

STAAR

Testing Strategies

- Read the last sentence to see if you have enough information to answer the question before you go back and read everything.

Which of these best explains why energy is needed for active transport?

- A. Ions are negatively charged.
- B. Ions are attached to large proteins.
- C. Ions are moved against the concentration gradient.
- D. Ions are trapped inside the plasma membrane.

The cellular process known as the sodium-potassium pump was discovered in the 1950s by Jens Christian Skou, a Danish scientist. This process is a form of active transport that moves three sodium ions to the outside of a cell for every two potassium ions that it moves into the cell. Which of these best explains why energy is needed for active transport?

- A. Ions are negatively charged.
- B. Ions are attached to large proteins.
- C. Ions are moved against the concentration gradient.
- D. Ions are trapped inside the plasma membrane.

The feature that distinguishes euglena from cyanobacteria is the —

- A. ability to maintain homeostasis
- B. presence of ribosomes
- C. ability to reproduce
- D. presence of a nuclear membrane

Both euglena and cyanobacteria are photosynthetic unicellular organisms found in pond water. The feature that distinguishes euglena from cyanobacteria is the —

- A. ability to maintain homeostasis
- B. presence of ribosomes
- C. ability to reproduce
- D. presence of a nuclear membrane

The cellular process that enables cells to grow and develop into tissue is —

- A. Conjugation
- B. Mitosis
- C. Budding
- D. Meiosis

Scientists can bioengineer skin in a laboratory to treat severe burns and other types of skin injuries. This bioengineered tissue is grown from living cells. The cellular process that enables the cells to grow and develop into tissue is —

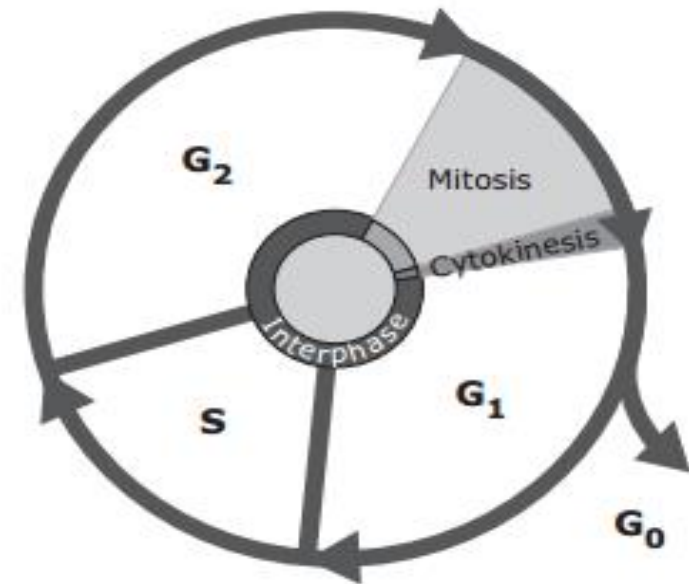
- A. Conjugation
- B. Mitosis
- C. Budding
- D. Meiosis

Cancer cells are different because they cannot enter G_0 phase and are likely to do which of the following?

- A Fail to complete S phase
- B Mutate during G_1 phase
- C Repeat the cell cycle continuously
- D Die after completing mitosis

The diagram below represents the cell cycle. When cells leave the cell cycle, they exit during G_1 phase and then enter G_0 phase, a resting period. Most normal cells can leave G_0 phase and reenter the cell cycle at G_1 phase before entering S phase. **Cancer cells are different because they cannot enter G_0 phase and are likely to do which of the following?**

- A Fail to complete S phase
- B Mutate during G_1 phase
- C Repeat the cell cycle continuously**
- D Die after completing mitosis



Nucleotide sequence comparisons are possible because all organisms share which of the following?

- A. DNA bases
- B. Cellular organelles
- C. Division of the nuclear chromosomes
- D. Types of proteins needed for cellular functions

Organisms can be classified based on homology, which is shared characteristics inherited from a common ancestor. In the past, homologies were based on studies of anatomical structures and patterns of embryonic development. In more recent years, the use of molecular biology techniques has allowed homologies to be compared at the level of nucleotide sequences. Nucleotide sequence comparisons are possible because all organisms share which of the following?

A. DNA bases

B. Cellular organelles

C. Division of the nuclear chromosomes

D. Types of proteins needed for cellular functions

Obtaining these samples is necessary because **blood and cheek cells contain**

—

- A. plasma and platelets
- B. a complete set of DNA
- C. essential proteins and amino acids
- D. a large number of neutrophils

A genome-wide association study involves searching the genomes of many people in order to find genetic variations associated with common diseases such as cancer, asthma, and diabetes. These studies are possible because of computer databases that allow researchers to compare the genomes of people who do not have a particular condition with the genomes of people who have the condition. In order to do this type of testing, researchers need blood samples or cheek swabs from people. Obtaining these samples is necessary because blood and cheek cells contain —

- A. plasma and platelets
- B. a complete set of DNA**
- C. essential proteins and amino acids
- D. a large number of neutrophils

Which of the following best describes how the luciferase enzyme speeds up the chemical reaction?

- A. Luciferase increases the amount of time the light is visible.
- B. Luciferase decreases the amount of energy required for the reaction to start.
- C. Luciferase increases the number of sites on luciferin that must bind to oxygen.
- D. Luciferase decreases the temperature of the environment inside the body of the firefly.

Fireflies emit light. The production of light by an organism is called bioluminescence. To generate visible light, cells in a firefly's tail produce thousands of luciferase enzymes. Luciferase binds to a chemical called luciferin. Once bound, the luciferase enzyme speeds up a chemical reaction that combines an oxygen molecule and luciferin to produce oxyluciferin. This reaction requires energy and releases light. Which of the following best describes how the luciferase enzyme speeds up the chemical reaction?

- A. Luciferase increases the amount of time the light is visible.
- B. Luciferase decreases the amount of energy required for the reaction to start.
- C. Luciferase increases the number of sites on luciferin that must bind to oxygen.
- D. Luciferase decreases the temperature of the environment inside the body of the firefly.

- Yes! There will be times that you need to read everything.

What was the most likely conclusion of Morgan's research?

- A. The pigment in butterfly wings absorbs light from the environment.
- B. The phenotypic expression of wing shape depends on color pigmentation in butterflies.
- C. The genes regulating wing color in butterflies are influenced by environmental factors.
- D. Caterpillars exposed to red and green light are healthier than caterpillars exposed to no light or blue light.

You don't have enough information to answer this unless you read the entire paragraph.

In 1917 the biologist Thomas Hunt Morgan conducted studies in which he kept some caterpillars in the dark and placed some others under red, green, or blue lights. Exposure to red light produced butterflies with brightly colored wings. Exposure to green light resulted in dark-colored wings. Exposure to blue light or no light resulted in pale-colored wings. What was the most likely conclusion of Morgan's research?

- A. The pigment in butterfly wings absorbs light from the environment.
- B. The phenotypic expression of wing shape depends on color pigmentation in butterflies.
- C. The genes regulating wing color in butterflies are influenced by environmental factors.
- D. Caterpillars exposed to red and green light are healthier than caterpillars exposed to no light or blue light.

In 1917 the biologist Thomas Hunt Morgan conducted studies in which he kept some caterpillars in the dark and placed some others under red, green, or blue lights. Exposure to red light produced butterflies with brightly colored wings. Exposure to green light resulted in dark-colored wings. Exposure to blue light or no light resulted in pale-colored wings. What was the most likely conclusion of Morgan's research?

- A. The pigment in butterfly wings absorbs light from the environment.
- B. The phenotypic expression of wing shape depends on color pigmentation in butterflies.
- C. The genes regulating wing color in butterflies are influenced by environmental factors.
- D. Caterpillars exposed to red and green light are healthier than caterpillars exposed to no light or blue light.