

# Practice Test 1

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## Multiple-Choice

**Directions:** Select the best answer for each question.

1. While on vacation last summer, you and your sister explored a pond that was inhabited by many frogs. By the end of your vacation, you'd both seen several living frogs that had legs in the wrong places, limb deformities, extra legs, or missing eyes. Which characteristic of life appears to be working incorrectly?
  - (A) homeostasis
  - (B) growth
  - (C) metabolism
  - (D) organization
2. Frogs can be found in many different environments. Some frogs that live in areas with freezing temperatures have an interesting adaptation. When a frog's body begins to freeze, its blood sugar levels increase significantly, acting as antifreeze. The frog's breathing and heartbeat stop. When these frogs return to non-freezing temperatures, their hearts begin to beat, they begin to breathe, they go back to normal. The production of glucose to maintain the frog's body, in spite of external surroundings, is an example of \_\_\_\_\_.
  - (A) organization
  - (B) metabolism
  - (C) homeostasis
  - (D) metamorphosis
3. Your science teacher has assigned your team to do a presentation on reported deformities in amphibian populations in Minnesota. You've found a government website that gives you the numbers of types of deformities and the species of frogs and salamanders in which they're found. What is the name for this type of data?
  - (A) qualitative
  - (B) quantitative
  - (C) unsubstantiated
  - (D) double blind

4. Your biology class has been developing experiments to assess aggressive behavior in betta, or fighting, fish. These fish can't be put in a tank together because they'll attack each other. One team has put two betta fish in bowls next to each other, one team put pictures of different color bettas next to a fish bowl, and one team put pictures of a single color betta in different sizes next to another bowl. Your classmates will be recording the responses to these different stimuli, the response is considered to be a(n) \_\_\_\_\_.
- (A) control
  - (B) placebo
  - (C) independent variable
  - (D) dependent variable
5. You're looking at cells through a compound light microscope and you can see and identify nuclei in many of the cells. You know that you're looking at \_\_\_\_\_.
- (A) an animal cell
  - (B) a bacterial cell
  - (C) a prokaryote
  - (D) a eukaryote
6. You've been getting leg cramps at night and your dad thinks that you may need more potassium in your diet to remedy this problem. You eat plenty of bananas and baked potatoes to get extra potassium. Which organelle will allow, or prevent, the potassium into your cells?
- (A) cell membrane
  - (B) cell wall
  - (C) nucleolus
  - (D) lysosome
7. You have been involved in a heavy-conditioning program to prepare for your next sports season. Your muscles have had a tough workout and are sore but you need to keep building them up. Which organelles are working extra hard to make this happen?
- (A) cell wall
  - (B) Golgi complex
  - (C) ribosome
  - (D) smooth endoplasmic reticulum
8. You're viewing a transmission electron microscope image of a piece of onion skin. Which of the following organelles should you not expect to see?
- (A) vacuoles
  - (B) chloroplasts
  - (C) mitochondria
  - (D) centrioles

9. You've begun training with the schools cross-country team and your coach has discussed the dangers of dehydration. Which of the following will not be a concern if you don't get enough water during your run?
- (A) body temperature increasing
  - (B) cells don't get the nutrients they should be getting
  - (C) increased heart rate
  - (D) bones become unstable
10. Your aunt has been told that because of a clogged artery in her heart, she needs to reduce her dietary intake of fats. Now she wants to eliminate all fats from her diet. Is this a good idea and why?
- (A) Yes, all fats she eats will be harmful to her because they will all add to her coronary artery blockage.
  - (B) Yes, because fats are just bad for everybody.
  - (C) No, because some fats are good for us, we need them and they help us out.
  - (D) No, because it doesn't really matter what she eats. A heart surgeon can try to fix the blockage.
11. In biology class you've been discussing cellular metabolism and the process of building large biomolecules from smaller molecules. This process is called \_\_\_\_\_.
- (A) hydrolysis
  - (B) dehydration synthesis
  - (C) endocytosis
  - (D) carbon fixation
12. Your older brother has been working out every day and has been taking amino acid supplements. He has a new girlfriend and wants to look "ripped." What material is he trying to build up in his body?
- (A) proteins
  - (B) carbohydrates
  - (C) nucleic acids
  - (D) lipids
13. You just got your first pet, a goldfish. You go to a web site to read up on fish care and keep seeing references to salt water fish and you're starting to worry that your fish needs salt in its water. Fortunately, you find a good goldfish information site and discover that goldfish are freshwater fish and while a little salt may be ok, too much salt in their water can kill them. What process makes salty water dangerous to your fish?
- (A) osmosis
  - (B) facilitated diffusion
  - (C) endocytosis
  - (D) exocytosis

14. Pickles are cucumbers that have been soaked in brine (salt water) and then stored in vinegar. The brine is considered a \_\_\_\_\_ solution because it moves water \_\_\_\_\_ the cell.
- (A) hypotonic; out of
  - (B) hypertonic; out of
  - (C) hypotonic; into
  - (D) hypertonic; into
15. You are running in a cross-country event and you feel yourself breathing heavily. The oxygen you are gasping for is being used to metabolize the carbohydrates from the last meal you ate. This process will generate energy for you by adding \_\_\_\_\_.
- (A) disaccharide to ADP
  - (B) trisaccharide to ATP
  - (C) phosphate to ADP
  - (D) phosphate to ATP
16. You were turning over the soil in your backyard garden and saw that you had cut an earthworm with your shovel. You did some research and you found out that earthworm cells have 36 chromosomes. If this earthworm survived and its cells undergo mitosis, one parent cell will produce \_\_\_\_\_.
- (A) two daughter cells each with 36 chromosomes
  - (B) two daughter cells each with 18 chromosomes
  - (C) one daughter cell each with 36 chromosomes
  - (D) four daughter cells each with 18 chromosomes
17. Your work in a pathology lab has you reviewing hundreds of microscope slides every day. Today, you have to compare the number of cells on each slide that are undergoing mitosis compared to a standard, or "mitotic index." What might be indicated by a slide that has a tissue sample that has way too many mitotic cells compared to the index?
- (A) apoptosis
  - (B) senescence
  - (C) synapsis
  - (D) immortality
18. A feral (wild) cat in your neighborhood had kittens. Your neighbor wants to trap the cat soon to have her spayed and prevent her from having more kittens. Spaying is the surgical removal of the female reproductive organs including all of the cat's eggs. These eggs were produced during the process of \_\_\_\_\_.
- (A) mitosis
  - (B) meiosis
  - (C) metamorphosis
  - (D) synapsis

19. You are working in a medical lab and are testing for the presence of DNA in a sample. Which of the following test results will indicate that you have DNA in your sample?
- (A) the presence of uracil
  - (B) the presence of deoxyribose
  - (C) the presence of ribose
  - (D) None of these results are conclusive for DNA.
20. A gene is to a protein as a \_\_\_\_\_ is to a \_\_\_\_\_.
- (A) pencil; paper
  - (B) car; steering wheel
  - (C) cookie recipe; cookie
  - (D) door; house
21. The sequence of events in the production of a protein molecule is \_\_\_\_\_.
- (A) RNA → translation → replication → RNA → protein
  - (B) translation → DNA → transcription → RNA → protein
  - (C) DNA → transcription → RNA → translation → protein
  - (D) DNA → replication → translation → RNA → protein
22. An mRNA molecule is 606 nucleotides long with an initiation and termination codon at either end. How many amino acids make up this protein?
- (A) 200
  - (B) 300
  - (C) 600
  - (D) 1,200
23. Your friend has type O blood. His mom is type A and his dad is type B. Your friend has decided that he must be adopted. Can you help him figure this out?
- (A) Mom's genotype is  $I^A i$  and dad's genotype is  $I^B i$ .
  - (B) Mom's genotype is  $I^B i$  and dad's genotype is  $I^A i$ .
  - (C) Mom's genotype is II and dad's genotype is ii.
  - (D) Listen a lot and be sympathetic, because you agree he must be adopted.
24. Your friend with the blood typing questions wants to know more. You explain that blood typing is an example of \_\_\_\_\_ with \_\_\_\_\_.
- (A) incomplete dominance; epistasis
  - (B) codominance; epistasis
  - (C) codominance; multiple alleles
  - (D) incomplete dominance; multiple genes

25. You are at a very crowded movie and just as the movie begins, a very tall man sits down in front of you. There is nowhere else to sit and between adjusting your position to see, you find yourself wondering about the genetics behind this person's height. You know that his parents each contributed genes for height and you think about whether those genes were dominant or recessive and whether he is homozygous or heterozygous. These questions are about his \_\_\_\_\_. You also wonder whether his parents and siblings are similarly tall, now you are wondering about his \_\_\_\_\_.
- (A) transcription; translation
  - (B) translation; transcription
  - (C) phenotype; genotype
  - (D) genotype; phenotype
26. Hemophilia is a disorder that results in problems with bleeding and blood clotting. The recessive gene for hemophilia is found on the X chromosome. Most women who carry the gene for hemophilia also have a healthy, and dominant, X chromosome so they become carriers of the disorder and it does not make them sick. Males exhibit symptoms of hemophilia when they receive this gene because their genotype is \_\_\_\_\_. This disorder is \_\_\_\_\_.
- (A) XY; metabolic
  - (B) XY; sex-linked
  - (C) XX; metabolic
  - (D) XX; sex-linked
27. Development of a new cultivar of roses is a result of \_\_\_\_\_.
- (A) natural selection
  - (B) selective breeding
  - (C) sexual reproduction
  - (D) all of the above
28. Which of the following is an example of a transgenic organism?
- (A) A new type of potato plant that has all the best features of its species.
  - (B) A cow treated with bovine growth hormone.
  - (C) A zebrafish that glows green with the fluorescence gene from a jellyfish.
  - (D) all of the above
29. When it is important to identify DNA, but there is not much available to test, scientists can run a \_\_\_\_\_ and produce millions of copies of the original strand of DNA.
- (A) gel electrophoresis
  - (B) polymerase chain reaction
  - (C) restriction site enhancement
  - (D) DNA fingerprint

30. Following an oil rig explosion and release of millions of gallons of oil into the Gulf of Mexico there were many types of attempts to clean up the massive oil spill. One type of cleanup effort relied upon the development of bacteria that could consume and break down hazardous material and oil spills. Use of these bacteria is called \_\_\_\_\_.
- (A) bioremediation
  - (B) vector replacement technology
  - (C) polymerase chain reaction
  - (D) biogenic manipulation
31. Following photolysis, the energy available to fuel photosynthesis is no longer \_\_\_\_\_ energy, it is \_\_\_\_\_ energy.
- (A) mechanical; heat
  - (B) light; heat
  - (C) light; chemical
  - (D) mechanical; chemical
32. Whenever aerobic cellular respiration occurs, it is known to generate a total of 40 molecules of ATP. A different number of molecules of ATP actually become available for use by the cell. The number of available ATP molecules is \_\_\_\_\_ and it is different because \_\_\_\_\_.
- (A) 30; cellular activity uses up one-quarter of any ATP generated
  - (B) 36; four molecules of ATP fuel the process of respiration
  - (C) 44; four molecules of ATP from photosynthesis are added to ATP generated during cellular respiration.
  - (D) 48; eight molecules of ATP from photosynthesis are added to ATP generated during cellular respiration.
33. The main eukaryotic organelle used during aerobic cellular respiration is the \_\_\_\_\_.
- (A) mitochondria
  - (B) chloroplast
  - (C) ribosome
  - (D) lysosome
34. You're looking through the powerful microscope at single-celled organisms found in samples of water from a deep sea thermal vent, a volcanic bed, and from a salt lake. They do not appear to contain a nucleus or obvious organelles. What are you most likely observing?
- (A) eubacteria cells
  - (B) protist cells
  - (C) archaeobacteria cells
  - (D) plant cells

35. You're in the field observing sea stars (commonly called star fish) moving along a tidal inlet at the shore. As you watch their star-shaped bodies, you are reminded that their symmetry is \_\_\_\_\_.
- (A) radial
  - (B) bilateral
  - (C) asymmetrical
  - (D) lateral
36. You've been working with a scientific expedition along the Amazon and it turns out you found a species of tiny, pale, white fish that has never been seen before. As the discoverer, you get to pick the species name. Which is the correct way to write this name?
- (A) *Pygocentrus Caspericus*
  - (B) *Pygocentrus caspericus*
  - (C) *pygocentrus caspericus*
  - (D) Pygocentrus Caspericus
37. Most organisms that are heterotrophic need to be mobile in order to find and catch their food. One heterotrophic kingdom is immobile. Which kingdom is it and how does it get its nutrients?
- (A) Protist kingdom; food comes to it and then the food is digested internally
  - (B) Fungus kingdom; digests food externally and absorbs nutrients
  - (C) Plant kingdom; makes its own food and absorbs nutrients
  - (D) The animal kingdom; catches its food and then the food is digested internally
38. Vessels that exclusively transport blood away from the hearts of animals with closed circulation include \_\_\_\_\_.
- (A) veins
  - (B) arteries
  - (C) capillaries
  - (D) all of the above
39. When water evaporates from the leaves of a plant into the atmosphere, it draws water up through the roots toward the leaves in a process called \_\_\_\_\_.
- (A) transpiration
  - (B) transduction
  - (C) adhesion
  - (D) cohesion

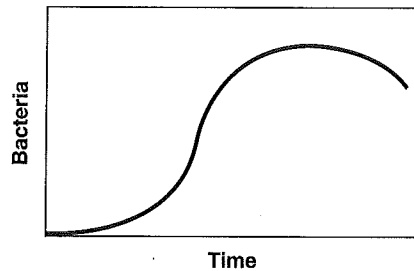


40. Movement of water inside vascular plants travels from roots to shoots in the vessels called \_\_\_\_\_ and sugars made by the plant travel through \_\_\_\_\_.
- (A) sieve tubes; companion cells
  - (B) phloem; xylem
  - (C) companion cells; sieve tubes
  - (D) xylem; phloem
41. Which biological molecules, present in the early Earth's oceans, combined to form the first primitive cells?
- (A) lipids
  - (B) proteins
  - (C) nucleic acids
  - (D) all of the above
42. The red fox, grey fox, and arctic fox all evolved from a common ancestor but have variations that work for them in their habitats. These three species of fox are examples of \_\_\_\_\_.
- (A) vestigial structures
  - (B) analogous structures
  - (C) homologous structures
  - (D) convergent evolution
43. The eye of a human serves a similar function to the eye of an octopus but their evolutionary development came from different lines of descent. Human and octopus eyes are examples of \_\_\_\_\_.
- (A) vestigial structures
  - (B) analogous structures
  - (C) homologous structures
  - (D) convergent evolution
44. There are two tubes in the throat. The one in the front is the \_\_\_\_\_ and it is used for \_\_\_\_\_.
- (A) small intestine; water absorption
  - (B) trachea; air exchange
  - (C) esophagus; air exchange
  - (D) trachea; movement of food
45. Which one of the following groups of words do not belong together?
- (A) prostate, bulbourethral gland, epididymus, vas deferens
  - (B) esophagus, small intestine, stomach, large intestine
  - (C) pancreas, ovary, trachea, lymph node
  - (D) arteries, veins, capillaries, heart

46. Which of the following statements about the skeletal system is not true?
- (A) One job of the bones is blood cell production.
  - (B) Bones are not living organs.
  - (C) Some joints that hold bones together are immovable.
  - (D) A healthy adult human body contains more than 200 bones
47. Following the eruption of Mount St. Helens in 1980, 23 square miles of surrounding forest were decimated. Some areas were so thickly covered in ash and rock, that soil was no longer available. Small plants began to inhabit this terrain and began the process of reforming soil. These small plants are considered to be \_\_\_\_\_.
- (A) primary producers
  - (B) pioneer species
  - (C) too small to help
  - (D) apex producers
48. As new soil formed near Mount St. Helens, more species slowly returned to the area. This process is called \_\_\_\_\_ succession.
- (A) initial
  - (B) secondary
  - (C) preliminary
  - (D) primary
49. There is a viral video that shows a lion and a crocodile fighting over a baby buffalo near a watering hole in Africa. This amazing video shows \_\_\_\_\_ competition, with two \_\_\_\_\_ (the lion and the crocodile) fighting over the baby buffalo. (Spoiler Alert: Fortunately for the little buffalo, its herd gets involved and saves it from becoming a meal).
- (A) interspecific; predators
  - (B) interspecific; prey
  - (C) intraspecific; predators
  - (D) intraspecific; prey
50. What is unique about the organisms that live in the deepest parts of the ocean?
- (A) They are all very small or microscopic.
  - (B) Their food webs are not based on photosynthetic producers.
  - (C) There is nothing different about them, they're just like any other plant or animal, they just live in the ocean.
  - (D) There are no living organisms in the deepest parts of the ocean.

51. The forest floor of a rainforest doesn't have much plant growth because \_\_\_\_\_.
- (A) it's always raining.
  - (B) the canopy blocks the sunlight.
  - (C) its soil doesn't have enough nutrients for plants to grow.
  - (D) bacteria, fungi, and worms in the soil destroy plants before they can grow.
52. In which biome is the state of New Jersey?
- (A) taiga
  - (B) temperate forest
  - (C) grassland
  - (D) rainforest
53. Once a species becomes extinct it can only be brought back through \_\_\_\_\_.
- (A) wildlife-based breeding programs
  - (B) zoo-based breeding programs
  - (C) gene therapy
  - (D) Sorry, they're all gone and can't be brought back with current technology.
54. If a couple have a baby with a genetic disorder and then want to have another baby, they can ensure that the new baby will not have the genetic disorder by \_\_\_\_\_.
- (A) cloning the new baby
  - (B) using IVF with genetic screening of the embryos
  - (C) talking with a genetic counselor
  - (D) being genetically screened themselves
55. The Japanese beetle is a very destructive insect pest that is believed to have arrived in the United States at a New Jersey plant nursery along with a shipment of iris bulbs in 1912. It is considered to be \_\_\_\_\_.
- (A) a native species since its been here for so long
  - (B) an invasive species
  - (C) an internationally adoptive species
  - (D) a sustainable species

56. You and your lab partner designed an experiment to evaluate the impact of plant food on the growth of plants. At the end of the experiment, the five plants that received plant food were 72, 68, 78, 81, and 75 centimeters tall. This gives you an average height of \_\_\_\_\_ centimeters. The plants that did not receive food were 73, 65, 64, 74, and 73 centimeters tall for an average of \_\_\_\_\_ centimeters.
- (A) 80; 70  
(B) 70; 60  
(C) 75; 70  
(D) 72; 68
57. In the plant food experiment above (Question 56), lack of food is the \_\_\_\_\_ and plant food is the \_\_\_\_\_.
- (A) dependent variable; independent variable  
(B) independent variable; control  
(C) control; dependent variable  
(D) control; independent variable
58. In your lab you are conducting an experiment to evaluate the impact of time on bacterial population growth. You plot your experimental data on a graph. Your explanation of the decline in population at the end of the experiment involved the population reaching the maximum size that the environment could support, known by population biologists as \_\_\_\_\_.



- (A) population potential  
(B) maximization  
(C) carrying capacity  
(D) maximal capacity
59. Some of your classmates have been talking about trying to maintain a lifestyle that will minimize their negative impact on the Earth. Which of the following activities would allow them the most potential impact on the environment?
- (A) growing an organic garden  
(B) using mass transit  
(C) recycling  
(D) becoming vocal and politically active about environmental issues

60. If you and your friends were to begin to live this lifestyle that would have a minimal negative impact on the Earth—planting trees, avoiding the use of fertilizers, recycling everything that can be recycled, buying environmentally friendly products, and using mass transit—the lifestyle that you would be living is considered \_\_\_\_\_.
- (A) sustainable
  - (B) too difficult
  - (C) bioremediation
  - (D) environmental modification

## Free-Response

**Directions:** You may use words, tables, graphs, drawings, and/or diagrams to answer the two free-response questions that follow.

1. Some of your friends have expressed an interest in making modifications to their diets. You all agree that maintaining a healthy diet is important.
  - Describe and explain what it means to have a healthy diet.
  - What biochemical molecules and elements do people need in a healthy diet?
  - Why are these compounds important to a healthy body?
  - How might someone eating a gluten-free diet (no wheat), a vegetarian diet (no meat), or a vegan diet (no animal products at all) be sure to get all the nutrients they need?
  
2. You recently watched a show that mentioned habitat destruction and it has made you think about where, how, and why habitat destruction has an impact.
  - How does habitat destruction happen?
  - What is the impact of habitat destruction on biodiversity?
  - How does habitat destruction cause endangered species and extinctions?
  - What can be done to minimize the negative effects of habitat destruction?

