

# Past-paper walk-through

Endocrine Disruptors ■ 8.3

eXercise

## Questions in this set

- 2021 Set 2 Q2

## Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

## Question 2

2021 Set 2 ■ Q2

Biodiversity around the world is changing as a result of anthropogenic influences. [World map titled “GLOBAL AMPHIBIAN SPECIES RICHNESS”, drawn in an oval (Robinson-style) projection with latitude lines labeled  $60^\circ$ ,  $30^\circ$ ,  $0^\circ$ ,  $30^\circ$ ,  $60^\circ$  (top to bottom) and longitude lines labeled  $180^\circ$ ,  $120^\circ$ ,  $60^\circ$ ,  $0^\circ$ ,  $60^\circ$ ,  $120^\circ$ ,  $180^\circ$  (left to right). A legend “Number of species” shows four shading categories: diagonal hatching = 0-20 species; light gray = 21-50 species; medium gray = 51-100 species; black = 101-136 species. The map shows the darkest shading (101-136 species, highest richness) concentrated in a band along the equator ( $0^\circ$ ) in South America (the Amazon basin) and a small patch in central Africa; medium-gray shading (51-100 species) in a broader band around the tropics in South America, Central America, sub-Saharan Africa, and parts of Southeast Asia/South Asia (e.g., India, Myanmar/Thailand region); lighter shading (21-50 species) in a band through central Africa and parts of South America;

## Question 2

and diagonal-hatch shading (0-20 species, lowest richness) at higher latitudes including North America, Europe, northern Asia/Russia, and most of Australia.]

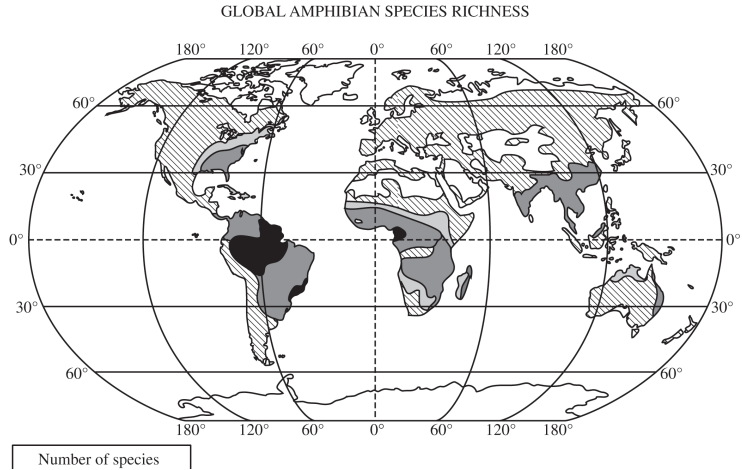
**(a)(i)** The map represents species richness of amphibians around the globe. Use the map to answer the following questions.

Identify the latitudinal range with the greatest amphibian species richness.

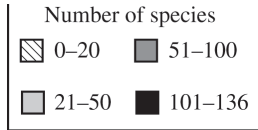
**(a)(ii)** Identify what biome this range most likely represents.

**(a)(iii)** Describe one reason amphibian species richness would tend to be highest in this region.

## Question 2



## Question 2



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**(b)** There are many environmental threats facing amphibians today, such as deforestation. Describe one possible anthropogenic reason for deforestation.

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**(c)(i)** Many factors influence biodiversity.

Explain how the species richness of an ecosystem influences its response to environmental stressors.

**(c)(ii)** Explain why amphibian biodiversity is declining globally, other than from deforestation.

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**(d)(i)** Currently, wildlife species are going extinct at an alarming rate. To combat this threat, governments around the world have enacted legislation and signed treaties to protect species threatened by extinction.

Identify one specific piece of legislation that has been designed to protect species threatened by extinction.

**(d)(ii)** Explain how the requirements of the legislation identified in part (d)(i) specifically protect species threatened by extinction.

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**(e)(i)** A town is considering selling an undeveloped parcel of land along its border for residential developments. The square parcel of land consists of approximately 30% wetland and 70% pasture. The wetland runs through the middle of the property for its entire width and is home to three native frog species.

Propose a viable solution that will result in the protection of the native frog species while still allowing for maximum profit of the property development.

**(e)(ii)** Justify the solution proposed in (e)(i) by describing a potential advantage of the plan, other than frog protection.

## Solution 2

(a)(i)

### Mark scheme

- The greatest amphibian species richness occurs in the latitudinal range between the Tropic of Cancer and the Tropic of Capricorn (equivalently, roughly 30 degrees N to 30 degrees S, or more narrowly about 10 degrees N to 15 degrees S).

(a)(ii)

### Mark scheme

- This latitudinal range most likely represents the tropical rainforest biome.



## Solution 2

**(a)(iii)**

### Mark scheme

- Amphibian species richness tends to be highest here because year-round rainfall and warm temperatures are the preferred conditions for amphibians, and greater biodiversity/higher net primary productivity (NPP) provides more habitat, food sources, and niches.

## Solution 2

(b)

### Mark scheme

- A possible anthropogenic reason for deforestation is human demand for agriculture, housing, firewood, or other forest products (e.g., medicine, food, lumber).

## Solution 2

(c)(i)

### Mark scheme

- An ecosystem with greater species richness/diversity is more resilient/resistant to environmental stressors, because even if some species are harmed, other species will survive and help restore/stabilize the ecosystem.

## Solution 2

### (c)(ii) Mark scheme

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- Amphibian biodiversity is declining globally (aside from deforestation) for reasons such as: increasing water pollution (pharmaceutical pollution harming reproduction, pesticide pollution absorbed through the skin being toxic, endocrine disruptors such as atrazine altering reproductive development); pesticide use reducing insect food sources; microclimatic changes from global climate change (warmer/drier conditions, loss of wetlands) reducing available habitat; illegal amphibian trafficking removing individuals from populations; introduced invasive species competing for niche space; habitat fragmentation limiting range and access to resources; or fungal infections such as chytridiomycosis causing skin to dry out so amphibians cannot breathe. Any one such reason earns the point.

## Solution 2

**(d)(i)**

### Mark scheme

- One specific piece of legislation designed to protect species threatened by extinction: the Endangered Species Act (ESA), the Convention on International Trade in Endangered Species (CITES), or the Lacey Act.

## Solution 2

### (d)(ii) Mark scheme

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- Explanation depends on the legislation named in (d)(i). ESA: lists endangered/threatened plant and animal species and prevents them from being killed or harmed; designates/protects critical habitat to promote survival and recovery; creates plans to restore populations to healthy sizes; identifies species as threatened before they become endangered. CITES: a global agreement that protects endangered/threatened plants and animals (including goods such as ivory, shark fins, or rhinoceros' horns) by banning/regulating their trade. Lacey Act: prohibits the trade of wildlife, fish, and plants that have been illegally taken, possessed, transported, or sold.

## Solution 2

(e)(i)

### Mark scheme

- A viable solution: move/transplant the frog populations to an adjacent undeveloped area before development; designate a portion of the wetland as a park/preserve; build wildlife corridors (land or bridges) across a portion of the wetland; restrict development within a minimum setback away from the wetland; or group/cluster the buildings together (build up, not out) to leave the wetland undisturbed.

## Solution 2

### (e)(ii) Mark scheme

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- Justification depends on the solution proposed in (e)(i). Move/transplant frogs: only a one-time disruption during removal rather than continued disruption (e.g., population growth, fertilizer/pesticide use), and the developer gets the maximum amount of usable land. Park/preserve: more food and space availability increases wildlife survival rates; a nearby park/preserve is an educational/environmental draw that may let the developer charge higher rents; the wetland has aesthetic value for residents; and the preserved wetland helps prevent flooding. Wildlife corridors: other species are less affected by habitat fragmentation and can keep moving for food, shelter, and reproduction. Setback: creates a buffer zone that filters runoff into the wetland and adds resident privacy. Clustered/grouped



## Solution 2

development: species are less affected by multiple habitat fragments because the apartments are developed in groups while wetlands are preserved.