



2016 specification
first exams in 2018

Topic Tests for A Level AQA Geography

Hot Deserts

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Teacher's Introduction

This resource has six tests on *Topic 3.1.2 Hot Desert Systems and Landscapes* for the AQA Geography specification. Every key aspect of the specification is covered in this resource.

These topic tests are designed to test the student's knowledge and enable the teacher to diagnose the student's strengths and weaknesses in certain areas. Each test covers a range of question types, and there is a wide variety of stimulus material. These tests are not intended to mimic exam papers; section 1 answers do not necessarily match AQA's standard command word mark allocation; however, extension questions do reflect the command words and mark schemes used in exams.

Remember!

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

- The resource is designed to be co-teachable with both AS and A Level students.

Mark schemes for each topic test can be found at the back of this resource. For 'closed' questions, where only one answer is acceptable, a model answer has been provided. For 'open' and extended questions, indicative content has been included.

When to Use This Resource

This resource can be used at the end of a particular topic area, or at the end of the whole unit in order to enable consolidation of knowledge. The students can also use the tests towards the end of the course, to assess knowledge either before or after revision. There is scope to provide your students with one test every two weeks if teaching the A Level course over two years.

How to Use This Resource

The tests can be completed individually in class, or set as homework tasks. The tests can be quickly marked by the student or the teacher, at home or in the classroom, as answers are provided.

These structured tests provide an opportunity to mark and score students in order to monitor progress. The tests are provided in a non-write-on format.

The Benefits to the Student

Students can be confident they have been tested on every key aspect of the specification. After completing a test, they will know which areas they are strong in, and which require further work, and can set their own goals for future learning. The answer sections also provide students with an indication of what a good answer entails.

Differentiation

In order to support lower-ability students while pushing the more able, each test has been written in two sections.

- The first section has approximately 40 marks and has been written to test knowledge of the core elements of the specification.
 - These questions are for all students and the difficulty or complexity of questions generally increases throughout the test.
- The second section has approximately 9–20 further marks of extension questions for higher-ability students.
- The final test draws from themes from the whole topic. This test would be ideal as an end-of-topic activity, and to identify gaps in the student's knowledge.

October 2017

Free Updates!

Register your email address to receive any future free updates* made to this resource or other Geography resources your school has purchased, and details of any promotions for your subject.

* resulting from minor specification changes, suggestions from teachers and peer reviews, or occasional errors reported by customers

Go to [zzed.uk/freeupdates](https://www.zzed.uk/freeupdates)

Test 1 – The Desert System

1. What is meant by the term 'dynamic equilibrium'?
2. On the insert you will find a world map, labelled Figure 1. On the map label the key deserts.
3. What are two key outputs from dryland and desert systems?
4. Explain the difference between a positive feedback and a negative feedback.
5. What is the measure of?
6. State three key factors that contribute to aridity.
7. Describe the climate within hot desert environments.
8. Explain how the type of vegetation that is found in hot desert systems is linked within the environment.
9. Explain the concept of 'water balance'.
10. What is meant by the term 'semi-arid'?
11. Explain how landforms and landscapes are different but connected concepts.
12. Explain how the hot desert landscape works as a system, with reference to the components and transfers within the system.

Extension Question

13. 'Atmospheric processes are the predominant cause of aridity.' Assess the extent to which you agree with this statement.

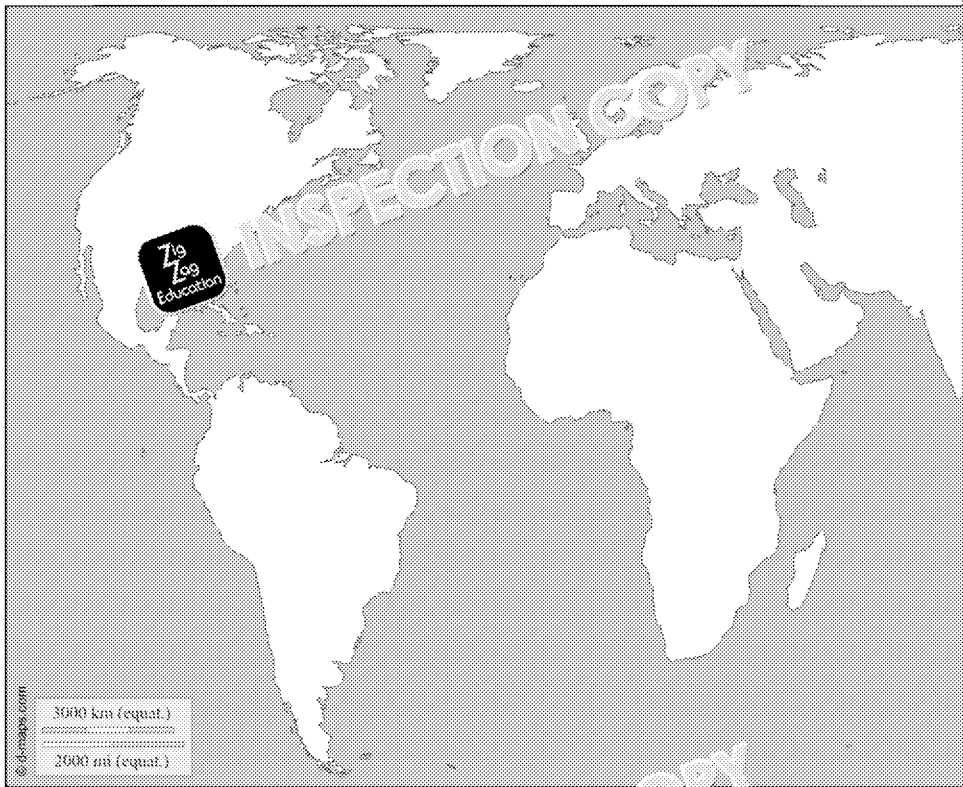
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Handout for Test 1

Figure 1: For use with question 2.



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Test 2 – Hot Desert Systems and Processes

1. a) Insolation is one of the key energy inputs into hot desert environments. What are the other key energy inputs?
 - b) Explain what insolation is.
 - c) Why does insolation create particularly high temperatures in desert systems?
2. Outline the different types of sediment within a hot desert system.
3. Explain the terms meant by the sediment 'budget'.
4. What are the three main subcategories of weathering?
5. What causes mass movement in desert environments?
6. What are the two key agents of erosion within a desert environment?
7. What are the three main ways sediment is transported by the wind in desert environments?
8. What is thermal fracture?
9. Explain the difference between block and granular disintegration.
10. a) Take a look at Figure 2 below. Suggest what type of wind erosion would be most likely to occur in this environment.

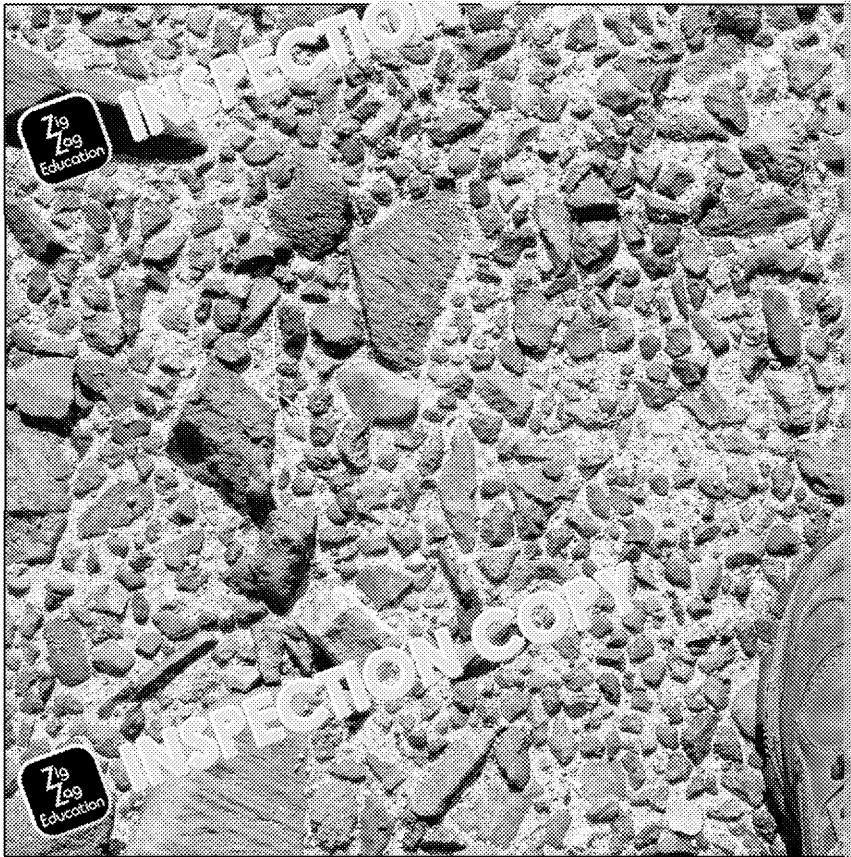


Figure 2

- b) Give a reason for your answer to part a.

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11. Provide definitions for the following sources of water in desert environments
- a) Exogens
 - b) Endorheic
 - c) Ephemeral
12. Explain the impact of flooding in desert environments.



Extension Question

13. Analyse the role of wind in erosion of desert environments.



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Test 3 – Desert Landscape Develop

1. What are 'aeolian landforms'?
2. Describe the characteristics of a ventifact.
3. Sketch a barchan as it would be seen from a high-angle view.
4. What is the term used to describe landforms that show signs of considerable erosion?
5. Use the label 'Zig Zag Education' to identify the image of a yardang and draw an arrow to illustrate the prevailing wind direction.
6.
 - a) What conditions are required for the formation of sand dunes?
 - b) How is a seif dune different from an ordinary sand dune?
7. What are wadis?
8.
 - a) How does increased flow of rivers impact on pediments?
 - b) How are inselbergs shaped by pluvial conditions?
9. Answer true or false to the following statements regarding playas.
 - a) Playas are small bodies of water found in deserts. They have an extremely high salt concentration.
 - b) Playas occur where ephemeral rivers flow into a desert environment.
 - c) Sodium chloride is the most common salt found in playas.
 - d) Playas often become sites of economic activity.
10. Analyse the reasons why the characteristics of desert landscapes are different in different environments.

Extension Question

11. Assess the relative importance of aeolian processes in forming desert landforms.

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Handout for Test 3

For use with question 5.

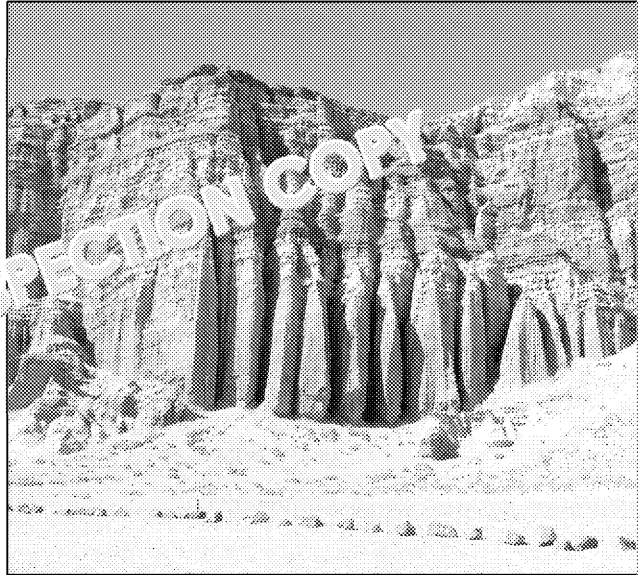


Figure 3



Figure 4

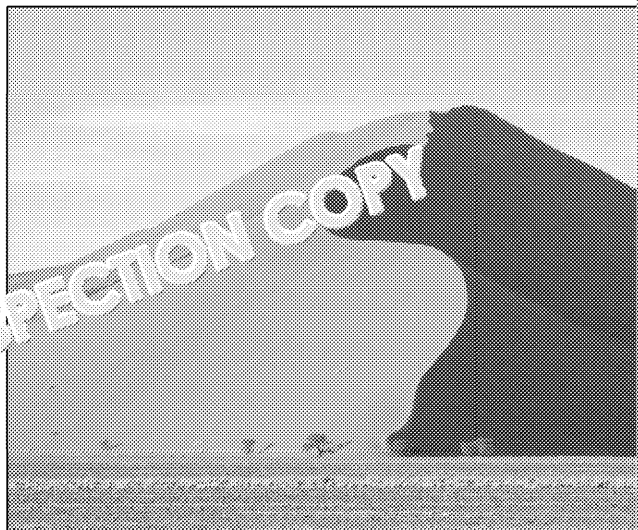


Figure 5

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Test 4 – Desertification

1. Take a look at Figure 6 below, showing the distribution of the world's hot deserts.

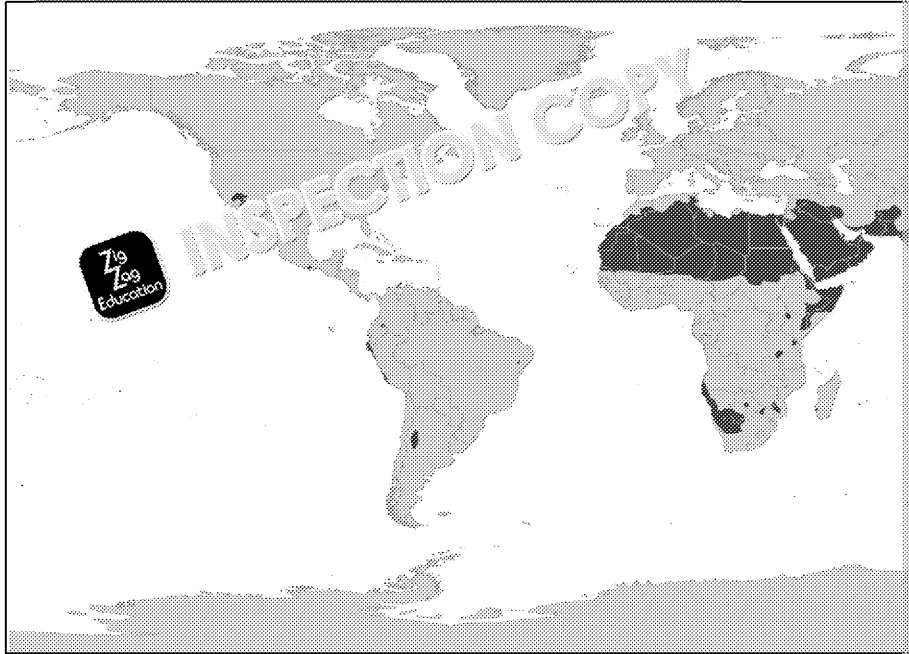


Figure 6

- a) What is the name of the world's largest hot desert?
 - b) Describe the distribution of hot deserts in the world today.
 - c) Explain how the extent of hot deserts has changed over the last 10,000 years.
2.
 - a) What is 'desertification'?
 - b) Outline how climate change is causing desertification.
 - c) Outline how human activity is exacerbating desertification.
 3. Which areas of the world are most at risk from desertification in the future?
 4. Explain what impact desertification can have on the animals and plants within an area.
 5. What impact is desertification having on physical landscapes?
 6. Explain, in full, one feedback link connecting desertification and biodiversity.

Extension Questions

7. Evaluate possible future strategies taken by populations in response to prevent or reduce desertification.

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Test 5 – Skills and Case Studies

1. Take a look at Figures 7 and 8 below, both of which show a dryland landscape



Figure 7



Figure 8

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- a) Identify three similarities between the dryland environments shown in Fig. 1.1.
- b) Identify three differences between the dryland environments shown in Fig. 1.1.
2. Explain how geospatial mapping can be used to aid studies into desertification of dryland environments.
3. Outline and explain what qualitative skills could be used within an investigation of dryland systems and how they are changing.
4.
 - a) As it is not always possible to visit dryland landscapes in order to gather first-hand data, an alternative environment could be investigated in order to explore the aeolian processes within dryland environments?
 - b) With reference to a case study you have studied, explain why it is often difficult to study aeolian processes within dryland environments.
 - c) With reference to a case study you have studied, explain how a local field study could be carried out that improves understanding of aeolian processes within dryland environments.
5.
 - a) With reference to a case study you have studied, describe the causes of desertification of a dryland landscape.
 - b) For the case study you have studied, explain the implications of desertification on local development.
 - c) With reference to the case study you have studied, evaluate the success of strategies to desertification.



Extension Question

6. With reference to a case study you have studied, to what extent have mitigation strategies helped alleviate the impacts of desertification on a local community?



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Test 6 – Overview

1. What are the key inputs into a hot desert system?
2. Are desert systems open or closed systems? Give a reason for your answer.
3. State what type of vegetation can be found in hot desert systems.
4. Outline the interaction between climate, soil and vegetation within a hot desert system.
5. Why does wind erosion, transportation and deposition play such an important role in desert systems?
6. Explain the weathering process of exfoliation.
7. When is chemical weathering most likely to occur in desert systems?
8. Explain the difference between sheet flooding and channel flooding.
9. What is a bahada (or bajada) and where might one form?
10. Suggest three reasons why the characteristics of desert landscapes differ.
11. Which areas of the world are most at risk from desertification in the future?
12. State two impacts of desertification on the physical landscape.
13. The table below shows the sediment budget for a stretch of the Yellow River in the Kubq Desert.

| | | A | B |
|-----------|-----------------|--------------|---------------------------|
| | Sediment influx | Bank erosion | Sediment from tributaries |
| 1982–1991 | 0.713 | 0.67 | 0.36 |
| 1991–2000 | 0.801 | 0.65 | 0.12 |

- a) Identify which of 'Bank erosion', 'Sediment from tributaries' and 'Deposition' is gained, and which show where sediment is lost.
- b) Calculate the sediment efflux from the river between 1991 and 2000. You must show your workings.
- c) Identify one change between the sediment budgets of the Yellow River for the two time periods and explain why this might be.

Extension Question

14. Assess the relative importance of wind and water in shaping desert landscapes.

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Answers

Test 1 – The Desert System

1. A state whereby the inputs of a system are balanced by the outputs [1].
2. Students should label three of the deserts in the correct locations, as shown by the



3. Two from the following:
 - High evaporation [1]
 - Evapotranspiration [1]
 - Strong wind [1]
 - Removal of sediment [1]
4. Positive feedback increases the change / negative feedback reduces the change further away from equilibrium / and returns balance to the system [1].
5. The rate of evapotranspiration that would be possible [1] if water was readily available.
6. Three from the following points:
 - Atmospheric pressure [1]
 - Winds [1]
 - Continentality [1]
 - Relief [1]
 - Ocean currents [1]
7. Four from the following points:
 - Extreme high temperatures during the summer [1]
 - Extreme low temperatures during the winter [1]
 - Extreme differences between daytime and night-time temperatures [1]
 - Low humidity levels [1]
 - Low cloud levels [1]
 - Cloudless skies [1]

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8. Six from the following points:
- Soils have a lack of moisture [1] so plants have adapted to store water in the soil [1].
 - Soils have extremely high rates of evaporation [1] so plants have adapted to soil following rainfall [1].
 - Moisture content of the soil is generally highest in the surface of the soil [1].
 - Systems that do not penetrate deep into the soil, instead spreading across the surface [1].
 - Soils have a high salt content, such as calcium or sodium compounds [1]; plants are tolerant to such high levels of salinity [1].
9. The amount of water stored in a system can be determined by the relationship between precipitation [1] and water lost through evapotranspiration [1].
10. An environment that is naturally dry [1] and receives between 250 and 500 mm of rainfall [1].
11. • A landscape is a naturally created characteristic on the earth [1].
 • A landscape is an expanse of land characterised by a number of key features [1].
 • Landforms can be a feature within a landscape [1].
 • Landscapes may be made up of a number of defining landforms [1].
 Or any other suitable suggestion.
12. Eight from the following points:
- Hot deserts are an open system [1].
 - Inputs include solar energy [1], wind [1] and precipitation [1].
 - Erosional processes [1], transportation processes [1] and depositional processes [1] within the system [1].
 - Wind [1] and water [1] are the key components responsible for transportation [1].
 - Outputs include the removal of sediment from the system by water or wind [1] from the surface into the atmosphere [1].
- Or any other suitable suggestion.

Extension Question

13. 9 marks
- The student should discuss how atmospheric processes cause aridity, but should also include the effect of and cold ocean currents.
- The student should offer some form of conclusion, stating the extent to which the student's answer is correct.
- Answers may relate to, but are not limited to, the following points:
- Hadley cells are the cyclical movement of air [1] as it is warmed at the equator or south [1]. On the poleward limb of the Hadley cell there is very little cloud formation [1], high surface temperatures and levels of aridity [1].
 - At mid-latitudes there is air sinking from both Hadley cells and Ferrel cells [1], leading to high surface temperatures and levels of aridity [1].
 - Continentality affects temperature and rainfall across countries [1]. Location in the interior of a continent experience much more extreme temperatures and drier conditions [1].
 - Relief can impact on aridity [1], with the leeward side of mountains lying in the rain shadow [1]. As warm air falls on the leeward side of the mountain there is a decrease in cloud formation [1], meaning there is no rainfall, creating a dry environment [1].
 - Cold ocean currents can also lead to arid environments [1]. Wind blowing over the sea, creating fog or mist over the sea, which gets blown inland [1]. The sun bakes the land, which held little moisture due to its high temperature [1]. This means cloud formation is reduced [1], leading to little rainfall [1]. This means cloud formation is reduced [1], leading to little rainfall [1].
- Or any other suitable suggestion [1].

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Test 2 – Hot Desert Systems and Processes

1. a) Winds [1]
Rainwater run-off [1]
- b) Insolation is incoming solar radiation reaching the earth's surface [1].
- c) Example answer:
In low- and mid-latitude deserts the sun is almost directly above the desert. The deserts, therefore, receive 12 hours of daylight [1]. Furthermore, the angle of the sun's rays on the earth's surface means that each given amount of radiation covers a small area [1]. The intensity of the sun's energy on the surface, as well as the prolonged exposure to the sun, means that temperatures in deserts become extremely hot during the day [1].
2.
 - The weathering of rocks [1]
 - Carried by rivers [1]
 - Carried by the wind [1]
3. The amount of sediment stored in a system [1], determined by the loss of sediment and sediment gained through transportation and deposition [1].
4.
 - Mechanical weathering [1]
 - Chemical weathering [1]
 - Biological weathering [1]
5. Two from the following points:
 - The influence of gravity [1]
 - Rainfall [1]
 - Lack of vegetation to hold materials together [1]
 Or any other suitable suggestion.
6.
 - Wind [1]
 - Water [1]
7.
 - Surface erosion [1]
 - Saltation [1]
 - Suspension [1]
8.
 - A type of mechanical weathering [1]
 - Caused by the rapid heating and cooling of rocks [1]
 - Expansion and contraction of rocks [1]
9.
 - Block disintegration occurs on rocks that form in large masses and have a uniform texture [1].
 - Block disintegration is where chemical weathering causes large blocks of rock to break apart [1].
 - Granular disintegration occurs on rocks that have a granular structure [1].
 - Granular disintegration involves the dislodging and breaking away of individual grains [1].
10. a) Deflation [1]
- b) Two from the following points:
 - The photograph shows a desert pavement [1].
 - Larger sediments have been left behind [1].
 - Smaller sediments are absent from the photograph [1].
 Or any other suitable suggestion [1].
11. a) River originates from a location outside of the desert [1]
- b) River is enclosed within a drainage basin and ending at an inland water body [1]
- c) Periodically/briefly flowing rivers [1]

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12. Four from the following points:
- Dislodging of loose sediment [1]
 - Sheet erosion / sheet wash [1]
 - Creation of erosional landform features [1]
 - Transportation of sediments [1]
 - Deposition of sediments [1]
- Or any other suitable suggestion.

Extension Question

13. 9 marks

The student must discuss the ways in which wind causes erosion of the desert.

The student may also choose to mention other agents of erosion, such as water.

Answers may relate to some of the following points:

- Many desert landscapes are barren [1] and have few landforms to reduce wind.
- Winds can blow across vast distances uninterrupted [1].
- Deflation [1] results in the removal of unconsolidated sediments from the surface.
- Reg or desert pavements [1] are created as wind erodes and transports away the surface.
- Deflation hollows [1] are created where large volumes of sediment have been removed.
- Abrasion [1] is when wind causes sediments to be blasted against exposed rock.
- Flooding can cause sheet erosion [1].
- Flooding can cause the removal of large bodies of sediment [1].

Or any other suitable suggestion [1].

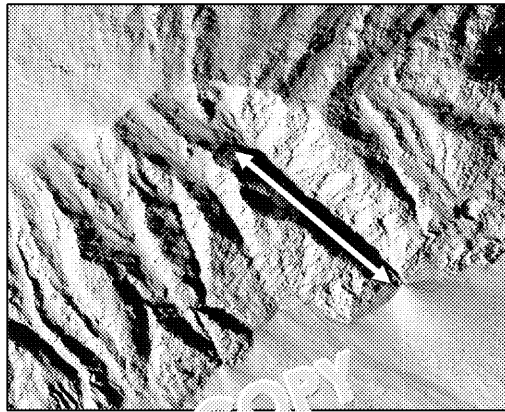
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Test 3 – Desert Landscape Development

1. Landforms created through processes of wind [1] erosion, transport and deposition [1]
2. Two from the following points:
 - Can vary hugely in size [1]
 - Smooth/flattened sides [1]
 - Sharp edges [1]
3. One mark can be awarded for a labelled diagram [1].
A second mark can be awarded for the 'horns' of the barchan narrowing to a point on a diagram showing the main body being the widest part of the barchan [1].
4. Zeugen

5. a) Figure 4
- b)



The student's arrow may not indicate the direction of the directions shown above.

6. a) Four from the following points:
 - Large supply of sediment/sand [1]
 - Winds strong enough for transporting sediment [1]
 - Winds that are not so strong they remove more sediment than is deposited [1]
 - Winds from a single dominant direction [1]
 - Rocks/vegetation to trap sediment and cause a build-up [1]
- b)
 - Seif dunes have sharp ridges [1]
 - The top and side of seif dunes have a serrated look caused by eddying [1]
7. Three from the following points:
 - Gorge-like valleys [1]
 - Steep sided [1]
 - Wide based [1]
 - Covered by weathered sediments [1]
 - Largely dry [1]
8. a) Increased flow of rivers and streams carrying sediment particles causes abrasion as well as larger materials to be deposited at their mouths [1].
- b) The sandstone on the steep slopes could absorb water [1] increasing their mass and chance of rockfall [1] and therefore, increases the rate of inselberg recession [1] also the increase of inselbergs [1] causing collapse and further recession [1].
9. a) False [1]
- b) False [1]
- c) True [1]
- d) True [1]

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10. The student should discuss differences in time, landforms and landscapes.

Answers may include some of the following points:

- Weathering occurs at a faster rate in deserts with greater diurnal temperature ranges [1].
- Levels of moisture in the environment determine the landforms which will be created. At some locations the presence of moisture speeds up weathering processes [1].
- Some deserts will have more frequent variations in moisture [1] – with some deserts having more periods and others having more variations in levels of aridity [1].
- Levels of moisture can also impact on vegetation cover, which characterises the landscape [1].
- Some deserts will have been shaped by periods of much colder climatic conditions, leading to the creation of nivation hollows [1].
- Some deserts will have been shaped by periods of much wetter climatic conditions, leading to the creation of inselbergs [1].
- Meteorological events can cause sudden and drastic changes to the desert landscape [1].
- Direction of winds plays an important role in shaping landforms, particularly if the winds are of different directions or come primarily from a single direction [1].
- The presence of exogenous, endorheic and ephemeral water sources plays a role in the patterns of pluvial erosion, transportation and deposition [1].
- The sediment budget of each desert is different, which determines the abundance and formation of landforms [1].

Or any other suitable suggestion.

Extension Question

11. 9 marks

The student should discuss aeolian processes and the landforms that are created by them.

The student should also mention the role of pluvial processes in shaping desert landscapes.

Answers may relate to some of the following points:

- Aeolian processes refer to the action of the wind [1].
- Aeolian processes can play a significant role in shaping desert landscapes [1]. Sediments are not held together [1] and are, therefore, vulnerable to erosion [1 mark each].
- Aeolian processes create landforms such as deflation hollows, desert pavements, barchans and seif dunes [1 mark each].
- Pluvial processes can cause sudden and drastic changes to the landscape [1].
- Rivers in deserts can be responsible for erosional and depositional landforms [1].
- Pluvial processes create landforms including wadis, bahadas, pediments, etc. [1].

Or any other suitable suggestion [1].

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Test 4 – Desertification

1.
 - a) The Sahara Desert [1]
 - b) Four from the following points:
 - Deserts are found within the tropics [1].
 - Largest area of desert extends across North Africa and the Middle East [1].
 - A smaller stretch of desert extends across Namibia, Botswana and South Africa [1].
 - Much of Australia is desert [1] with desert extending from the western coast [1].
 - Desert extends from California down into the Mexican Baja California [1].
 - There are small areas of desert in Peru [1] and Argentina [1].
 - There is a small desert in South Asia [1], particularly in Iran, Afghanistan and India [1].
 - c) Six from the following points:
 - Desert cover has increased [1].
 - The desert in Africa has expanded hugely [1] – particularly the Sahara [1] – 10,000 years ago [1].
 - Desert cover in North America has occurred [1], as 10,000 years ago desert was confined to the western coast extending through Peru and Chile [1].
 - 10,000 years ago there was no desert in the Middle East [1], whereas Saudi Arabia, Yemen and Oman is covered in desert [1].
 - Australia was desert-free 10,000 years ago [1].Or any other suitable suggestion.
2.
 - a) The degradation of dryland environments [1].
 - b) Four from the following points:
 - Less rainfall in drylands [1]
 - Less predictable rainfall in drylands [1]
 - Higher temperatures [1]
 - Decreased moisture [1]
 - Limited evapotranspiration [1]
 - Drying up of rivers [1]
 - Falling water tables [1]Or any other suitable suggestion.
 - c) Four from the following points:
 - More intensive agricultural practices [1]
 - Over-grazing of land [1]
 - Deforestation to increase agricultural land [1]
 - Deforestation for fuel wood [1]
 - Removal of vegetation causes soil erosion [1]Or any other suitable suggestion.
3. Four from the following points:
 - The areas surrounding current deserts are most at risk [1].
 - Desertification will occur further into central Asia [1].
 - The majority of Australia is at risk of desertification, with the threat stretching towards the northern and southern coasts [1].
 - Deserts will extend further into central North America [1], extending eastwards [1].
 - The west coast of Madagascar is at risk from desertification, having previously been a dryland environment [1].
 - Parts of Europe are at risk from desertification [1], including parts of Spain [1].Or any other suitable suggestion.
4. Six from the following points:
 - Disruption to food web can disrupt the entire system [1].
 - Habitats are destroyed pushing species into different areas [1].
 - There is increased competition between species for scarce resources or habitats [1].
 - Certain species become at risk of extinction [1].
 - Certain species will thrive under the dryer and hotter environment [1].
 - There will be a shifting risk of pathogens, parasites and diseases [1].
 - Migration patterns may be disrupted [1].

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- Mating patterns may be disrupted [1].
- Life cycles for fertilisation, germination, etc. may be disrupted [1].
- Loss of vegetation, increasing spread of barren treeless areas [1].
- Vegetation becomes damaged by sandblasting [1].

Or any other suitable suggestion.

5. Six from the following points:

- Deserts encroach into other landscapes [1]
- Erosion of soil [1]
- Loss of topsoil [1]
- Increased sand dunes [1]
- Loss of vegetation, including trees [1]
- Sedimentation in rivers and lakes [1]
- Loss of salinity of water bodies [1]
- Increased salt concentration within soils [1]
- Increasing frequency of sandstorms [1]
- Emergence of salt crusts [1]

Or any other suitable suggestion.

6. Example answers:

- A doubling of atmospheric CO₂ results in a temperature increase of between environments [1]. This temperature increase causes a loss of biodiversity [1]. A loss of plants leads to soil erosion [1] which in turn causes desertification [1].
- Desertification means there is less vegetation available as a carbon sink [1] as there is increased concentration of atmospheric CO₂ [1]. Climate change events such as droughts and floods [1]. These events cause soil erosion which leads to desertification [1].
- Climate change causes changes to the balance of species within an environment [1]. Loss of vegetative species causes soil erosion [1] which leads to desertification [1].

Or any other suitable suggestion.

Extension Question

7. 9 marks

The student should discuss several strategies, assessing the importance of each and the relative impact and effectiveness of each.

Answers may relate to, but are not limited to, the following points:

- Reducing human pressure on areas at risk from desertification is linked to top-down approaches are mutually beneficial for both populations and the environment [1].
- Bottom-up strategies will ensure the problems causing desertification are not cause problems to be moved to other locations [1].
- Vulnerable populations need to be given support in order to cope with change [1].
- Globalisation can be used as an advantage, [1] as resources and knowledge can be shared [1].
- Cooperative work between governments and private organisations can help with planning [1].
- In a globalised world strategies tend to be reactive and top-down and are often based on economic growth [1].
- A globalised proactive approach involves developing green technologies that encourage populations to prevent desertification [1]. These strategies are advantageous as they prevent issues from arising in the future [1].
- A more regionalised approach involves bottom-up strategies which are based on individual contexts [1]. These strategies fall down in the fact they do not take into account the future [1].
- A more regionalised approach looks at empowering local communities to develop their own approach to managing ecosystems [1].

Or any other suitable suggestion [1].

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Test 5 – Skills and Case Studies

1. a) Three from the following points:
 - Arid [1]
 - Treeless [1]
 - Poor soil quality [1]
 - Uninhabited [1]
 - No visible water source [1]
 Or any other suitable suggestion
- b) Three from the following points:
 - Low-lying dunes in Figure 7 [1]
 - Near to salt desert in Figure 8 [1]
 - Simple landforms in Figure 8 [1]
 - More sand sediment in Figure 7 [1]
 - Indication of desertification in Figure 8 [1]
 - Some small clouds in Figure 7; Figure 8 is completely cloudless [1]
 Or any other suitable suggestion.
2. Four from the following points:
 - Can be used to identify changing climatic conditions over time [1]
 - Can be used to identify changing climatic conditions over space [1]
 - Can be used to evidence expanding desert conditions [1]
 - Can be used to evidence shrinking water bodies [1]
 - Can be used to measure the extent of tree/vegetation cover [1]
 - Can be used to identify the development of desert landforms [1]
 - Can be used to monitor changes in land use, which could lead to desertification [1]
 Or any other suitable suggestion.
3. Example answers:
 - Interviews [1] could be used to improve understanding of the links between economic activity [1].
 - Focus groups / group discussions [1] could be useful in gaining an understanding of the experiences of people living in areas at risk from desertification [1].
 - Direct observation of local communities [1] could help improve understanding of agricultural practices, which may be responsible for exacerbating desertification [1].
 Or any other suitable suggestion.
4. a) Coastal dunes [1]
- b) Answers will be specific to the case study the student has studied.
Answers may relate to some of the following points:
 - To assess whether surrounding areas are at risk from overflowing sand
 - To assess whether another 'Dust Bowl' is at risk from arising
 - Wind erosion can cause sand to be transported vast distances
 - To assess the threat of erosion that could arise from sandblasting
 Or any other suitable suggestion.
- c) Answers will be specific to the case study the student has studied.
For full marks the student must clearly identify:
 - The aeolian process they are investigating [1]
 - The fieldwork method used for investigating the process [3]
5. a) Answers will be specific to the case study the student has studied.
Answers may relate to some of the following points:
 - Expanding agricultural practices
 - Increased use of chemical fertilisers
 - Use of heavy agricultural machinery
 - Over-extraction from water sources
 - Inefficient irrigation systems where a large volume of water is evaporated

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- b) Answers will be specific to the case study the student has studied.
Answers may relate to some of the following points:
- Increasing intensification of agriculture in order to counteract declining yields
 - More intensive use of fertilisers
 - Increased extraction of water resources
 - Deforestation, as agriculture shifts into non-desert environments
 - Greater demand placed on scarce resources such as fertile land or water

- c) Answers will be specific to the case study the student has studied.

The student should discuss human responses in relation to resilience, mitigation and adaptation.

The student must assess the responses, offering some form of argument regarding weaknesses.

Answers may relate to some of the following points:

- Bottom-up, community-led strategies
- Top-down, government-led strategies
- Strategies to improve irrigation practices
- Strategies to restore soil nutrients
- Preserving traditional and less intensive agricultural practices
- Improved water management
- The resources required to enforce such responses
- The reach of the benefits of a given response
- Positive/negative side effects of the response

Extension Question

6. 20 marks

Up to 10 marks can be awarded for A01 for knowledge of the issue.

Up to 10 marks can be awarded for A02 for assessment of the issue.

| Level | Assessment Objective 1 (A01) | Assessment Objective 2 (A02) |
|--------------------------|--|--|
| Level 1 (1-3 marks) | <ul style="list-style-type: none"> • The response uses little geographic theory and geographical information may be inaccurate or superficial. • No use of geographical terms. • Little evidence of comprehension. • No or restricted use of example material, where appropriate. | <ul style="list-style-type: none"> • Investigation and development of the issue is limited. • Argument is biased or unstructured. • Evidence is poorly written and does not answer the question. |
| Level 2 (4-10 marks) | <ul style="list-style-type: none"> • Use of more complex theories may be inaccurate, but overall use of geographical information is correct. • Geographical terms used infrequently. • Comprehension is apparent but may be patchy. • Case study material is present, where appropriate, but may be brief, biased or superficial. | <ul style="list-style-type: none"> • Investigation and development of the issue is limited. • Argument is structured but does not fully answer the question. |
| Level 3 (11-15 marks) | <ul style="list-style-type: none"> • There are reliable references to geographical theories, and the answer is likely to be detailed and appropriate. • Geographical terms used often. • The answer demonstrates a good level of geographical comprehension. • Case study material is appropriate, specific and well linked to the argument, where applicable. | <ul style="list-style-type: none"> • Investigation and development of the issue is thorough. • Argument is well structured and answers the question. • Evidence is well written and clearly linked to the question. |

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| | A01 | |
|-----------------------------|--|--|
| Level 4 (16–20 marks) | <ul style="list-style-type: none"> Geographical theories and processes are appropriately referred to, demonstrating comprehensive and specific knowledge. Frequent use of geographical terms. Critical comprehension is self-evident from the confident and appropriate use of geographical theory and information. Use of case study material is suitable, broad and thorough where applicable. Specific data and figures are fully presented and support the overall argument. | <ul style="list-style-type: none"> Investigation develops a clear line of enquiry. Argument is supported by a balance of evidence and justified conclusions, creative, structured and logical. |

Answers will be specific to the case study the student has studied.

The student must clearly outline the specific mitigation and adaptation response.

The student must offer some kind of argument, discussing the strengths and weaknesses.

The student must offer a conclusion, clearly stating the extent to which they feel the response is successful.

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Test 6 – Overview

1.
 - Insolation / solar energy [1]
 - Precipitation [1]
 - Sediment [1]
2. Example answer:
Desert systems are open systems [1] because there is a flow of sediment into and out of the system [1] by wind or sometimes water [1].
3. Two from the following points:
 - Ground-hugging clastic dunes [1]
 - Short topographic relief [1]
 - Cold temperatures [1]
4. Example answer:
Desert soils are largely infertile and have very little moisture [1]. The conditions of an extremely arid climate in the desert [1] means that few plant species are able to grow [1] which causes further degradation of the soil as there is no way for nutrients to be replaced [1].
5. Example answers:
 - There is no vegetation to hold sediment in place [1] meaning loose sediment is easily transported [1].
 - The other key agent of transportation and deposition is water [1] of which there are few environments [1].
 Or any other suitable suggestion.
6. Example answer:
 - Rapid warming and cooling of rocks [1] causes fractures to appear on the rock surface [1] which often then peels away from the rest of the rock [1].
7. When there is moisture in the air [1], for example during precipitation / when the humidity is high [1].
8. Sheet flooding is the flooding of an open expanse of land whereby the water flows over a wide area [1]. Channel flooding occurs as runoff from heavy rainfall is directed through a steep sided channel [1].
9. Example answer:
A ground-hugging dune [1] that form at the base slopes of a linear mountain range [1] through the deposition of sediment by rivers [1].
10. Three from the following points:
 - Weathering occurs at a faster rate in deserts with greater diurnal temperature variations [1].
 - Levels of moisture in the environment determine the landforms which will form [1].
 - Some deserts will have more frequent variations in moisture [1].
 - Levels of moisture can also impact on vegetation cover, which characterises the landscape [1].
 - Some deserts will have been shaped by periods of much colder climatic conditions [1].
 - Mass movement can cause sudden and drastic changes to the desert landscape [1].
 - Direction of winds plays an important role in shaping landforms, particularly if they come from a number of different directions or come primarily from a single direction [1].
 - The presence of exogenous, endorheic and ephemeral water sources plays a role in determining the patterns of pluvial erosion, transportation and deposition [1].
 - The sediment budget of each desert is different, which determines the abundance of landforms [1].
 Or any other suitable suggestion.
11. Four from the following points:
 - The areas surrounding the Great Salt Lake are most at risk [1].
 - Desertification will occur further into central Asia [1].
 - The south-east of Australia is at risk of desertification, with the threat stretching from the northern and southern coasts [1].
 - Deserts will extend further into central North America [1], extending eastwards [1].
 - The west coast of Madagascar is at risk from desertification, having previously been a dryland environment [1].
 - Parts of Europe are at risk from desertification [1], including parts of Spain [1].
 Or any other suitable suggestion.

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12. Two from the following points:
- Deserts encroach into other landscapes [1]
 - Erosion of soil [1]
 - Loss of topsoil [1]
 - Expansion of sand dunes [1]
 - Loss of vegetation, particularly trees [1]
 - Sedimentation of rivers and lakes [1]
 - Loss / filling in of water bodies [1]
 - Increased salt concentration within soils [1]
 - Increasing frequency of sandstorms [1]
 - Emergence of salt crusts [1]
- Or any other suitable suggestion [1]

13. a) Balance - sediment gained [1]
 Sediment from tributaries - sediment gained [1]
 Deposition - sediment lost [1]
- b) $0.801 + 0.65 + 0.12 - 1.15$ [1]
 $= 0.421$ [1]
- c) Example answers:
- There is more sediment flowing into the river system in the more recent period [1] because of increased wind erosion [1] bringing in sediment from the desert [1].
 - There is less bank erosion in the more recent period [1]. This could be because of lower discharge [1] and is flowing at a lower velocity [1].
 - Sediment from tributaries has decreased [1], potentially because increased sedimentation in the tributaries [1] has caused the flow of these tributaries to decrease [1].
 - Deposition is greater in the more recent period [1]. This could occur because of lower discharge [1] meaning the river has less energy for transporting sediment [1].
- Or any other suitable suggestion.

Extension Question

14. 20 marks
- Up to 10 marks can be awarded for AO1 for knowledge of the issue.
 Up to 10 marks can be awarded for AO2 for assessment of the issue.

| AO1 | | |
|-------------------------|--|---|
| Level 1 (1–5 marks) | <ul style="list-style-type: none"> • The answer uses little geographic theory and information may be inaccurate or superficial. • No use of geographical terms. • Little evidence of comprehension. • No or restricted use of example material, where appropriate. | <ul style="list-style-type: none"> • Investigation and development of the issue is superficial. • Argument is biased or unstructured. • Little evidence of written and oral communication. |
| Level 2 (6–10 marks) | <ul style="list-style-type: none"> • Use of more complex theories may be inaccurate, but overall use of geographical information is correct. • Geographical terms used infrequently. • Comprehension is apparent but may be patchy. • Case study material is present where appropriate, but may be brief, biased or superficial. | <ul style="list-style-type: none"> • Investigation and development of the issue is structured. • Argument is structured and addresses the question. |

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| | A01 | |
|--------------------------|--|--|
| Level 3 (11–15 marks) | <ul style="list-style-type: none"> There are reliable references to geographical theories, and the answer is likely to be detailed and appropriate. Geographical terms used often. The answer demonstrates a good level of critical comprehension. Case study material is appropriate, specific and well linked to the argument, where applicable. | <ul style="list-style-type: none"> Investigation development. Argument is evidence, of conclusion question. |
| Level 4 (16–20 marks) | <ul style="list-style-type: none"> Geographical theories and processes are appropriately referred to, demonstrating comprehensive and specific knowledge. Frequent use of geographical terms. Critical comprehension is self-evident from the confident and appropriate use of geographical theory and information. Use of case study material is suitable, broad and thorough, where applicable. Specific facts and figures are fully integrated and support the overall argument. | <ul style="list-style-type: none"> Investigation development. Argument is evidence and balance of justified creative, so |

The student should discuss the processes associated with both water and wind, of erosion, transportation and deposition.

The student should discuss how important these processes are in shaping the landscape.

Answers may include some of the following points:

- Rainfall can prompt mass movement events such as rockfalls or rockslides.
- The presence of moisture plays a significant role in chemical weathering such as hydrolysis and oxidation. Both granular and block disintegration of rocks can be allowed to enter into rock pores.
- Rivers can play an important role in transporting sediments both into and out of the desert.
- Sheet flooding can be responsible for removing (eroding) huge volumes of sediment over a period of several days and heavy rainfall over a flat desert landscape.
- Channel flooding occurs as overland flow is channelled through a narrow gully. The powerful flow of water can play a huge role in eroding and transporting sediment.
- Previous geological periods of wetter climatic periods have shaped desert landscapes in the present day.
- Rivers can create distinctive depositional features, including alluvial fans, but they are not permanent.
- Water flows are responsible for erosional landform features such as pediments and pediment fans.
- Winds are particularly powerful in deserts as a lack of surface features means they can, therefore, gain significant speed.
- The two main processes of aeolian erosion are by deflation (removing dry, loose material from the surface) and abrasion (also known as sandblasting).
- Wind systems can play an important role in transporting sediments during storms. Sediments are transported through suspension, saltation and surface creep.
- In some cases wind is causing desert landscapes to extend outwards, as sediments are deposited by the wind, causing sand dunes to encroach on other landscapes.
- Wind erosion can create landforms such as ventifacts, yardangs, zeugen (incised rock surfaces), mushroom rocks and pillars).
- Wind erosion can also be responsible for creating deposition land forms such as sand dunes, barchans, etc.

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