

Recycling Technologies for Zinc

Environmental Science · Answer Key · 19 Questions

1. What is the definition of recycling?

- A) Recovering and reprocessing waste materials for use in new products.**
- B) Disposing of waste materials in landfills.
- C) Burning waste materials to generate energy.
- D) Extracting raw materials from the earth.

2. What are the basic phases in recycling?

- A) Collection, processing into new products, and purchasing those products.**
- B) Extraction of raw materials, manufacturing, and disposal.
- C) Sorting, refining, and packaging.
- D) Research, development, and marketing.

3. Besides ecological benefits, what other significance does recycling have in modern industry?

- A) Economic significance, creating jobs and reducing reliance on imported raw materials.**
- B) Increased pollution and waste generation.
- C) Higher production costs and reduced efficiency.
- D) Limited application in industrial processes.

4. Which metals are specifically mentioned as having particular importance for recycling due to energy efficiency and cost-effectiveness when processed from secondary raw materials?

- A) Aluminum, copper, and zinc.**
- B) Iron and steel.
- C) Gold and silver.
- D) Platinum and palladium.

5. After iron, aluminum, and copper, what is the rank of zinc in terms of the most frequently used metal globally?

- A) Fourth.**
- B) Fifth.
- C) Sixth.
- D) Seventh.

6. What is the primary use of zinc mentioned in the text?

- A) Galvanizing to protect iron and steel from rusting.**
- B) Manufacturing of batteries.
- C) Production of alloys like brass.
- D) Use in construction materials.

7. Which of the following is NOT listed as an ecological aspect of zinc recycling?

- A) Significant reduction in energy consumption.
- B) Increased land and water pollution.**
- C) Reduced emission footprint and contamination.
- D) Support for a circular economy.

8. Which of the following is NOT listed as an economic advantage of zinc recycling?

- A) Lower production and energy costs.
- B) Increased waste disposal costs.**
- C) More stable supply chains.
- D) Greater market competitiveness.

9. Which of these is a type of waste that contains zinc?

- A) Galvanic waste.**
- B) Plastic packaging.
- C) Organic food scraps.
- D) Glass bottles.

10. What is the goal of mechanical recycling technologies for zinc?

- A) Separating and purifying zinc from mixed materials.**
- B) Melting zinc at high temperatures.
- C) Dissolving zinc using chemical solutions.
- D) Using bacteria to extract zinc.

11. Which of these is a mechanical method for zinc recycling?

- A) Crushing, grinding, and sorting.**
- B) Electrolysis.
- C) Leaching with sulfuric acid.
- D) Bioleaching.

12. What is a disadvantage of pyrometallurgical methods for zinc recycling?

- A) High energy consumption and gas emissions.**
- B) Low efficiency for complex materials.
- C) Slow processes and sensitivity to conditions.
- D) Generation of hazardous liquid waste.

13. Which pyrometallurgical processes are mentioned for zinc recycling?

- A) Waelz process and ISP process.**
- B) Bioleaching and bioelectrochemical systems.
- C) Leaching and electrolysis.
- D) Crushing and grinding.

14. What is the principle behind hydrometallurgical methods for zinc recycling?

A) Chemical dissolution of metals from waste using aqueous solutions.

- B) Processing at high temperatures.
- C) Using microorganisms to extract metals.
- D) Physical separation of materials.

15. What is a significant advantage of hydrometallurgical methods for zinc recycling?

A) High purity of the metal.

- B) Low energy consumption.
- C) Environmentally friendly processes.
- D) Fast processing times.

16. Which biotechnological approach for zinc recycling involves bacteria or fungi dissolving zinc?

A) Bioleaching.

- B) Electrolysis.
- C) Waelz process.
- D) Gravitational separation.

17. What is a disadvantage of biotechnological approaches for zinc recycling, as mentioned in the text?

A) Slow processes and still in the development phase.

- B) High energy consumption.
- C) Generation of toxic byproducts.
- D) Limited applicability to zinc waste.

18. Which of the following is a disadvantage of mechanical recycling methods for zinc?

A) No direct separation of pure zinc and may require further processing.

- B) High energy consumption.
- C) Generation of hazardous liquid waste.
- D) Slow processing times.

19. What is a significant environmental benefit of less zinc mining due to recycling?

A) Conservation of resources and biodiversity.

- B) Increased air pollution.
- C) Higher greenhouse gas emissions.
- D) Greater landfill usage.