main alo Describe the settlement fronting the promenade.

      .....

      .....

   c. What sort of defence is there against large storm waves for the town?

      .....

      .....

4. Come out of Street View, reset to North and travel across to Barrow-in-Furne the location of Roa Island. Then zoom in to it as far as you can go.

   a. What coastal depositional feature does Roa Island look like?

   .....

   b. Go to the North of the settlement, where you can see 'Hawcoat'. To the blocks of blue and what looks like an industrial area. Zoom in further an you describe this area.

   .....

   .....

   .....

   c. What does this su[illegible]h[illegible]t the importance of Barrow-in Furness?

   .....

   .....

   d. The barrage will contain a road, reducing the distance that drivers need polygon' tool to measure a path from Barrow Park across the bay (rough barrage) to Heysham, and then follow the roads to join the M6 by Halto

   .....

   e. Make sure you have the layers 'everything' turned on if you're in the bro using the app. Now, use the 'add a path or polygon' tool to measure the way round Morecambe Bay along the main roads until you get to the M6 (Don't worry if your path isn't perfect). How far is this?

   .....

5. Now go North until you reach the Duddon Estuary (you need to be quite zoo Find Haverigg to the West of the Estuary.

   a. What seems to be developing to the south of Haverigg?

   .....

   b. If you go into Street View and visit one of the photo spheres, what do yo landscape here?

   .....

   c. What are the main differences between the Duddon Estuary and Morec *shape and settlement*

   .....

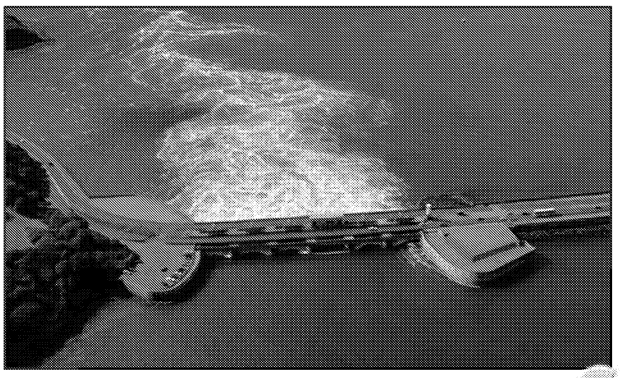
   .....

   d. To the south of Soutergate when you are in Street View, you will see a p into the sphere and describe the landscape.

   .....

   .....

Discussion Questions

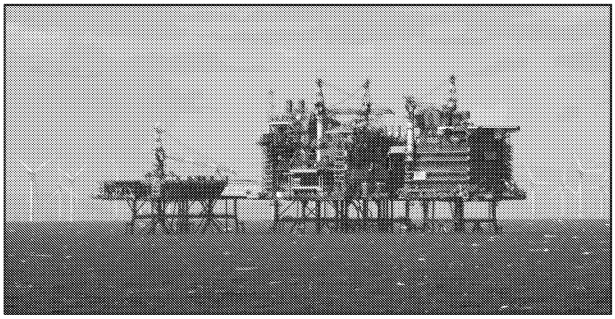


La Rance Tidal Barrage, F
Opened in 1966

- How will local comm development?
- How can tidal projec
- How will the wildlife
- What does this proje of tidal power?

Duddon Estuary

- How will building a t
- How can communica tidal barrage?
- Is tidal power really
- Is the generation of habitats?



Morecambe Bay

- How would a tidal b generated in the are
- Who benefits from i production here?
- Is there ever too mu
- How is power transp

Saltmarsh

- What will happen to t
- How can this power p and an advantage for
- How will this landscap
- What will happen to t

Duddon Estuary

- Why are sand dunes s
- Will a tidal barrage al
- Is change necessary f
- How will local people ecosystem change?

Duddon Estuary

- What is Nimbyism?
- How might this envir
- Will more visitors lea of the area?

Greylag geese at Leighton

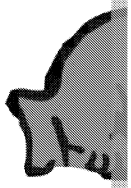
- How might this enviro
- Will the saltmarsh mig
- What impact does red on migratory birds?

Developing Decisions

Boxing Match

'The Morecambe Bay and Duddon Estuary Tidal Gateway Project will not only he
but it will also provide benefits for the region.' Discuss.

Argument 1



Counterargu

Argument 2

Counterargu

Argument 3

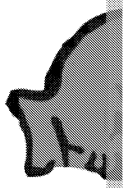
Counterargu

Conclusion

Boxing Match

'The Morecambe Bay and Duddon Estuary Tidal Gateway Project will not only he[l]
but it will also provide benefits for the region.' Discuss.

Argument 1 – *The project will be carbon net zero after one year of operation…*



Counterargu
not only releas
but it also cau

Argument 2 – *Improved transport links…*

Journey times shortened…

Counterargu
may lead to in

Argument 3 – *The barrage will help provide a defence against coastal flooding, which is increasing…*

Counterargu
be squeezed…

Carbon stores

Conclusion

Model Essay 1 – Boxing Match Question

For the model essay below, consider the following:

- What mark would you give it?
- How could it be improved?

'The Morecambe Bay and Duddon Estuary Tidal Gateway Project will not only help with energy security, but it will also provide benefits for the region.' Discuss.

Does this introduction really set the scene for the argument and show understanding of tidal power?

The Morecambe Bay and Duddon Estuary Tidal Gateway is designed to generate renewable energy using the movement of tides. This helps improve the UK's energy security by reducing dependence on imported fossil fuels and creating a more reliable, sustainable energy supply. Tidal power is predictable and consistent, which makes it a valuable addition to the UK's energy mix. With the project estimated to produce enough power for 1 million homes, energy security is obviously the driver of the project, but there are other important benefits too.

Has data been used to back up arguments? Are specific sectors named?

In addition to energy production, the project could bring economic benefits. For example, it is estimated that it will create around 7,300 jobs in construction, engineering and maintenance, boosting the local economy. New infrastructure could also improve transport links, making access to parts of Cumbria and Lancashire easier, as journey times will be cut by up to 7[illegible]

Are both sides of the argument covered?

However, some people may be concerned about environmental impacts. Tidal barrages can affect local ecosystems. Morecambe Bay and the Duddon Estuary are important overwintering grounds for migratory birds, and this has been recognised by the area being classified as a Ramsar site. In addition, the varying habitats and communities are home to some rare plants such as the coastal orchid and to animals such as the natterjack toad with the area holding around 25% of the UK's population. Many people visit the area due to the biodiversity and beauty of the region, and there are concerns that this development will stop people coming and thereby cause tourism businesses to lose income.

Does the conclusion have enough assessment and reach a clear decision?

Overall, while the primary reason is to improve energy security, the project could bring wider economic and transport benefits which support those living in the area. However, these must be weighed against potential environmental costs.

Examiner's commentary:
This is a level 3 answer.
There is consistent use of data, both from own knowledge and research as well as
throughout the essay. This helps to back up statements made and so gives greate
Information is combined to help develop arguments fully. There is an attempt to
before weighing up the evidence at the end to reach a conclusion. There is some
environmental impacts, which isn't necessarily totally relevant but does show rea
and an attempt is made to link it to potential economic and social disadvantages.
everything together, although it is quite basic. However, it attempts to reflect the
weighing up the range of evidence.

3 (detailed)	7–9	• **AO3** Exhibits systematic application of knowledge an to discuss why the project is a multipurpose project a of benefits and cost with regard to improving energy Morecambe Bay and Duddon Estuary and their releva • **AO3** Applies knowledge and understanding to mak variety of supporting evidence, making detailed link economic benefits of the project as well as those re • **AO4** Expresses findings clearly and coherently, with final conclusion.

SPaG: Uses appropriate terminology (e.g. 'barrage', 'biodiversity', 'orchid') and in

SWOT Analysis – Building the Morecambe Bay and Duddon Estuary Tidal

Task:

1. Your group should undertake some additional research into the potential cos
   tidal barrage at Morecambe Bay and the Duddon Estuary.

2. The following websites are a good starting point:
   - **zzed.uk/12642-Bay** – fact file on the bay
   - **zzed.uk/12642-Facebook** – Facebook group linked to the project
   - **zzed.uk/12642-Lecture** – a copy of a PowerPoint presentation on why t
   - **zzed.uk/12642-MPs** – a news article highlighting that local government
   - **zzed.uk/12642-Evidence** – evidence to support the project.

3. Once you have done your research, bullet-point information (especially data)

Strengths	Weaknesses
Opportunities	**Threats social/econ**

4. Finally, compare your SWOT analysis with another group. Did you come to si
   in some more ideas to your sheet?

5. **Extension**: use your data from the task to answer the following question: *'As*
   building the Morecambe Bay and Duddon Estuary tidal power project.' [9 ma

SWOT Analysis – Building the Morecambe Bay and Duddon Estuary Tid

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   - **zzed.uk/12642-Evidence** – evidence to support the project.

3. Once you have done your research, bullet-point information (especially data)

Strengths	W
In less than 12 months from the start of power generation, the carbon emitted during the building of the plant will have been offset. *Journey times between south Cumbria and Lancaster will be reduced by about 75%…*	*The site currently has six designations and has th* *Unsure of the impact ho migratory birds…*
Opportunities	**Threats social/econ**
Building the project will lead to local jobs… *The barrage could act as a form of coastal defen*	*Marsh squeeze…* *Impact on the habitats* *Easier access for people* *National government*

4. Finally, compare your SWOT analysis with another group. Did you come to si in some more ideas to your sheet?

5. **Extension**: use your data from the task to answer the following question: *'As building the Morecambe Bay and Duddon Estuary tidal power project.' [9 ma*

Debate Role Play

Background information for debate

The focus

- The UK government has pledged that the country will be net zero in its carbo
  we will need to increase our use of renewable energy significantly.
- However, with the increase in electric car use, demand for electricity is set to i
  need to start building renewable energy projects now in order to meet future
- Working with your group, you need to create a speech to present at the Plan
  has been called to discuss the proposals. You need to include the following:
  - What option you approve of, and why.
  - Why you think the other option is unsuitable.
  - Any solutions you may have to improve the proposal.
- Try to be as persuasive as possible and include evidence in your argument.
- You will need to nominate someone in your group to put your decisions acro

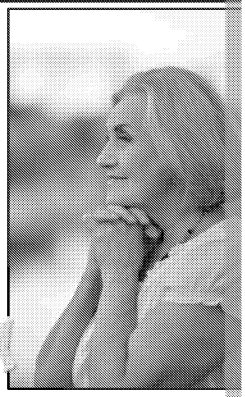
You will need to make notes for the different arguments put forward on the note-
written rep[illegible] the end of the debate.

The options

- **Option 1 – Allow the development of the Morecambe Bay and Duddon Estu**
  This project will go a long way to helping the UK's energy security, while also
  being net carbon zero, and, with an expected lifespan of 120 years, it is susta
  provide mitigation against the impacts of climate change locally by protectin
  flooding; it will also transform regional transport for the better.
- **Option 2 – Do not allow the development of the Morecambe Bay and Duddo**
  The proposed development site has six environmental designations, making t
  both nationally and internationally (it is a Ramsar wetland site). It is home to
  not been a thorough risk assessment undertaken in order to ascertain the imp
  have on the habitats and species living in the region, let alone the knock-on e
  food chain or local fisheries.

MP for Morecambe and Lunesdale While he supports the transition to clean energy, he is deeply concerned about the excessive costs and uncertainties surrounding tidal power technology. He believes that proven, cost-effective solutions such as wind and solar should be prioritised over [illegible]-risk, expensive tidal power project[illegible] that lack sufficient research and long-term [illegible]ees.

- As a l[illegible] project, there is a risk of cost overruns, which could lead to higher taxpayer burdens.
- The UK has some of the best wind resources in the world, and expanding offshore and onshore wind farms would provide more energy at a lower cost.
- The planning, approval and construction processes for a project of this scale could take decades, delaying the transition to clean energy, whereas wind and solar can be deployed much faster.



concerned about the ris
businesses and local inf

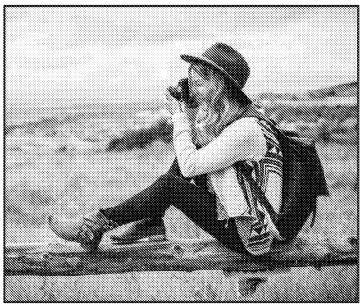
- The tidal barrier w
  reducing the impac
  frequently flood co
- Homes and busine
  other bay commun
  from extreme wea
- By controlling tidal
  stabilise shoreline
  along the coast.
- Reduced coastal da
  ongoing repairs and

Highways Agency representative He has spent over 20 years in transport infrastructure planning, focusing on reducing congestion and improving travel efficiency across the region. He sees the Morecambe Bay Tidal Gateway Project as a groundbreaking opportunity to improve transport links.

- This new route could cut travel time betwe[en] Barrow-in-Furness and Lancaster b[y] 45 minutes, benefiting comm[uters] [b]usinesses and emergency servic[es]
- Impro[ved] an[d] links would make the area more [attrac]ve for business investment, tourism and logistics, and would aid job creation.
- A new, direct route would reduce vehicle emissions from long, inefficient detours.
- Lower congestion in existing bottlenecks (such as the A590 and M6 junctions) would improve air quality and road safety.

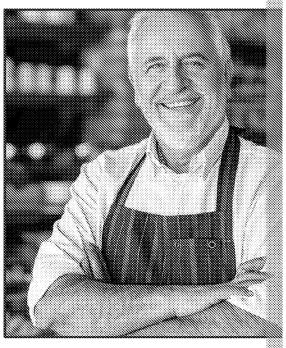
Morecambe Bay. With [a] of fieldwork, she has st[udied] life thriving in this uniq[ue]

- The coastal marshe[s] Morecambe Bay pr[ovide] rare orchids such a[s] the pyramidal orch[id]
- Construction and [other] disrupt the delicat[e] require, leading to [local] extinction.
- The bay is home to [many] including the smal[l] fritillary (the faste[st]
- Increased human a[ctivity] fragmentation cou[ld] species.



Local member of the RSPB She is a dedicated conservationist with over 15 years' experience in wildlife protection and habitat preservation. She has been advocating for the preservation of Morecambe Bay for several years, working to protect its status, which is critical for migratory birds such as oystercatchers, curlews and redshanks. She is deeply concerned about the potential effects of the proposed Morecambe Bay tidal power plant on the delicate ecosystems that exist in the region.

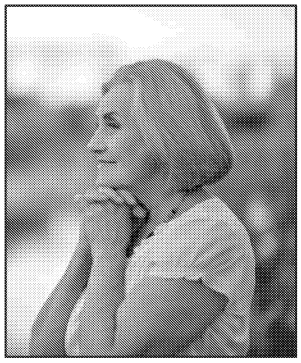
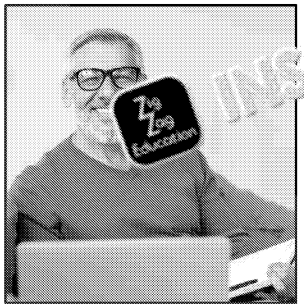
- Morecambe Bay is a critical habitat for [mi]gr[at]ory bird species. The tidal power [pl]a[nt] co[uld] disrupt their feeding, nesting [and] mig[r]ation patterns, particularly du[ring] s[en]sitive times of the year.
- Many [bird]s depend on the intertidal zone for food, a[nd] the construction of a tidal power plant could disturb these delicate ecosystems, leading to reduced bird numbers and potentially endangering species that rely on this area.
- The creation of large barriers and turbines in the bay may have unforeseen consequences on sediment movement and water quality, further impacting the biodiversity of the area.

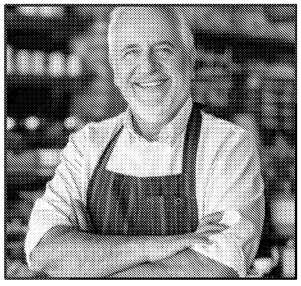


changer for the area. T[he] increased tourism and [job] him hope for a brighter [future]

- The project would [create] during construction [and] opportunities in th[e] energy sectors.
- More jobs would [be] shops, restaurants [and]
- The tidal barrier w[ould] links, making it eas[ier] travel across the b[ay]
- More foot traffic w[ould] and other attracti[ons]
- Morecambe has ex[perienced] the past. The tidal [range] homes and busine[sses]
- Local businesses co[uld] costs in the long ru[n]

Note-taking Activity for the Debate

Role	Supported option	Points supporting the option	Points a other
MP for Morecambe and Lunesdale 			
Local resident 			
Highways Agency representative 			

Role	Supported option	Points supporting the option	Points a other
Ecologist and conservation activist 			
Local member of the RSPB 			
Café owner 			

Press release following public meeting

Having attended the local meeting, you need to write a press release for Morecam the discussions at the meeting.

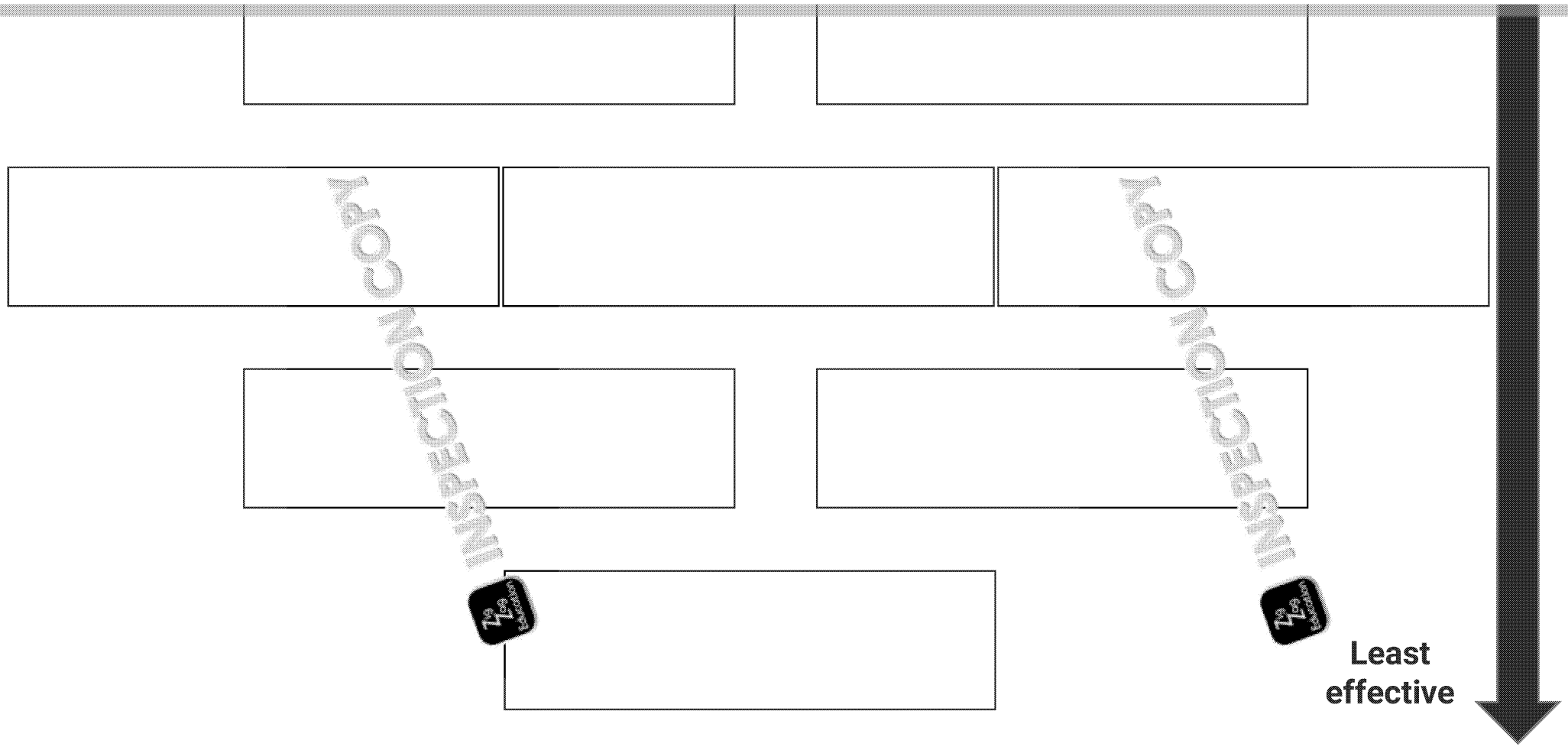
- It should state the points made by each speaker, explaining which organisati represented and which option they favoured. It should give people who wer sense of what was discussed.
- It needs to conclude with the final consensus reached at the meeting.
- It should be focused and succinct – no more than one page of A4 paper.

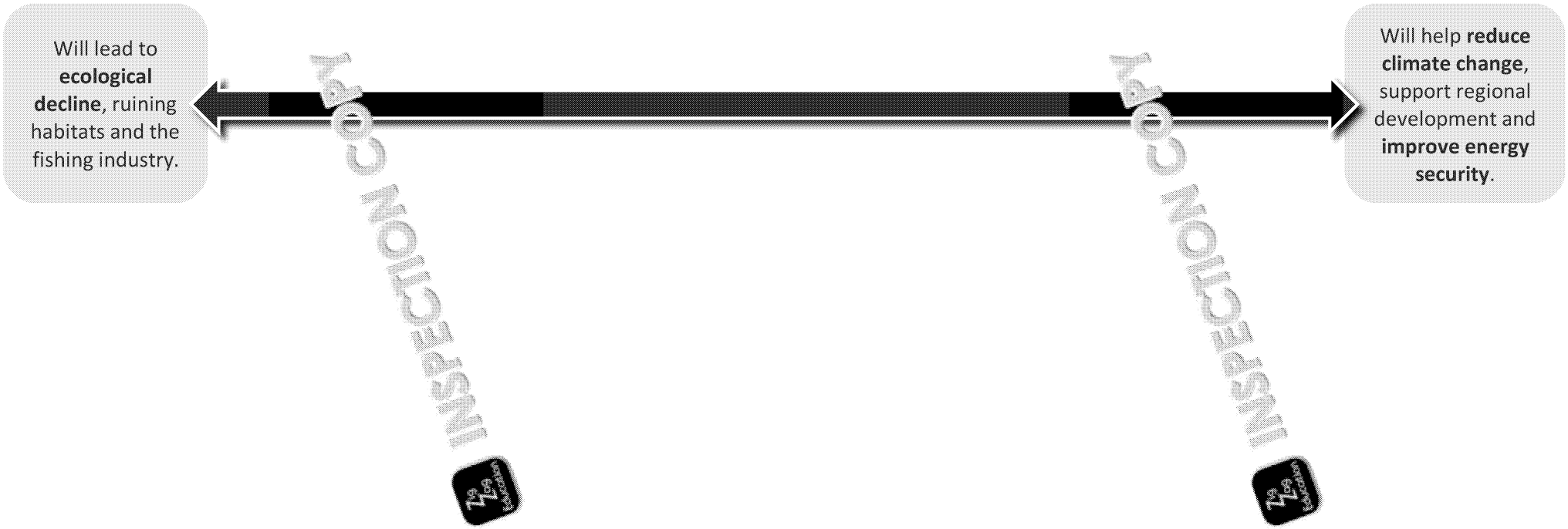
Diamond Nine Activity

What should be done to secure energy supplies for the UK?

Reverse the current ban on fracking to allow exploitation of shale gas.	Invest in new nu
Increase incentives for farmers to grow crops for biofuel.	Develop tidal en propo
Impr st of electricity to cope with ations in supply when using renewable sources.	Invest i hydroge
Prioritise measures to reduce energy consumption across all sectors, including homes, businesses and industry.	Make it mandato solar pane
Invest in developing new technology to make extracting energy more efficient and reliable.	Provide tax br ener

1. Each of the cards above gives information relating to the UK's need for ene and, either in pairs or individually, organise them in order of effectiveness security on the Diamond Nine template on the following page.
2. There are 10 cards, so you will also need to decide on one item to discard a
3. The solution you decide has the highest priority should be placed at the to have two equal second-placed items, and so on, until the grid is completed
4. If you have time, join another pair and explain you e sions to them.





Continuum Line Activity:
The Morecambe Bay and Duddon Estuary Tidal Gateway Proje
climate change mitigation?

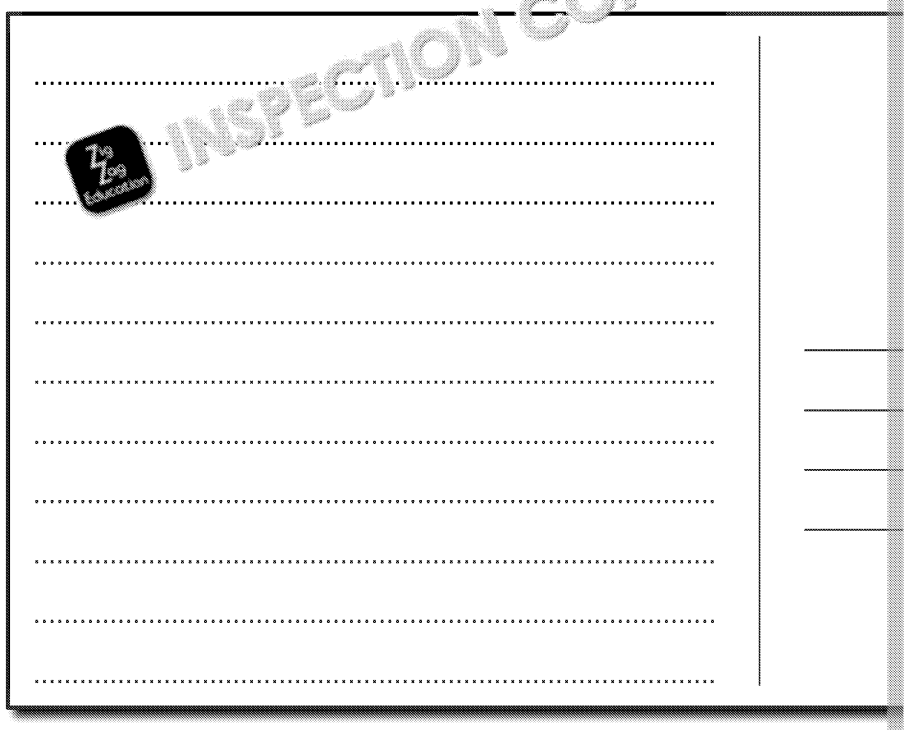
Congestion reduction The A590 is regularly congested, in particular around Ulverston and the junction with the M6.	**Local river floods** The River Kent regularly has flood alerts issued. The Morecambe barrage could be closed before high tide to allow rivers to drain and re[illegible] lood risk.	
Environmental designation Ram[illegible]ve [illegible]te, [illegible] Area of Conservation (SAC), Special Protection Area (SPA), Site of Community Importance (SCI), Site of Special Scientific Interest (SSSIs), Area of Outstanding Natural Beauty (AONB)	**Current local benefits of the area** The fishing industry catches plaice, flounder and dabs, as well as cockles and mussels. The area is famous for its potted shrimps. The scenic beauty encourages high levels of tourism worth around £400m.	
Houses protected from storm surges. The barrage would break the waves and greatly reduce the height of those impacting the shore. This would protect the whole area and limit the need to build individual defences for settlements.	**Potential additional renewable energy** as part of site: wind turbines may be able to be added to the barrage. Tidal stream units could be sited near the outfalls to capture extra energy and reduce high-velocity streams.	
Birds who rely on the area The area is particularly important for waders and wildfowl, with over 240,000 birds using the area annually, including species such as curlew, oystercatcher[illegible] kn[illegible].	**Roads helping business** It is estimated that travel time would de[illegible]ease by 75%, le[illegible]ing to [illegible]50,000 [illegible]s of fuel saved a year. This equals £200m in savings, helping local people and businesses.	
Jobs 7,300 jobs are needed for the construction of the project. There would be 7,400 ongoing jobs after completion.	**Power output** 132 turbines would generate 8 million megawatt hours of energy, enough for around 2 million homes. Lifespan: 120 years.	

Postcard to MP

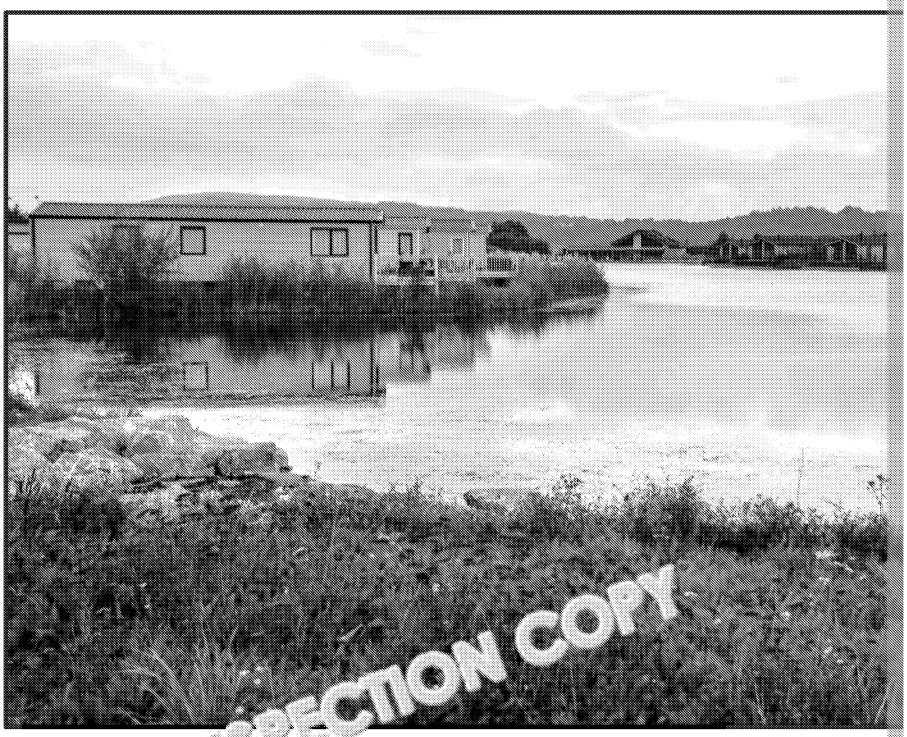
Either imagine you are a carer working in Aldingham Nursing home (postcard A). explaining why you think the tidal barrage should not be built. (*Hint: think about about what older people like to do.)*

Or imagine you are a caravan owner who often rents out their caravan in Haven L extra income (postcard B). Write a postcard to your MP explaining why you think be beneficial to the region to help protect your investment.

Postcard A



Postcard B



Planning Grids for 9-mark Questions

For each of the following 9-mark questions, use the scaffold to write a simple pla
would need to include to fully answer the question.

***'The Morecambe Bay and Duddon Estuary Tidal Gateway Project will not only he
the UK's energy security, but it will also provide benefits for the region.'*** **Discuss.**

Introduction	
Improve energy secur	**Role in the energy mix**
Bring benefits for region	**Bring costs to the regio**
Conclusio	

Answers

Gaining an Overview of the Pre-release Booklet

Task 4

a) Due to energy efficient products in our homes, e.g. light bulbs. People are m
consumption of energy and are more careful due to the increased costs.

b) Coal was second largest contributor (30.59%); now it's only 2.69%. Gas is no
contributor, increasing from 22.68% to 32.89%. The only real renewable ene
hydropower, 0.49%, although this has increased slightly by 2023. The bigges
wind power (11.03%).

c) They should be closed

d) It will help reduce our need to import energy f[illegible] verseas

e) It's encouraging investment in renew[illegible]

Task 5

a) A walled [illegible] across a tidal inlet or estuary. Water flows through tur
flowing [illegible] urbines to produce energy.

b) Because [illegible] know when the tides will occur

c) Because it produces power as the water flows in both directions (ebb and flo

d) The difference between high and low tide

e) As tides occur at roughly 12-hour intervals, there will be no power generated
high and low tide. Also, as tides change slightly each day, there will be times
generated is not when peak demand for electricity needs it.

Task 6

a) Gravitational forces exerted by the Sun, Moon and rotational forces of Earth

b) Along coastlines

c) 5 metres

d) Tidal barrages

e) Turbines that operate like giant turnstiles

f) Water turns turbine blades in the water; these are connected to a generator

g) Tidal turbines create more energy because seawater is 832 times denser than
on the turbine

h) There are specific requirements for producing tidal power, and tidal cycles d
consumption requirements and so don't produce enough to meet demand

Task 7

a) Just south of the Lake District National Park in NW England

b) 120 square miles (310 km^2)

c) Leven, Kent, Keer, Lune and Wyre

d) High brown fritillary

e) 7

f) Because there are fast tides [illegible] and around the islands

g) Around 320,000

h) It has B[illegible]'s [illegible] largest natural gas field; gas first came ashore in 1985
supply [illegible] rom these gas fields when production was at its peak.

i) 2004

j) A wetland that is designated as internationally important

k) One fifth

l) Pintail, red knot, common redshank, common shelduck, red-breasted merga
ringed plover, dunlin and Eurasian curlew

m) 20,000

n) Saltmarsh, sand dune and shingle communities