

Advanced Biology: Animal, Nature, and Environmental Facts

Biology · Answer Key · 18 Questions

1. Which marine mammal exhibits the longest recorded migration, traveling over 20,000 kilometers annually between its feeding and breeding grounds?

- A) Humpback whale (*Megaptera novaeangliae*)
- B) Gray whale (*Eschrichtius robustus*)**
- C) Blue whale (*Balaenoptera musculus*)
- D) Fin whale (*Balaenoptera physalus*)

2. The 'Great Pacific Garbage Patch' is primarily composed of microplastics, with a significant portion originating from which specific type of waste?

- A) Fishing gear**
- B) Single-use plastic bottles
- C) Cosmetic microbeads
- D) Polystyrene foam packaging

3. What is the primary mechanism by which extremophile archaea, such as those found in hydrothermal vents, derive energy?

- A) Photosynthesis using infrared light
- B) Chemosynthesis utilizing inorganic compounds**
- C) Thermogenesis through metabolic byproducts
- D) Radiosynthesis from radioactive decay

4. The symbiotic relationship between mycorrhizal fungi and plant roots is crucial for nutrient uptake. Mycorrhizae primarily enhance the plant's absorption of which essential macronutrient?

- A) Nitrogen
- B) Potassium
- C) Phosphorus**
- D) Calcium

5. Which terrestrial biome is characterized by permafrost, low precipitation, and dominant vegetation of mosses, lichens, and dwarf shrubs?

- A) Temperate rainforest
- B) Taiga (Boreal forest)
- C) Tundra**
- D) Savanna

6. The process of bioaccumulation refers to the increasing concentration of a substance, such as a toxin, in organisms at successively higher levels in a food chain. What is the term for the increasing concentration of that substance within a single organism over its lifetime?

- A) Biomagnification
- B) Bioavailability
- C) Bioremediation
- D) Bioamplification**

7. The unique ability of the axolotl (*Ambystoma mexicanum*) to regenerate lost limbs and other body parts throughout its adult life is an example of extreme what?

- A) Apoptosis
- B) Metamorphosis
- C) Parthenogenesis
- D) Regeneration**

8. Which avian species is known for its complex 'dialects' in its songs, which can vary geographically and change over time, similar to human languages?

- A) European Robin (*Erithacus rubecula*)
- B) Zebra Finch (*Taeniopygia guttata*)
- C) Northern Cardinal (*Cardinalis cardinalis*)
- D) European Starling (*Sturnus vulgaris*)**

9. Coral reefs, vital marine ecosystems, are built by colonies of small marine invertebrates called polyps. These polyps secrete an external skeleton made primarily of what compound?

- A) Silica
- B) Chitin
- C) Calcium carbonate**
- D) Keratin

10. The 'oxygen minimum zone' (OMZ) in the ocean is an area with extremely low dissolved oxygen levels. These zones are often exacerbated by nutrient runoff from land, leading to eutrophication and subsequent oxygen depletion. What is the primary biological process responsible for this depletion?

- A) Increased photosynthesis by phytoplankton
- B) Decreased respiration by zooplankton
- C) Bacterial decomposition of excess organic matter**
- D) Abyssal hydrothermal vent activity

11. Which insect group exhibits the most complex social organization, including a caste system with reproductive queens and sterile workers, as observed in ants, bees, and wasps?

- A) Coleoptera (Beetles)
- B) Lepidoptera (Butterflies and moths)
- C) Hymenoptera**
- D) Diptera (Flies)

12. The phenomenon of 'bioluminescence' in marine organisms, such as anglerfish and some jellyfish, is typically achieved through a chemical reaction involving a light-emitting molecule and an enzyme. What is the generic term for the light-emitting molecule?

- A) Chlorophyll
- B) Carotenoid
- C) Luciferin**
- D) Hemoglobin

13. Which of the following is a keystone species in the intertidal zone, whose grazing on barnacles and mussels prevents the dominance of a few species and maintains high biodiversity?

- A) Dolphin
- B) Sea otter**
- C) Great white shark
- D) Coral polyp

14. The rapid spread of invasive species, such as the zebra mussel (*Dreissena polymorpha*) in North America, can have devastating ecological and economic impacts. What is a primary mode of dispersal for this particular invasive mollusk?

- A) Wind currents
- B) Bird droppings
- C) Ballast water from ships**
- D) Riverine flow only

15. The process by which plants release water vapor into the atmosphere is called transpiration. What is the primary driving force behind this process?

- A) Active pumping of water by root cells
- B) Capillary action within the xylem
- C) Evaporation from leaf surfaces due to stomatal opening**
- D) Pressure generated by photosynthesis

16. Which type of extremophile thrives in environments with high salt concentrations, such as salt lakes and salt pans?

- A) Thermophile
- B) Psychrophile
- C) Halophile**
- D) Acidophile

17. The 'dead zones' in coastal areas, characterized by hypoxic (low oxygen) conditions, are often a result of nutrient pollution leading to algal blooms. The decomposition of these algae by bacteria consumes large amounts of dissolved oxygen. What is the primary source of the excess nutrients causing these blooms?

- A) Volcanic activity
- B) Atmospheric deposition of dust
- C) Agricultural runoff (fertilizers) and sewage**
- D) Natural oceanic upwelling of deep-sea nutrients

18. The adaptation of desert plants to survive in arid conditions often involves specialized leaf structures. For example, the spines of cacti are modified leaves designed to:

- A) Increase surface area for photosynthesis
- B) Facilitate water absorption from fog
- C) Reduce water loss through transpiration and deter herbivores**
- D) Store atmospheric carbon dioxide