



## GEO.KS32 Water Security: Rising Demand and Factors Affecting Supply

AQA 8035 • Calculators not allowed • about 30 minutes

Total Marks

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|  |
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Name: \_\_\_\_\_ Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**Answer ALL questions. Show all your working.**

- 1** Define the term 'water security' as it is used when discussing national or regional supplies of fresh water.

(Total for Question 1 is 1 mark)

- 2** Give one reason why global domestic water consumption has increased in recent decades.

(Total for Question 2 is 1 mark)

- 3** Give one way rising living standards can increase household water use in urban areas.

(Total for Question 3 is 1 mark)

- 4** Describe the pattern shown on this simple world map of water stress categories. Map key: Low stress, Medium stress, High stress, Extremely high stress. Regions: North Africa and the Middle East = Extremely high stress; Western Europe = Low stress; South Asia (northern India, Pakistan) = High stress; Western United States and parts of Australia = Medium to High stress.

(Total for Question 4 is 4 marks)

**5** Explain TWO ways that industrial growth increases national water demand.

(Total for Question 5 is 4 marks)

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**6** Suggest one reason why agriculture is the largest user of water in many countries.

(Total for Question 6 is 1 mark)

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**7** Explain TWO ways pollution of rivers and aquifers reduces the availability of usable fresh water for people and industry.

(Total for Question 7 is 4 marks)

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**8** Explain TWO ways limited infrastructure for storage and distribution can reduce the availability of water to households and farms.

(Total for Question 8 is 4 marks)

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**9** Suggest TWO geopolitical reasons why transboundary rivers can make water availability uncertain for countries downstream.

(Total for Question 9 is 4 marks)

# Mark scheme · GEO.KS32 Water Security: Rising Demand and Factors Affecting Supply

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## Question 1

- **B1** secure access to enough safe, reliable fresh water for people, agriculture and industry, oe
- **Answer: Secure access to enough safe, reliable fresh water for people, agriculture and industry.**

## Question 2

- **B1** population growth, oe
- **Answer: Population growth.**

## Question 3

- **B1** more appliances such as washing machines and dishwashers in homes, oe
- **Answer: More appliances such as washing machines and dishwashers in homes.**

## Question 4

- **B1** identify one broad pattern, e.g. arid regions such as North Africa and the Middle East show extremely high water stress, oe
- **B1** identify a contrasting area, e.g. Western Europe shows low water stress, oe
- **B1** identify another high stress region, e.g. South Asia (northern India and Pakistan) shows high stress, oe
- **B1** make a linked observation about distribution, e.g. water stress tends to be highest in arid climates and in densely populated agricultural regions, oe
- **Answer: Arid regions such as North Africa and the Middle East have extremely high water stress, while Western Europe has low stress. South Asia, especially northern India and Pakistan, shows high stress, and semi arid areas like western USA and parts of Australia have medium to high stress. Overall, stress is greatest in dry climates and in densely populated agricultural areas.**

## Question 5

- **B1** industrial processes require large volumes of water for cooling and manufacturing, oe
- **B1** linked detail for first way, e.g. power stations and factories withdraw water from rivers and aquifers for cooling and processing, raising total national extraction, oe
- **B1** industrial expansion increases water needed for cleaning, processing and waste dilution, oe
- **B1** linked detail for second way, e.g. growing industrial estates and supply chains mean continuous higher withdrawals and greater demand on treatment infrastructure, oe
- **Answer: Industrial processes need large volumes of water for cooling and manufacturing; power stations and factories withdraw water from rivers and aquifers, increasing national extraction. Industrial expansion also increases water needed for cleaning, processing and waste dilution; growing industrial estates create continuous higher withdrawals and greater demand on treatment infrastructure.**

## Question 6

- **B1** large areas of irrigated crops need water continuously, oe
- **Answer: Large areas of irrigated crops need water continuously.**

## Question 7

- **B1** pollution can contaminate water with chemicals or pathogens, making it unsafe for drinking and many industrial uses, oe
- **B1** linked detail for first way, e.g. contaminated water requires costly treatment or must be abandoned, effectively reducing the volume of available clean water, oe
- **B1** pollution can harm aquatic ecosystems and reduce natural purification, oe
- **B1** linked detail for second way, e.g. loss of wetland filtration or fish stocks can reduce ecosystem services that help maintain usable surface water supplies, oe
- **Answer: Pollution contaminates water with chemicals or pathogens, making it unsafe for drinking and many industrial uses; contaminated water needs costly treatment or must be abandoned, reducing available clean supplies. Pollution also harms aquatic ecosystems and reduces natural purification, so the ecosystem services that keep surface water**

### Question 8

- **B1** lack of storage, such as reservoirs, means water from wet periods cannot be saved for dry periods, oe
- **B1** linked detail for first way, e.g. seasonal rainfall then runs off and is not available during droughts, reducing supply reliability, oe
- **B1** poor distribution networks cause losses through leaks and prevent water reaching users, oe
- **B1** linked detail for second way, e.g. inefficient pipes and lack of treatment plants mean treated water does not reach homes or farms, so availability is effectively lower, oe
- **Answer: Without sufficient storage like reservoirs, water from wet periods cannot be saved for dry times, so supplies run short in droughts. Poor distribution networks leak and fail to deliver treated water to users, so even when water exists upstream it does not reach homes or farms reliably.**

### Question 9

- **B1** upstream countries may build dams or divert water for their own use, reducing flow to downstream neighbours, oe
- **B1** linked detail for first reason, e.g. without agreements upstream abstraction can suddenly reduce downstream availability for irrigation and domestic supply, oe
- **B1** downstream countries may have limited political power to influence upstream management, oe
- **B1** linked detail for second reason, e.g. weak treaties or conflict can prevent cooperative management of shared water resources, making availability uncertain, oe
- **Answer: Upstream countries may build dams or divert water for their own uses, which can reduce flow to downstream neighbours unless there are binding agreements; and downstream countries often lack the political power or effective treaties to influence upstream management, so weak cooperation or conflict can make water availability uncertain.**