

Pollution Science Mastery

Pollution Science · Answer Key · 19 Questions

1. Which atmospheric pollutant, primarily a product of incomplete combustion of fossil fuels, binds to hemoglobin more readily than oxygen, impairing oxygen transport in the blood?

- A) Sulfur dioxide (SO₂)
- B) Nitrogen oxides (NO_x)
- C) Ozone (O₃)
- D) Carbon monoxide (CO)**

2. The process by which certain synthetic organic chemicals, like DDT, accumulate in organisms at increasing concentrations up the food chain is known as:

- A) Eutrophication
- B) Bioaccumulation
- C) Biomagnification**
- D) Biodegradation

3. Acid rain, a significant environmental problem, is primarily caused by atmospheric emissions of sulfur dioxide and which other major pollutant?

- A) Particulate matter
- B) Volatile organic compounds (VOCs)
- C) Nitrogen oxides (NO_x)**
- D) Carbon dioxide (CO₂)

4. Which of the following is the primary source of microplastic pollution in marine environments?

- A) Volcanic eruptions
- B) Industrial wastewater discharge
- C) Breakdown of larger plastic debris**
- D) Atmospheric deposition of aerosols

5. The '\$100 billion question' regarding the Montreal Protocol relates to its success in phasing out which class of ozone-depleting substances?

- A) Perfluorocarbons (PFCs)
- B) Hydrofluorocarbons (HFCs)
- C) Chlorofluorocarbons (CFCs)**
- D) Sulfur hexafluoride (SF₆)

6. What is the main cause of eutrophication in freshwater bodies, leading to excessive algal growth and oxygen depletion?

- A) Acid mine drainage
- B) Thermal pollution from power plants
- C) Excessive nitrogen and phosphorus runoff**
- D) Sedimentation from deforestation

7. The persistent organic pollutants (POPs) are a group of chemicals that have been identified as having adverse effects on human health and the environment. Which international treaty aims to eliminate or restrict the production and use of POPs?

- A) The Kyoto Protocol
- B) The Paris Agreement
- C) The Stockholm Convention**
- D) The Basel Convention

8. Groundwater contamination by nitrates is a significant concern, often linked to agricultural practices. What is a major source of this nitrate pollution?

- A) Leaching of heavy metals from mining operations
- B) Runoff from urban areas containing road salt
- C) Overuse of synthetic fertilizers and animal manure**
- D) Discharge of untreated sewage

9. Which type of air pollution is primarily responsible for the 'London smog' events of the mid-20th century, characterized by a combination of smoke and fog?

- A) Photochemical smog
- B) Industrial emissions of greenhouse gases
- C) Sulfurous smog**
- D) Ozone layer depletion

10. The 'Great Pacific Garbage Patch' is a prominent example of marine pollution. It is composed primarily of what substance?

- A) Oil spills
- B) Industrial waste chemicals
- C) Discarded fishing gear
- D) Accumulated plastic debris**

11. Heavy metal pollution, such as mercury, can pose serious health risks. A significant source of mercury pollution in aquatic ecosystems is the burning of:

- A) Natural gas
- B) Biomass (e.g., wood)
- C) Coal**
- D) Solar power

12. What is the primary mechanism by which land use changes, such as deforestation, contribute to increased greenhouse gas concentrations in the atmosphere?

A) Increased methane emissions from livestock

B) Reduced absorption of CO₂ by trees and increased release during decomposition

C) Direct release of industrial pollutants

D) Increased energy consumption for agriculture

13. The phenomenon of 'urban heat island effect' refers to the elevated temperatures in urban areas compared to surrounding rural areas. What is a major contributing factor to this effect?

A) Increased vegetation cover

B) Higher albedo of urban surfaces

C) Absorption and re-radiation of solar energy by built environments

D) Increased wind speeds in cities

14. Which of the following is a key characteristic of endocrine-disrupting chemicals (EDCs)?

A) They only affect aquatic life.

B) They mimic or interfere with the body's hormones.

C) They are always visible pollutants.

D) They are rapidly biodegraded in the environment.

15. The 'ozone hole' is most pronounced over which region of the Earth due to specific atmospheric conditions and the presence of CFCs?

A) The equator

B) The Arctic

C) The Antarctic

D) Mid-latitude regions

16. What is the principal environmental concern associated with per- and polyfluoroalkyl substances (PFAS)?

A) Their rapid decomposition in water

B) Their persistence and potential for bioaccumulation

C) Their ability to increase soil fertility

D) Their role in enhancing ozone formation

17. Noise pollution can have detrimental effects on human health and wildlife. What is a common, significant source of anthropogenic noise pollution in urban environments?

A) Natural seismic activity

B) Animal vocalizations

C) Transportation (e.g., road traffic, aircraft)

D) Wind turbines in rural areas

18. The concept of 'carrying capacity' in pollution science refers to:

- A) The maximum number of pollutants an ecosystem can absorb without lasting damage.**
- B) The rate at which pollutants are removed from the environment.
- C) The total amount of pollutants produced by a single industry.
- D) The speed at which a pollutant spreads through the air.

19. Which of the following air pollutants is a major contributor to respiratory illnesses and is often measured as PM2.5 (particulate matter less than 2.5 micrometers in diameter)?

- A) Methane (CH₄)
- B) Ammonia (NH₃)
- C) Black carbon**
- D) Water vapor (H₂O)