

# INTERNATIONAL ENVIRONMENTAL SCIENCE OLYMPIAD



## Battery Examination – Part 2 Elementary School Division Friends and Family Younger Siblings

Name \_\_\_\_\_

Country OR State \_\_\_\_\_

ID Number \_\_\_\_\_

**Instructions – Mark your answers on the scantron provided.  
Correct answers are worth 2 points. Incorrect answers are  
worth –1 point. Questions left blank are worth 0 points.**

Questions 1-5 are on ecosystems.

1. What is the primary source of energy for most ecosystems on Earth?

- A. wheat and corn
- B. solar radiation
- C. wind energy
- D. beef and chicken

2. Which of the following would likely lead to an increase in biodiversity within an ecosystem?

- A. habitat fragmentation
- B. introduction of invasive species
- C. restoration of degraded ecosystems
- D. an increase in acid rain

3. A keystone species is one that does which of these?

- A. has a disproportionate impact on ecosystem structure and function
- B. always has the largest population
- C. is always a top predator
- D. is the largest mammal in the ecosystem

4. Which term describes organisms that obtain energy by consuming both plants and animals?

- A. herbivores
- B. carnivores
- C. omnivores
- D. bottom feeders

5. Which of the following is the correct order of energy flow in a typical food chain?

- A. Producers → Secondary Consumers → Primary Consumers → Decomposers
- B. Primary Consumers → Producers → Secondary Consumers → Decomposers
- C. Producers → Decomposers → Primary Consumers → Secondary Consumers
- D. Producers → Primary Consumers → Secondary Consumers → Decomposers

Questions 6-10 are on biodiversity.

6. Which of the following is NOT a direct driver of biodiversity loss?

- A. overuse of natural resources
- B. pollution from industrial waste
- C. increased food supply
- D. introduction of invasive species

7. Which of the following is true of an invasive species?

- A. it has a mutualistic relationship with native species
- B. it competes with native species for resources and has no natural predators
- C. it is highly dependent on a specific habitat
- D. it is always introduced intentionally by humans

8. What is the primary purpose of a biodiversity hotspot designation?

- A. to prioritize conservation efforts in areas with unique species
- B. to identify areas with the highest economic value
- C. to track invasive species' spread
- D. to increase tourism in ecologically significant regions

9. Which of these is NOT an ecosystem service provided by biodiversity?

- A. cultural and recreational value
- B. oxygen production through photosynthesis
- C. climate stabilization by industrial processes
- D. pollination of crops by insects

10. How does deforestation typically affect biodiversity?

- A. it increases species richness by creating new habitats
- B. it has no impact on biodiversity
- C. it increases genetic diversity by forcing species to adapt
- D. it reduces biodiversity by destroying habitats and causing species loss

Questions 11-20 are on populations.

11. Which of the following is a key characteristic of a K-selected species like humans?

- A. rapid reproduction and short lifespans
- B. high parental investment and low reproductive rates
- C. adaptation to disturbed environments
- D. early maturity and high offspring mortality

12. What is the primary goal of family planning programs?
- to promote emigration
  - to promote growth of cities
  - to regulate fertility rates and reduce unplanned pregnancies
  - to increase the birth rate
13. Which of the following is most likely to occur in a population experiencing exponential growth?
- rapid increase in population size over a short period
  - rapid population decline
  - sudden decrease in birth rates
  - a slow population decline
14. Which of the following best describes the industrial stage of the demographic transition model?
- high birth rates and low death rates
  - high birth and death rates
  - high birth rates and infant mortality
  - declining birth rates and stable death rates
15. Which of the following factors is most likely to lead to a population overshooting its carrying capacity?
- sudden increase in predation
  - lag between resource depletion and population decline
  - high emigration rates
  - decreased reproductive rates
16. Which of the following is NOT a consequence of rapid population growth in developing countries?
- strain on natural resources
  - decreased biodiversity
  - decreased infant mortality rates
  - increased urbanization
17. What is the relationship between education levels for women and population growth rates?
- higher education levels lead to higher population growth rates
  - higher education levels lead to lower population growth rates
  - there is no relationship between education and population growth rates
  - education increases fertility rates in developing countries
18. In human populations, which factor is the strongest determinant of life expectancy?
- access to healthcare and sanitation
  - size of the country
  - natural disasters
  - religion
19. What does crude death rate measure?
- the number of births in a given year
  - the percentage of the population that survives each year
  - the number of deaths of infants under one year old
  - the number of deaths per 1,000 individuals in a population per year
20. Which of these best defines population momentum?
- the continued growth of a population after replacement-level fertility is reached
  - the rapid decline of a population after a natural disaster
  - the stabilization of population size when immigration matches emigration
  - the decline of a population due to migration
- Questions 21-30 are on earth systems and resources.
21. Which of the following is the primary source of energy driving the rock cycle?
- solar radiation
  - geothermal energy
  - gravitational pull of the moon
  - wind erosion
22. Which type of soil particle is the smallest?
- sand
  - silt
  - clay
  - gravel
23. Which of the following is an example of a negative feedback mechanism in the Earth's climate system?
- increased cloud cover reflecting sunlight, reducing temperatures
  - melting ice exposing dark ocean water, which absorbs more heat and warms the oceans
  - forest fires cleaning carbon dioxide from the atmosphere
  - falling global temperatures causing more permafrost
24. Which of the following best describes the Hadley cell?
- a system of deep ocean currents driven by temperature and salinity differences
  - a seasonal wind pattern associated with monsoons
  - a region of tectonic activity at subduction zones
  - a large-scale atmospheric circulation pattern near the equator
25. Which of the following best describes an aquifer?
- a layer of soil rich in organic material
  - a layer of permeable rock that stores groundwater
  - a surface water feature, such as a river or lake
  - a region where tectonic plates meet

26. What is the role of the Earth's atmosphere in the water cycle?

- A. storing water in the form of ice caps
- B. preventing condensation from occurring
- C. blocking precipitation from entering oceans
- D. facilitating the evaporation and transport of water vapor

27. Which layer of the Earth is composed mostly of silicate rocks and is the least dense?

- A. inner core
- B. outer core
- C. mantle
- D. crust

28. In areas of upwelling, the water is usually which of these?

- A. warm and lacking in nutrients
- B. warm and high in nutrients
- C. cold and high in nutrients
- D. cold and lacking in nutrients

29. Which of these gives the three factors necessary for thunderstorm formation?

- A. moisture, oceans, heat
- B. moisture, stability, front boundary
- C. moisture, lifting mechanism, instability
- D. heat, lifting mechanism, front boundary

30. What is the main characteristic of an El Niño event?

- A. increased atmospheric pressure in the eastern Pacific
- B. warm surface waters in the eastern Pacific
- C. abnormally cold water in the eastern Pacific
- D. reduced rainfall in the western Pacific

Questions 31-35 are on land and water use.

31. Which of the following land management practices is most effective at reducing soil erosion on sloped terrain?

- A. clear-cutting
- B. terracing
- C. center-pivot irrigation
- D. monocropping

32. Which of the following is a primary purpose of wildlife corridors?

- A. to connect fragmented habitats and promote biodiversity
- B. to prevent invasive species from spreading
- C. to concentrate wildlife into specific areas for management
- D. to increase urban development

33. Which of the following is a potential effect of excessive groundwater extraction?

- A. increased soil fertility
- B. reduced urbanization
- C. increased crop diversity
- D. land subsidence

34. Which of the following is a common result of overirrigation in agriculture?

- A. soil erosion
- B. increased soil fertility
- C. salinization of soil
- D. decreasing prevalence of insects

35. What is a potential environmental consequence of clear-cutting forests?

- A. increased biodiversity
- B. reduced soil erosion
- C. disruption of carbon storage and sequestration
- D. greater groundwater infiltration

Questions 36-40 are on energy resources and consumption.

36. Which factor makes geothermal energy location-dependent?

- A. accessibility to fossil fuels
- B. availability of solar radiation
- C. proximity to tectonic plate boundaries or hotspots
- D. dependence on atmospheric temperatures

37. What is a primary advantage of using hydrogen fuel cells for energy?

- A. it has zero emissions at the point of use
- B. the low cost of hydrogen production
- C. abundance of natural hydrogen reserves
- D. high efficiency compared to all other energy sources

38. Which energy source is most commonly used for electricity generation in the United States?

- A. solar
- B. coal
- C. nuclear
- D. natural gas

39. What is the primary purpose of carbon capture and storage technology?

- A. increase energy production from coal
- B. reduce carbon dioxide emissions from power plants
- C. eliminate the need for renewable energy
- D. generate energy directly from carbon dioxide

40. Which of the following is an example of a secondary energy source?

- A. electricity
- B. wind
- C. coal
- D. natural gas

Questions 41-50 are on atmospheric pollution.

41. Which of these is the largest anthropogenic source of greenhouse gas emissions?

- A. transportation
- B. agriculture
- C. fossil fuel combustion for energy
- D. deforestation

42. Which of the following does the ozone layer primarily absorb?

- A. gamma rays
- B. infrared radiation
- C. ultraviolet radiation
- D. visible light

43. What is the purpose of scrubbers in industrial facilities?

- A. to improve energy efficiency
- B. to remove harmful pollutants like sulfur dioxide from emissions
- C. to monitor air quality
- D. to reduce water usage during manufacturing

44. Decomposition of organic matter in wetlands leads to the emission of which of these pollutants?

- A. methane
- B. lead
- C. nitrous oxide
- D. ozone

45. Which of these best describes how carbon monoxide affect humans?

- A. it causes skin irritation
- B. it binds with hemoglobin, reducing oxygen transport in the blood
- C. it disrupts the digestive system
- D. it leads to increased risk of infection and disease transmission

46. Which of these best describes a 'secondary pollutant'?

- A. pollutants that are less harmful to humans
- B. pollutants emitted only by industrial activities
- C. pollutants that originate from natural sources
- D. pollutants that form in the atmosphere from chemical reactions

47. What is the primary drawback of biofuels like ethanol?

- A. reduced greenhouse gas emissions
- B. competition with food production and high water usage
- C. inability to use existing infrastructure
- D. high production costs compared to fossil fuels

48. What is the efficiency range of most coal-fired power plants?

- A. 10–20%
- B. 25–30%
- C. 35–45%
- D. 50–60%

49. Which of these is the largest environmental concern with the use of nuclear energy?

- A. long-term storage of radioactive waste
- B. dependence on fossil fuels
- C. high greenhouse gas emissions
- D. inability to provide consistent energy output

50. Which nation is the largest consumer of energy per capita?

- A. Mexico
- B. the United States
- C. India
- D. China

Questions 51-60 are on aquatic and terrestrial pollution.

51. Which of the following is an example of point-source pollution?

- A. agricultural runoff
- B. urban stormwater runoff
- C. acid deposition from the atmosphere
- D. leakage from an oil pipeline

52. What is the primary effect of thermal pollution on aquatic ecosystems?

- A. decreased levels of dissolved oxygen
- B. increased levels of heavy metals
- C. reduced pH levels
- D. accumulation of microplastics

53. Which of these is a leading cause of eutrophication in aquatic ecosystems?

- A. acid rain
- B. excess nutrients from runoff
- C. heavy metal pollution
- D. oil spills

54. Which of the following is a major terrestrial source of marine debris?

- A. overfishing
- B. waste from cruise ships
- C. improperly managed solid waste on land
- D. thermal pollution from power plants

55. Which of these aquatic ecosystems is most vulnerable to sediment pollution?

- A. open ocean
- B. coral reefs
- C. deep-sea hydrothermal vents
- D. coastal estuaries

56. Which of the following is an environmental effect of persistent organic pollutants?

- A. They degrade quickly in the environment.
- B. They bioaccumulate in animal tissues and persist for long periods.
- C. They neutralize heavy metals in aquatic systems.
- D. They improve the fertility of agricultural soils.

57. Which of these is NOT considered to be a teratogen?

- A. ethanol
- B. tap water
- C. radiation
- D. benzene

58. Which of these water sources is most likely to be contaminated with radon?

- A. public water systems that use surface water
- B. public water systems that use groundwater
- C. private wells
- D. public water that has been purified with ozone

59. Which of these is the largest category of solid waste in the US?

- A. metal
- B. plastic
- C. yard waste
- D. paper

60. Which of these groups is likely to be least susceptible to the effects of air pollution?

- A. an adult in their 40s
- B. an adult in their 80s
- C. a teenager
- D. a newborn

Questions 61-70 are on global change.

61. Which of the following climate changes is most likely to increase the frequency of wildfires?

- A. increased rainfall and higher humidity
- B. rising temperatures and prolonged droughts
- C. decreased wind activity and cooler temperatures
- D. increased snowfall during winter months

62. What is a major environmental consequence of warmer ocean temperatures?

- A. increased carbon sequestration in the deep ocean
- B. increased occurrence of marine dead zones
- C. decreased coral bleaching events
- D. improved habitat for cold-water fish species

63. Which of these occurs as permafrost thaws in polar regions?

- A. It releases carbon dioxide and methane into the atmosphere.
- B. It increases soil water retention.
- C. It decreases atmospheric carbon dioxide levels.
- D. It enhances the albedo effect.

64. What is the primary goal of the Paris Agreement?

- A. eliminating plastic pollution in oceans
- B. phasing out ozone-depleting substances
- C. limiting global temperature rise to below 2°C above pre-industrial levels
- D. restoring ecosystems damaged by climate change

65. How does ocean warming affect marine biodiversity?

- A. It increases dissolved oxygen levels.
- B. It improves coral reef health.
- C. It increases nutrient availability for fish.
- D. It causes species migration and habitat loss.

66. Which of the following is most responsible for ozone depletion?

- A. carbon dioxide (CO<sub>2</sub>)
- B. nitrous oxide (N<sub>2</sub>O)
- C. chlorofluorocarbons (CFCs)
- D. methane (CH<sub>4</sub>)

67. Which of these pollutants primarily leads to acid deposition on a global scale?

- A. carbon monoxide (CO)
- B. sulfur dioxide (SO<sub>2</sub>)
- C. chlorofluorocarbons (CFCs)
- D. methane (CH<sub>4</sub>)

68. What is the term for species that are particularly vulnerable to climate change due to narrow ecological niches?

- A. specialist species
- B. invasive species
- C. generalist species
- D. keystone species

69. What is the primary environmental effect of permafrost thawing in Arctic regions?

- A. decreased biodiversity
- B. release of methane and carbon dioxide
- C. reduction in sea surface temperatures
- D. increased soil fertility

70. What is the primary impact of El Niño events on global weather patterns?

- A. warmer-than-average sea surface temperatures in the Pacific Ocean
- B. increased ozone formation in the stratosphere
- C. increased glacial ice accumulation in polar regions
- D. reduced ocean salinity worldwide

Questions 71-75 are general questions about environmental science.

71. What type of succession occurs after a volcanic eruption forms a new island?

- A. primary succession
- B. secondary succession
- C. terrestrial succession
- D. climax succession

72. Which of the following ecosystems has the largest standing biomass?

- A. open ocean
- B. tropical rainforest
- C. desert
- D. boreal forest

73. Which type of ecological interaction benefits one species while having no effect on the other?

- A. mutualism
- B. parasitism
- C. competition
- D. commensalism

74. What is the best example of a cultural ecosystem service provided by biodiversity?

- A. climate regulation by forests
- B. ecotourism in tropical rainforests
- C. pollination of crops by bees
- D. nutrient cycling in wetlands

75. A population pyramid with a narrow base and a wide top indicates which of these?

- A. rapid population growth
- B. stable population
- C. declining population
- D. population with high fertility rates