



MARKSCHEME

May 2008

ECOSYSTEMS AND SOCIETIES

Standard Level

Paper 1

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General Marking Instructions

Subject Details: Ecosystems and Societies SLP1 Markscheme

General

A markscheme often has more specific points worthy of a mark than the total allows. This is intentional. Do not award more than the maximum marks allowed for part of a question.

When deciding upon alternative answers by candidates to those given in the markscheme, consider the following points:

- Each marking point has a separate line and the end is signified by means of a semicolon (;).
- An alternative answer or wording is indicated in the markscheme by a “/” either wording can be accepted.
- Words in (...) in the markscheme are not necessary to gain the mark.
- ♦ Words that are underlined are essential for the mark.
- The order of points does not have to be as written (unless stated otherwise).
- If the candidate’s answer has the same meaning or can be clearly interpreted as being the same as that in the mark scheme, then award the mark.
- Mark positively. Give candidates credit for what they have achieved, and for what they have got correct, rather than penalising them for what they have got wrong.
- Effective communication is more important than grammatical accuracy.
- Occasionally, a part of a question may require a calculation whose answer is required for subsequent parts. If an error is made in the first part then it should be penalized. However, if the incorrect answer is used correctly in subsequent parts then **follow through** marks should be awarded.
- Units should always be given where appropriate. Omission of units should only be penalized once. Ignore this, if marks for units are already specified in the markscheme.
- Do not penalize candidates for errors in significant figures, unless it is specifically referred to in the markscheme.

1. (a) accept answers between 10 and 14 billion; [1]
 - (b) exponential;
rate of population increase increases over time; [1 max]
Accept responses with a step by step description that demonstrates that the rate of increase is increasing.
 - (c) more intense production;
input of technology *e.g.* GM crops to increase yields / farm machinery;
bringing new land under production *e.g.* through irrigation / hydroponics;
additional fertilizers to increase yield;
more efficient transport (as less food decays);
better storage (as less food decays); [2 max]
*Accept any other reasonable responses, but only if they lead to an increase in yield.
Do not accept suggestions to limit food consumption as the question is about meeting increases in demand.*
 - (d) traditions *e.g.* for large family sizes;
religious resistance to contraception *e.g.* Catholic countries;
pressure for sons *e.g.* in farming countries causes increased birth rate to secure a son;
remote areas with no access to information/contraceptives;
lack of education;
few alternatives for women;
economic costs of funding family planning/medical improvements;
value of large populations for economic growth; [2 max]
2. (a) positive feedback because the effects of the problem make the problem worse; [1]
Award [0] if no reason is given for positive feedback.
 - (b) traditionally defined as development which meets the needs of the current generation without compromising ability of future generations to meet their own needs; but in this context it suggests development which has a positive role in enhancing the environment;
and is dependent in some way on a healthy population; [2 max]
*Accept any other reasonable responses.
Award [1 max] if no reference is made implicitly or explicitly to figure 2.*
 - (c) simple, easy to see the connections;
shows clearly how actions in one area can have a knock on effect on the original development;
can distinguish between positive and negative actions and consequences;
but far too simple, detail of what constitutes sustainable as opposed to inappropriate development is not clear;
exact natures of the causal relationships are not explained; [2 max]
Award [1] for a strength and [1] for a weakness.

3. (a) (i) 400 000 (tonnes) / 4×10^5 ; [1]
- (ii) Allow [2] for explanation in which increase in waste is implicit.
total amount of waste produced has increased;
but a larger proportion is now recycled;
explanation:
as demand for goods increases people consume more;
economic/industrial growth so more waste produced;
increase in packaging over time;
some products cannot be recycled so will still have to be sent to landfill;
new landfill sites may have been opened so little incentive to reduce waste;
increase in population has led to more consumption;
some people simply do not bother to recycle; [2 max]
- (b) (i) Award [1] for **two** of the following.
recyclable packaging (e.g. cartons / recycling bins / devices);
transporting waste to other countries;
incineration technology;
use of computers/IT to reduce paper storage;
manufacturing goods which can be recycled; [1 max]
Accept other reasonable responses.
- (ii) collecting recycling still uses petrol/energy;
waste is sent elsewhere but still contributes to global economic footprint;
incineration produces atmospheric pollutants; [2 max]
Negative environmental effects should relate to response given in (b)(i).
Award [1 max] if not.

4. (a) trophic level 3 / tertiary trophic level / secondary consumer / carnivore; [1]
- (b) amount of leaves/algae in the stream could increase as no longer consumed;
with knock-on effect on abiotic conditions/impact on species in the food web as visibility is reduced;
less food for fish so they may eat other things, knock-on effect on other prey species;
decline in numbers of bats/spiders/birds/frogs that depend on invertebrates (emergent phase) as food source; [2 max]
- (c) *named factor: e.g. pollution of a fresh water ecosystem*
method:
kick sampling and nets to measure numbers of invertebrates in stream;
compare with previous/baseline studies;
refer to biotic indicator keys and evaluate state of river from invertebrates present
e.g. biotic indices; [3 max]
Accept any other reasonable responses.
Award [0] if no named factor.
- (d) habitat for prey species;
contribute leaves as food for invertebrates;
acts as protection against erosion;
important for photosynthesis;
may shade stream, thus control temperature;
contributes nutrients to the water/soil; [2 max]
- (e) succession;
trampling;
erosion;
evolution; [1 max]

5. (a) nitrogen oxides/carbon dioxide from power station as fossil fuels are burned;
greenhouse gases emitted in transportation and distribution as exhaust fumes;
methane from ruminants (not shown on diagram);
emission of gases as food is processed/packaged; [2 max]
Award [1 max] for general responses in which specific gases are not identified.
- (b) a pollutant is any substance/agent (such as heat) added to the environment by
human activity, at a rate greater than that at which it can be rendered harmless by
the environment / and which has a negative effect on the organisms within it;
whereas organic wastes can be treated and recycled back into the system in a
positive way; [2]
*Award [1 max] if the response has identified that pollutants are harmful to the
environment but organic wastes do not need to be. Award [1 max] if no distinction
is made between the terms.*
- (c) arable more energy efficient than the livestock, as energy will have been lost
along the food chain due to respiration and excretion / 10% rule / second law of
thermodynamics;
livestock more processing required and therefore more energy; [1 max]
- (d) MEDC because fertilizers and pesticides are factory produced;
product processing and packaging is on a grander scale in MEDCs;
complex system;
sewage treatment; [2 max]
Award [0] if MEDC stated with no reason.
- (e) fossil fuel resources are still economically cheaper to exploit;
the technology to harness renewable sources not available on a large scale;
inertia/culture/tradition means that non-renewable resources are favoured;
renewable resources are not able to meet current demand;
locations for renewable energy sources are limited by available sites/politics; [2 max]
- (f) when fossil fuels are burned nitrogen oxide is released;
it reacts with oxygen to form nitrogen dioxide;
nitrogen dioxide absorbs sunlight and breaks up to release oxygen atoms that
combine with oxygen in the air to form ozone; [3]
Award [0] if specific gases are not named.

6. (a) stops organic residues entering streams and causing pollution/eutrophication; [1]
- (b) (i) reducing lawn size – lawns are restricted to grass species and succession cannot occur as they are cut regularly;
allowing plants and trees to grow alongside streams will increase the range of habitats for insect/bird species;
more food/nutrients provided for species; [2]
Accept any other reasonable responses.
Award [0] if no reason given.
- (ii) provides greater stability;
more niches so more alternative food sources within the food web should anything happen to an individual species;
greater genetic diversity so better able to withstand diseases/change;
aesthetic / potential economic value of greater diversity; [2 max]
- (c) removing grass cuttings takes nutrients away from the soil, so there will be a net loss of nutrients;
natural fertilizers less likely to contain harmful toxins which may build up in species (biomagnification);
cheaper;
a way of reducing overall waste/resources/energy used;
a more sustainable strategy;
less likely to cause eutrophication than artificial fertilizers;
artificial fertilizers lead to release of greenhouse gases as they are produced;
natural fertilizers may contribute positively to soil structure; [2 max]
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