

TEST NAME: Biology Test 2
TEST ID: 2871656
GRADE: 10 - Tenth Grade
SUBJECT: Life and Physical Sciences
TEST CATEGORY: School Assessment

Student: _____

Class: _____

Date: _____

1. How can drugs and chemical pollutants affect the expression of traits?
 - A. They can cause genetic mutations that alter phenotypes.
 - B. They do not have any effect on physical traits but may alter moods.
 - C. They may cause the modifications in genotypes but not affect the phenotype.
 - D. The chemicals and pollutants will only affect the organism if they are ingested over a long period of time.

2. Type II diabetes is caused by a lack of receptors for insulin on target tissues. How is this caused by external factors?
 - A. overuse of the receptors due to poor diet choices
 - B. drinking too much alcohol coupled with a diet high in protein
 - C. eating disorders and too much exercise damage the pancreas
 - D. taking too many diet supplements cause harmful levels of fat soluble vitamins

3. Which could lead to Type 2 diabetes?
 - A. tobacco use
 - B. improper diet
 - C. sun exposure
 - D. vitamin D deficiency

4. Which condition is correctly paired to its cause?
 - A. phenylketonuria – sun exposure
 - B. phenylketonuria – tobacco use
 - C. lung cancer – sun exposure
 - D. lung cancer – tobacco use

5. How can a strict diet help people diagnosed with PKU?
- A. by avoiding proline which reduces the risk of nerve damage
 - B. by avoiding tyrosine which reduces the risk of becoming obese
 - C. by avoiding aspartic acid which reduces the risk of organ damage
 - D. by avoiding phenylalanine which reduces the risk of mental defects
6. Some animal behaviors are listed.

Animal Behaviors

- Newborn kangaroo crawling into its mother's pouch
- Tadpole swimming after emerging from egg
- Robin building a nest in a tree
- Spider spinning a web in a meadow

These behaviors are innate because the behaviors are

- A. performed by four different species.
 - B. learned from one or both parents.
 - C. observed only in certain environments.
 - D. performed without any previous learning experience.
7. A newborn has phenylketonuria, which can cause severe intellectual disability. Fortunately, a simple dietary restriction of foods rich in phenylalanine has been shown to be effective in preventing intellectual disability. Given this, which is the **best** advice a physician can give the parents?
- A. "Please be aware that your child has an inherited disease that has no cure."
 - B. "Please restrict your child's consumption of diet soft drinks to help prevent an intellectual disability."
 - C. "Please be aware that your child has an inherited disease, which will likely result in an intellectual disability."
 - D. "Please restrict your child's consumption of all foods rich in phenylalanine to help prevent an intellectual disability."

8. Which would **most likely** increase a person's likelihood of developing heart disease?
- A a vegetarian diet
 - B exercising regularly
 - C restricting salt intake
 - D diet high in fat and cholesterol
9. Which worker would have the highest probability of developing skin cancer based solely on their job requirements?
- A a nurse
 - B a lawyer
 - C a teacher
 - D a lifeguard
10. Himalayan rabbits possess genes that regulate pigment in certain temperatures. If the temperature is moderate, rabbits will be white with dark ears and feet. The gene is inactive in extreme conditions. Which **best** describes a Himalayan rabbit living near the equator?
- A all black
 - B all white
 - C black with white ears and feet
 - D white with black and white ears and feet
11. **Which of these traits is MOST influenced by environment?**
- A weight
 - B hair color
 - C blood type
 - D handedness

12. **The flower petals of a hydrangea plant change color as the acidity of the soil changes. The color changes are directly related to which factor?**
- A. gravitropism
 - B. photosynthesis
 - C. geographic location
 - D. environmental conditions
13. Which is an example of the environment influencing the expression of a genetic trait?
- A. hemophilia in Queen Victoria's family
 - B. widow's peak in each generation of a family
 - C. great variation in height seen in members of a family
 - D. formation of freckles after sun exposure in members of a family
14. **Which characteristic is affected by interactions with the environment?**
- A. weight
 - B. eye color
 - C. blood type
 - D. handedness
15. DNA mutations as a result of tobacco use can lead to which condition?
- A. PKU
 - B. diabetes
 - C. skin cancer
 - D. lung/mouth cancer
16. Heart disease is a genetic trait that may run in a family's health history. Which external factor may delay the onset of this disease?
- A. starting a high-dose aspirin regimen
 - B. exercising regularly and proper nutrition
 - C. getting on an organ transplant list early on
 - D. not being involved in strenuous physical activity

17. **¿En cuál de los siguientes rasgos influye tanto la genética como la conducta?**
- A. el color de ojos
 - B. la textura del cabello
 - C. el grupo sanguíneo
 - D. el peso corporal
18. Which condition is linked to excess exposure to UV radiation?
- A. PKU
 - B. diabetes
 - C. skin cancer
 - D. heart disease
19. Both female and male sheep have alleles for horn size and length in their genomes. Which **best** describes the reason the males grow horns and the females do not?
- A. Male sheep hormones dictate the growth of horns.
 - B. Male sheep use their horns to fight other male sheep.
 - C. Male sheep have fewer chromosomes than female sheep.
 - D. Female sheep rub down their horns on hard objects like trees and rocks.
20. **Which trait of a pet dog is inherited?**
- A. The dog avoids a pet cat.
 - B. The dog jumps on a sofa.
 - C. The dog rolls over on command.
 - D. The dog drools when it smells food.
21. In which condition can an affected individual avoid symptoms by following a low phenylalanine diet?
- A. PKU
 - B. diabetes
 - C. skin cancer
 - D. heart disease

22. What are some external factors that affect gene expression in organisms?
- A. alleles
 - B. cyclins
 - C. mutations
 - D. temperature
23. Which human disorder would be **most** affected by dairy products?
- A. PKU
 - B. anemia
 - C. hemophilia
 - D. Huntington's disease
24. **Which of these traits is inherited but greatly influenced by the environment?**
- A. tongue rolling ability
 - B. athletic performance
 - C. language
 - D. color of eyes
25. Two flowers that have the same genotype have different phenotypes; one has blue petals, and one has pink petals. Which **best** describes the differences in gene expression?
- A. One flower is mutated.
 - B. The flowers may have been exposed to different pH levels in the soil.
 - C. The flowers may have been exposed to homozygous recessive genes.
 - D. The flowers were hybrids and one gene was dominant over the other allele.

26. What nutrient is most associated with skin cancer?
- A. magnesium
 - B. potassium
 - C. vitamin D
 - D. vitamin K
27. Phenylketonuria, or PKU, is a genetic condition that affects metabolism and can cause severe intellectual disability in children. Children affected with PKU cannot digest foods containing the amino acid phenylalanine, like milk and diet soda. Which statement **best** identifies the cause of complications related to PKU?
- A. The body is unable to digest lipids.
 - B. The body is unable to digest carbohydrates.
 - C. The body is unable to produce a certain enzyme.
 - D. The body is unable to produce a certain hormone.
28. Why can differences be observed in the personalities and appearances of identical twins?
- A. because of the expression of recessive genes
 - B. because of the impact of a chromosomal mutation
 - C. because of the impact of environment factors on gene expression
 - D. because of the expression of genes caused by incomplete dominance
29. What would **most likely** occur due to excessive exposure to x-rays?
- A. mutation
 - B. skin cancer
 - C. lung cancer
 - D. unhealthy diet

30. Which results from the inability to digest the amino acid phenylalanine in food?
- A. PKU
 - B. SIDS
 - C. diabetes
 - D. cystic fibrosis
31. **Genetics and the environment both play roles in cell differentiation. Which is the BEST example of an environmental factor influencing cell differentiation?**
- A. The cells of a chicken embryo divide to form three layers: the ectoderm, mesoderm, and endoderm.
 - B. The terminal bud on a runner of a strawberry plant begins growing roots when it contacts the ground.
 - C. Cambium cells in the trunk of an apple tree form rings of xylem and phloem annually.
 - D. During meiosis, a single cell divides to form four gametes with half the number of chromosomes that somatic cells have.
32. Which would be **most** effective at preventing heart disease?
- A. using sunscreen
 - B. exercising regularly
 - C. eating a diet low in sugars
 - D. eating a diet low in phenylalanine
33. Rat snakes come in a variety of colors because they are capable of living in a variety of climates and terrains. Their color helps them to hide from predators. What factor **most likely** influenced the variety of colors of this species?
- A. pollution
 - B. diet variation
 - C. human interaction
 - D. environmental factors

34. A new factory is built near a large forest. The smokestacks emit a lot of soot that covers the trees in the nearby forest. What is the **most likely** outcome of the environmental change described above?
- A. Most insects die due to lack of food.
 - B. Predators decrease due to lack of food.
 - C. The organisms migrate to a new environment.
 - D. Insects are darker colored to blend in with their surroundings.
35. Which **best** explains how a person who smokes lightly can develop lung cancer while a person who smokes heavily does not?
- A. The person who smokes lightly has a genetic predisposition to developing cancer.
 - B. The person who smokes heavily has a genetic predisposition to developing cancer.
 - C. The person who smokes lightly is immune to the harmful effects of cigarette smoke.
 - D. The person who smokes heavily is immune to the harmful effects of cigarette smoke.
36. Which human genetic disorder is **most** affected by a person's diet?
- A. cystic fibrosis
 - B. phenylketonuria
 - C. sickle cell anemia
 - D. Huntington's disease

37. Which is an example of the relationship between environmental factors and gene expression?
- A. The offspring of a black hen and a white rooster are black and white due to codominance.
 - B. A man is colorblind because he inherited the sex-linked trait for colorblindness from his mother.
 - C. Two plants with the same genetic make-up have different flower colors due to the pH of the soil.
 - D. The offspring of a red-flowered plant and a white-flowered plant have pink flowers due to incomplete dominance.
38. **Ambos la genética y el medio ambiente desempeñan las funciones en la diferenciación celular. ¿Cuál es el MEJOR ejemplo de un factor ambiental que influye la diferenciación celular?**
- A. Las células de un embrión de gallina se dividen para formar tres capas: el ectodermo, mesodermo y endodermo.
 - B. La yema terminal sobre un estolón de una planta de fresa comienza creciendo raíces cuando entra en contacto con la tierra.
 - C. Las células de cámbium en el tronco de un árbol de manzana forman anualmente los anillos de xilema y floema.
 - D. Durante la meiosis, una sola célula se divide para formar cuatro gametos con la mitad del número de cromosomas que las células somáticas tienen.
39. Which action must occur in order for an individual to inherit sickle cell?
- A. The individual must inherit one gene for Hemoglobin S.
 - B. Chromosomes 11 and 16 must exchange parts of their DNA.
 - C. Two genes for Hemoglobin S must be inherited from the parents.
 - D. A parent having sickle cell must experience a diet rich in fats and sugar.
40. Which human condition would be **most** affected by a diet deficient in iron?
- A. PKU
 - B. anemia
 - C. hemophilia
 - D. Huntington's disease

41. **Stem cells are cells that can differentiate into many different kinds of cells. Scientists have discovered that the environment supporting the cells influences stem-cell differentiation. For example, stem cells grown on strong, flexible surfaces became muscle cells. What MOST likely happened to stem cells grown on a hard, rigid surface?**
- A. They became nerve cells.
 - B. They became red blood cells.
 - C. They became bone cells.
 - D. They became skin cells.
42. **Which of the following is influenced by both genetics and behavior?**
- A. eye color
 - B. hair texture
 - C. blood type
 - D. body weight
43. John has family members on both parents' sides who have suffered from lung cancer. All of them have been smokers. Which would **most likely** explain why lung cancer is prevalent in John's family?
- A. They have weak immune systems.
 - B. His families' homes are full of asbestos.
 - C. His family is breathing mold-infested air.
 - D. They have a genetic mutation that expresses itself in smokers.
44. **Which characteristic is LEAST likely to be affected by an individual's environment?**
- A. height
 - B. weight
 - C. skin color
 - D. eye color

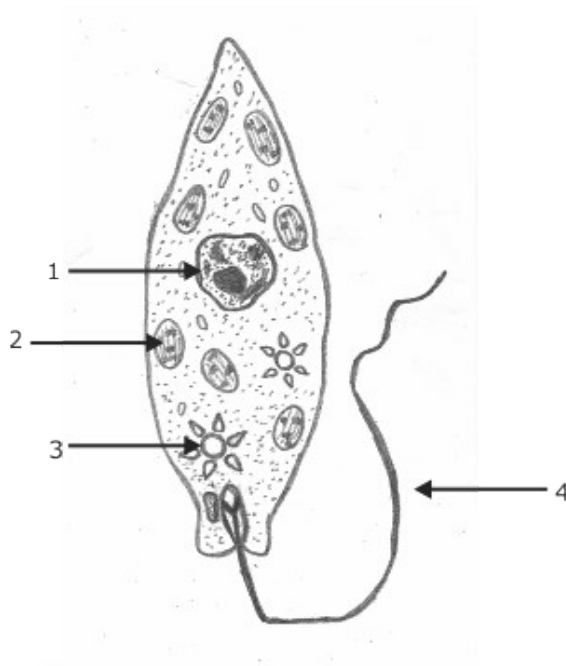
45. PKU, or Phenylketonuria, is an inherited disease which leads to an elevated amount of phenylalanine and can cause mental retardation. For this reason, diet soft drinks containing aspartame, which contains phenylalanine, include a warning. Which reason **best** supports the conclusion that PKU can be treated by limiting the consumption of these types of foods?
- A. Limiting the consumption of phenylalanine cures phenylketonuria.
 - B. Limiting the consumption of phenylalanine turns off the gene responsible for phenylketonuria.
 - C. Limiting the consumption of these foods reduces the amount of aspartame in the bloodstream.
 - D. Limiting the consumption of these foods reduces the amount of phenylalanine in the bloodstream.
46. DNA mutations caused by ultraviolet radiation are responsible for which condition?
- A. diabetes
 - B. lung cancer
 - C. skin cancer
 - D. phenylketonuria (PKU)
47. Environmental factors are capable of changing one's DNA and can cause uncontrolled cell growth that often results in cancer. What are these factors called?
- A. deletions
 - B. mutagens
 - C. inversions
 - D. mutations
48. ¿Cuál característica es **MENOS** probable que se vea afectada por el entorno de un individuo?
- A. la estatura
 - B. el peso
 - C. el color de piel
 - D. el color de ojos

49. How can patients reduce the symptoms associated with PKU (phenylketonuria)?
- A. by exercising weekly
 - B. by keeping a strict diet
 - C. by getting vitamin treatments
 - D. by receiving antibiotic treatments
50. Eyespots are found in some unicellular organisms and can detect light. How might this adaptation be beneficial to a photosynthetic green algae cell?
- A. It would help the algae cell move away from the light to avoid being seen.
 - B. It would help the algae cell move away from the light so that it may make food.
 - C. It would help the algae cell move towards the light to see predators coming.
 - D. It would help the algae cell move towards the light so that it could make food.
51. A scientist studies a group of fossilized unicellular organisms that have long tail-like projections. Which is the **most likely** purpose of these tail-like projections?
- A. mating
 - B. locomotion
 - C. grasping prey
 - D. defense against predators
52. What structure in bacteria protects the cell from injury and resists some antibiotics?
- A. nucleus
 - B. cell wall
 - C. mitochondria
 - D. cell membrane

53. Why is the use of Gram staining to identify types of bacteria important?
- A. It allows doctors to identify the type of cell wall and enables them to prescribe the right antibiotic.
 - B. It allows doctors to identify the type of cell membrane and enables them to prescribe the right antibiotic.
 - C. It allows doctors to identify the type of nuclear membrane and enables them to prescribe the right antibiotic.
 - D. It allows doctors to identify the type of mitochondrial DNA and enables them to prescribe the right antibiotic.
54. Which would **most likely** hinder the ability of a paramecium to survive in its environment?
- A. absorbing chemicals that impact contractile vacuoles
 - B. dividing into two identical daughter cells
 - C. using ATP to aid in movement of the cilia
 - D. replicating mitochondria within the cell
55. How are flagella and cilia similar?
- A. They both aid in movement.
 - B. They are both used for reproducing.
 - C. They are both hair-like projections that are used for digestion.
 - D. They are both used to shoot out trichocysts that paralyze potential prey.
56. Which is a primary function of a cilium?
- A. movement
 - B. catching prey
 - C. sensing light
 - D. maintaining homeostasis

57. Which organelles will a photosynthetic unicellular organism use to find the light?
- A. cilia
 - B. flagella
 - C. eyespots
 - D. pseudopods
58. Which structure found in paramecium serves the same function as the pseudopods of an amoeba?
- A. cilia
 - B. eyespot
 - C. flagella
 - D. vacuole
59. To maintain homeostasis, a cell needs to expel some of its water. Which structures below would **most likely** help accomplish this task?
- A. pseudopods
 - B. protein pumps
 - C. tunnel proteins
 - D. contractile vacuoles

60. The diagram shows a common pond water protist.



The removal of excess water is accomplished by the action of which numbered organelle?

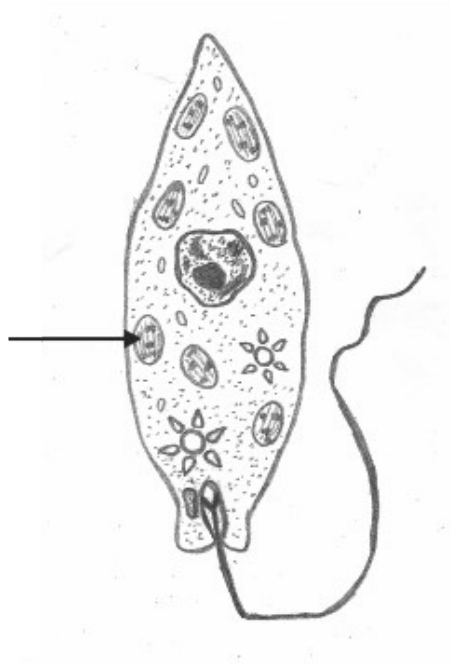
- A. 1, nucleus
- B. 2, chloroplast
- C. 3, contractile vacuole
- D. 4, flagellum

61. How does an amoeba capture food?

- A. traps it with cilia
- B. traps it with flagella
- C. engulfs it with pseudopodia
- D. ingests it through contractile vacuole

62. Scientists conduct a study on different unicellular organisms. They want to see how the organism behaves when food is placed near the organisms. Some organisms move toward the food source. What is the **best** conclusion that the scientists can make of these results?
- A. Some organisms have adapted and move toward food due to chemotaxis.
 - B. Some organisms have adapted and move toward food due to phototaxis.
 - C. Some organisms have adapted to use flagella to engulf food.
 - D. Some organisms have adapted to use cilia to engulf food.

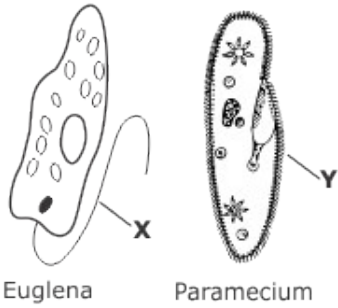
63. Examine the diagram of the Euglena.



How does the organelle identified by the arrow function to help this protist obtain food?

- A. The organelle stores water used to break down glucose.
- B. The organelle detects the direction and intensity of light that can be trapped for photosynthesis.
- C. The organelle produces energy that is used in twisting the flagellum to swim toward food.
- D. The organelle contains chlorophyll that absorbs the light energy used for photosynthesis.

64. These diagrams represent a Euglena and a Paramecium.



Which function do structures **X** and **Y** have in common?

- A. digestion
 - B. gathering food
 - C. movement
 - D. reproduction
65. A unicellular organism that produces glucose through photosynthesis would **most likely** contain which structure?
- A. chloroplasts
 - B. cilia
 - C. eyespots
 - D. pseudopods
66. Which are hair-like projections used for locomotion by unicellular organisms?
- A. cilia
 - B. flagella
 - C. pseudopodia
 - D. contractile vacuoles

67. The bacterium, *E.coli*, responds and moves toward a sudden high concentration of sugar added to the medium it lives in. Which describes this response?
- A. aerotaxis
 - B. phototaxis
 - C. chemotaxis
 - D. thigmotaxis
68. Phototaxis is movement in response to which stimulus?
- A. light
 - B. sugar
 - C. chemicals
 - D. nutrients
69. A scientist shines a bright light on a group of unicellular organisms and observes the organisms move away from the light. Which structure **most likely** helped the organisms sense the light?
- A. cilia
 - B. flagella
 - C. eyespots
 - D. pseudopods
70. Which is used by the amoeba for locomotion?
- A. cilia
 - B. flagella
 - C. pseudopod
 - D. contractile vacuole

71. Which **best** describes the function of eyespots in *Euglena*?
- A. maintains water balance within the *Euglena*
 - B. senses predators so that the *Euglena* can escape
 - C. produces energy for the *Euglena* to use for movement
 - D. detects the direction and intensity of light for the *Euglena*
72. Which example represents chemotaxis?
- A. An amoeba engulfs a food particle.
 - B. A paramecium removes excess water.
 - C. A euglena moves from a dark area towards a light source.
 - D. A bacterium swims towards higher concentrations of glucose.
73. What is the function of the contractile vacuole in protozoans?
- A. to detect light
 - B. for movement
 - C. for digestion
 - D. to pump out excess water
74. Which is the paramecium regulating with the use of the contractile vacuole?
- A. development
 - B. homeostasis
 - C. metabolism
 - D. reproduction

75. Contractile vacuoles control the balance of water in *Paramecium* cells. What might happen if a pond-dwelling *Paramecium*'s contractile vacuole fails?
- A. The *Paramecium* would swell, because the water it makes from photosynthesis would become trapped inside.
 - B. The *Paramecium* would swell, because water would enter the cell where the concentration of water is lower.
 - C. The *Paramecium* would shrivel, because the pressure inside the cell would decrease.
 - D. The *Paramecium* would shrivel, because water would leave the cell to a lower concentration of water.
76. Why are contractile vacuoles important to unicellular organisms like paramecia?
- A. They excrete wastes.
 - B. They help the cell move.
 - C. They maintain homeostasis.
 - D. They respond to external stimuli.
77. How might an eyespot apparatus be adaptive for an algae cell?
- A. It would create a positive phototactic response.
 - B. It would create a negative phototactic response.
 - C. It would create a positive thigmotropic response.
 - D. It would create a negative thigmotropic response.
78. What primary function do flagella serve in bacteria?
- A. gathering food
 - B. intake of fluids
 - C. directional movement
 - D. defense against attackers

79. Which structure found in an amoeba would help the organism maintain water balance?

- A. cilia
- B. nucleus
- C. pseudopod
- D. contractile vacuole