

MASTERMIND SCHOLARS EDUCATIONAL ALLIANCE

BIOLOGY

ECOLOGY 1 & 2

ECOLOGY & BIOLOGY – OBJECTIVE QUESTIONS

1. The study of organisms and the environment of an abandoned farmland is the ecology of
- A. A community
 - B. A population
 - C. A species
 - D. A habitat
 - E. An ecosystem
-

2. The feature that distinguishes the toad or frog from the fish is the absence of
- A. Scales
 - B. Lungs
 - C. Paired appendages
 - D. A tail
 - E. Skin glands
-

3. An organism which lives on the remains of dead plants is called a
- A. Endoparasite
 - B. Saprophyte
 - C. Commensal
 - D. Symbiont
 - E. Ectoparasite
-

4. The complex relationship between the members of a community and between the community as a whole and its physical environment is known as
- A. Ecosystem
 - B. Habitat
 - C. Environment
 - D. Niche
 - E. Microhabitat

5. A Secchi disc is used in the determination of

- A. Rainfall
 - B. Tides
 - C. Waves
 - D. Turbidity
 - E. Current velocity
-

6. Grasses → Grasshopper → Lizard → Snake → Hawk

In this food chain, the organisms that are least in number are

- A. Grasses
 - B. Grasshopper
 - C. Lizards
 - D. Snakes
 - E. Hawks
-

7. A green plant growing in a compost pit is feeding

- A. Holozoically
 - B. Parasitically
 - C. Saprophytically
 - D. Holophytically
 - E. In none of the above ways
-

8. A student trying to find out the order in which organisms appear on a cleared plot is studying

- A. Ecosystem
 - B. Food chain
 - C. Food web
 - D. Succession
 - E. Community
-

9. Choose the sequence which represents the correct order of organisms in a food chain.

- A. Grass → Snake → Toad → Grasshopper → Hawk
- B. Grass → Grasshopper → Toad → Snake → Hawk
- C. Grass → Grasshopper → Snake → Toad → Hawk
- D. Grass → Snake → Grasshopper → Toad → Hawk
- E. Grass → Toad → Snake → Grasshopper → Hawk

10. An instrument used in measuring the speed of wind is

- A. Barometer
 - B. Wind gauge
 - C. Wind vane
 - D. Anemometer
 - E. Hydrometer
-

11. A population is defined as the collection of

- A. Similar organisms found in the same habitat
 - B. Similar organisms that breed in the same habitat
 - C. Similar organisms that interbreed freely in the same habitat
 - D. Similar organisms eating the same food
 - E. Different organisms in the same habitat
-

12. Which of these food chains is NOT possible in a forest?

- A. Diatom → Fly → Toad → Snake
 - B. Fly → Toad → Snake → Hawk
 - C. Leaves → Antelope → Man → Lion
 - D. Leaves → Caterpillar → Bird → Lion
 - E. Leaves → Goat → Man → Lion
-

13. Roots of plants are normally

- A. Positively phototropic
 - B. Negatively geotropic
 - C. Negatively hydrotropic
 - D. Positively hydrotropic
 - E. Negatively chemotropic
-

14. Which of the following instruments is used for determining turbidity of water?

- A. Thermometer
 - B. Secchi disc
 - C. Rain gauge
 - D. Hydrometer
 - E. Wind vane
-

15. Which of the following statements about the rate of transpiration is INCORRECT? It is

- A. Dependent on temperature
 - B. Affected by changes in light intensity
 - C. Unaffected by humidity
 - D. Dependent on air movement
 - E. Affected by availability of water
-

16. An anemometer is an instrument for measuring

- A. Relative humidity
 - B. Altitude
 - C. Wind speed
 - D. Turbidity
 - E. Salinity
-

17. Green plants are important in the ecosystem because they are

- A. Primary consumers
 - B. Producers
 - C. Decomposers
 - D. Secondary consumers
 - E. Scavengers
-

18. Which of the following groups of factors is completely abiotic?

- A. Salinity, tide, plankton, turbidity
 - B. Temperature, pH, soil, insect
 - C. Wind, altitude, humidity, light
 - D. Conifers, wind, pH, rainfall
 - E. Soil, water, bacteria, salinity
-

19. In fish, the sense organs that detect movements in water are located within the

- A. Gills
 - B. Operculum
 - C. Nostrils
 - D. Median fin
 - E. Lateral line
-

20. An instrument that can be used to demonstrate phototropism and geotropism in plants is the
- A. Auxanometer
 - B. Potometer
 - C. Klinostat
 - D. Photometer
-

21. In an ecosystem, animals that feed directly on plants are called
- A. Secondary consumers
 - B. Primary consumers
 - C. Producers
 - D. Predators
-

22. In an agricultural ecosystem, the biotic component consists of
- A. Crops, pests and beneficial insects
 - B. Crops, temperature and humidity
 - C. Pests, beneficial insects and water
 - D. Crops, water and soil
-

23. Which of the following ecological factors are common to both terrestrial and aquatic habitats?
- A. Rainfall, temperature and light
 - B. Salinity, rainfall and altitude
 - C. Tides, wind, rainfall and altitude
 - D. pH, salinity, rainfall and humidity
-

24. In a community, bacteria and fungi are referred to as
- A. Producers
 - B. Decomposers
 - C. Scavengers
 - D. Consumers
-

25. An organism found on a bare rock surface with features of algae and fungi is
- A. An epiphyte
 - B. A lichen

- C. A bryophyte
 - D. A fern
-

26. Which of the following has the greatest influence on the distribution of animals in marine and freshwater habitats?

- A. pH
 - B. Salinity
 - C. Water current
 - D. Turbidity
-

27. One of the characteristics of plants in the savanna is the

- A. Possession of thin, smooth bark
 - B. Possession of large tap root
 - C. Production of seedlings on the mother plant
 - D. Possession of thick, flaky bark
-

28. Transpiration can be measured with a

- A. Photometer
 - B. Hygrometer
 - C. Potometer
 - D. Barometer
-

29. Etiolation is caused by the influence of

- A. Mineral salts
 - B. Water
 - C. Carbon dioxide
 - D. Light
-

30. The salinity of a brackish environment

- A. Increases immediately after rain
- B. Increases at the end of the rainy season
- C. Decreases with increase in micro-organisms
- D. Increases during the dry season

31. Physiological adaptation to very dry conditions in animals is called

- A. Hibernation
 - B. Aestivation
 - C. Rejuvenation
 - D. Xeromorphism
-

32. The most important factors which influence an organism's way of life in its habitat are

- A. The physical and biotic environment
 - B. Food and water availability
 - C. Temperature, water, light and predator–prey relationships
 - D. Competition for food and space
-

33. Organisms in an ecosystem are usually grouped according to their trophic level as

- A. Carnivores and epiphytes
 - B. Consumers and parasites
 - C. Producers and consumers
 - D. Producers and saprophytes
-

34. A food web is more stable than a food chain because

- A. It contains more organisms
 - B. It has greater energy source
 - C. It is not easy to destroy
 - D. Every organism has an alternative source of food
-

35. Which of the following is likely to occur in a deciduous forest during the dry season?

- A. New leaves are formed
 - B. The trees die off
 - C. The undergrowth increases
 - D. The ground becomes bare
-

36. Which of these is NOT an adaptive feature for arboreal life?

- A. Possession of long tail
 - B. Possession of claws
 - C. Possession of teeth
 - D. Counter-shading in coat colour
-

37. The flowering period of plants in a habitat is determined by the

- A. Duration of sunlight
 - B. Intensity and duration of rainfall
 - C. Relative humidity of the atmosphere
 - D. Temperature of the habitat
-

38. Mangrove swamp can be found

- A. On a seashore with flat terrain
 - B. Where a river meets the sea
 - C. On a mudflat near the sea
 - D. Where two rivers meet
-

39. A population is defined as a collection of similar organisms that

- A. Behave in the same way
 - B. Interbreed freely
 - C. Are found in the same habitat
 - D. Eat the same food
-

40. In a typical predator food chain, organisms become progressively

- A. Smaller and more numerous
 - B. Equal in number and size
 - C. Larger and fewer
 - D. Parasitized as consumers get bigger
-

41. An example of plant adaptation to a xerophytic environment is the development of

- A. Fleshy tissue and reduced leaves
- B. Broad canopy and extensive surface roots

- C. Thick bark and broad leaves
 - D. Rough leaves and shallow roots
-

42. Which factor is LEAST likely to affect animals living in freshwater habitat?
- A. Turbidity
 - B. Temperature
 - C. pH
 - D. Salinity
-

43. Which instrument is NOT used in measuring abiotic factors in a habitat?
- A. Microscope
 - B. Thermometer
 - C. Hygrometer
 - D. Wind vane
-

44. Plants adapted for life in salty marshes are called
- A. Hydrophytes
 - B. Xerophytes
 - C. Halophytes
 - D. Epiphytes
-

45. Which group of plants would be the first colonizers in succession from rocks to soil?
- A. Mosses
 - B. Ferns
 - C. Lichens
 - D. Grasses
-

46. What ecological condition favours the breeding of black flies?
- A. Freshwater habitat
 - B. Water in ponds and swamps
 - C. Water in small containers
 - D. Fast-flowing streams

47. Use the list below to answer the question.

1. Mango 2. Spear grass 3. Goat 4. Sheep 5. Temperature 6. Beans 7. Rock 8. Water

Items 1–4 can be regarded as

- A. A population
 - B. A community
 - C. An ecosystem
 - D. A niche
-

48. From the same list, the physical factors are

- A. 1, 5, 6
 - B. 4, 5, 7
 - C. 5, 7, 8
 - D. 6, 7, 8
-

49. Which of the following sets is made up of decomposers?

- A. Rhizopus, earthworm and protozoa
 - B. Mushroom, Rhizopus and bacteria
 - C. Bacteria, earthworm and nematodes
 - D. Earthworm, sedges and Platyhelminthes
-

50. Ecological succession ends with the formation of a stable

- A. Niche
 - B. Population
 - C. Pioneer community
 - D. Climax community
-

51. Use the list of biomes:

1. Desert 2. Rain forest 3. Southern Guinea savanna 4. Northern Guinea savanna

A biome with low rainfall and scattered trees found in Kano and Katsina is

- A. 1
 - B. 2
 - C. 3
 - D. 4
-

52. From the same list, the biome with many cacti where small mammals aestivate is

- A. 1
 - B. 2
 - C. 3
 - D. 4
-

53. In a drought situation, plants suffer from water stress which could result in

- A. Reduced biochemical activities
 - B. Enhanced chemical activities
 - C. Enhanced microbial activities
 - D. Reduced phototropic activities
-

54. In a food chain involving a primary producer, a primary consumer and a secondary consumer, trophic energy is shared such that

- A. The primary consumer has more energy than the primary producer
 - B. The secondary consumer takes up all the energy of the primary consumer
 - C. Energy is shared equally among the three groups
 - D. The secondary consumer gets only a small portion of the energy in the primary producer
-

55. Toads and lizards in an ecosystem depend on a limited quantity of food. This is an example of

- A. Parasitism
 - B. Intraspecific competition
 - C. Predation
 - D. Interspecific competition
-

56. Adaptive features of plants to desert conditions include

- A. Thick bark, succulent stems and sunken stomata
 - B. Thin bark, succulent stems and sunken stomata
 - C. Thin bark, air-filled stems and sunken stomata
 - D. Air spaces in tissues, adventitious roots and thick bark
-

57. After heavy rainfall and the formation of a large pond, the most likely sequence of vegetation changes is

- A. Euglena → Water lily → Spirogyra → Grass
 - B. Water lily → Spirogyra → Grass → Euglena
 - C. Spirogyra → Euglena → Grass → Water lily
 - D. Euglena → Spirogyra → Water lily → Grass
-

58. A group of organisms of different species living in a particular area is called a

- A. Colony
 - B. Community
 - C. Population
 - D. Niche
-

59. A freshwater plant such as water lily solves the problem of buoyancy by possessing

- A. Aerenchymatous tissues
 - B. Dissected leaves
 - C. Thin epidermal cell walls
 - D. Water-repelling epidermis
-

60. Ecological succession often leads to

- A. An increase in species diversity
 - B. A decrease in species diversity
 - C. An unstable community
 - D. The dispersal of species
-

61. Which of the following are adaptations of animals to aquatic habitats?

- A. Gills, streamlined bodies and lateral lines
 - B. Lateral lines, streamlined bodies and lungs
 - C. Gills, scaly skin and lungs
 - D. Gills, streamlined bodies and spiracles
-

62. Which of the following is an adaptation of tropical rainforest species?

- A. Few stomata
 - B. Thick bark
 - C. Buttress roots
 - D. Reduced leaves
-

63. In a food chain, each succeeding level represents

- A. An increase in the number of individuals
 - B. A decrease in the number of individuals
 - C. An increase in biomass
 - D. A gain in total energy
-

64. The disaster with the least destructive impact on animal life and natural balance is

- A. Chemical pollution
 - B. Forest fires
 - C. Oil spillage
 - D. Grasshopper pests
-

65. The factors that determine the distribution of vegetation zones are

- A. Temperature, light, rain and humidity
 - B. Light, humidity, air and mist
 - C. Temperature, light, air and humidity
 - D. Humidity, snow, frost and dew
-

66. The highest percentage of energy in an ecosystem occurs at the level of the

- A. Secondary consumers
- B. Decomposers

- C. Producers
 - D. Primary consumers
-

67. The greatest influence on a stable ecosystem in nature is exerted by
- A. Man
 - B. Pollution
 - C. Animals
 - D. Rainfall
-

68. The physical space occupied by an organism together with its functional role in a community is the
- A. Environment
 - B. Biome
 - C. Niche
 - D. Habitat
-

69. A freshwater pond may contain
- A. Tadpole, water boatman, leeches and crab
 - B. Water beetle, shrimps, water snail and water bug
 - C. Water lily, fish, water scorpion and dragonfly larva
 - D. Pond skater, water lily, shark and mosquito larva
-

70. A hygrometer is used for measuring
- A. Relative humidity
 - B. Specific gravity
 - C. Rainfall
 - D. Salinity
-

71. The distribution of plants in a rainforest is governed mainly by
- A. Vegetation
 - B. Soil types
 - C. Amount of sunlight
 - D. Rainfall pattern

72. The ability of an organism to live successfully in an environment is known as

- A. Resistance
- B. Competition
- C. Succession
- D. Adaptation

73. The most important adaptation of xerophytes is the ability of the protoplasm to

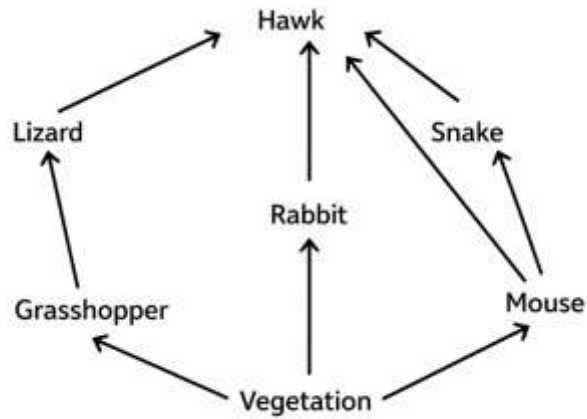
- A. Resist damage from water loss
- B. Store sugar and minerals in vacuoles
- C. Absorb water and swell
- D. Shrink from the cell wall

74. A green snake in green grass escapes notice from predators because of

- A. Disruptive coloration
- B. Counter shading
- C. Warning coloration
- D. Cryptic coloration

75. For heterotrophic organisms, competition is least caused by lack of

- A. Mates
- B. Space
- C. Light
- D. Nutrients



76. In the diagram, the hawk is
- A. An omnivore
 - B. A primary consumer
 - C. A tertiary consumer
 - D. A scavenger
-

77. Examples of competitors are
- A. Lizard and mouse
 - B. Snake and lizard
 - C. Grasshopper and mouse
 - D. Rabbit and snake
-

78. One adaptation for life on trees by a monkey is the possession of digits which are
- A. Extensible
 - B. Big
 - C. Opposable
 - D. Long
-

79. The community of plants in which the same species occur from year to year is the
- A. Annual species

- B. Pioneer vegetation
 - C. Perennial species
 - D. Climax vegetation
-

80. Plants tend to prevent overcrowding by means of efficient

- A. Water uptake
 - B. Seed germination
 - C. Pollination
 - D. Seed dispersal
-

81. The physical and climatic factors of a region primarily determine the

- A. Kinds of animals inhabiting the area
 - B. Types of plants found in the area
 - C. Nature of the soil in that region
 - D. Community of organisms in the region
-

82. A step in the movement of energy through an ecosystem best describes the term

- A. Food chain
 - B. Trophic level
 - C. Pyramid of numbers
 - D. Food web
-

83. In a population study using the transect method, the highest number of species is likely to be recorded in

- A. A tropical rainforest
 - B. A Guinea savanna
 - C. A Sahel savanna
 - D. An estuarine swamp
-

84. The most effective method of dealing with non-biodegradable pollutants is by

- A. Dumping
- B. Recycling

- C. Incineration
 - D. Burying
-

85. The pioneer organisms in ecological succession are usually
- A. Mosses
 - B. Lichens
 - C. Ferns
 - D. Algae
-

86. The presence of sunken stomata and folding of leaves are adaptations to
- A. Prevent entry of pathogens
 - B. Reduce water loss
 - C. Remove excess water
 - D. Prevent guttation
-

87. Spines and shells in animals are adaptations for
- A. Camouflage
 - B. Chemical defence
 - C. Physical defence
 - D. Mimicry
-

88. The inactive state exhibited by animals during hot dry seasons is termed
- A. Aestivation
 - B. Dormancy
 - C. Resting
 - D. Hibernation
-

Ecological Zone	Temperature (oC)	Rainfall (mm)
I	45	300
II	32	2000
III	30	2200
IV	15	800

89. From the table above high relative humidity will be expected in zones

- A. I and III
 - B. I and IV
 - C. II and III
 - D. II and IV
-

Ecological Zone	Temperature (oC)	Rainfall (mm)
I	45	300
II	32	2000
III	30	2200
IV	15	800

90. From the table above which of the zones is likely to be desert?

- A. I
 - B. II
 - C. III
 - D. IV
-

91. One of the adaptation of reptile to water loss is the presence of

- A. keratinous scale
 - B. claws on limbs
 - C. long tails
 - D. long sticky tongues
-

- 92.** The scarcity of food causes a sudden decrease in population size by
- A. decreasing the reproductive rate
 - B. bringing about immigration
 - C. raising the mortality rate
 - D. minimizing the rate of competition
-

- 93.** Plants survive hot dry conditions by
- A. storing water in large parenchyma cells
 - B. producing numerous leaves
 - C. having numerous stomata
 - D. having evergreen leaves
-

- 94.** An evidence of the relationship between living organisms and their extinct relatives can best be obtained from
- A. embryology
 - B. comparative anatomy
 - C. comparative physiology
 - D. palaeontology
-

- 95.** The population density of *Tridax* in an abandoned square farm land of side 200 m was found to be 5 plants per m². The population size of the plant on the farm is
- A. 40
 - B. 1,000
 - C. 40,000
 - D. 200,000
-

- 96.** One adaptation shown by hydrophytes in freshwater habitats is the
- A. leaves reduced to spines
 - B. poor development of roots and xylem tissues
 - C. waxy cuticle on shoot surface
 - D. well developed roots and supporting system
-

97. A biotic factor which affects the distribution and abundance of organisms in a terrestrial habitat is

- A. temperature
 - B. competition
 - C. pH
 - D. light
-

98. The major consequence of bush burning in an ecosystem is

- A. the loss of water
 - B. the loss of biological diversity
 - C. a decrease in animal population
 - D. an increase in soil fertility
-

99. In a typical freshwater habitat, the edge of the stream or pond constitutes the

- A. tidal zone
 - B. intertidal zone
 - C. littoral zone
 - D. euphotic zone
-

100. The main ecological problem facing intertidal organisms is

- A. desiccation
- B. floatation
- C. salinity
- D. humidity

DETAILEDLY EXPLAIN ANSWERS

1. Ecology of organisms and environment of abandoned farmland

Answer: E — Ecosystem

Why: Ecology studies how living things interact **with each other and with their environment.**

Key terms difference:

Term	Meaning
Species	One type of organism
Population	Same species in one area
Community	All living organisms in area
Habitat	The place organisms live
Ecosystem	Living + non-living interacting

2. Feature distinguishing frog/toad from fish

Answer: B — Lungs

Fish vs amphibians:

Feature	Fish	Frog/Toad
Gills	✓	Larval stage only
Lungs	✗	✓
Scales	✓	✗
Skin glands	✗	✓

The **major difference** is breathing:

- Fish → gills
 - Frogs → lungs (especially adults)
-

3. Organism feeding on dead plants

Answer: B — Saprophyte

Types of feeding:

Term	Meaning
Parasite	Feeds on living host
Commensal	One benefits, other unaffected
Symbiont	Live closely together
Saprophyte	Feeds on dead matter

Examples: fungi, bacteria.

Dead plant remains → saprophyte.

4. Complex relationship between community + environment

Answer: A — Ecosystem

This question describes **interactions:**

- organisms ↔ organisms

- organisms ↔ environment

That definition = ecosystem.

A **habitat** is just the place, not the interactions.

5. Use of Secchi disc

Answer: D — Turbidity

Turbidity = how **cloudy or muddy** water is.

How it works:

- Disc lowered into water
- Depth where it disappears = water clarity

Used in lakes, rivers, oceans.

Cloudy water = low light penetration → affects plants and fish.

6. Organisms least in number in food chain

Answer: E — Hawks

Food chain:

Grasses → Grasshopper → Lizard → Snake → Hawk

Energy transfer rule:

Only **10% energy** passes to next level.

Example:

- Plants: 10,000 units energy
- Herbivores: 1,000
- Carnivores: 100
- Top predator: 10

So top predators are **fewest**.

7. Feeding of green plant in compost pit

Answer: D — Holophytic

Holophytic nutrition = photosynthesis.

Even if plant grows in compost, it still:

- uses sunlight
- makes its own food

Saprophytic feeding is done by fungi, not green plants.

8. Order of organisms appearing on cleared plot

Answer: D — Succession

Ecological succession = **gradual replacement of species over time**.

Stages:

1. Pioneer species (lichens)
2. Grasses
3. Shrubs
4. Trees
5. Climax community

So studying the order = succession.

9. Correct food chain order

Answer: B — Grass → Grasshopper → Toad → Snake → Hawk

Rule:

1. Producer → plant
2. Herbivore → eats plant
3. Small carnivore
4. Larger carnivore
5. Top predator

Check chain:

- Grass (producer)
- Grasshopper (herbivore)
- Toad (insect eater)
- Snake (eats toads)

- Hawk (top predator)
Perfect energy flow.
-

10. Instrument measuring wind speed

Answer: D — Anemometer

Instruments summary:

Instrument	Measures
Barometer	Air pressure
Wind vane	Wind direction
Hydrometer	Density of liquids
Anemometer	Wind speed

Used in weather stations.

11. A population is defined as the collection of

Answer: C — Similar organisms that interbreed freely in the same habitat

Explanation

- **Population** = group of individuals of the **same species** living in the same area **and capable of interbreeding**.
- Key points:
 - Same species → ensures genetic similarity
 - Same habitat → same environmental conditions
 - Interbreeding → essential to maintain gene flow

Other options:

- A & B → just being in the same habitat isn't enough
 - D → diet doesn't define population
 - E → "different organisms" → community, not population
-

12. Which of these food chains is NOT possible in a forest?

Answer: E — Leaves → Goat → Man → Lion

Explanation

- A **food chain** must reflect realistic ecological relationships.

Check each:

1. Diatom → Fly → Toad → Snake → **plausible**
 2. Fly → Toad → Snake → Hawk → **plausible**
 3. Leaves → Antelope → Man → Lion → **plausible** (herbivore → human → carnivore)
 4. Leaves → Caterpillar → Bird → Lion → **plausible**
 5. Leaves → Goat → Man → Lion → **NOT plausible**:
 - Lions in forests don't feed on humans in normal ecosystems.
 - Food chains must be **natural interactions**.
-

13. Roots of plants are normally

Answer: D — Positively hydrotropic

Explanation

- Tropism = growth response to a stimulus.

Roots show:

- **Positive hydrotropism** → grow towards water
- **Positive geotropism** → grow downward in response to gravity (also true, but hydrotropism is the normal defining factor in roots seeking moisture)

Other options:

- Phototropism → roots grow **away from light** (negative phototropism)
 - Chemotropism → toward chemicals, only in special cases
-

14. Instrument for determining turbidity of water

Answer: B — Secchi disc

Explanation

- **Turbidity** = cloudiness of water caused by suspended particles.
 - **Secchi disc**:
 - Circular disc lowered into water
 - Depth at which it disappears measures turbidity
 - Other options:
 - Thermometer → temperature
 - Rain gauge → rainfall
 - Hydrometer → density
 - Wind vane → wind direction
-

15. Statement about rate of transpiration that is INCORRECT

Answer: C — Unaffected by humidity

Explanation

- **Transpiration** = loss of water vapor from plant leaves.
 - Factors affecting transpiration:
 - Temperature → ↑ temp, ↑ transpiration
 - Light → stomata open in light
 - Air movement → wind removes humid air → ↑ transpiration
 - Water availability → drought reduces transpiration
 - **Humidity** → **high humidity reduces transpiration**, so saying “unaffected” is **incorrect**.
-

16. An anemometer measures

Answer: C — Wind speed

Explanation

- Anemometer = weather instrument that measures **speed of wind**.
 - Other options:
 - Relative humidity → hygrometer
 - Altitude → barometer/altimeter
 - Turbidity → Secchi disc
 - Salinity → hydrometer or refractometer
-

17. Green plants are important because they are

Answer: B — Producers

Explanation

- Green plants perform **photosynthesis** → convert solar energy into chemical energy.
- They form the **base of all food chains**, supporting:
 - Primary consumers (herbivores)
 - Secondary consumers (carnivores)

Other options: consumers, decomposers, scavengers → rely on plants or other organisms for energy.

18. Which group of factors is completely abiotic?

Answer: C — Wind, altitude, humidity, light

Explanation

- **Abiotic factors** = non-living environmental factors:
 - Temperature, light, water, wind, pH, soil, altitude, humidity
 - Other options include **living organisms**:
 - Plankton → biotic
 - Insects → biotic
 - Conifers → biotic
 - Bacteria → biotic
-

19. In fish, sense organs that detect movements in water

Answer: E — Lateral line

Explanation

- **Lateral line system** = series of sensory organs along fish body.
 - Detects:
 - Vibrations
 - Water currents
 - Nearby movement of predators/prey
 - Other options:
 - Gills → respiration
 - Operculum → covers gills
 - Nostrils → smell
 - Median fin → locomotion
-

20. Instrument used to demonstrate phototropism & geotropism

Answer: C — Klinostat

Explanation

- **Klinostat:**
 - Rotates plant slowly
 - Removes directional stimulus (light or gravity)
 - Used to show **how roots/shoots respond to stimuli**
- Other instruments:
 - Auxanometer → measures plant growth
 - Potometer → measures water uptake
 - Photometer → measures light intensity

21. Animals that feed directly on plants

Answer: B — Primary consumers

Trophic levels in ecosystem:

1. Producers → plants
2. **Primary consumers** → herbivores
3. Secondary consumers → carnivores
4. Tertiary consumers → top predators

Animals eating plants (goats, cows, grasshoppers) are **primary consumers**.

22. Biotic components of agricultural ecosystem

Answer: A — Crops, pests and beneficial insects

Biotic = **living things**.

Agricultural ecosystem includes:

- Crops (plants)
- Pests (insects, rodents)
- Beneficial insects (bees, ladybirds)

Options with temperature, water or soil are **abiotic** (non-living).

23. Ecological factors common to land and water habitats

Answer: A — Rainfall, temperature and light

These affect **all ecosystems**:

- Light → photosynthesis

- Temperature → metabolism
- Rainfall → water availability

Other options include factors not common to both (like tides or altitude).

24. Bacteria and fungi in community

Answer: B — Decomposers

Role:

- Break down dead plants & animals
- Release nutrients back into soil

Without decomposers → nutrients would run out.

They are the **recycling system of nature**.

25. Organism with features of algae + fungi

Answer: B — Lichen

Lichen = symbiosis:

- Algae → makes food
- Fungus → provides shelter & moisture

They grow on rocks and are **pioneer species**.

26. Factor influencing animal distribution in water

Answer: B — Salinity

Salinity = salt concentration.

Why important:

- Freshwater fish cannot survive in salty water
- Marine fish cannot survive in freshwater

Salt balance affects:

- Osmosis
 - Survival
 - Distribution
-

27. Savanna plant characteristic

Answer: D — Thick flaky bark

Savanna has frequent **bush fires**.

Adaptations:

- Thick bark → protects tree from fire
- Deep roots → reach water

Example: baobab, acacia.

28. Instrument measuring transpiration

Answer: C — Potometer

Transpiration = water loss from leaves.

Potometer measures:

- Rate of water uptake
 - Which equals water lost through transpiration.
-

29. Cause of etiolation

Answer: D — Light

Etiolation = plant grown in darkness.

Features:

- Long weak stems
- Pale yellow leaves
- Small leaves

Why? No light → no chlorophyll.

30. Salinity of brackish water

Answer: D — Increases during dry season

Brackish water = mix of fresh + salt water.

Dry season:

- Less rain
- More evaporation
→ salt concentration increases.

Rainy season dilutes salt.

31. Physiological adaptation to very dry conditions

Answer: B — Aestivation

This question focuses on **physiological adaptation** (internal body change).

In hot dry seasons:

- Water becomes scarce
- Temperature is very high

Some animals survive by **aestivation**, meaning:

- They become inactive
- Metabolism slows down
- Water loss reduces

Examples: snails, frogs, reptiles.

This helps them survive drought until rain returns.

32. Most important factors influencing an organism's way of life

Answer: A — The physical and biotic environment

Two main categories affect life:

Abiotic (physical)

- Temperature
- Light
- Water
- Soil

Biotic (living)

- Predators
- Competition
- Parasites
- Food supply

An organism's survival depends on **both together**, not just one.

33. Grouping organisms by trophic level

Answer: C — Producers and consumers

Trophic level = **feeding level**.

Basic classification:

1. Producers → plants make food
2. Consumers → animals eat plants/animals

Other groups (parasites, saprophytes) are not main trophic grouping.

34. Why food web is more stable than food chain

Answer: D — Every organism has an alternative source of food

Food chain = single pathway

Food web = multiple pathways

Example:

If grasshopper disappears:

- Frog may eat beetles instead.
- Birds may eat worms instead.

Because organisms have **backup food**, ecosystem survives.

35. Deciduous forest during dry season

Answer: D — The ground becomes bare

Deciduous trees drop leaves to:

- Reduce transpiration (water loss)
- Survive dry season

Result:

- Trees become leafless
 - Ground looks bare and dry
-

36. NOT an arboreal (tree-life) adaptation

Answer: C — Possession of teeth

Arboreal animals need:

- Long tail → balance
- Claws → grip branches
- Camouflage → hide from predators

Teeth are for feeding and **not specific** to tree living.

37. Flowering period determined by

Answer: A — Duration of sunlight

This is **photoperiodism**.

Plants detect:

- Length of day vs night

Examples:

- Short-day plants → flower when nights are long
- Long-day plants → flower when days are long

So **sunlight duration** triggers flowering.

38. Mangrove swamp location

Answer: B — Where a river meets the sea

This area is called an **estuary**.

Characteristics:

- Brackish water (salt + fresh)
- Muddy soil
- Waterlogged land

Mangroves are adapted to:

- Salty water
 - Low oxygen soil.
-

39. Population definition

Answer: B — Interbreed freely

Population must satisfy 3 things:

1. Same species
2. Same location
3. **Interbreed freely**

Interbreeding is the key scientific requirement.

40. Predator food chain trend

Answer: C — Larger and fewer

Energy pyramid idea:

- Plants → many small organisms
- Herbivores → fewer
- Carnivores → even fewer
- Top predators → very few and large

Because **energy decreases at each level**.

41. Plant adaptation to xerophytic environment

Answer: A — Fleshy tissue and reduced leaves

Xerophytes live in **very dry environments**.

Adaptations to conserve water:

- Fleshy tissues → store water (e.g., cactus)
- Reduced leaves/spines → reduce water loss
- Thick cuticle → reduce evaporation

Perfect survival strategy in deserts.

42. Factor least likely to affect freshwater animals

Answer: D — Salinity

Freshwater habitats (rivers, lakes):

- Very low salt content
- Salinity stays almost constant

Factors that DO affect freshwater animals:

- Temperature → affects metabolism
- pH → affects survival
- Turbidity → affects light & feeding

Since salt level barely changes, salinity affects them the **least**.

43. Instrument NOT used to measure abiotic factors

Answer: A — Microscope

Abiotic factors = temperature, wind, humidity, rainfall, light.

Instruments used:

- Thermometer → temperature
- Hygrometer → humidity
- Wind vane → wind direction

Microscope is used to study **living organisms**, not abiotic factors.

44. Plants adapted to salty marshes

Answer: C — Halophytes

Types of plants by habitat:

Plant type	Habitat
Hydrophytes	Water
Xerophytes	Dry desert
Epiphytes	Grow on trees
Halophytes	Salty soil

Examples: mangroves, salt marsh plants.

45. First colonizers in succession from rocks

Answer: C — Lichens

Primary succession begins on bare rock.

Why lichens?

- Can survive extreme conditions
- Break rocks into soil using acids
- Prepare land for other plants

After lichens → moss → grasses → trees.

46. Ecological condition for black flies breeding

Answer: D — Fast-flowing streams

Black fly larvae need:

- Highly oxygenated water
- Strong current

Fast streams provide:

- High oxygen
- Suitable attachment surfaces

So they thrive in flowing water.

47. Items 1–4 regarded as

(Mango, spear grass, goat, sheep)

Answer: B — Community

Definitions:

- Population → one species
- **Community** → many different species together

These are **different organisms living together**, so community.

48. Physical factors from list

(Temperature, rock, water)

Answer: C — 5, 7, 8

Physical (abiotic) = non-living:

- Temperature
- Rock
- Water

Plants and animals are biotic.

49. Set made of decomposers

Answer: B — Mushroom, Rhizopus and bacteria

True decomposers:

- Bacteria
- Fungi (mushrooms, Rhizopus)

They break down dead organic matter into nutrients.

Earthworms are **detritivores**, not decomposers.

50. Succession ends with formation of

Answer: D — Climax community

Succession stages:

1. Pioneer species
2. Intermediate stages
3. **Climax community**

Climax community:

- Stable ecosystem
- Balanced organisms
- No major change unless disturbed.

Example: mature forest.

51. Biome with low rainfall and scattered trees in Kano & Katsina

Answer: D — Northern Guinea savanna

Biomes listed:

1. Desert
2. Rainforest
3. Southern Guinea savanna
4. **Northern Guinea savanna**

Northern Guinea savanna characteristics:

- Low rainfall (but not as dry as desert)
- Scattered trees and grasses
- Found in Northern Nigeria (Kano, Katsina)

Desert would have **almost no trees**, so option 1 is wrong.

52. Biome with many cacti and aestivating mammals

Answer: A — Desert

Desert features:

- Very low rainfall
- High temperature
- Plants store water → **cacti**
- Animals survive drought by **aestivation**

Examples: rats, reptiles, snails.

53. Effect of drought on plants (water stress)

Answer: A — Reduced biochemical activities

Water is needed for:

- Photosynthesis
- Enzyme activity
- Transport of nutrients

When plants lack water:

- Photosynthesis slows
- Growth stops
- Metabolism reduces

So biochemical activities decrease.

54. Energy transfer in food chain

Answer: D — Secondary consumer gets small portion

Energy flow rule (10% law):

- Only about **10% energy** moves to next level.

Example:

- Producer = 1000 units
- Primary consumer = 100
- Secondary consumer = 10

So secondary consumer gets **very little energy**.

55. Toads and lizards depending on limited food

Answer: D — Interspecific competition

Types of competition:

Type	Meaning
Intraspecific	Same species compete
Interspecific	Different species compete

Toads + lizards = different species → competing for insects.

56. Plant adaptations to desert conditions

Answer: A — Thick bark, succulent stems and sunken stomata

Why these help:

Feature	Function
Thick bark	Prevents water loss
Succulent stem	Stores water
Sunken stomata	Reduces evaporation

These are classic **xerophyte adaptations**.

57. Vegetation sequence after pond formation

Answer: D — Euglena → Spirogyra → Water lily → Grass

This is **hydrosere succession** (water → land).

Stages:

1. Microscopic algae (Euglena)
2. Filamentous algae (Spirogyra)
3. Floating plants (water lily)
4. Grasses as pond fills with soil

Water body gradually becomes land.

58. Group of different species in an area

Answer: B — Community

Definitions recap:

- Population → same species
- **Community** → **different species**
- Ecosystem → community + environment

Since species are different → community.

59. How water lily floats

Answer: A — Aerenchymatous tissues

Water plants need buoyancy.

Aerenchyma:

- Tissue with large air spaces
- Traps air
- Helps plant float

This keeps leaves at water surface for sunlight.

60. Effect of ecological succession

Answer: A — Increase in species diversity

As succession progresses:

- More plants grow
- More animals arrive
- Food chains become complex

So biodiversity **increases over time**.

61. Adaptations of animals to aquatic habitats

Answer: A — Gills, streamlined bodies and lateral lines

Aquatic animals need to:

- Breathe in water → **gills**
- Move easily in water → **streamlined body**
- Detect movement in water → **lateral line**

Lungs are for land animals, spiracles are for insects → so option A is correct.

62. Adaptation of tropical rainforest plants

Answer: C — Buttress roots

Rainforest soil:

- Shallow and nutrient-poor
- Trees grow very tall

Buttress roots:

- Large, spreading roots
- Provide support and stability

- Help absorb nutrients near surface

Common in tall rainforest trees.

63. Each level in food chain represents

Answer: B — Decrease in number of individuals

Energy reduces at each trophic level:

- Many plants
- Fewer herbivores
- Even fewer carnivores

So population size decreases as we move up the food chain.

Answer: D. Grasshopper pests

We choose the disaster that causes the **least harm to animals and nature**.

A. Chemical pollution – Very harmful

Poisons water, air, and soil. Many animals die and the damage lasts a long time.

B. Forest fires – Very harmful

Burns animals and destroys their homes and food.

C. Oil spillage – Extremely harmful

Kills fish and sea animals and damages oceans for many years.

D. Grasshopper pests – Least harmful ✓

They mainly eat plants and crops.

They don't poison the environment, and many animals eat grasshoppers, so nature can recover quickly.

65. Factors determining vegetation zones

Answer: A — Temperature, light, rain and humidity

Climate determines vegetation.

Key climate factors:

- Temperature
- Rainfall
- Light
- Humidity

These decide whether an area becomes forest, savanna or desert.

66. Highest percentage of energy in ecosystem

Answer: C — Producers

Energy pyramid:

- Producers capture sunlight.
- Each trophic level loses energy.

Therefore producers hold **the most energy**.

67. Greatest influence on stable ecosystem

Answer: A — Man

Humans affect ecosystems through:

- Deforestation
- Pollution
- Hunting
- Urbanization

Human activities can drastically change ecosystem balance.

68. Physical space + functional role of organism

Answer: C — Niche

Difference:

Term	Meaning
Habitat	Where organism lives
Niche	Role + position + lifestyle

Niche includes:

- What it eats
 - Where it lives
 - How it interacts
-

69. Freshwater pond organisms

Answer: C — Water lily, fish, water scorpion and dragonfly larva

Why others wrong:

- Crab and shark → marine animals.
- Pond must contain freshwater organisms only.

Option C contains all freshwater species.

70. Hygrometer measures

Answer: A — Relative humidity

Hygrometer → moisture in air.

Humidity affects:

- Transpiration
 - Weather
 - Plant growth
-

71. The distribution of plants in a rainforest is governed mainly by

Answer: C — Amount of sunlight

Explanation

Rainforests receive **abundant rainfall all year**, so water is **not the limiting factor**.

What becomes scarce inside the forest is **sunlight**, because:

- The canopy (tall trees) blocks light.
- Only little light reaches the forest floor.

This causes **stratification (layering)** of plants:

- Emergent layer → full sunlight
- Canopy → high sunlight
- Understory → little sunlight
- Forest floor → very little sunlight

Therefore plant distribution depends mainly on **light availability**.

72. The ability of an organism to live successfully in an environment is

Answer: D — Adaptation

Explanation

Adaptation = features that help organisms survive and reproduce.

Examples:

- Camel storing fat → desert survival
- Fish gills → aquatic survival
- Cactus spines → reduce water loss

The question asks for **ability to survive in environment**, which is the definition of adaptation.

73. The most important adaptation of xerophytes is ability of protoplasm to

Answer: A — Resist damage from water loss

Explanation

Xerophytes = plants in dry environments.

Biggest problem = **dehydration**.

Their cells can:

- Survive extreme water loss
- Remain alive even when dried

Example:

Some desert plants can lose **up to 90% water** and still live.

This ability of the **protoplasm (living cell content)** is critical.

74. Green snake in green grass escapes predators due to

Answer: D — Cryptic coloration

Explanation

Cryptic coloration = **camouflage**.

It helps an organism **blend into its environment**.

Other options:

- Disruptive coloration → breaks body outline (zebra stripes)
- Countershading → dark top, light belly (fish)
- Warning coloration → bright colors (poison frogs)

Snake blending with grass = camouflage → cryptic coloration.

75. Competition for heterotrophs is least caused by lack of

Answer: C — Light

Explanation

Heterotrophs = animals (cannot make food).

They compete for:

- Food (nutrients)

- Space
- Mates

But **light is needed by plants (autotrophs)** for photosynthesis.

So animals **do not compete for light**.

76. In the diagram, the hawk is

Answer: C — A tertiary consumer

Explanation

Typical food chain:

- Producer → plants
- Primary consumer → herbivore
- Secondary consumer → small carnivore
- Tertiary consumer → top predator

A hawk eats snakes, rats, birds → high-level predator → tertiary consumer.

77. Examples of competitors are

Answer: C — Grasshopper and mouse

Explanation

Competition occurs when organisms need the **same resource**.

Grasshopper and mouse both eat:

- Seeds
- Plants

So they compete for **food**.

Other options are predator-prey relationships.

78. Adaptation for life on trees by monkey

Answer: C — Opposable digits

Explanation

Opposable digits = thumb can touch fingers.

Benefits:

- Strong grip on branches
- Ability to climb

- Ability to grasp food

This is key for **arboreal life** (tree living).

79. Community where same plants occur yearly

Answer: D — Climax vegetation

Explanation

Ecological succession stages:

1. Pioneer stage
2. Intermediate stages
3. Climax community

Climax vegetation:

- Stable
- Self-sustaining
- Same species persist for years

Example: mature forest.

80. Plants prevent overcrowding by efficient

Answer: D — Seed dispersal

Explanation

If seeds fall near parent plant:

- Competition for light
- Competition for nutrients
- Competition for water

Seed dispersal spreads seeds via:

- Wind
- Water
- Animals
- Explosive fruits

This reduces overcrowding and increases survival.

81. Physical and climatic factors primarily determine the

Answer: B — Types of plants found in the area

Explanation

Climate (rainfall, temperature, sunlight) mainly determines **vegetation** first.

Plants form the **foundation of ecosystems** because:

- Animals depend on plants for food and shelter.
- Once plants are established, animals follow.

So climate → determines plants → determines animals.

82. A step in movement of energy through ecosystem

Answer: B — Trophic level

Explanation

Trophic level = feeding level in food chain.

Examples:

1. Producers → 1st trophic level
2. Herbivores → 2nd trophic level
3. Carnivores → 3rd trophic level

A food chain is the *whole pathway*, but a **step in it** is a trophic level.

83. Highest number of species recorded using transect method

Answer: A — A tropical rainforest

Explanation

Tropical rainforests have:

- High rainfall
- Warm temperatures
- Abundant sunlight

These create the **highest biodiversity on Earth**.

Savannas and swamps have fewer species compared to rainforests.

84. Most effective way to deal with non-biodegradable pollutants

Answer: B — Recycling

Explanation

Non-biodegradable = cannot be broken down naturally.

Examples:

- Plastics

- Metals
- Glass

Best solution = **recycling** because it:

- Reduces waste accumulation
- Saves resources
- Reduces pollution

Dumping/burying only stores the problem.

85. Pioneer organisms in succession

Answer: B — Lichens

Explanation

Pioneer species = first organisms to colonize bare land.

Lichens can:

- Grow on bare rock
- Break rocks into soil
- Survive harsh conditions

They prepare the environment for mosses and plants.

86. Sunken stomata & leaf folding help to

Answer: B — Reduce water loss

Explanation

These are xerophyte (desert plant) adaptations.

Sunken stomata:

- Trap moist air
- Reduce evaporation

Leaf folding:

- Reduces exposed surface area
- Reduces transpiration

Main goal → conserve water.

87. Spines and shells in animals are for

Answer: C — Physical defence

Explanation

Spines (porcupine) and shells (tortoise) protect animals from predators by:

- Making them hard to eat
- Preventing attack

This is **physical/mechanical defence**.

88. Inactive state during hot dry season

Answer: A — Aestivation

Explanation

Aestivation = summer dormancy.

Animals become inactive to:

- Avoid heat
- Avoid dehydration

Examples:

- Snails
- Frogs

Hibernation happens during **cold winter**.

89. Zones with high relative humidity

Answer: C — II and III

Explanation

High humidity occurs in areas with:

- High rainfall
- Dense vegetation
- High evaporation

These correspond to **rainforest & swamp zones** (commonly labelled II & III in such tables).

90. Zone likely to be desert

Answer: A — I

Explanation

Deserts have:

- Very low rainfall
- Very low humidity
- High temperature

In typical climate tables, Zone I represents the **lowest humidity/rainfall zone**, hence desert.

91. Adaptation of reptiles to prevent water loss

Answer: A — Keratinous scales

Explanation

Reptiles (snakes, lizards) live in dry or semi-dry habitats. Their main problem = **water loss through skin**.

Adaptation:

- **Keratinous scales** → a tough, waxy covering
- Reduces evaporation
- Prevents dehydration

Other options (claws, long tails) are for locomotion or defense, not water conservation.

92. Scarcity of food causes sudden population decrease by

Answer: C — Raising the mortality rate

Explanation

When food is limited:

- Animals cannot get enough energy
- Weak individuals die → mortality increases
- Fewer offspring survive

Other options:

- Decreased reproductive rate → slower long-term effect
 - Immigration → might reduce pressure but does not immediately reduce population
 - Minimizing competition → behaviorally occurs, but does not stop deaths
-

93. How plants survive hot dry conditions

Answer: A — Storing water in large parenchyma cells

Explanation

Xerophytes survive drought by:

- **Succulent tissues** → water storage in leaves, stems, or roots
- Example: Cactus stem stores water, allowing survival during long dry periods

Other options:

- Numerous leaves → increases water loss
 - Numerous stomata → increases transpiration
 - Evergreen leaves → helps in moderate climates, not hot dry deserts
-

94. Evidence of relationship between living organisms and extinct relatives

Answer: D — Palaeontology

Explanation

Palaeontology = study of fossils

Fossils provide evidence:

- How organisms evolved
- Similarities with extinct species

Other options:

- Embryology → compares embryos, not extinct species
 - Comparative anatomy → living organisms
 - Comparative physiology → functions of living organisms
-

95. Population size of Tridax in farm of 200 m side with 5 plants/m²

Given:

- Side of square farm = 200 m → Area = $200 \times 200 = 40,000 \text{ m}^2$
- Density = 5 plants/m²

Population size = density × area

$$\left[\begin{array}{l} \text{\text{Population}} = 5 \times 40,000 = 200,000 \\ \end{array} \right]$$

Answer: D — 200,000

96. Adaptation shown by hydrophytes

Answer: B — Poor development of roots and xylem tissues

Explanation

Hydrophytes = plants living in water

Adaptations:

- Water is abundant → roots don't need to absorb much water
- Xylem reduced → less need to transport water
- Leaves often float → large surface area for photosynthesis

Other options:

- Leaves as spines → xerophytes
- Waxy cuticle → xerophytes
- Well-developed roots → terrestrial plants

97. Biotic factor affecting distribution & abundance in terrestrial habitat

Answer: B — Competition

Explanation

Biotic factors = living factors (plants, animals, microbes)

- Competition → limits resources like food, mates, space
- Example: Two herbivores feeding on same plants

Abiotic factors (temperature, pH, light) → non-living, so not the correct answer here.

98. Major consequence of bush burning

Answer: B — Loss of biological diversity

Explanation

Bush burning destroys:

- Plants → removes food and shelter
- Animals → lose habitat
- Soil micro-organisms

Result = **reduction in biodiversity**, which disrupts the ecosystem.

Other effects: temporary fertility increase, but **biodiversity loss** is the major impact.

99. Edge of stream or pond constitutes

Answer: C — Littoral zone

Explanation

Zones in freshwater:

- **Littoral zone** → shallow area near the shore → plants rooted in sediment
- **Limnetic zone** → open water → light penetrates
- **Profundal zone** → deep water → light doesn't penetrate
- **Intertidal** → only in tidal coastal regions

So **pond edge = littoral zone**.

100. Main ecological problem facing intertidal organisms

Answer: A — Desiccation

Explanation

Intertidal zone = area exposed to air during low tide, submerged at high tide.

Challenges:

- **Desiccation** → drying out during low tide
- Salinity changes → minor issue (organisms are adapted)
- Flootation & humidity → not limiting factors

Adaptations: shells, burrowing, moisture retention.
