



August 2010 Environmental News Worksheet

How many species are there on Earth?

The International Year of Biodiversity

The United Nations chose 2010 to celebrate the Earth's biological diversity, and to call attention to the threat it faces from humanity's actions.

Read more about the international Year of Biodiversity [here](#).



What is Biodiversity?

The word 'biodiversity' was first used in the 1980s by American biologist E.O. Wilson. It is a conflation of 'biological diversity', and can be used to describe species, ecosystem, and genetic diversity (pages 176–177 of textbook). Biodiversity has historically been used to describe the range of organisms found on Earth, although the term species diversity is more specific, and incorporates measurements of both species richness (species number) as well as the relative abundances of each species in an area. The components of biodiversity are not independent – all ultimately are the consequence of genetic diversity interacting with environmental conditions to produce differences between organisms.

How many species are there?

It is said that more is known about the surface of the moon than the deep ocean. This can be extrapolated to the whole of biology, where much remains still to be discovered. Humanity cannot answer basic questions about life on Earth, including how many species there are on the planet. We know that there are approximately 1.8 million described species, but can only estimate how many other organisms remain undiscovered. Difficult to reach areas, such as the canopy of tropical rainforest may harbour half of all species on Earth, but very little is known about them. The debate about how many species there are on Earth flourished in the 1980s and 1990s, and originated in a seemingly innocuous scientific paper written by American entomologist Terry Erwin, who estimated that there could be 30 million arthropods on Earth. Please read Terry Erwin's original paper available [here](#).

Since then, the need to understand more about the range and diversity of life has become increasingly pressing. Estimations of species extinction rates need to be framed in the light of known species numbers, so that a percentage loss of different groups can be calculated. Other reasons are equally as important.



Environmental Systems and Societies

Questions

- a) Why is the study of biodiversity of current concern? [5 marks]
- b) What are the aims of the International Year of Biodiversity? [5 marks]
- c) What are the current estimates for the number of species on Earth? [1 mark]
- d) Why are the numbers of species on Earth so poorly understood? [3 marks]

Convention on Biological Diversity

Prior to the 1992 UN Rio Conference (see textbook pages 104–105) a convention was developed to protect the Earth's biodiversity (the *Convention on Biological Diversity* – CBD). The CBD came into force in December 1993. Please take a moment to read about the convention [here](#).

- e) What are the objectives of the CBD? [2 marks]
- f) How many countries have signed up to the CBD? [1 mark]
- g) What is the *Alliance for Zero Extinction*? [3 marks]

During the International Year of Biodiversity, the Natural History Museum in London (NHM) is running a 'species of the day' on its website: see the current entry and a list of all species [here](#).

Read more about the NHM's biodiversity activities [here](#).



Environmental Systems and Societies

Answers

- a) Habitat and ecosystem loss from human activity leading to species extinction; disappearance of species with potential economic and agricultural value; loss of medical cures not yet discovered; loss of Earth's genetic diversity; threat to global climate and environment; 'variety is the spice of life' arguments. *[5 max]*
- b) Increase understanding of the vital role that biodiversity plays in sustaining life on Earth; highlight the intrinsic links between humanity and nature/biodiversity; highlight the huge variety of other animals and plants, the places they live and their surrounding environments, all over the world; show the reliance of humanity on biodiversity, for e.g. food, fuel, and medicine; highlight how this rich diversity is being lost at a greatly accelerated rate because of human activities; show how people all over the world are working to safeguard this irreplaceable natural wealth and reduce biodiversity loss. *[5 max]*
- c) Range between 5–100 million: higher numbers may be possible if groups such as bacteria and soil organisms are included, which are currently poorly understood. *[1 mark]*
- d) Bias in the past on large popular and appealing groups such as mammals and birds, which actually represent a very small proportion of total species numbers; only a relatively small number of taxonomists globally are involved in identifying and describing new species; most described species are large and smaller species requiring microscopic examination are less well known/historically less appealing for study; description of new species is laborious and archaic – modern techniques such as DNA technology and genome identification may prove a quicker and more accurate means of naming new species; some ecosystems remain poorly sampled, such as the canopy of rainforest and the deep sea. *[3 max]*
- e) An international treaty to sustain the rich diversity of life on Earth; the conservation of biological diversity; the sustainable use of the components of biodiversity; the fair and equitable sharing of the benefits arising from genetic resources. *[2 max]*
- f) 192 states and the European Union. *[1 mark]*
- g) A global initiative comprised of conservation organizations aiming to prevent extinctions; prevent extinctions by identifying and safeguarding key sites where species are in imminent danger of disappearing; the goal of the Alliance is to eliminate threats and restore habitats to allow endangered species' populations to recover. Visit the [website](#). *[3 marks]*

Total: [20 marks]