

Markscheme

May 2026

Environmental systems and societies

Standard level

Paper 1

© International Baccalaureate Organization 2026

All rights reserved. No part of this product may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without the prior written permission from the IB. Additionally, the license tied with this product prohibits use of any selected files or extracts from this product. Use by third parties, including but not limited to publishers, private teachers, tutoring or study services, preparatory schools, vendors operating curriculum mapping services or teacher resource digital platforms and app developers, whether fee-covered or not, is prohibited and is a criminal offense.

More information on how to request written permission in the form of a license can be obtained from <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

© Organisation du Baccalauréat International 2026

Tous droits réservés. Aucune partie de ce produit ne peut être reproduite sous quelque forme ni par quelque moyen que ce soit, électronique ou mécanique, y compris des systèmes de stockage et de récupération d'informations, sans l'autorisation écrite préalable de l'IB. De plus, la licence associée à ce produit interdit toute utilisation de tout fichier ou extrait sélectionné dans ce produit. L'utilisation par des tiers, y compris, sans toutefois s'y limiter, des éditeurs, des professeurs particuliers, des services de tutorat ou d'aide aux études, des établissements de préparation à l'enseignement supérieur, des fournisseurs de services de planification des programmes d'études, des gestionnaires de plateformes pédagogiques en ligne, et des développeurs d'applications, moyennant paiement ou non, est interdite et constitue une infraction pénale.

Pour plus d'informations sur la procédure à suivre pour obtenir une autorisation écrite sous la forme d'une licence, rendez-vous à l'adresse <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

© Organización del Bachillerato Internacional, 2026

Todos los derechos reservados. No se podrá reproducir ninguna parte de este producto de ninguna forma ni por ningún medio electrónico o mecánico, incluidos los sistemas de almacenamiento y recuperación de información, sin la previa autorización por escrito del IB. Además, la licencia vinculada a este producto prohíbe el uso de todo archivo o fragmento seleccionado de este producto. El uso por parte de terceros —lo que incluye, a título enunciativo, editoriales, profesores particulares, servicios de apoyo académico o ayuda para el estudio, colegios preparatorios, desarrolladores de aplicaciones y entidades que presten servicios de planificación curricular u ofrezcan recursos para docentes mediante plataformas digitales—, ya sea incluido en tasas o no, está prohibido y constituye un delito.

En este enlace encontrará más información sobre cómo solicitar una autorización por escrito en forma de licencia: <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

Subject details: Environmental systems and societies SLP1

Markscheme

Mark allocation

Candidates are required to answer:

- **ALL** questions
- The maximum total = **[35]**.

1. Environmental systems and societies uses marking points and markbands to determine the achievement of candidates

When using marking points:

- i. A markscheme often has more marking points than the total allows. This is intentional
- ii. Each marking point has a separate line and the end is shown by means of a semi-colon (;)
- iii. Where a mark is awarded, a tick/check (✓) **must** be placed in the text at the **precise point** where it becomes clear that the candidate deserves the mark. **One tick to be shown for each mark awarded**
- iv. The order of marking points does not have to be as in the markscheme, unless stated otherwise.

When using markbands (Only for Paper 2 Section B, part (c) questions):

- i. Read the response and determine which band the response fits into
- ii. Then re-read the response to determine where the response fits within the band
- iii. Annotate the response to indicate your reasoning behind the awarding of the mark
Do not use ticks at this point
- iv. Decide on a mark for the response
- v. At the end of the response place the required number of ticks to enable RM Assessor to input the correct number of marks for the response.

2. An alternative answer or wording is indicated in the markscheme by a slash (/). Either wording can be accepted.
3. Words in brackets () in the markscheme are not necessary to gain the mark.
4. Words that are underlined are essential for the mark.
5. If the candidate's answer has the same "meaning" or can be clearly interpreted as being of equivalent significance, detail and validity as that in the markscheme then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect).

6. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
7. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forward) on the script.
8. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the markscheme.

1. With reference to **Figure 1(d)**, state the range of the monthly average temperatures throughout the year in Mauritius. [1]

22.68 to 27.35 (°C);

Note to examiner: Do not accept 4.67 (°C)

2. (a) With reference to **Figure 2(a)**, state **one** possible reason why the dodo became extinct by 1690 in Mauritius. [1]

- a. Habitat destruction/degradation/loss;
- b. Hunted by humans;
- c. Eaten/killed by alien/invasive species (e.g. dogs/cats/rats/pigs/macques);
- d. Disease;
- e. Competition for resources;
- f. Unable to escape humans/ introduced predators because of flightlessness;
- g. Lack of conservation efforts/ educational campaigns in 1690' or 'no/ little establishment of national parks in 1690;

Note to examiner: List principle applies: where multiple responses are given, mark only the first response provided by the candidate.

- (b) With reference to **Figure 2(b)**, calculate (to **two** decimal places) the percentage of flowering plant species that have become extinct in Mauritius. [1]

$61 / 691 \times 100 = 8.83 (\%)$;

- (c) Describe the relationship between population numbers and native forest cover as illustrated in **Figure 2(c)**. [1]

- a. As population increases, forest cover decreases;
- b. Inverse/indirect/negative relationship/ correlation;

Note to examiner: Do not accept indirectly/ inversely proportional.

- (d) Outline **one** way in which deforestation alters the way that carbon is stored in the ecosystem. [1]

- a. Removal of tree/leaf litter/roots reduces amount of carbon stored in biomass/soils;
- b. As forests are removed/destroyed, carbon in biomass enters atmosphere (as CO₂) / less carbon will be removed from atmosphere by plants;
- c. Removal/destruction of roots may result in soil erosion, with loss of carbon stored in soil;
- d. Greater exposure of soil (higher temperature and oxygen levels) can accelerate decomposition, releasing more CO₂ into atmosphere;

Note to examiner: Answer must refer to carbon and state where carbon is stored in the ecosystem.

List principle applies: where multiple responses are given, mark only the first response provided by the candidate.

3. (a) Identify **one** reason why it is difficult to determine the exact population of the Mauritius kestrel. [1]

- a. Hard to find/spot/identify/capture because they hide/fly away/nest;
- b. Are in areas difficult to reach/access;
- c. Population is highly dispersed/difficult to cover wide area;
- d. Method of counting can be difficult (e.g. loss of tags)/ often only an estimate;
- e. Movement within island makes it difficult to count;
- f. Identification of species could be difficult if other species look similar;
- g. Needs expertise to identify/trap;

Note to examiner: List principle applies: where multiple responses are given, mark only the first response provided by the candidate

- (b) Describe how the Lincoln index could be used to estimate the number of Mauritius kestrels. [2]

- a. Capture, mark, release and recapture / mark recapture techniques can be used to sample populations;
- b. Method of capture e.g. nets/traps baited with carrion;
- c. Method of marking doesn't affect survival (e.g. with appropriate tags/plastic rings on legs);
- d. Appropriate time interval between release and recapture to mix;

- (c) With reference to **Figures 3(b)** and **3(c)**, evaluate the programme used to conserve the Mauritius kestrel.

[4]

Pros [3 max]:

- a. Numbers/ population has increased (since 1974/ from 4 to 350–500);
- b. Programme prevented extinction;
- c. Use of targeted conservation methods (e.g. predator control, nest boxes, hand-rearing, supplementary feeding) improved survival;
- d. Monitoring breeding activity allowed the tracking of population recovery/targeted intervention;
- e. Removal of predator/invasive species that threaten Kestrel also benefits other native/indigenous species;
- f. Programme can be used to educate the public about the importance of conservation;
- g. Cultural value of preserving national bird;
- h. Preys on animals that are pests to farmers/detrimental to (human) health;
- i. Success of conservation programme motivates society/scientists for further conservation projects;
- j. Economic value of increased ecotourist due to programme/see birds;
- k. much wider geographic range currently compared to the fragmented historic range;

Cons [3 max]:

- l. Ongoing programme is expensive/ requires ongoing management, monitoring and funding;
- m. Numbers fell by 2018 again suggesting threats have not been removed;
- n. Species remains endangered;
- o. Hand-reared birds may have difficulty in adapting/surviving when released into the wild;
- p. Have not addressed loss of habitat/reduction in species;
- q. DDT is not biodegradable and will remain in the environment for a long time posing a long-term threat;
- r. Invasive species (cats, mongoose, macaques) remain a threat/ invasive species threat has not been addressed;
- s. Kestrel may prey on other endangered species/make other species endangered / negative impact on food web;
- t. A small population can contain very little genetic diversity, so the species is at a disadvantage when conditions change;

Conclusion: 1 max

4. (a) With reference to **Figure 4(a)**, calculate the natural increase rate of the population of Mauritius. [1]
- a. a. ($\text{NIR} = \text{CBR} - \text{CDR} / 10 = (9.8 - 9.0) / 10 =$) 0.08 (%);
 b. b. 0.8 per 1000;

Note to examiner: Working out is not required for the mark. Do not accept only “0.8”.

- (b) Explain the possible reasons for the shape of the population pyramid in **Figure 4(b)**. [3]

Narrow base (smaller younger age groups):

Decreasing birth rate/low birthrate due to:

- a. increased level of women's education;
- b. emancipation/empowerment of women / greater economic independence;
- c. increased cost of raising children / urbanization;
- d. reduced need for child labour (e.g. mechanisation of agriculture);
- e. spread of family planning / contraception;
- f. reduced child mortality → fewer births required;
- g. government policies to reduce birth rates / anti-natalist measures;

Narrow base (smaller younger age groups/ population shrinking due to):

- h. Possible outward migration of younger working-age adults;

Relatively wider middle age groups:

- i. Previously higher birth rates compared to current rates → ageing cohorts moving through population;

Wider upper age groups (ageing population):

- j. Increased life expectancy due to improved healthcare/living conditions;

Greater proportion of females in older age groups:

- k. Women tend to outlive men, so the pyramid is ‘heavier’ for females over 70 years of age;

5. (a) With reference to **Figure 5(a)** and **Figure 5(b)**, outline **two** possible impacts of growing sugar on local rivers systems. [2]
- a. Run-off of fertilizers/nutrients can cause eutrophication;
 - b. Pesticides/herbicides -run off can be toxic to aquatic organisms;
 - c. Run-off containing sediments/suspended solids can reduces water clarity reducing plant productivity/photosynthesis;
 - d. Run-off containing sediments/suspended solids can smothers benthic organisms;
 - e. Water extraction can reduce water levels of river impacting aquatic ecosystem;
 - f. Oil spill from farming machinery can run off into river water, killing aquatic organisms;

- (b) Describe **one** way in which the growing of sugarcane could contribute to soil degradation. [1]

- a. Intensive growing/monoculture of sugarcane causes nutrient depletion;
- b. Cropping process/use of machinery causes soil erosion (loss of soil)/soil compaction/reduced porosity/infiltration;
- c. Use of pesticides causing loss of soil biota involved with nutrient cycles;
- d. Excessive irrigation/use of water causing soil erosion/nutrient loss/leeching within run-off;
- e. Can cause salinization due to over irrigation/use of water with high salt content/use of fertilisers with inorganic salts;
- f. Removal of vegetation for sugar cane farming may increase soil erosion;

Note to examiner: List principle applies: where multiple responses are given, mark only the first response provided by the candidate.

- (c) State how soil degradation from growing sugarcane could be reduced. [1]

- a. Avoid soil tillage;
- b. Leaving soil cover, e.g. crop residue;
- c. Use of mulch/ compost/ organic matter;
- d. Use of cover crops;
- e. Terracing;
- f. Contour ploughing
- g. Use of hedges/plant barriers /Agroforestry / planting trees (to prevent erosion);
- h. Drip irrigation/irrigating (at a rate which reduces any run-off);
- i. Use of organic fertilisers (instead of inorganic fertilisers that leave salt residues);
- j. Biological pest control (to reduce use of pesticides);
- k. Interplanting legumes/use of GM organisms (increases nutrient content);
- l. Alternate growing of sugar cane with other crops/ crop rotation;

Note to examiner: Do not credit answers focused only on water management or pest control unless clearly linked to soil quality.

6. (a) With reference to **Figure 6(c)**, outline **one** possible reason for the change in the production of fish in Mauritius between 2010 and 2021. [1]

- a. Increased demand for fish due to growth in population/increased tourist numbers/ change to healthier diet/dietary preference;
- b. Increase in affluence allowing more people (in other countries) to afford to buy/import fish/fish products;
- c. Advancement in fishing equipment/techniques/technology (e.g. nets/sonar);
- d. Government subsidies to encourage growth of fishing/aquaculture;
- e. Government policies to limit/ban fishing from 2019;
- f. Fish production fell slightly after 2019, due to overfishing/depletion of fish stocks/disruption caused by COVID-19;

Note to examiner: List principle applies: where multiple responses are given, mark only the first response provided by the candidate.

Allow a range of plausible explanations but require a clear causal link to fish production.

(b) Explain how fishing around the coast of Mauritius could be managed sustainably. [3]

- a. Fishing below the maximum sustainable yield (MSY) to prevent depletion of fish stocks;
- b. Use of seasonal permits/closures to limit over exploitation of fish stocks/to allow breeding and stock recovery;
- c. Use of fishing quotas/licensing/ban/legislation/policy to limit over exploitation of fish stocks/to reduce pressure on stocks;
- d. Use of mesh net sizes that allows juvenile/young fish to escape/ fish below a certain size cannot be legally caught;
- e. Establishing no take zones/marine protected areas that act as fish nursery/spawning grounds;
- f. Ban destructive fishing methods (e.g. trawling, explosives) to protect habitats and ecosystems/non target fish;
- g. Avoid inappropriate discard/loss of fishing gear leading to ghost fishing to prevent unintended ongoing catches;
- h. Monitoring and enforcement to ensure regulations are followed;

Note to examiner: Award [1] per valid strategy with a clear explanation of how it contributes to sustainability (max [3]).

7. (a) With reference to **Figure 7(a)**, outline **one** advantage and **one** disadvantage of solar energy as a renewable source of energy. [2]

Advantage (1 max)	a. Sustainable source of energy/infinite; b. Reduces production of GHG/lowers carbon footprint; c. Efficiency of solar panels is improving; d. No toxic emissions into air; e. Reduces reliance on fossil fuels;
Disadvantage (1 max)	f. High construction costs/ expensive to install/implement; g. Difficulty in recycling at end of life; h. Weather dependent; i. Batteries for storage of excess energy produced are expensive; j. Large land areas may be needed for solar farms;

Note to examiner: Award [1] for one valid advantage and [1] for one valid disadvantage. Maximum [1] if both points are advantages or both are disadvantages.

- (b) Suggest **one** way in which the energy efficiency target stated in **Figure 7(b)** could be met.

[1]

- a. Grants to help pay for set-up of renewable sources e.g. solar panels;
- b. Increase tax on non-renewable energy sources;
- c. Government investment in infrastructure;
- d. Set and enforce energy efficiency standards (e.g. appliances, buildings);
- e. Provide incentives/subsidies for energy-efficient technologies/renewable energy;

Note to examiner: List principle applies: where multiple responses are given, mark only the first response provided by the candidate.

8. Outline why the ecological footprint for Mauritius has changed over time, as shown in **Figure 8(b)**.

[2]

Increase in footprint since about 1973 due to:

- a. Increase in population leading to greater resources being used;
- b. Increase in affluence/wealth/living standards leading to greater consumption and use of resources;
- c. Increase in population leading to increase in waste being generated;
- d. Increase in affluence/wealth/change in culture leading to more waste being generated;
- e. Increase in importing goods/food that generates waste (into the environment);

Decrease in footprint since about 2019, due to:

- f. Reduction in economic activity and tourist numbers through COVID-19 pandemic;
- g. Expansion of government sustainability and energy saving measures;
- h. Decrease in CO₂ due to change in energy source to renewable (2017-2021);

9. Using the information in the resource booklet, discuss whether Mauritius's commitment to sustainability is effective.

[6]

Pros [4 max]:

- a. Renewable energy road map – plans to reduce use of coal by 2030 / increased use of renewable energy to 60 % by 2030 / improve energy efficiency by 10 %;
- b. Growth in use of renewable energy (wind, solar) since 2000/2013;
- c. CO₂ emissions in electricity sector are falling (since 2017); Recently CO₂ emissions have been falling;
- d. Moving towards a blue economy which is sustainable use of the ocean;
- e. Sugar mills have diversified to include electricity generation and ethanol production;
- f. Reduction in the birth rate/death rate;
- g. National parks have been set up to maintain biodiversity;
- h. Conservation programmes prevented extinction of the Mauritius kestrel/ population increased (from 4 individuals in 1974 to 350-500 in the 1990s);
- i. Removal of invasive species in conservation areas to help conserve biodiversity;
- j. Education campaigns for locals on importance of biodiversity conservation/conservation efforts involved local communities;
- k. Low population growth / low fertility rate reducing future resource pressure;
- l. Ecological Footprint has lowered since 2017;

Cons [4 max]:

- m. Ecological footprint has increased and exceeds biocapacity (ecological deficit);
- n. Native forest cover reduced (to <2%), indicating long-term environmental degradation/habitat loss/biodiversity/loss of carbon sink;
- o. Increase in CO₂ production from transport sector;
- p. Increase in CO₂ production from electricity and heat sector;
- q. Continued reliance on fossil fuels (coal and oil dominate energy production);
- r. Tourism pressure increasing, rising tourist arrivals may strain resources and ecosystems
- s. Increase in fish production could lead to depletion of stocks;
- t. High number of extinct species/endemic species still under threat;
- u. Soil degradation from intensive farming of sugarcane;
- v. Water-intensive agriculture (sugarcane), adds pressure on freshwater resources;
- w. Dependence on imported food (low self-sufficiency);

Conclusion [1 max]

A clear overall judgement on effectiveness (e.g. partially effective, limited effectiveness)
Must be supported by evidence presented.

e.g. Mauritius shows commitment through renewable energy targets, conservation efforts, and development of a blue economy. However, increasing ecological footprint, rising emissions, and continued reliance on fossil fuels suggest sustainability is not yet fully effective. Overall, there is progress, but significant challenges remain.
