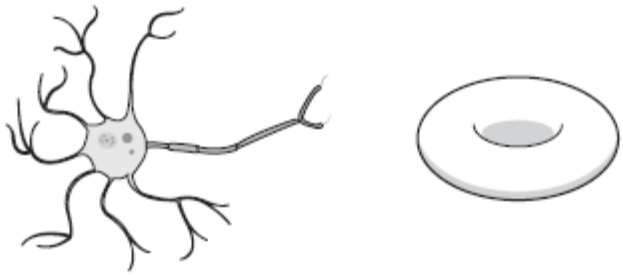
SAMPLE Keystone Questions (from Biology IB course)

Body Cells



nerve cell red blood cell

1. Which statement **best** explains why these cells have structural differences?

   A. The cells have different functions.

   B. The cells evolved in different organisms.

   C. One of the cells develops into the other type of cell.

   D. One of the cells is more primitive than the other cell.

Water Strider

2. Which of the following is a property of water that allows a water strider to walk on the surface of water?

   A. solubility

   B. cohesion

   C. high specific heat

   D. low freezing point

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3. Which statement describes the formation of a protein molecule?

A. Amino acids combine to form a protein chain.

B. Fatty acid monomers dissolve to form a protein chain.

C. Fatty acid monomers combine to form a protein chain.

D. Amino acids dissolve monomers to form a protein chain.

Students' Descriptions of Four Organic Compounds

Student	Organic Compounds	Description
1	carbohydrates	complex compounds made of purines and pyrimidines that function as data-storage molecules
2	lipids	use the relatively high energy contained in carbon-hydrogen bonds to perform their primary function
3	proteins	chains of amino acids that can function as enzymes, hormones, or antibodies
4	nucleic acids	compounds, produced by photosynthetic plants, that contain only carbon, hydrogen, and oxygen

4. Which two students correctly described organic compounds?

A. students 1 and 2

B. students 2 and 3

C. students 3 and 4

D. students 2 and 4

5. Carbonic anhydrase is an enzyme involved in the reaction of carbon dioxide with water to form a molecule that dissolves well in the liquid part of blood. How does carbonic anhydrase affect this reaction?

A. by making the reaction reversible

B. by changing chemical products of the reaction

C. by increasing the time needed for the reaction to occur

D. by decreasing the amount of energy needed to complete the reaction

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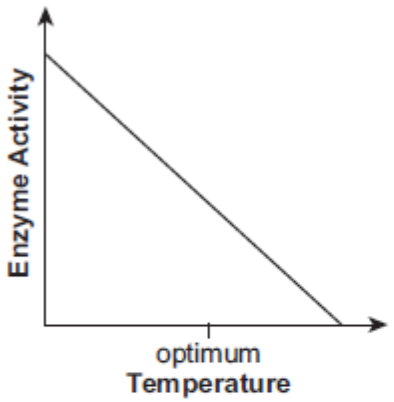
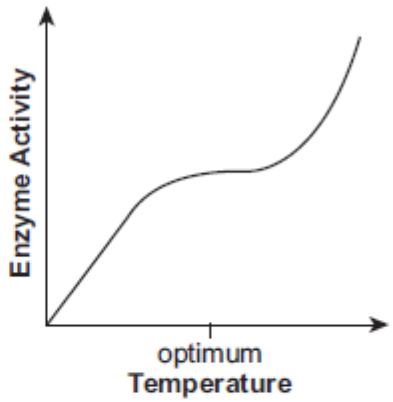
6. Which graph **best** shows how enzyme activity changes as the temperature is adjusted above and below the enzyme's optimum temperature?

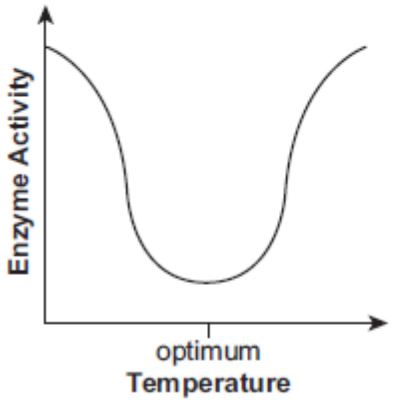
A.



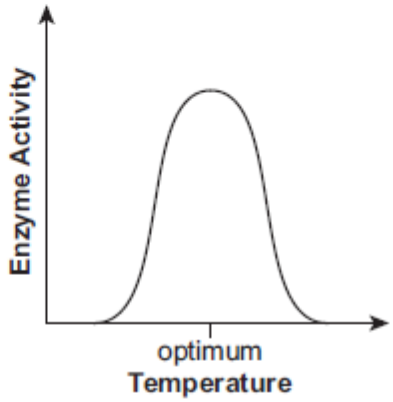
B.



C.



D.



1. Cellular respiration and photosynthesis both involve water.
2. Cellular respiration uses sugar, and photosynthesis produces sugar.
3. Cellular respiration and photosynthesis both use light to produce energy.
4. Cellular respiration requires light energy, and photosynthesis requires chemical energy.

7. Which two statements correctly describe one similarity and one difference between cellular respiration and photosynthesis?

A. statements 1 and 2

B. statements 1 and 4

C. statements 2 and 3

D. statements 3 and 4

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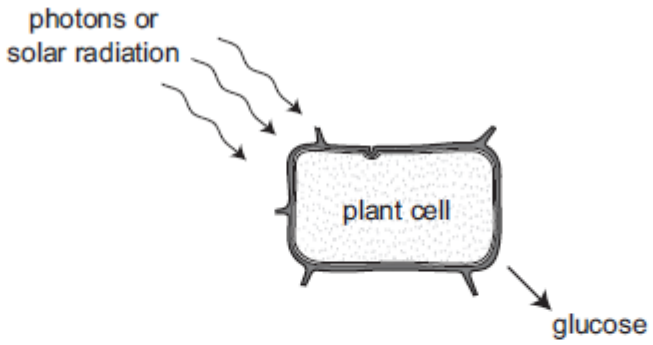
Plant Cell Energy Transformation



8. The diagram shows an energy transformation that typically occurs in plant cell plastids. Which statement **best** describes this role of plastids in the plant cell?

A. Chloroplasts transform light energy into chemical energy.

B. Mitochondria transform light energy into chemical energy.

C. Chloroplasts transform chemical energy into electromagnetic energy.

D. Mitochondria transform chemical energy into electromagnetic energy.

Functions of a Cell Structure

- allows waste to exit the cell
- allows chemicals required for cellular respiration to enter the cell
- regulates movement of water into and out of the cell

9. The functions of which cell structure are described in this list?

A. a lysosome

B. a mitochondrion

C. the plasma membrane

D. the endoplasmic reticulum

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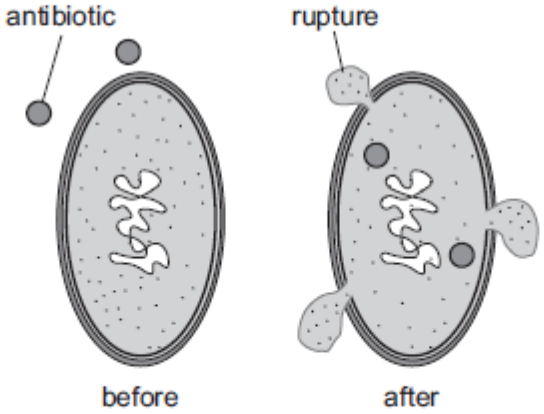
Bacteria and Antibiotics

Bacteria are single-celled microorganisms. The cell walls of these microorganisms serve as barriers to chemicals that might affect the processes that occur within a bacterial cell. Antibiotics are a type of substance used to stop bacterial growth. Some antibiotics cause the bacterial cell wall to rupture.

Antibiotic Action on a Bacterium



10. The function of which human organ is **most** like the cell walls of bacteria?

A. skin

B. liver

C. heart

D. pancreas

11. Which statement **best** describes how antibiotics affect cellular homeostasis?

A. Antibiotics remove chloroplasts from plant cells to cause starvation.

B. Antibiotics interfere with the transport of intracellular and extracellular materials.

C. Antibiotics increase the rate of DNA replication in human cells by forming nucleotides.

D. Antibiotics decrease the rate of cellular respiration in animal cells by producing oxygen.

12. Which statement **best** describes the relationship between an allele and a gene?

A. An allele is a variation of a gene that can be expressed as a phenotype.

B. An allele is the part of a gene that attaches to messenger RNA molecules.

C. An allele is a segment of a DNA molecule that controls replication of a gene.

D. An allele is the primary protein made by a gene found in a developing embryo.

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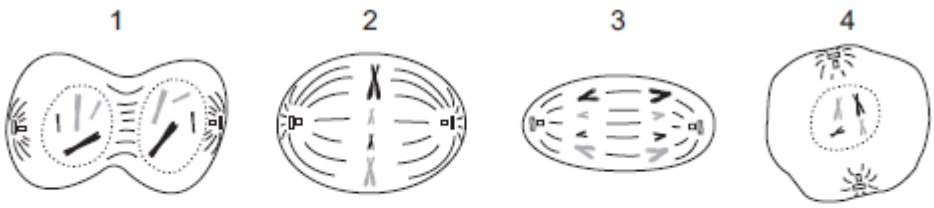
Cell Images



13. Which sequence lists the cell images in chronological order for mitosis?

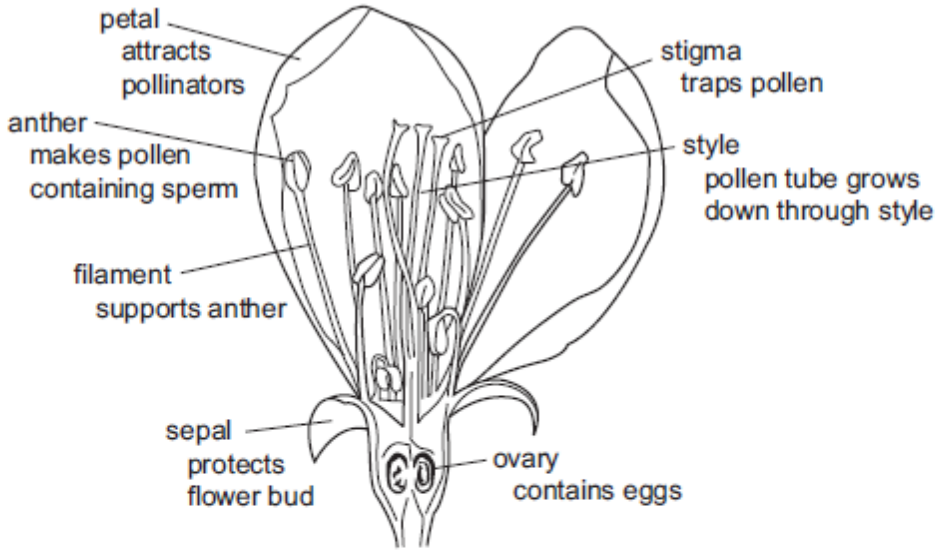
A. 1, 2, 3, 4

B. 4, 3, 2, 1

C. 1, 4, 3, 2

D. 4, 2, 3, 1

Parts of an Apple Flower



14. Which part of the apple flower produces cells by meiosis?

A. style

B. anther

C. stigma

D. filament

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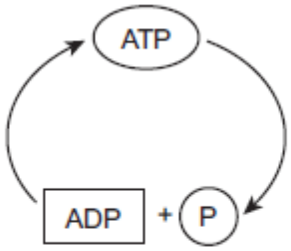

15. **Part A:** Explain why ATP is important in biochemical reactions.

Part B: Give two examples of biochemical reactions and explain how an organism uses ATP within the reactions.

Example	Explanation