

# Practice Test 2

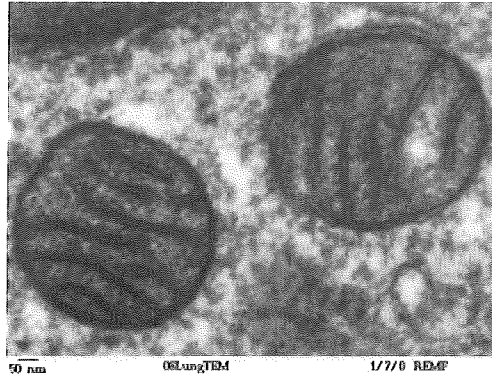
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## Multiple-Choice

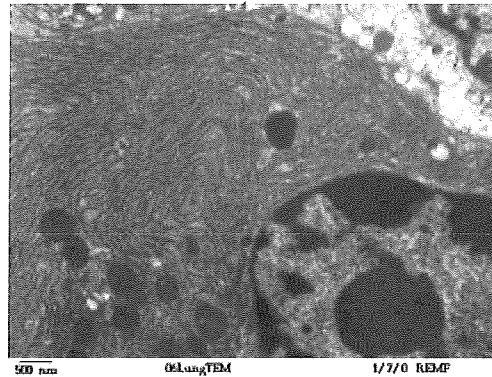
**Directions:** Select the best answer for each question.

1. You observe that when you run the track in gym class, you breathe faster and deeper and your heart rate increases. This is an example of which characteristic of life?
  - (A) organization
  - (B) homeostasis
  - (C) development
  - (D) movement
  
2. Your baby cousin seems to be growing up so fast. She's not only getting bigger, she's getting her baby teeth and she's gaining more control over her body: crawling, making sounds on purpose, and trying to stand up. Which characteristic of life is she exhibiting?
  - (A) development
  - (B) organization
  - (C) homeostasis
  - (D) metabolism

3. In order to identify organelles, you've been given cross-section photographs of interior structures of a cell. You can tell that these photographs used a technology called \_\_\_\_\_.



Mitochondria



Rough Endoplasmic Reticulum

- (A) SEM  
(B) TEM  
(C) infrared imagining  
(D) digital photography
4. Your lab team is designing an experiment on the effects of plant food on plant growth. You will be keeping 10 bean plants under all the same conditions except you will be using plant food on 5 and not feeding the other 5. You will be measuring the height of each plant every day for a month. Plant growth is the \_\_\_\_\_ in this experiment.
- (A) control variable  
(B) independent variable  
(C) dependent variable  
(D) experimental variable

5. You went to the doctor for a severe sore throat, fever, and swollen glands. She swabbed your throat and said she thinks you have a bacterial infection called “strep.” What kind of organism does she think is making you sick?
- (A) prokaryote
  - (B) protist
  - (C) eukaryote
  - (D) plant
6. Your neighbor is out of town for a few weeks and she’s paying you to stop over to bring in her mail and water her plants. You were invited during this time to a friend’s house at the shore for a long weekend. When you got back the plants were all droopy and wilted. You quickly gave them all lots of water and in a short time they were back to looking normal and strong. Which organelle helped you get the plants looking healthy again?
- (A) chloroplast
  - (B) nucleus
  - (C) vacuole
  - (D) RER
7. You’ve been given a microscope slide with many cells on it. The cells have nuclei and are all attached to each other. As far as you can tell, so far, they look very similar to each other. What can you most accurately say about these cells?
- (A) They are bacterial.
  - (B) They are all identical.
  - (C) They are part of a tissue.
  - (D) They are part of an organ.
8. The cells on your microscope slide all appear to have a green tint, nuclei, cell walls, and large central vacuoles. What can you most accurately say about these cells?
- (A) They are prokaryotic.
  - (B) They are autotrophic.
  - (C) They are decomposers.
  - (D) They are heterotrophic.
9. You baked a pie yesterday and some of the sticky pie filling overflowed, burning onto the bottom of the oven. Now your mom says you have to clean the oven and to be sure to wear protective gloves. She’s even found you protective goggles to wear. Why is she being so cautious?
- (A) Because the burnt-on pie filling is really crusty and you’re going to have to scrub really hard.
  - (B) Because the pie filling has a pH of around 2 and the acid might burn.
  - (C) Because the oven cleaner has a pH of around 13 and the strong base will burn.
  - (D) She’s just overly cautious.

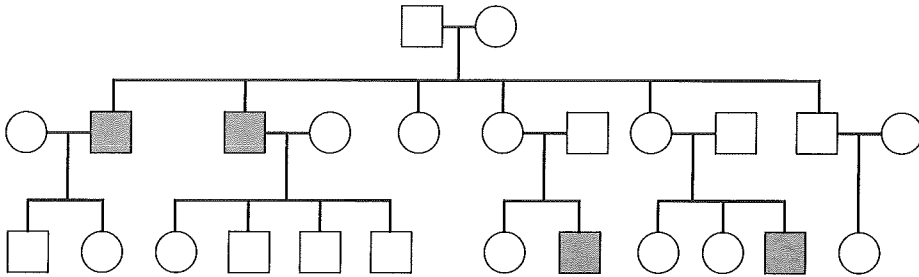
10. It was raining out and you and a friend were playing basketball inside the house. You knew it was a bad idea but since you were going to play anyway you looked around to see if anything needed to be moved out of the way. Your mom had a couple plants out so you stuck them in a closet for protection. Unfortunately, you forgot about them and several weeks have gone by. Your mom just found them in the closet and they are all yellow and look like they're dying. Which macromolecule were they deprived of while they were in the closet and out of the sun?
- (A) proteins
  - (B) nucleic acids
  - (C) lipids
  - (D) carbohydrates
11. In biology class you're discussing cellular metabolism and the enzyme catalyzed process of hydrolysis; breaking large molecules down to small enough molecules to pass through cell membranes. The simple molecule that will split the larger molecule into smaller monomers is \_\_\_\_\_.
- (A) glucose
  - (B) carbon dioxide
  - (C) water
  - (D) a fatty acid
12. Your biology class did an experiment that involved placing liver in peroxide. Fresh liver placed in peroxide produced both heat and many bubbles. Thinking about this experiment, you realize that a chemical in the liver must have triggered the reaction you have observed. Later, in a discussion about the experiment, the teacher used the word catalyst. You now know that the liver must contain \_\_\_\_\_ that break down peroxide.
- (A) enzymes
  - (B) lipids
  - (C) structural proteins
  - (D) signaling proteins
13. When a cell needs to use energy to move molecules across the cell membrane during active transport, it gets that energy by breaking the bonds of a chemical called \_\_\_\_\_.
- (A) glucose
  - (B) salt
  - (C) adenosine diphosphate (ADP)
  - (D) adenosine triphosphate (ATP)

14. Last week, your science teacher asked everyone to bring in a water sample today. Since you spent the weekend at the shore, you picked up a sample of water from the ocean to bring back. Several of your friends forgot about the assignment so you added some water from the water fountain in the hall and divided your sample. Now, you're looking at your sample through a microscope and while you see lots of stuff in the sample, it doesn't look like there's anything alive. What process probably killed off any living matter in your sample?
- (A) endocytosis
  - (B) osmosis
  - (C) pinocytosis
  - (D) exocytosis
15. Many of our white blood cells fight off infection by extending their cell membrane to wrap around infectious particles. After the particles are brought inside the cells, lysosomes destroy and digest them. The process of enveloping infectious particles is called \_\_\_\_\_.
- (A) phagocytosis
  - (B) exocytosis
  - (C) pinocytosis
  - (D) osmosis
16. Following meiosis in the cells of a whitefish, haploid cells are formed that are precursors to eggs and sperm cells. What process must these cells undergo before they become viable gametes?
- (A) mitosis
  - (B) synapsis
  - (C) interphase
  - (D) gametogenesis
17. During which of the following processes is mitosis not apparent?
- (A) asexual reproduction
  - (B) sexual reproduction
  - (C) repair of cellular damage
  - (D) Mitosis is used for all of these processes.
18. Which process in cellular reproduction contributes significantly to variation in a species and ultimately to evolutionary changes in a population?
- (A) crossing over
  - (B) apoptosis
  - (C) senescence
  - (D) cytokinesis

19. In your research for a class project on pancreatic cancer, you find information about programmed cell death. You discover that cancers generally happen when the cell stops following the cellular rules about dying when they become old. Programmed cell death is called \_\_\_\_\_.
- (A) cytokinesis
  - (B) senescence
  - (C) apoptosis
  - (D) immortality
20. You are working in a crime scene lab and are trying to isolate the different types of molecules in a body fluid sample. Which of the following would indicate to you that you've isolated RNA?
- (A) the presence of thymine
  - (B) the presence of deoxyribose
  - (C) the presence of uracil
  - (D) None of these results are conclusive for RNA.
21. In what way is DNA replication different from transcription?
- (A) They are the same thing because both make copies of DNA.
  - (B) Replication produces a single-stranded product and transcription makes a double-stranded product.
  - (C) Replication produces proteins while transcription prepares the cell for mitosis.
  - (D) Replication makes two copies of DNA while transcription produces a strand of RNA.
22. When you get a cut, your body needs to make proteins to repair the damaged skin. The first step in replacing these structural proteins takes place during the process of \_\_\_\_\_.
- (A) translation
  - (B) transcription
  - (C) gametogenesis
  - (D) epistasis
23. People who have one allele for sickle cell disease and one healthy matching allele will have \_\_\_\_\_ and \_\_\_\_\_.
- (A) heterozygous superiority; vulnerability to malaria
  - (B) heterozygous superiority; resistance to malaria
  - (C) codominance; sickle cell disease
  - (D) epistasis; no sickle cell disease

24. A friend of yours plays center on her school's basketball team. She's really long and lean. She wears glasses and braces and can never find clothes or shoes that fit her. When she went to the doctor this summer for a sports physical, the doctor heard a mild heart murmur and now wants to do some tests. What do you think the doctor is concerned about?
- (A) cystic fibrosis  
 (B) Marfan syndrome  
 (C) hemophilia  
 (D) sickle cell disease

25. The inheritance pattern shown in this pedigree is \_\_\_\_\_.



- (A) autosomal, dominant  
 (B) sex linked, recessive  
 (C) sex linked, dominant  
 (D) polygenic, epistatic
26. Two parent pea plants are both heterozygous for two traits. There is a 9:3:3:1 ratio of these two traits among their offspring. A geneticist would call this a \_\_\_\_\_.
- (A) dihybrid cross  
 (B) monohybrid cross  
 (C) trihybrid cross  
 (D) common cross
27. The existence of breeds of cattle with worthwhile traits, such as high milk production, is a result of \_\_\_\_\_.
- (A) sexual reproduction  
 (B) natural selection  
 (C) selective breeding  
 (D) all of the above
28. Gene therapy is primarily used in \_\_\_\_\_.
- (A) specific groups of somatic, or body, cells.  
 (B) egg and sperm cells to correct genetic disorders  
 (C) somatic cells to correct multifactoral genetic disorders  
 (D) all of the above

29. When a therapeutic gene is isolated, it needs to be inserted into a carrier that will transport it to its target cells in order to initiate the process of gene therapy. This carrier is also known as a \_\_\_\_\_.
- (A) hormone
  - (B) cultivar
  - (C) vector
  - (D) somatic cell
30. The force that pulls DNA fragments across a gel plate during electrophoresis is \_\_\_\_\_.
- (A) facilitated diffusion
  - (B) exocytosis
  - (C) a negative electrode
  - (D) a positive electrode
31. The energy needed by cells to conduct life's activities is originally generated by \_\_\_\_\_.
- (A) the cells that need the energy
  - (B) the soil, water, and air surrounding living things
  - (C) the sun
  - (D) the food that all living things eat
32. A process that occurs in both aerobic and anaerobic respiration is \_\_\_\_\_.
- (A) photosynthesis
  - (B) glycolysis
  - (C) the Krebs's cycle
  - (D) the light-independent reactions
33. The energy available in a molecule of ATP is stored in its \_\_\_\_\_.
- (A) adenosine molecule
  - (B) bond to its first phosphate group
  - (C) bond to its second phosphate group
  - (D) bond to its third phosphate group
34. Animals such as frogs and butterflies transition from one appearance as a juvenile to a totally different appearance as an adult. This change is called \_\_\_\_\_.
- (A) endothermism
  - (B) bipedalism
  - (C) metamorphosis
  - (D) conversion

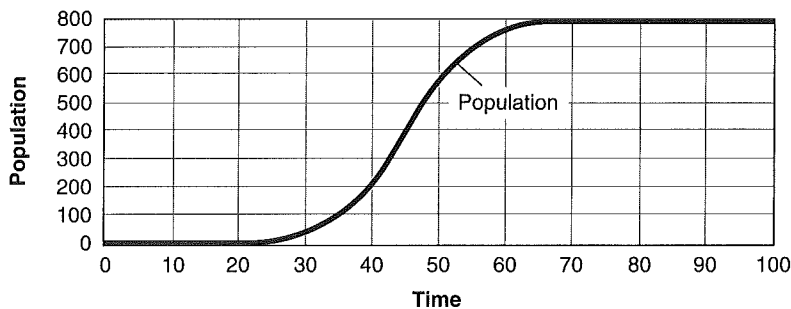


35. You're walking through a neighborhood park and noticing all the different life forms around you. The cherry trees are blossoming. You know they are \_\_\_\_\_ because they have \_\_\_\_\_.
- (A) gymnosperms; fruit
  - (B) gymnosperms; green leaves
  - (C) angiosperms; flowers
  - (D) angiosperms; green leaves
36. You've been working with a scientific expedition deep inside a cave and you have found a very active species of tiny, glowing worm 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) Arachnocampa Glowicus
  - (B) *Arachnocampa Glowicus*
  - (C) *Arachnocampa glowicus*
  - (D) *arachnocampa glowicus*
37. Characteristics of water that help with its transport in complex plants include all the following except \_\_\_\_\_.
- (A) cohesion
  - (B) transduction
  - (C) adhesion
  - (D) transpiration
38. Vessels that carry materials down the plant from the leaves to the roots are called \_\_\_\_\_ and they transport \_\_\_\_\_.
- (A) xylem; water and minerals
  - (B) xylem; carbohydrates
  - (C) phloem; water and minerals
  - (D) phloem; carbohydrates
39. Animal classes that have a dorsal nerve cord, a notochord, and gill slits at some point in their development include \_\_\_\_\_.
- (A) birds and fish
  - (B) squid and octopus
  - (C) earthworms and jellyfish
  - (D) insects and crustaceans
40. A transport mechanism that allows vertebrates to distribute oxygen and nutrients to all the body cells and to pick up and dispose of carbon dioxide and other waste products involves a pump and \_\_\_\_\_.
- (A) kidneys and urinary bladder
  - (B) arteries, capillaries, and veins
  - (C) lungs and heart
  - (D) stomach, small and large intestines

41. Which of the following does not fit in with Darwin's Theory of Natural Selection?
- (A) Every organism produces offspring.
  - (B) Variations are passed from parents to offspring.
  - (C) Better adapted organisms will live longer and produce more offspring.
  - (D) As more adapted offspring survive, variations become characteristic to the species.
42. The study of embryology relates and compares embryos of different species in an effort to establish their evolutionary relationships. Human embryos go through stages that look like the embryos of \_\_\_\_\_.
- (A) rabbits
  - (B) cats
  - (C) pigs
  - (D) all of the above
43. As he traveled throughout the Galapagos Islands, Charles Darwin saw unique species of finch, tortoise, and iguana that were specifically adapted, from common ancestors, to the environmental conditions of the islands on which they lived. These birds and reptiles could no longer interbreed with related animals on other islands. They had changed as a result of \_\_\_\_\_.
- (A) artificial selection
  - (B) adaptive radiation
  - (C) geographic isolation
  - (D) all of the above
44. The thyroid is considered an endocrine gland because \_\_\_\_\_
- (A) it secretes a chemical into surrounding fluid that acts in other parts of the body.
  - (B) it secretes a chemical into ducts that act in other parts of the body.
  - (C) it secretes a chemical that acts to end a chemical reaction.
  - (D) it secretes lymphatic fluid.
45. The sequence of structures through which urine passes along its path out of the body is \_\_\_\_\_.
- (A) kidney, urethra, urinary bladder, ureter
  - (B) kidney, urinary bladder, urethra, ureter
  - (C) kidney, ureter, urinary bladder, urethra
  - (D) kidney, urethra, ureter, urinary bladder

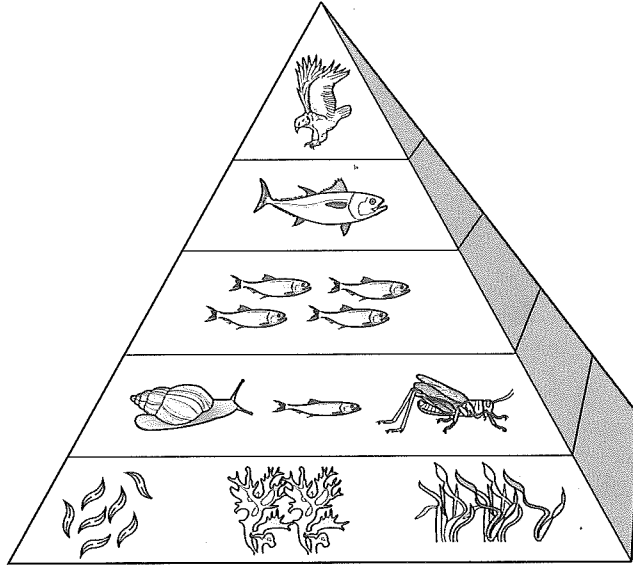
46. The human body system that eliminates carbon dioxide is the \_\_\_\_\_.
- (A) urinary system  
 (B) respiratory system  
 (C) digestive system  
 (D) lymphatic system
47. In 1788, rabbits were brought to Australia to be used as a food source for European colonists. Since then, Australia has had a tremendous problem with rabbit overpopulation and the damage that rabbits have done to the countryside and to crops. This damage is primarily because there are so many more rabbits than the environment can support. The rabbits have exceeded the \_\_\_\_\_ of this ecosystem.
- (A) carrying capacity  
 (B) load capacity  
 (C) emigration capacity  
 (D) pyramid of energy
48. Whitetail deer are the largest wild herbivores in the state of New Jersey. It is estimated that there are now around 200,000 deer in New Jersey while there were very few deer in the state 100 years ago. This population explosion has resulted in damage to the deer's habitat and, as boundaries between human activities and the forests become less distinct, many deer-related motor vehicle accidents and property damage. Movement of deer out of the forests is called \_\_\_\_\_ and movement into human-populated areas is called \_\_\_\_\_.
- (A) immigration; emigration  
 (B) emigration; immigration  
 (C) an abiotic factor; a biotic factor  
 (D) the carrying capacity; the limiting factor

Use the following graph to answer question 49.



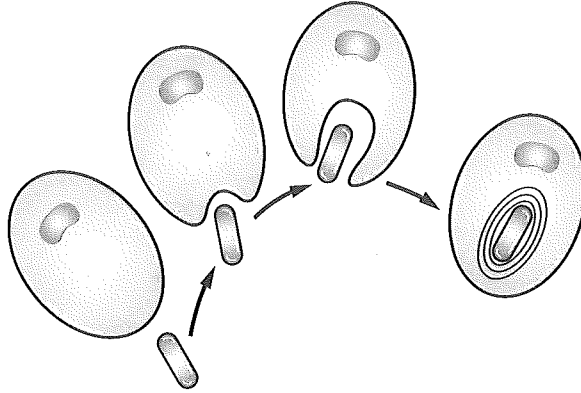
49. The graph shows a(n) \_\_\_\_\_ curve. This tells us that when the population hit 800 the environment reached its \_\_\_\_\_.
- (A) S; limiting factor
  - (B) J; niche
  - (C) S; carrying capacity
  - (D) J; biome capacity
50. Why are so few trees found in grassland biomes?
- (A) Permafrost blocks root growth.
  - (B) Root mats of grasses block the trees from developing strong root systems.
  - (C) There isn't enough rain.
  - (D) Herbivores eat their leaves, killing the trees before they mature.
51. Only one biome is characterized by the presence of four distinct seasons each year, summer, autumn, winter, and spring. That biome is the \_\_\_\_\_.
- (A) rainforest
  - (B) taiga
  - (C) desert
  - (D) temperate forest
52. When carbon dioxide interacts with water in the atmosphere, acid rain is produced because \_\_\_\_\_.
- (A) hydroxide ions ( $\text{OH}^-$ ) are generated.
  - (B) hydrogen ions ( $\text{H}^+$ ) are released.
  - (C) carbon monoxide molecules ( $\text{CO}$ ) are generated.
  - (D) all of the above
53. Effective natural resource management does not include \_\_\_\_\_.
- (A) replanting trees in areas where logging occurs.
  - (B) building a windmill farm to harness the energy produced by the movement of air.
  - (C) finding a new oil field deep under the Gulf of Mexico and building an oil rig there.
  - (D) powering street lights with solar panels.

Use the following image to answer questions 54–56.



54. At each level, moving from the bottom to the top of the pyramid, the amount of available energy \_\_\_\_\_.
- (A) remains the same
  - (B) keeps increasing
  - (C) keeps decreasing
  - (D) Cannot be determined from this image
55. At the bottom of the pyramid \_\_\_\_\_ are found, while at the top of the pyramid there are \_\_\_\_\_.
- (A) heterotrophs; autotrophs
  - (B) autotrophs; heterotrophs
  - (C) consumers; producers
  - (D) eukaryotes; prokaryotes
56. At each level, moving from the bottom to the top of the pyramid, the number of living organisms \_\_\_\_\_.
- (A) remains the same
  - (B) keeps increasing
  - (C) keeps decreasing
  - (D) cannot be determined from this image

Use the following image to answer questions 57–58.



57. The type of transport represented in the image is called \_\_\_\_\_.
- (A) passive transport
  - (B) exocytosis
  - (C) pinocytosis
  - (D) endocytosis
58. This image represents one hypothesis about the evolution of early life forms called the \_\_\_\_\_ Hypothesis.
- (A) exosymbiont
  - (B) endosymbiont
  - (C) mitochondrial
  - (D) cell membrane

## Free-Response

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

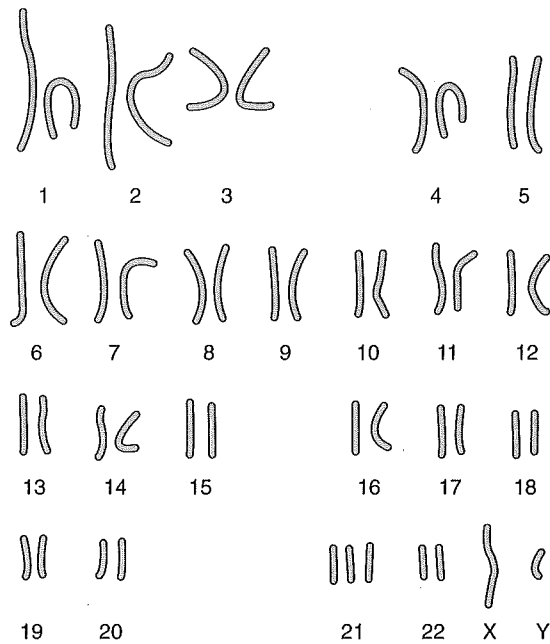
1. Your family has decided that it would like to set up an aquarium and is deciding between establishing a fresh water or a salt water habitat. At the pet store, the salesperson explains that it is both more difficult and more expensive to set up and maintain a salt water tank.
  - Why is the salt water habitat more difficult and expensive to set up and maintain?
  - What kinds of organisms would inhabit each type of aquarium?
  - Why does salt content of the water matter (make sure to consider osmosis and tonicity)?

2. After learning about genetic disorders in biology class, it seems like you are hearing about genetic disorders all too often. You just heard that Brian, one of the starring members of the school basketball team, was diagnosed with the Marfan syndrome. This dominant, autosomal genetic condition causes an error in the production of a structural protein called fibrillin which acts as a glue holding parts of his body together as tightly as they should be held. Brian has been told he can no longer play contact sports because his aorta has been weakened by incorrectly made fibrillin.

Then, the other day in history class you were discussing the impact of hemophilia on history. Your teacher explained that Queen Victoria passed this recessive, sex-linked genetic disorder onto her offspring. The ruler of early 1900s Russia Czar Nicholas, and his wife, Alexandra, had a son with hemophilia, as well. This disorder causes blood to clot much more slowly than it should and can cause serious bleeding complication after even minor injuries.

- What are some similarities and differences in the causes of these disorders?
- How are dominant and recessive traits inherited?
- What is the difference between autosomal and sex-linked disorders?
- Brian has a very tall, slender mom and an average-height dad. He also has two average-height sisters. What might a pedigree for his family look like?
- What genotypes and phenotypes might you see in these families?
- What might a Punnett Square for Brian's family look like?

Use the following image to answer questions 59 and 60.



59. This image is called a \_\_\_\_\_ and it is a photograph of a person's \_\_\_\_\_.

- (A) karyotype; chromosomes
- (B) karyotype; chromatids
- (C) PCR; chromosomes
- (D) PCR; chromatids

60. The person represented by this image is a \_\_\_\_\_ with \_\_\_\_\_.

- (A) male; Down syndrome
- (B) male; healthy genes
- (C) female; cystic fibrosis
- (D) female; Huntington's disease