

Robotics and the Natural World

Robotics · Answer Key · 21 Questions

1. Which biomimetic robot, inspired by cephalopod locomotion, was developed to navigate complex underwater environments and has been used for deep-sea exploration?

- A) Robo-Octopus (OctoBot)
- B) Robot-Fish (AquaBot)
- C) Soft Robotic Jellyfish (Medusabot)**
- D) Bio-inspired Squid Robot (SquidBot)

2. The 'Pleasant Goat' robot series, designed for herding, draws inspiration from the sensory and motor control mechanisms of which domesticated animal?

- A) Sheep
- B) Cattle
- C) Goats**
- D) Horses

3. Roboticists have created drones that mimic the flight patterns and wing articulation of which bird species to achieve energy-efficient aerial maneuverability for surveillance and ecological mapping?

- A) Eagles
- B) Hummingbirds**
- C) Owls
- D) Pigeons

4. The 'Robo-bee' project aims to create micro-robots capable of pollination, drawing architectural and aerodynamic inspiration from which tiny insect?

- A) Ant
- B) Beetle
- C) Bee**
- D) Dragonfly

5. Which type of robot, designed to mimic the movement of earthworms, has been explored for soil aeration and environmental remediation by burrowing through compacted earth?

- A) Serpentine robot**
- B) Amphibious robot
- C) Auger robot
- D) Trenching robot

6. Researchers have developed robotic grippers that emulate the adhesive properties of which climbing mammal's paws, enabling them to scale smooth vertical surfaces?

- A) Squirrel
- B) Gecko**
- C) Monkey
- D) Chimpanzee

7. To study marine ecosystems without disturbance, scientists use autonomous underwater vehicles (AUVs) designed to mimic the slow, deliberate movement of which large marine mammal?

- A) Dolphin
- B) Whale shark
- C) Sea otter
- D) Manatee**

8. Robotic systems inspired by the bioluminescent communication of which deep-sea organism are being researched for use in underwater signaling and exploration?

- A) Coral reefs
- B) Anglerfish**
- C) Jellyfish
- D) Squid

9. The 'Sand-Bot' project investigates robots that mimic the burrowing behavior of which desert-dwelling arthropod to explore subterranean environments and assess soil conditions?

- A) Scorpion**
- B) Spider
- C) Tarantula
- D) Centipede

10. Which robotic concept utilizes the collective behavior of a swarm of simple robots to perform complex tasks, mirroring the foraging strategies of colonies of which insect?

- A) Wasps
- B) Termites
- C) Ants**
- D) Bees

11. Robots designed to mimic the tactile sensing of which aquatic invertebrate are being developed for delicate sample collection in fragile marine environments?

- A) Starfish
- B) Sea cucumber
- C) Sea urchin

D) Octopus

12. The development of agile, multi-legged robots capable of traversing uneven terrain is often inspired by the locomotion of which class of terrestrial invertebrates?

- A) Mollusks
- B) Arachnids
- C) Myriapods

D) Insects

13. Robotic systems are being designed to mimic the remarkable adhesive abilities of which marine invertebrate for manipulating objects in wet, slippery conditions?

- A) Clam
- B) Mussel**
- C) Oyster
- D) Snail

14. Which bird's migratory navigation capabilities are being studied to inform the development of autonomous robots for long-distance environmental monitoring and data collection?

- A) Albatross
- B) Arctic Tern**
- C) Swift
- D) Seagull

15. The 'Mantis Shrimp' robot, with its powerful striking appendages, is being developed for which underwater task that requires rapid force application?

- A) Coral reef monitoring
- B) Seabed mapping
- C) Marine debris collection

D) Substrate sampling

16. Robots that mimic the water propulsion of which aquatic vertebrate are being researched for efficient, low-noise underwater locomotion in sensitive habitats?

- A) Frog
- B) Fish**
- C) Turtle
- D) Salamander

17. The ability of some robots to self-assemble and reconfigure, inspired by cellular processes, aims to replicate the adaptive growth observed in which fundamental biological structures?

A) Fungi

- B) Bacteria
- C) Algae
- D) Viruses

18. Robotic arms designed for precision manipulation in agricultural settings are often inspired by the dexterity and prehensile capabilities of which primate's hands?

- A) Gorilla
- B) Orangutan

C) Chimpanzee

- D) Lemur

19. Which insect's highly efficient and distributed sensory network is being studied to develop more robust and resilient robotic sensing systems for environmental monitoring?

- A) Aphid
- B) Grasshopper

C) Cockroach

- D) Moth

20. The development of soft robots capable of navigating through porous materials and complex organic structures is inspired by the movement of which microscopic organism?

A) Amoeba

- B) Paramecium
- C) Bacteria
- D) Yeast

21. Robots designed to mimic the echolocation capabilities of which mammal are being explored for mapping complex, cluttered environments like caves and dense forests?

- A) Dolphin

B) Bat

- C) Whale
- D) Seal