

26 The human impact on the environment - answers

1 Human activities which threaten species with extinction are: (i) hunting of individual species, (ii) over-exploitation of stocks (e.g. over-fishing), (iii) destruction of habitats (deforestation, agriculture, urbanisation).

2 A pesticide is a compound which destroys or controls any organism which is considered to be harmful to our interests.

An insecticide destroys or controls populations of insects, preferably only those thought to be harmful.

A herbicide kills or controls plants which humans want to get rid of, e.g. weeds.

3 (a) A persistent insecticide is chemically stable, i.e. it takes a long time to break down.

(b) (i) This property is useful because the substance will continue to kill insects long after it has been applied.

(ii) 'Persistence' is harmful because the insecticide lasts long enough to pass up a food chain and become concentrated in the bodies of secondary or tertiary consumers.

4 (e) Beetles damage trees by spreading a virus.

(b) Trees sprayed with insecticide.

(f) Insecticide absorbed by tree leaves.

(c) Earthworms eat leaves which fall from trees.

(g) Small birds eat earthworms.

(d) Predatory birds eat small birds.

(a) Predatory birds poisoned by insecticide.

5 (b) Excess nitrate and phosphate discharged into river.

(g) Aquatic algae grow rapidly.

(e) Aquatic algae die.

(a) Dead algae decomposed by bacteria.

(d) Bacteria use up oxygen.

(f) Water depleted of oxygen.

(c) Fish die of suffocation.

6 Excessive nitrates and phosphates come mainly from sewage effluents and intensive agriculture.

7 (a) Deforestation on hillsides exposes the soil to erosion by rain and leads to silting of rivers and lakes. Floods may be caused by (i) the rapid run off from deforested slopes, (ii) the silting up of rivers and lakes by the eroded topsoil.

(b) Deforestation in the tropics also leads to erosion. If followed by agriculture, it causes impoverishment of the soil. There may also be local climatic changes and a global increase in atmospheric carbon dioxide. Biodiversity is reduced.

8 Over-grazing leads to erosion because (i) the animals remove all the vegetation, so exposing the soil to heavy rain, (ii) their hooves compact the soil so that rain water runs off the surface carrying the soil with it.

9 Soil conservation is helped by (b) planting trees on steep slopes, (d) terracing hillsides, (e) using organic manure. The other activities are likely to lead to soil erosion.

The human impact on the environment - answers (continued)

- 10** (a) The main pollutants in acid rain are sulphur dioxide and oxides of nitrogen. Ozone may also be a pollutant.
- (b) Sulphur dioxide and oxides of nitrogen come mainly from burning coal in power stations. Oxides of nitrogen come from burning petrol and diesel in cars and lorries. Ozone results from reactions of these gases in the atmosphere.
- (c) Acid rain (i) leads to acidification of lakes which kills all the living organisms; (ii) directly or indirectly leads to the premature death of trees and the destruction of forests; (iii) the erosion of buildings and other structures containing limestone, marble, mortar etc.
- 11** Important 'greenhouse' gases are *water vapour, carbon dioxide, nitrogen oxides, methane*
- 12** The burning of fossilized products (coal and oil) of some plants is the cause of increasing carbon dioxide in the atmosphere. (Burning wood and paper has a neutral effect because these are products of plants which have absorbed carbon dioxide during photosynthesis).
- 13** The greenhouse gases do not interfere with the short-wave radiation reaching the Earth from the sun but absorb the long wave radiation reflected from the Earth's surface. This reduces the escape of heat from the Earth.
- 14** We need to cut carbon dioxide emissions by about 60% to halt (but not reverse) global warming.
- 15** Chlorofluorocarbons react with and deplete the ozone in the ozone layer. This allows more ultra-violet light from the sun to reach the Earth, with harmful effects on living organisms (e.g. skin cancer in humans).
- 16** (a) 'Monoculture' is the term applied to the growing of the same agricultural crop year after year on the same land. It also implies that the crop consists exclusively of one species of plant grown in dense stands.
- (b) Because the crop consists of one species of plants in close proximity, any pest or disease will spread easily and rapidly to the whole crop.
- 17** (a), (c) and (d) are not covered by the Clean Air Acts of 1956 and 1968.
- 18** Sulphur dioxide emissions can be reduced by fitting desulphurization plants or by changing to a cleaner form of coal with less sulphur in it.
- 19** (a) A catalytic converter reduces emissions of nitrogen oxides, carbon monoxide and unburnt petrol.
- (b) A lean-burn engine reduces the nitrogen oxide emissions.

26 The human impact on the environment

- 1 List three human activities which could cause the loss of a species.
- 2 Distinguish between the terms 'pesticide', 'insecticide' and 'herbicide'.
- 3 (a) What is the special property of a 'persistent' insecticide?
(b) In what ways is 'persistence' (i) a useful property, (ii) a harmful property?
- 4 Put the following events in the most probable order.
 - (a) Predatory birds poisoned by insecticide.
 - (b) Trees sprayed with insecticide.
 - (c) Earthworms eat leaves which fall from trees.
 - (d) Predatory birds eat small birds.
 - (e) Beetles damage trees by spreading a virus.
 - (f) Insecticide absorbed by tree leaves.
 - (g) Small birds eat earthworms.
- 5 Put the following events in the most probable order.

(a) Dead algae decomposed by bacteria.	(d) Bacteria use up oxygen.
(b) Excess nitrate and phosphate discharged into river.	(e) Aquatic algae die.
(c) Fish die of suffocation.	(f) Water depleted of oxygen.
	(g) Aquatic algae grow rapidly.
- 6 What are the principal sources of excessive nitrate and phosphate in rivers and lakes?
- 7 List the short-term and long-term effects of forest destruction (a) on hillsides, (b) in the tropics.
- 8 In what ways does over-grazing lead to soil erosion?
- 9 Which of the following are likely to help conserve soil and prevent erosion?

(a) Ploughing slopes.	(f) Removing trees from hillsides.
(b) Planting trees on steep slopes.	(g) Growing the same crops each year.
(c) Using chemical fertilisers.	(h) Keeping as many animals as possible on grassland.
(d) Terracing hillsides.	(e) Using organic manure.
- 10 (a) What are the two main pollutants that contribute to acid rain?
(b) Where do these pollutants come from?
(c) What direct or indirect effect is 'acid rain' thought to have on (i) lakes, (ii) forests and (iii) buildings?
- 11 Which of the following are important 'greenhouse' gases?
oxygen, water vapour, carbon dioxide, nitrogen oxides, ozone, methane, nitrogen
- 12 Which part of the carbon cycle is responsible for the increasing concentration of carbon dioxide in the atmosphere.

The human impact on the environment (continued)

- 13** Explain briefly why 'greenhouse' gases lead to global warming.
- 14** By how much do we need to cut carbon dioxide emissions in order to halt global warming?
5%, 20%, 60%, 90%
- 15** In what way do chlorofluorocarbons (CFCs) cause global problems?
- 16** (a) What do you understand by the term 'monoculture'?
(b) What is one disadvantage of a monoculture?
- 17** Which of the following are not covered by the 1956 and 1968 Clean Air Acts?
(a) Sulphur dioxide emission from power stations.
(b) Smoke emission from factories.
(c) Particulate emission from vehicles.
(d) Emission of chlorofluorocarbons from aerosol sprays.
- 18** State two ways in which sulphur dioxide emissions from coal-fired generating stations could be reduced.
- 19** Which of the gases listed below can be reduced in vehicle exhausts by (a) a catalytic converter (b) a lean burn engine?
carbon dioxide, carbon monoxide, unburned petrol, nitrogen oxide, water vapour, oxygen