

Contest 1

1. In genetics, how many sets of sister chromatids make a tetrad?
Two sets of sister chromatids (Don't accept four chromatids)
2. What name is given to heterotrophs that utilize inorganic compounds or geological processes as their source of electrons?
Lithotrophs
3. What is a perfect flower?
A perfect flower is one in which both male and female reproductive structures are present. / Both androecium and gynoecium are located on the same flower

.....

Contest 2

1. Name the important environment factor which epiphytes in the rain forest compete for?
Light
2. The inner ear of mammals contains 2 main structures that perform 2 different functions. Name the part that is responsible for hearing.
The cochlea
3. Dilute NaOH solution was added to a solution of food substance in a test tube, followed by the addition of drops of 1% CuSO₄ solution while shaking the test tube. The appearance of which colour would indicate the presence of protein?
The production of violet colouration

.....

Contest 3

1. How do nastic movements differ from tropic movements?
Nastic movements differ from tropic movements in that the direction of tropic responses depends on the direction of the stimulus, whereas the direction of nastic movements is independent of the stimulus's position.
2. Which of the chambers of the mammalian heart possesses the thickest wall?
The left ventricle
3. Blood grouping in human beings is derived from combinations of how many alleles?
Three (3)

Contest 4

1. Which jointed structure in insects bears the organs which are sensitive to touch, smell and vibration?

Antenna

2. In which part of the brain can one locate the respiratory centres that control inspiration and expiration?

Medulla oblongata

3. Indicate the mode by which an insect with a mandibulate mouth part will obtain its food.

Biting and chewing

.....

Contest 5

1. Explain Climax Community in an ecological succession

The state of relative stability or equilibrium of species composition, occurring when a community does not experience any disturbance for long periods of time.

2. What mode of nutrition is exhibited by a tapeworm?

Parasitic

3. Name the part of a flower that provides landing platform to pollinating insects

Corolla / Petal

.....

Contest 6

1. What is Protandry cross pollination

In protandry, the anther matures earlier than the stigma, and hence they are not able to pollinate the stigma of the same flower

2. Why do all living cells require water?

It is the medium for all metabolic reactions

3. What is the role of the long-winged reproductives of the termites colony?

Disperse the population

Contest 7

1. Which group of enzymes catalyze the breakdown of fats and oils into simpler absorbable compounds?

Lipases

2. Name the type of placentation in which the ovules develop in rows near the margin on the placenta formed along the ventral suture.

Marginal

3. In mammals, which organ is located within the duodenal loop?

Pancreas

.....

Contest 8

1. Name the tiny blood vessels on the surface of an alveolus in a mammal.

Capillaries

2. Name the effect of an increase in solute concentration in the guard cells on the stomatal pore

It opens

3. Which type of reproduction is common to both Hydra and yeast?

Budding

.....

Contest 9

1. Which type of germination is noted for more rapid elongation of the hypocotyl than the epicotyl?

Epigeal

2. Name the two important cations involved in the action potential of nervous transmissions

Na⁺ and K⁺

3. In which mammalian system can one locate the Node of Ranvier

Nervous system

Contest 10

1. Name the type of ecological association that exists between termites and the cellulose - digesting protozoans in their guts

Mutualism

2. What type of circulatory system is found in arthropods

An open circulatory system

3. Which structures in plants are physiologically similar to gap junctions in animals?

Plasmodesmata

.....

Contest 11

1. Which type of pollination is referred to as Ornithophily?

Pollination by birds

2. What name is given to the conversion of atmospheric nitrogen to effective nitrogen compound?

Nitrification

3. Why is metaphase the best stage of cell division to study chromosome morphology?

At that stage the chromosomes are in a highly condensed stage and get stained completely

.....

Contest 12

1. A lizard and an ant-eater chasing an insect is an example of which type of competition

Intraspecific competition

2. What percentage of the offspring of a cross between two heterozygous parents will exhibit the recessive condition phenotypically?

25%

3. What makes the hyphal wall of fungi rigid?

The presence of chitin

Contest 13

1. The dorsal cavity of humans consists of two parts. Name one of them.
The cranial cavity and the vertebral (spinal) cavity.
2. What name is given to a collection chamber that reduces the resistance of blood flow into the heart of a fish?
Sinus venosus
3. What happens to surface area to volume ratio when the size of a cell increases?
Decreases

.....

Contest 14

1. Which group of algae are often regarded as the most beautiful of the algae?
Diatoms
2. Why should a hard seed coat cause seed dormancy?
A hard seed coat may physically prevent water uptake and embryo expansion or even gaseous exchange,
3. What kind of cytoskeleton fibres could help a cell change shape to fit into a space?
Microfilaments

.....

Contest 15

1. What are Aceolomate organisms?
Organisms that lack body cavity / mesoderm fills the body cavity
2. In the natural environment, how do chemical inhibitors present in the seed which may cause dormancy be removed to allow the seed to germinate?
They must first leach out into the soil before germination can take place.
3. Which structure in Paramecium is used to take in food?
Oral groove

Contest 16

1. What name is given to fungi in which Sexual reproduction has not been observed

Imperfect fungi

2. What is Photoperiodism?

The response of plants to periods of light and dark

3. What is the first line of defence of preys against predators?

To avoid being detected by the predator/ Hide

.....

Contest 17

1. What is the driving force for long-distance water transport in plants as described by the cohesion-tension theory?

Transpiration

2. Which aspect of biology will deal with the structure of a fish, its organs or component parts and how they are put together?

Anatomy

3. What are endangered species?

They are species of plants or animals (or other life forms such as fungi) that are threatened with extinction.

.....

Contest 18

1. Which group of algae are regarded as the most abundant algae in the open ocean and responsible for about one-quarter of all the oxygen gas produced on the earth each year?

Diatoms

2. Name the process by which Mendel produced true breeding strains of pea plants.

Self-pollination

3. Why do many prey species use camouflage as their first line of defence?

Many predators search for their prey with their eyes.

Contest 19

1. Name one of the fundamental processes in any ecosystem.

Flow of energy / Cycling of nutrients

2. What name is given to the thimble-like structure that covers the tip of plant roots?

Root cap

3. Which hormone's level will be elevated in the body when blood sugar levels are high?

Insulin

.....
Contest 20

1. Why is the pyramid of energy always upright?

This is due to the fact that during the flow of energy from one trophic level to the other, some energy is always lost as heat in each step.

2. What name is given to the process of arranging various organisms into successive levels of the biological classification either in a decreasing or an increasing order from kingdom to species and vice versa?

Taxonomic hierarchy

3. Distinguish between simple epithelium and compound epithelium with respect to their function?

Simple epithelium gets involved in the function of secretion as well as absorption in animals whereas compound epithelium is involved in the process of the body's protection.

.....

Contest 21

1. Explain vital capacity with respect to exchange of gases
Vital capacity (VC) refers to the maximum volume of air that can be expired following maximum inspiration
2. Why is the cell known as the structural and functional unit of life?
The cell is known as the structural and functional unit of life as all living organisms are made up of cells and has the ability to exhibit the characteristics of life.
3. What name is given to the scar on the seed coat where the developing seeds were connected with the fruit?
Hilum

.....

Contest 22

1. What name is given to the proteinaceous layer that separates the embryo by the outer covering of the endosperm of monocotyledonous seeds?
The aleurone layer
2. In sarcomeres, the thick filament is composed of which protein?
Myosin
3. State one significance of the floral diagram of a flower.
It provides data relating to the number of parts of a flower/their arrangement/ and the relation they have with each other.
4. Which bone cell is responsible for resorbing bone matrix and releasing calcium into the blood?
Osteoclast

.....

Contest 23

1. In order for muscle contraction to occur, what molecules/ions must be readily available?

Calcium ions and ATP

2. Name the structures that are located at either end of the embryonal axis of a dicotyledonous seed.

The radicle and plumule

3. What name is given to a flower whose floral appendages are multiples of 5?

Pentamerous

4. What type of protection does the root cap provide to the root of plant?

It protects the tender apex from mechanical friction as it grows through the soil

.....

Contest 1

1. Why do true xerophytes produce extensive root system in proportion to shoot system?

It increases the total absorptive capacity of the plant / It exposes relatively only a small proportion of the plant to the atmosphere.

2. Which part of the internal ear is responsible for hearing?

The cochlea,

3. Which area in the brain is associated with strong emotion

Limbic system

.....

Contest 2

1. In neural control and coordination, potential difference across resting membrane is negatively charged. This is due to differential distribution of which ions?

Na⁺ and K⁺ ions

2. What name is given to the evolutionary process that produces new species from a single, rapidly diversifying lineage?

Adaptive radiation

3. What type of movable joint is present between the atlas and axis?

Pivot

.....

Contest 3

1. What name is given to chemicals which are released at synaptic junctions?

Neurotransmitters

2. Name the organ that is most strikingly modified in xerophytes.

The leaf.

3. What name is given to the entire system of airways which connect the mouth to the alveoli responsible for exchanging gases with the blood vessels in the lungs?

Respiratory tract

Contest 4

1. What name is given to the fusion of two gametes which are dissimilar in size?

Anisogamy

1. What name is given to the condition of accumulation of urea in the blood

Uremia

2. Which of the characteristics of flatworms allow them to carry out respiration by direct diffusion?

The extremely small diameter

.....

Contest 5

1. A mycorrhiza is a symbiotic association between a fungus and the roots of vascular plants. How do plants benefit from this association?

The plant gains the benefit of the mycelium of fungus which enhances its absorptive capacity for water and minerals due to the large surface area of mycelium

2. In which part of the mammalian respiratory system does the actual exchange of gases take place?

The alveoli

3. Which macronutrient is a component of all organic compounds but is not obtained from soil.

Carbon

.....

Contest 6

1. Which potent greenhouse gas is emitted from flooded rice fields as bacteria in the waterlogged soil produce it in large quantities?

Methane,

2. Which vitamin is present in Rhodopsin?

Vitamin A

3. A plant shows thallus level of organization. It shows rhizoids and is haploid. It needs water to complete its life cycle because the male gametes are motile. Which group does it belong to?

Pteridophyta / Pteridophytes / Ferns

Contest 7

1. Carnivorous plants have nutritional adaptations. Which nutrient do they especially obtain and from where?

They grow in nitrogen deficient soil. So, they make' up their nitrogen deficiency by trapping insects

2. Mention the common characteristic feature of plant sieve tube cells and most of mammalian erythrocytes.

Absence of nucleus

3. If the diploid number of a flowering plant is 48. What would be the chromosome number in its endosperm?

72

.....

Contest 8

1. Which section of the small intestine is responsible for the majority of chemical digestion?

Duodenum

2. Name two processes by which nitrates are removed from the soil

Nitrates are removed from the soil by plant roots, / by being washed out in rainwater / and by the activities of denitrifying bacteria.

3. In some animal groups, the body is found divided into compartments with at least some organs/ organ repeated. What name is given to this characteristic feature?

Segmentation

.....

Contest 9

1. What is the importance of pneumatic bones and air sacs in Aves?

Pneumatic bones in Aves keep the animal body light and hence help in flight. Air sacs in birds help in respiration and buoyancy.

2. Body cavity is the cavity present between body wall and gut wall. What name is given to some animals whose body cavity is not lined by mesoderm?

Pseudocoelomate

3. Mannitol is the reserve food material of which group of algae?

Brown algae / Phaeophyceae and order Fucales,

Contest 10

1. What name is given to the muscular contraction which moves food along the alimentary canal?

Peristalsis

2. What names are given to male and female sex organs In Bryophytes?

Antheridium (male sex organ), archegonium (female sex organ).

3. Which plant hormone is sprayed to increase sugar production in sugarcanes?

Gibberellin.

.....

Contest 11

1. Sweating, by itself, will not cool the body. What has to happen to sweat if it is to have a cooling effect?

For sweat to have a cooling effect, it must evaporate. In doing this it takes heat from the body.

2. Most blood returning from the jejunum and ileum passes first through which vessel?

Hepatic vein

3. A cell in the basal layer of the skin contains 46 chromosomes and divides by mitosis to produce new skin cells. After ten successive divisions, how many chromosomes will the basal cell have?

46 (Forty six)

.....

Contest 12

1. What do digestive enzymes do to food?

Digestive enzymes dissolve food, make food soluble, break large insoluble food molecules into smaller, soluble molecules

2. Why was the use of DDT insecticide not successful in eradicating malaria?

The mosquitoes became resistant to the DDT insecticide

3. What is the cause of blind spot in the field of vision?

There are no sensory cells in the blind spot.

Contest 13

1. At what period does a female's ovary have the most eggs she will ever have in her lifetime?

At birth

2. What structures do chromosomes produce when they replicate?

Chromatids

3. How do bone joints function without grinding noise and pain?

Bone joints function without grinding noise and pain due to the presence of synovial fluid between bones.

.....

Contest 14

1. Which two major groups of organisms make up the bulk of decomposers?

Bacteria and fungi are the principal decomposers

2. If an enzyme is denatured, why does it no longer work?

An enzyme which has been denatured has changed its shape and will no longer combine with its substrate (the substance it acts on).

3. Which part of the carbon cycle is responsible for the increasing concentration of carbon dioxide in the atmosphere?

The burning of fossilized products (coal and oil) of some plants is the cause of increasing carbon dioxide in the atmosphere. (Burning wood and paper has a neutral effect because these are products of plants which have absorbed carbon dioxide during photosynthesis).

.....

Contest 28

1. Give two examples of chemical reactions which are catalyzed by enzymes in the course of brewing.

Enzymes in the grain catalyze the conversion of starch to maltose; enzymes in yeast catalyze the conversion of maltose to alcohol.

2. What is distinctive about the chlorophylls found in different photosynthetic bacteria?

Their absorption spectra

3. State two of the three main ways in which the human body uses food.

The human body uses food (i) for energy, (ii) for growth (making new cells), (iii) repairing or replacing tissues.

.....

Contest 29

1. What are likely to be the coldest parts of the human body?

The extremities of the body (hands and fingers, feet and toes, ears and nose) are likely to be the coldest parts

2. Plant roots do not have chlorophyll and grow in darkness. How do roots obtain their food?

Food made in the leaves is transported to the roots in the phloem of the vascular bundles

3. What is the hereditary material in viruses?

DNA or RNA

Contest 30

1. After crossing the tricuspid valve, blood passes into which chamber of the mammalian heart?

Right ventricle

2. What feature of tracheids of xylem of angiosperms makes them effective water conducting cells?

They have gaps in their primary cell walls that connect to adjacent tracheids

3. Glucose represses transcription of cellulase genes. What does this statement mean?

Cellulase genes are not transcribed when glucose is present.

.....

Contest 31

1. How does refrigeration help to stop food from going bad?

The low temperature of refrigeration slows down bacterial reproduction and enzyme reactions.

2. Why is it significant that fungi produce the enzyme cutinase?

It cleaves molecules in plant cuticle and allows the fungus to enter

3. What does it mean to say that a characteristic of an organism is heritable?

The characteristic can be passed on to offspring.

.....

Contest 32

1. Why is the secondary structure of DNA called double helix?

Two strands wind around one another in a helical or spiral arrangement

2. Why is the presence of clay particles important to soil structure?

The negative charges on clay bind to positively charged ions and prevent them from leaching

3. Birds that feed on marine animals ingest a lot of salt. Indicate the means by which they excrete most of the salt.

Nasal salt glands

Contest 33

1. Which reproductive organ is divided into three regions: fundus, body, and cervix?

Uterus

2. For mammals of the same size, what feature of their nephron would give them the greatest ability to produce a hypertonic urine?

Longer loops of Henle

3. What name is given to the convergence over evolutionary time in the appearance of two or more unpalatable species?

Müllerian mimicry

.....

Contest 34

1. How do fishes that live in hypertonic environments regulate the osmolarity of their body fluids?

They drink large amounts of water from the environment and excrete large amounts of concentrated urine

2. What process is responsible for the movement of carbon dioxide into a leaf?

Diffusion is responsible for the movement of carbon dioxide into a leaf.

3. Give one major reason why burial is a key step in fossilization

It slows down the process of decay

It allows tissues to be preserved as casts or molds

It protects tissues from wind, rain, and other corrosive elements

.....

Contest 35

1. What is the only evolutionary mechanism that leads to adaptation?

Natural Selection

2. What does it suggest, if an experiment shows that the calcium concentration inside the root cell of a plant is thousands of times higher than the calcium concentration of the surrounding soils?

Passive uptake of calcium is occurring

3. Why is it that plant species from dry habitats appear to possess particularly low solute potentials in their tissues?

It helps them to compete more effectively for the soil water available

Contest 36

1. When meat is salted, bacteria cannot grow on it. Suggest a reason for this
The salt lowers the meat's osmotic potential so that water is withdrawn, by osmosis from bacterial cytoplasm and so kills the bacteria.
2. Why are seeds such a significant evolutionary development?
The evolution of seeds allowed plants to decrease their dependency upon water for reproduction. Seeds contain an embryo that can remain dormant until conditions are favorable when it grows into a diploid sporophyte. Seeds are transported by the wind, water, or by animals to encourage reproduction and reduce competition with the parent plant.
3. How do white blood cells differ from red blood cells with respect to their function?
White cells ingest bacteria or make antibodies. Red cells carry oxygen.

.....

Contest 37

1. An insect visits several flowers in succession on a single plant. In doing so, it transfers pollen from the younger flowers, near the top of the inflorescence to the older flowers near the base of the inflorescence. Is this an example of self-pollination or cross-pollination?
Transfer of pollen between flowers on the same plant is self-pollination; so is transfer of pollen within the same flower
2. A soup container was forgotten in the refrigerator and shows contamination. In terms of temperature classification, the contaminants probably belong to which group of microbes?
Psychrotrophs/ Psychrophiles
3. A pure-breeding male black mouse is mated with a female brown mouse and they produce a litter of 20. The allele for black fur is dominant to the allele to brown fur. What is the expected distribution of colour and sex in their litter?
10 black males and 10 black females

Contest 38

1. How are photosynthesis and respiration related to each other?

The end product of Photosynthesis is glucose that is used in cellular respiration to make ATP. The glucose is then turned back into carbon dioxide, which is used in photosynthesis. While water is broken down to form oxygen during photosynthesis, in cellular respiration oxygen is combined with hydrogen to form water.

2. The concentration of the tissue fluid, which bathes all cells in the body, is kept more or less constant. Why is this important?

If the tissue fluid became more dilute, the cells would absorb water by osmosis and swell up. If the tissue fluid became more concentrated, the cells would lose water by osmosis, shrink and become dehydrated, possibly to a point where metabolism was no longer possible.

3. What is the principle underlying the use of cyanobacteria in agricultural fields for crop improvement?

Many species of cyanobacteria can carry out nitrogen fixation in soil. Hence, they are used in agricultural fields for crop improvement.

.....

Contest 39

1. The common name of okro is simpler than its scientific name *Abelmoschus esculentus*. Why then is the simpler common name not used instead of the complex scientific name in biology?

The common name 'okro' is an English word and this can have different names in different languages. Hence, instead of using simple common names; It is preferred to use scientific names that may appear complicated but universally accepted.

2. How does a gap junction facilitate intercellular communication?

Gap junctions allow small signaling molecules to pass from one cell to another and thus they facilitate intercellular communication

3. A student was exposed to an organism and produced specific antibodies against the organism. What name is given to this type of immunity?

Adaptive immunity

Contest 40

1. Why is it that jams and dried meats often do not require refrigeration to prevent spoilage?

Enzymes and microorganisms that cause spoilage work best in wet conditions. Dried food is thus better preserved. / The sugar in jam reduces hydration by thickening. The thicker the jam, the longer it takes to spoil, the juicier the jam, the sooner it will spoil. / low water activity

2. Population growth is always finite or determinate. Under what circumstances is population growth maximal?

Population growth could be infinite when there are unlimited resources, such as space food and shelter, and where there are no deaths due to natural disasters.

3. Why is it important for the mammalian lung never to become completely empty?

If this residual volume did not exist and the lungs emptied completely, the lung tissues would stick together and the energy necessary to re-inflate the lung could be too great to overcome. Therefore, there is always some air remaining in the lungs.