**Understandings, Applications and Skills** (This is what you maybe assessed on)

**Significant ideas**

* The impact of losing biodiversity drives conservation efforts.
* The variety of arguments given for the conservation of biodiversity will depend on EVSs.
* There are various approaches to the conservation of biodiversity, each with associated strengths and limitations

**Big Questions:**

* To what extent have the solutions emerging from this topic been directed at preventing environmental impacts, limiting the extent of the environmental impacts, or restoring systems in which environmental impacts have already occurred?
* What value systems can you identify at play in the causes and approaches to resolving the issues addressed in this topic?
* How does your own value system compare with others you have encountered in the context of issues raised in this topic?
* In what ways might the solutions explored in this topic alter your predictions for the state of human societies and the biosphere some decades from now?
* How do different conservation measures (e.g. in situ and ex situ) prevent environmental impacts, limit the extent of the environmental impacts, or restore systems in which environmental impacts have already occurred?
* How would a technocentric view of biodiversity differ from an ecocentric one? Ho do different EVSs affect approaches to conservation>?
* If you are from a MEDC, how would your EVS differ from that of someone from a LEDC, or from someone who relies on the preservation of natural ecosystems for survival?
* Do you think that the conservation measures being taken today will be sufficient of preserve the Earth's biodiversity for the future?

|  |  |  |
| --- | --- | --- |
|  | **Statement** | **Guidance** |
| 3.4.U1 | Arguments about species and habitat preservation can be based on aesthetic, ecological, economic, ethical and social justifications. |  |
| 3.4.U2 | International, governmental and non-governmental organizations (NGOs) are involved in conserving and restoring ecosystems and biodiversity, with varying levels of effectiveness due to their use of media, speed of response, diplomatic constraints, financial resources and political influence. |  |
| 3.4.U3 | Recent international conventions on biodiversity work to create collaboration between nations for biodiversity conservation. |  |
| 3.4.U4 | Conservation approaches include habitat conservation, species-based conservation and a mixed approach. |  |
| 3.4.U5 | Criteria for consideration when designing protected areas include size, shape, edge effects, corridors, and proximity to potential human influence. |  |
| 3.4.U6 | Alternative approaches to the development of protected areas are species-based conservation strategies including: CITES, captive breeding and reintroduction programmes, and zoos, selection of “charismatic” species to help protect others in an area (flagship species), selection of keystone species to protect the integrity of the food web. |  |
| 3.4.U7 | Community support, adequate funding and proper research influence the success of conservation efforts |  |
| 3.4.U8 | The location of a conservation area in a country is a significant factor in the success of the conservation effort. Surrounding land use for the conservation area and distance from urban centres are important factors for consideration in conservation area design. |  |
| 3.4.A1 | Explain the criteria used to design and manage protected areas. |  |
| 3.4.A2 | Evaluate the success of a given protected area. |  |
| 3.4.A3 | Evaluate different approaches to protecting biodiversity. |  |

3.4.U1 Arguments about species and habitat preservation can be based on aesthetic, ecological, economic, ethical and social justifications.

1. Read the different reasons for conserving species and habitats and number them from 1-13 with one being the most important and thirteen the least.

|  |  |
| --- | --- |
|  | |
| *Direct values:* | |
|  | *Food sources – we eat other species both animals and plants* |
|  | *Natural products – Many of the medicines, fertilizers and pesticides we use are derived from plants and animals* |
| *Indirect values:* | |
|  | *Environmental Services – e.g. soil aeration depends on worms. Fertilization and pollination of some food crops depend on insects, climate regulation, decomposition, etc* |
|  | *Scientific and educational value* |
|  | *Biological control agents – some organisms help us control invasive species* |
|  | *Genetic diversity – potential source of valuable genes* |
|  | *Environmental monitors – e.g. canaries in the mines, indicator species* |
|  | *Recreational and ecotourism – areas of outstanding national beauty and parks* |
|  | *Human health – antibiotics originally obtained from fungi* |
|  | *Humans rights – indigenous communities* |
|  | *Ethical / intrinsic value – each species has a right to exist* |
|  | *Biorights – diverse ecosystems help to preserve their component species* |
|  | *Aesthetic value – a beautiful ecosystem or species provides pleasure* |

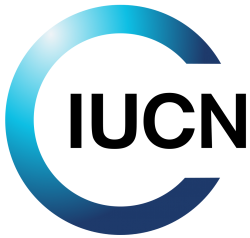
1. Using your list what reasons can you come up with for conserving rainforests?
2. Illustrate your answer by adding ideas to the mindmap that has been started for you in the space below. Try and include specific ideas based on the factors listed in the table above

Questions to Consider

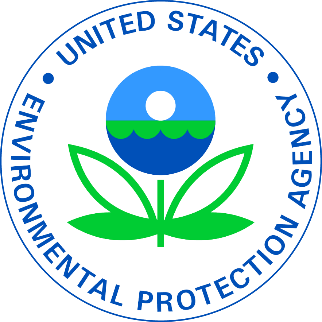
1. In which countries are indigenous rainforests people still found?
2. What are the threats to these people?
3. In which ways do their views of the rainforest and its value differ from yours?
4. What environmental services do rainforests provide?
5. What other reasons are there to conserve the rainforest?

3.4.U2 International, governmental and non-governmental organizations (NGOs) are involved in conserving and restoring ecosystems and biodiversity, with varying levels of effectiveness due to their use of media, speed of response, diplomatic constraints, financial resources and political influence.

1. Using the logos:
   1. Which organization is it from
   2. Is it an IGO, GO or NGO?
   3. What are its main aims?
   4. How does it accomplish these aims?
   5. Which are Ecocentric? Technocentric? Anthropocentric?
   6. Place the organizations onto the axis below
   7. Current projects
   8. Which organization would YOU like to work for?







Desk-based research

Radical

Conservative

In the field

1. Compare and contrast the different the roles and activities of intergovernmental and non-governmental organisations.

|  |  |  |  |
| --- | --- | --- | --- |
|  | IGOs (e.g. UNEP) | GOs (e.g. EPA) | NGOs (e.g. WWF, Greenpeace) |
| Identifying factors (description) |  |  |  |
| Use of Media |  | |  |
| Speed of response |  | |  |
| Diplomatic constraints |  | |  |
| Political influence |  | |  |
| Enforceability |  | |  |
| Public image |  | |  |
| Legislation |  | |  |
| Agenda |  | |  |
| Funding |  | |  |
| Extent of geographical influence |  | |  |
| Monitoring activities |  | |  |

3.4.U3 Recent international conventions on biodiversity work to create collaboration between nations for biodiversity conservation.

**International conventions on biodiversity**

UNEP was established after the 1972 UN Conference on the Human Environment, held in Stockholm, Sweden, proposed the creation of a global body to act as the environmental conscience of the UN system.

The Stockholm Conference marked the formal acceptance by the international community that development and the environment are inextricably linked. It prompted a growing body of research that has greatly improved understanding and awareness of critical environmental issues over the past three-plus decades, and it provided the impetus for new national, regional and international environmental legislation worldwide.

In the subsequent two decades, a proliferation of environmental conferences and conventions addressed various environmental issues, including conserving endangered species, controlling the movement of hazardous wastes, and reversing the depletion of the ozone layer. The most successful and well-known convention from this period was the 1987 Montreal Protocol of the Vienna Convention for the Protection of the Ozone Layer, an example of international environmental cooperation whose inspiration reverberates to this day.

In 1980 the IUCN established the World Conservation Strategy (WCS) along with UNEP and WWF. The WCS outlined a series of global priorities for action and recommended that each country prepare its own national strategy that would take into account the conservation of natural resources for long-term human welfare. The strategy also drew attention to the importance of making the users of natural resources become their guardians.

In 1992, the UN Conference on Environment and Development—the Earth Summit—was convened in Rio de Janeiro, Brazil, bringing together an unprecedented number of representatives from governments, civil society, and the private sector. The purpose of the Earth Summit was to examine progress made since Stockholm, and to “elaborate strategies and measures to halt and reverse the effects of environmental degradation in the context of strengthened national and international efforts to promote sustainable and environmentally sound development in all countries”.

It gave birth to two major conventions—the UN Framework Convention on Climate Change and the Convention on Biological Diversity—and saw the creation of the UN Commission on Sustainable Development. The Rio Declaration reafﬁrmed the principles ﬁrst elaborated in Stockholm twenty years earlier, while Agenda 21 gave the world an action programme for building sustainable development into the 21st century

In May 2000, UNEP convened the ﬁrst Global Ministerial Environment Forum, in Malmö, Sweden. One of the Forum’s functions was to send a strong message to the UN General Assembly, which was due to revisit the sustainable development debate at the Millennium Summit in September 2000.

The principal outcome of the Millennium Summit was the Millennium bound objectives and measurable targets collectively known as the Millennium Development Goals. Environmental sustainability is highlighted among the goals as an objective in itself, and is widely recognized as a major factor underlying the attainability of all the other goals. Finally, in September 2005, governments at the 2005 World Summit reafﬁrmed their commitment to the Millennium Development Goals, Agenda 21 and the Johannesburg Plan of Implementation.

1. When was UNEP formed?
2. What are UNEP’s responsibilities?
3. What is the World Conservation Strategy (WCS)? Who set it up and why?
4. What are the main objectives of the WCS?
5. What were the aims of the ‘Earth Summit’ of 1992?
6. What is Agenda 21?
7. What was the outcome of the UN Millennium Summit, held in 2000?

3.4.U4 Conservation approaches include habitat conservation, species-based conservation and a mixed approach.

3.4.A3 Evaluate different approaches to protecting biodiversity

1. Distinguish between habitat conservation and species-based conservation

Think About the Following Questions

1. Do you think keeping animals for humans to look at is a pointless exercise or does it have a value. Justify your answer
2. Do we have the right to capture and cage other species even if we treat them well? Justify your answer.
3. If there is a choice between allowing a species to become extinct or keeping the last few individuals in a zoos? Justify your answer.
4. Evaluate habitat conservation, species-based conservation and a mixed approach. approaches to protecting biodiversity
   1. State whether the approach is habitat-based, species-based or a mixed approach
   2. Outline the pros and the cons of the approach, supported by evidence and/or examples
   3. Determine whether the pros outweigh the cons, or vice versa, and justify your conclusion

3.4.U5 Criteria for consideration when designing protected areas include size, shape, edge effects, corridors, and proximity to potential human influence.

3.4.A1 Explain the criteria used to design and manage protected areas.

1. Complete the following table

|  |  |
| --- | --- |
| **Criteria to think about** | **Reasons?** |
| Area |  |
| Edge effects |  |
| Shape |  |
| Corridors |  |
| Buffer zone |  |

1. Which is better and why?

1.

2.

3.

4.

5.

6.

Be familiar with the idea of island biogeography: “Two eminent ecologists, the late Robert MacArthur of Princeton University and E. 0. Wilson of Harvard...proposed that the number of species on any island reflects a balance between the rate at which new species colonize it and the rate at which populations of established species become extinct.” (For a complete explanation, visit <http://www.stanford.edu/group/stanfordbirds/text/essays/Island_Biogeography.html>)

3.4.U6 Alternative approaches to the development of protected areas are species-based conservation strategies including: CITES, captive breeding and reintroduction programmes, and zoos, selection of “charismatic” species to help protect others in an area (flagship species), selection of keystone species to protect the integrity of the food web.

1. Compare in situ and ex situ. Identify the advantages and disadvantages of each approach
2. Evaluate the various conservation methods

|  |  |  |
| --- | --- | --- |
| **Conservation method** | **Strengths** | **Weaknesses** |
| ***CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna)*** |  |  |
| ***Captive breeding, reintroduction programmes and zoos*** |  |  |
| ***Botanical gardens and seed banks*** |  |  |
| ***Keystone species*** |  |  |
| ***Aesthetic vs. ecological value*** |  |  |

1. Read the Guardian Article Meerkats, Chimps and Pandas: The Cute and the Furry Attract Scientist Attention and Conservation Funding

https://www.theguardian.com/environment/2010/may/23/endangeredspecies-conservation

As you read the article identify and note down the advantages and disadvantages of this aesthetic approach

1. Research a successful reintroduction program. E.g. Black-footed ferret.
   1. What species was involved?
   2. Why was it successful?
   3. What were the opinions of the local communities?
   4. Why are reintroductions from captive bread populations so difficult?
   5. Explain the concept of a frozen zoo.

3.4.U7 Community support, adequate funding and proper research influence the success of conservation efforts

1. Identify the benefits of community support with a named example

3.4.U8 The location of a conservation area in a country is a significant factor in the success of the conservation effort. Surrounding land use for the conservation area and distance from urban centres are important factors for consideration in conservation area design.

1. State the advantages and disadvantages of having a conservation area close to an urban center

3.4.A2 Evaluate the success of a given protected area.

1. For each case study, be able to outline and discuss responses to the following questions:
   1. Name the protected area and its location
   2. Which species is the area designed to protect?
   3. Why is/are the species threatened?
   4. How and why has the protected area been successful?
   5. Weight the pros and cons of each of the following aspects of the area
      1. Size
      2. Shape
      3. Edge effect
      4. Corridors
      5. Human proximity (fragmentation)
      6. Involvement of local communities
   6. Clearly state whether each aspects’ pros outweigh its cons or vice versa
   7. Reach an overall conclusion and support it with reasons
   8. Describe how the criteria used to design protected areas have influenced the success of each case study.

Case Study Examples

* Royal Chitwan National Par, Nepal
* Sichuan Gian Panda Sanctuaries, Chine
* Sipilok Orang Utan Sanctuary, Malaysia
* Yosemite National Park, USA

1. In your opinion, how should we approach conservation? Or should we? Write out a conclusion of your position and justify it.
2. Design your won Conservation Program in your own country. Consider location, purpose, scope, staff, management and sustainability

**Review questions**

1. What is biodiversity? What is the underlying cause of biodiversity?
2. Biological diversity involves the following concepts. Explain each:
   1. Genetic diversity
   2. Habitat/ecosystem diversity
   3. Species diversity
3. Why is biodiversity high in some places but low in others?
4. List 3 ways diversity is important.
5. What is the only reason why things are becoming extinct at such a fast rate?
6. What are the characteristics of an endangered species?
7. Explain in situ vs ex situ.
8. List 3 endangered species.
9. Summarize the Endangered Species Act.
10. What is an ecological niche, and how does it help a population adapt to changing the environmental conditions?
11. How have human activities affected the earth’s biodiversity?
12. How serious is tropical deforestation, and how can we help sustain tropical forests?
13. How should rangeland resources be used, managed, and sustained?
14. What problems do parks face, and how should we manage them?
15. How should we establish, design, protect, and manage terrestrial nature reserves?
16. What is wilderness, and why is it important?
17. What is ecological restoration, and why is it important?
18. What can we do to help sustain the earth’s terrestrial biodiversity?
19. Why should we care about protecting wild species?
20. Which human activities endanger wildlife?
21. How can we help prevent premature extinction of species?
22. What are non-governmental organizations? List any you can find involved with conservation.
23. What are intergovernmental organizations?
24. What are UNEP’s responsibilities?
25. What is the World Conservation Strategy (WCS)? Who set it up and why?
26. What were the aims of the ‘Earth Summit’ of 1992?
27. What is Agenda 21?
28. What was the outcome of the UN Millennium Summit, held in 2000?
29. Discuss the strengths or weaknesses of the shapes of the nature reserves in the figure below.



1. Evaluate the role of local support, government agencies and research in the protection of a named protected area you have studied.
2. Evaluate species-based conservation as an approach for preserving biodiversity and suggest why trophy hunting (i.e. hunting animals for sport) may represent an acceptable method of achieving this goal.
3. Outline three characteristics that an area should have if it is to be designated a nature reserve or similar protected area.

1. An area of forest has been made a nature reserve. It is surrounded by farmland with several towns. Describe some of the changes that might occur in the area following its protection in this way.
2. Briefly describe a named protected area or nature reserve that you have studied and explain how it has been managed to protect its biodiversity.

ESS can be like learning a new language. So many words are not commonly used in everyday English. This can be challenging. To help you keep up with ESS Terms, you will need to create your own ESS DICTIONARY. You should add to this over the year and keep it in your notebook or on a page file THAT YOU CAN UPDATE AND ADD TO EASILY. Most of the vocabulary words can be found either on your STUDY GUIDE or at mrgscience.com.

You will be responsible for leaning the words and their meaning. Periodic quizzes will be given on the words. So, make your dictionary creative and you will remember the words more easily.

**KEY TERMS**

Species

UNEP

Community

Stewardship

Ecotourism

Ecotone

gradual edge

buffer zone

minimum viable pop.

seed bank

​in situ

Habitat

WWF

CITE

genetic resource

nutrient cycling

edge effect

biodiversity

security

botanical garden

​ex situ

Aesthetic

Greenpeace

captive breeding

gene pool

water purification

reserve

forest interior

scale

captive breeding

keystone species

​SLOSS

Intergovernmental

Rio Earth Summit

Ethical

natural selection

ecoterrorism

zonation

migration

ecological process

reintroduction

​flagship species

NGOs

island biogeography

life support

intrinsic value

corridors

abrupt change

invasive species

historic range

zoo

​intervention