

## **NERDS PLE 2024 SCIENCE MARKING GUIDE**

- 1. Red blood cells, specifically the hemoglobin in them, carry carbon dioxide in the body.**
- 2. One role played by the sun in maintaining water balance is evaporation, which helps regulate the Earth's water cycle.**
- 3. The injury one gets after stepping on glowing charcoal is a burn, specifically a thermal burn or heat burn.**
- 4. Weaning babies are given mashed and soft foods because they are easy to swallow, introduce new textures, and help develop oral skills.**
- 5. The use of the ureter is different from that of the urethra in that the ureter transports urine from the kidney to the bladder, while the urethra transports urine from the bladder out of the body.**
- 6. Folic acid is recommended for proper brain development of an unborn child.**
- 7. Nicotine is the major addictive substance found in tobacco.**
- 8. A child immunized against tuberculosis may have a raised, scar-like mark on their arm, indicating a BCG (Bacillus Calmette-Guérin) vaccine.**
- 9. New Zealand White is a breed of rabbit often kept for meat production.**
- 10. Fungi are useful in medicine for producing antibiotics, such as penicillin.**

11. The foot belongs to a bird of prey (raptor), such as an eagle, hawk, or owl, characterized by sharp talons.
12. The property of the magnet shown is magnetic lines of force move from north pole to south pole.
13. One body fluid through which HIV can be transmitted is blood.
13. A millipede protects itself from danger by curling up into a ball, revealing its hard exoskeleton, and releasing a foul-tasting chemical to deter predators.
14. Blood goes back to the heart after leaving the lungs because it needs to be pumped to the rest of the body, and the heart is the central pumping organ.
15. The epiglottis protects us when swallowing food by covering the trachea (windpipe) and preventing food from entering the lungs.
16. A silvery surface on a thermos flask is useful for reflecting heat and keeping liquids at a consistent temperature.
  
17. Alcohol and water are separated by distillation because they have different boiling points, allowing them to be vaporized and condensed separately.
18. Hepatitis B vaccine is given to people to protect against the Hepatitis B virus, which can cause liver disease and cancer.
19. Crop rotation prevents crop pests and diseases by breaking

the life cycle of pests and reducing the buildup of disease-causing pathogens in the soil.

20. Enzymes are biological molecules (proteins) that speed up chemical reactions in living organisms, facilitating processes like digestion, metabolism, and energy production.

21. A petiole is important to a leaf because it attaches the leaf to the stem, providing support and allowing for the transport of water, nutrients, and sugars between the leaf and the rest of the plant.

22. One other member of a bee colony, apart from the queen bee, is a worker bee.

23. Plant roots absorb water from the soil through a process called osmosis, where water molecules pass through the root cell membrane from an area of high concentration to an area of low concentration.

24. The food nutrient lacking in the body of the child shown is likely iron, as the diagram is calcium, phosphorus.

25. One traditional method of preserving milk is boiling and then storing it in a cool place or refrigerating it.

26. Mushrooms cannot make their own food because they lack chloroplasts, the organelles responsible for photosynthesis in plants.

27. Bacteria reproduce through a process called binary fission, where the bacterial cell divides into two identical daughter cells.

28. Pollution is the introduction of harmful substances or contaminants into the environment, causing harm to living organisms and ecosystems.

29. One major reason to maintain good sitting posture is to prevent back strain and injury.

30. One example of a contagious disease is influenza (the flu), which can be spread through airborne transmission, close contact, or touching contaminated surfaces.

31. The symbol for a switch in an electric circuit is:

32. Silk is called a resource because it is a valuable natural material obtained from silkworms, used for making high-quality textiles.

33. Essential drugs are medications necessary for treating common diseases and maintaining public health, whereas narcotic drugs are substances with potential for abuse, dependence, and addiction.

34. Bush burning promotes soil erosion by:

- Removing vegetation cover, exposing soil to wind and water erosion
- Reducing soil moisture, making it more susceptible to erosion

35. One body characteristic common to both spiders and ticks is:

- Eight legs (arachnid characteristic)

36. Moisture is useful to a germinating seed because:

- It helps soften the seed coat, allowing the seedling to emerge
- It provides water for metabolic processes and growth

37. We see lightning before hearing thunder because:

- Light travels faster than sound (approximately 299,792 km/s vs 343 m/s)
- The delay between seeing lightning and hearing thunder allows us to calculate the distance of the storm

38. The vector that spreads elephantiasis is:

- Mosquitoes (specifically, the female Anopheles mosquito)

39.  $1000^{\circ}\text{C}$  is equivalent to  $1832^{\circ}\text{F}$ .

40. One role played by the skin in regulating body temperature is:

- Sweating: releasing heat through evaporation of sweat to cool the body

41. (a) A solvent is a substance that dissolves another substance (solute) to form a solution.

(b) The scientific name given to a product formed when a solute and a solvent are mixed is a solution.

(c) Examples:

i) Solute: Sugar (dissolves in water)

ii) Solvent: Water (dissolves sugar)

42. (a) Force X is frictional force.

(b) Two ways of reducing force X (frictional force):

i) Lubrication (using oil, grease, etc.)

ii) Smoothening the surfaces in contact

(c) Sound is produced when the load is pulled over the ground because the frictional force causes vibrations, which produce sound waves.

43. (a) Labor refers to the process of childbirth, including the stages of delivery and the period of contractions leading up to birth.

(b) Infant refers to a child in the first year of life (0-12 months).

(c) Maternity refers to the state of being pregnant or having given birth, or a hospital department specializing in childbirth and women's health.

(d) Contraceptives refer to methods, devices, or medications used to prevent pregnancy.

44. (a) Apiculture is the practice of beekeeping, including the care and management of bees for honey production, crop pollination, and other products.

(b) Drone bees are useful in a bee colony because they:

- Mate with the queen bee to ensure the colony's survival

- Help with temperature regulation and hive maintenance

(c) Two duties of worker bees in a hive:

- i) Foraging for nectar, pollen, and water
- ii) Caring for young bees (brood) and building/maintaining the hive structure

45. (a) Modernization refers to the process of adopting modern technologies, practices, and ideas, often leading to significant changes in society, economy, and environment.

(b) Two ways modernity has negatively affected the population of wild animals:

- i) Habitat destruction and fragmentation due to urbanization and infrastructure development
- ii) Pollution and climate change affecting food chains and ecosystems

(c) Trees are important in conserving the environment because they:

- Absorb carbon dioxide and produce oxygen
- Provide habitat and food for various species
- Help regulate water cycles and prevent soil erosion

46. (a)

i) Sanitation: The practice of maintaining cleanliness and hygiene in public and private spaces to prevent disease and promote health.

ii) Personal hygiene: The practice of maintaining individual cleanliness and grooming to prevent disease and promote health.

(b) A pumice stone is useful in a home for:

- Exfoliating and cleaning skin
- Removing dead skin cells and smoothing rough patches

(c) One way to reduce smelling in a pit latrine is to:

- Add a layer of ash or soil after each use to absorb moisture and odors

47. (a) Heart:

- Pumps blood throughout the body, supplying oxygen and nutrients to tissues and organs
- Regulates blood pressure and maintains circulation

(b) Lungs:

- Exchange oxygen and carbon dioxide through respiration
- Filter the air we breathe, removing dust and other particles

(c) Kidneys:

- Filter waste and excess fluids from the blood, regulating electrolyte balance
- Produce hormones that control blood pressure and red blood cell production

(d) Skin:

- Protects the body from external damage, infections, and temperature fluctuations
- Regulates body temperature through sweating and dilation/constriction of blood vessels

48. Match the different forms of electricity and their sources:

- (a) Thermal electricity: burning fuel
- (b) Solar electricity: sun
- (c) Hydroelectricity: fast flowing water
- (d) Nuclear electricity: burning uranium

49. (a) Food contamination:

- The presence of harmful substances or microorganisms in food, making it unsafe for consumption

(b) Two ways to preserve food:

i) Refrigeration: storing food at low temperatures to slow down bacterial growth

ii) Canning: heating food to kill bacteria and sealing it in airtight containers

(c) Cleaning hands before eating food is advisable because:

- Hands can carry harmful bacteria and microorganisms that can contaminate food
- Clean hands prevent the transfer of pathogens to the mouth

and digestive system

Here are the answers:

50. (a) Classification:

- The process of grouping living things into categories based on their shared characteristics and features

(b) Two ways classification is important:

i) Helps understand relationships between organisms and their environments

ii) Facilitates communication and identification of species among scientists and researchers

(c) Ants are classified under insects because:

- They have a three-part body (head, thorax, abdomen)

- They have six legs and two antennae

- They have a hard exoskeleton

51. (a) The feeding relationship illustrated is called a food chain.

(b) The arrows represent the flow of energy and nutrients from one organism to another through consumption.

(c)

i) Producer: Grass (converts sunlight into energy through

photosynthesis)

ii) Decomposer: Bacteria (breaks down dead organisms into nutrients)

52. (a) Poultry:

- Domesticated birds raised for eggs, meat, and feathers, such as chickens, turkeys, and ducks

(b) Two methods of rearing poultry:

i) Intensive system (factory farming): large numbers of birds in confinement

ii) Free-range system: birds roam freely outdoors

(c) One contagious disease affecting chicken:

- Avian influenza (bird flu)

53. (a) Two examples of anti-social behaviors among people in the community:

i) Vandalism: intentionally damaging or destroying public or private property

ii) Bullying: using physical or verbal aggression to intimidate or harm others

(b) Two effects of anti-social behavior on school children:

i) Emotional trauma: leading to anxiety, depression, or low self-esteem

ii) Academic difficulties: decreased concentration, poor

performance, or dropout

**54. (a) Difference between HIV and AIDS:**

HIV (Human Immunodeficiency Virus) is a virus that attacks the immune system, while AIDS (Acquired Immunodeficiency Syndrome) is the final stage of HIV infection, characterized by a severely weakened immune system and opportunistic infections.

**(b) Two ways HIV spreads:**

- i) Unprotected sexual contact with an infected person
- ii) Sharing needles or syringes contaminated with HIV-infected blood

**(c) One way to reduce HIV stigmatization in a community:**

Education and awareness campaigns to dispel myths and promote understanding, acceptance, and support for people living with HIV/AIDS

**55. Four ways to enhance soil productivity:**

- i) Crop rotation: alternating crops to improve soil structure, fertility, and pest control
- ii) Organic amendments: adding compost, manure, or green manure to improve soil fertility and structure
- iii) Irrigation management: efficient water use to prevent erosion and nutrient loss
- iv) Conservation tillage: reducing soil disturbance to preserve

**soil moisture, reduce erosion, and promote soil biota**