

Name: _____

Date: _____

Class: _____

IB ESS

1.4 Sustainability

Significant Ideas:

All systems can be viewed through the lens of sustainability.

Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.

Environmental indicators and ecological footprints can be used to assess sustainability.

Environmental Impact Assessments (EIAs) play an important role in sustainable development.



Sustainability and Natural Capital

1. Define "sustainability".

2. List the ways in which a nation might measure sustainability.

3. State at least one advantage of measuring sustainability...

...on a local scale:

...on a global scale:

4. Define "natural capital".

5. For the country you live in (or you could choose the country you're from if it's different to the country you currently live in), list as many items of natural capital as you can think of that are provided by the ecosystem.



Sustainability vs Natural Capital vs Natural Income

1. Define "natural income".

2. Using examples, distinguish between natural income of goods and natural income of services.

3. Explain how unsustainable land use might affect natural income for the current and future generations.

Hints:

- Think about the benefits of unsustainable land use (there are some, at least in the short-term) as well as the drawbacks.
- Consider the various goods as well as services that land can provide, and the different people that benefit.
- Provide a balanced argument: should future generations be prioritized over the current generation? How might a technocentric person's opinion differ from an ecocentric person's opinion?



Lined writing area for student responses.



The Millennium Ecosystem Assessment

- The MEA is very extensive and a lot of information has been published. To explore this research, a good place to start is the "Ecosystems and Human Wellbeing: Synthesis", available here:
<http://www.millenniumassessment.org/documents/document.356.aspx.pdf>.
- The research has also been summarised in a more accessible format at this website:
<http://www.greenfacts.org/en/ecosystems/index.htm>

1. Summarise the purpose of the Millennium Ecosystem Assessment.

2. Summarise the key findings of the MEA with regards to:

a) The percentage of ecosystems worldwide that are currently being degraded.

b) Fish stock exploitation

c) Surface freshwater use

c) Mangroves

Use the "Ecosystems and Human Wellbeing: Synthesis" document to get information to answer question 3, 4 and 5.

3. Regarding biomes (see page 4)

a) Which three biomes had the most area converted by 1950?

b) Which three biomes had the most area converted between 1950 and 1990?

c) What is the main cause for biome conversion?



4. Regarding extinction rates (see page 5):

a) What is the current situation on global animal extinction rates?

b) How is this expected to change in the future?

5. The report states (Page 6) that "*The degradation of ecosystem services often causes significant harm to human well-being.*"

a) Figure 8 on page 9 will help answer the following:

i) State the natural income of goods a forest can provide.

ii) State the natural income of services a forest can provide.

b) In what way(s) might a forest ecosystem's services become "degraded"?

c) Using forests as an example, explain how the use of natural capital for "marketed benefits" may be less economically sustainable than use for "non-marketed benefits".



Environmental Impact Assessments

1. Outline the purpose of an Environmental Impact Assessment.

2. Using the table, briefly outline the stages of creating an EIA.

Stage	Details
Screening	<hr/> <hr/> <hr/>
Scoping	<hr/> <hr/> <hr/>
Baseline study	<hr/> <hr/> <hr/>
Impact prediction	<hr/> <hr/> <hr/>
Mitigation	<hr/> <hr/> <hr/>
Monitoring/ Assessment	<hr/> <hr/> <hr/>

3. Outline the reasons for creating a non-technical summary of an EIA.



4. Summarise *at least* four criticisms of EIAs.



Ecological Footprints

1. Outline what is meant by the term "ecological footprint".

2. Outline how the following factors relate to the ecological footprint of a country.

The first one has been done for you.

Factor	Details
Cropland	The amount of land required to provide food for human consumption (including food, animal feed, and other products taken from crops).
Grazing land	<hr/> <hr/> <hr/>
Carbon sequestration	<hr/> <hr/> <hr/>
Forests	<hr/> <hr/> <hr/>
Built-up land	<hr/> <hr/> <hr/>
Fisheries	<hr/> <hr/> <hr/>



An ecological footprint is often expressed as an area of land: if the size of a nation's ecological footprint is larger than their actual land mass, then they are living beyond their means and this is not sustainable.

3. Explain the link between EF and sustainability.

Another convenient way to think about an EF is "number of Earths". For example, how many Earths would we need if everybody on the planet lived your lifestyle?

4. Using the "number of Earths" method, make a sensible estimate of your ecological footprint. **Justify** the answer you give.



5. Do some online research: find the ecological footprint of the country you live in, and compare it to the ecological footprint of one other country, and **explain** the differences. You may find data to explain the differences and/or you may use your own knowledge about lifestyle differences between the two countries.

***http://data.footprintnetwork.org** is a useful resource for this.*

