

Oxford Revise | Geography | Answers

Chapter 37 The taiga

All exemplar answers given are worth full marks.

1.
 - a)
 - i) Coniferous
 - ii) Pine, fir
 - iii) The trees have a conical shape to allow the snow to slide off easily.
The trees have needle-like leaves with a waxy coating to prevent frost damage and to be less likely to be blown off by the wind.
 - iv) Animals have thick fur which keeps them warm and dry. Some conserve their energy by going into a long sleep called hibernation. Many birds migrate to warmer climates in the winter.
 - b) The climate has long, dry, cold winters, with several months below freezing and temperatures dropping as low as -20°C . The summers are short and wet, with temperatures rising as high as 20°C . Precipitation is below 750 mm, and the snow remains on the ground for many months in the winter.
 - c)
 - i) NPP is a measure of how much new biomass is added to a biome each year. It is measured in grams per square metre.
 - ii) It is low because of the harsh climatic conditions. There is a short growing season because of the long very cold winters, the short summers, and the low precipitation totals.
 - d) There is a low net primary productivity rate of only $800\text{ grams/m}^2/\text{per year}$ because of the limited sunlight, the low temperatures and low precipitation, much of it falling as snow. Nutrient cycling is slow and so there is limited biodiversity. Sources of food are low because there is a short growing season of only 4–5 months.
2.
 - a) Nutrient cycling is slow. The stores are small and there are few flows between them. Most nutrients are stored in the litter, because the waxy pine needles decompose slowly in the cold temperatures and so the nutrients are released slowly. There is little tree growth because of the short growing season so little new biomass is created. The cold temperatures and low precipitation restrict the amount of chemical weathering, so few nutrients are stored in the soil.
 - b) Pests and diseases are an increasing threat to the taiga. Insects are usually kept in check because of the very cold winters. Global warming means that winters are getting warmer and so the insects are not killed off. Trees die because of insect infestation, and this changes the ecosystem and the food webs. Fungus diseases are more common with the warmer weather, for example the wine pine blister affecting Canadian forests.

- c) The hotter and drier summers, with frequent thunder and lightning storms increases the danger of wildfires. Insects are usually kept in check because of the very cold winters. Global warming means that winters are getting warmer and so the insects are not killed off. Trees die because of insect infestation, and this changes the ecosystem and the food webs.
- d) Commercial logging of softwood to meet the increasing demand for wood pulp which is made into paper, wood chips for biofuel and timber for construction explains why the taiga is being deforested. Many areas of taiga have valuable mineral resources of nickel, and iron ore and the energy sources of coal and oil. In addition to actual mining and quarrying for these resources, taiga is cleared to build access roads and the other forms of infrastructure needed by the mining companies. Hydroelectric power stations, like James Bay in Canada, result in forested valleys being flooded to create reservoirs.
- e) The extraction of the taiga's mineral wealth results in the pollution of rivers and lakes by oil spills and the toxic waste left by mining companies. Commercial logging has caused deforestation which affects the habitat and the taiga's ecosystem. There may be severe consequences of deforestation of the taiga locally, but because of the vast areas covered by this biome the impact is still relatively small overall.

3.

- a) Agroforestry is sustainable farming, where the crops are grown between the trees so they do not need to be cut down.
- b) Selective logging allows only mature fully-grown trees to be cleared leaving those trees with important ecological value unharmed. It allows the unique ecosystem to remain and the trees that are left give some shelter, which may reduce the rate of soil erosion from wind and rain.