

# Keystone Type Example Questions

## Multiple Choice Type Questions

Which statement **best** describes an effect of the low density of frozen water in a lake?

- A. When water freezes, it contracts, decreasing the water level in a lake.
- B. Water in a lake freezes from the bottom up, killing most aquatic organisms.
- C. When water in a lake freezes, it floats, providing insulation for organisms below.
- D. Water removes thermal energy from the land around a lake, causing the lake to freeze.

Which characteristic is shared by **all** prokaryotes and eukaryotes?

- A. ability to store hereditary information
- B. use of organelles to control cell processes
- C. use of cellular respiration for energy release
- D. ability to move in response to environmental stimuli

A scientist observes that, when the pH of the environment surrounding an enzyme is changed, the rate the enzyme catalyzes a reaction greatly decreases. Which statement **best** describes how a change in pH can affect an enzyme?

- A. A pH change can cause the enzyme to change its shape.
- B. A pH change can remove energy necessary to activate an enzyme.
- C. A pH change can add new molecules to the structure of the enzyme.
- D. A pH change can cause an enzyme to react with a different substrate.

Using a microscope, a student observes a small, green organelle in a plant cell. Which energy transformation **most likely** occurs first within the observed organelle?

- A. ATP to light
- B. light to chemical
- C. heat to electrical
- D. chemical to chemical

A protein in a cell membrane changed its shape to move sodium and potassium ions against their concentration gradients. Which molecule was **most likely** used by the protein as an energy source?

- A. ATP
- B. ADP
- C. catalase
- D. amylase

## Open Ended Type Questions

Some animals can produce a potassium ion concentration inside their cells that is twenty times greater than that of their environment. This ion concentration gradient is maintained by the plasma membrane.

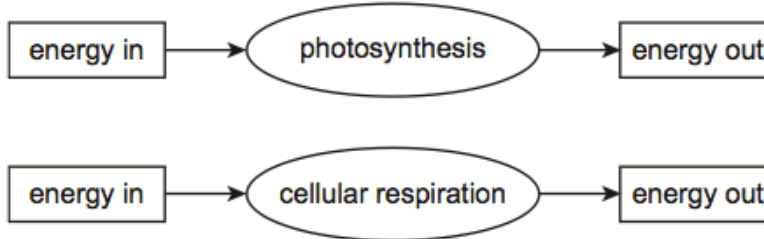
**Part A:** Identify the process in the cell membrane that produces this difference in concentration.

**Part B:** Explain the process that occurs as the cell produces the ion concentration gradient.

**Part C:** Compare the process of potassium ion transport to another mechanism that moves material across the plasma membrane.

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Use the diagrams below to answer the question.



**Part A:** Complete the chart below by describing energy transformations involved in each process.

Process	Energy Transformations
photosynthesis	
cellular respiration	

**Part B:** Describe how energy transformations involved in photosynthesis are related to energy transformations involved in cellular respiration.

Patau syndrome can be a lethal genetic disorder in mammals, resulting from chromosomes failing to separate during meiosis.

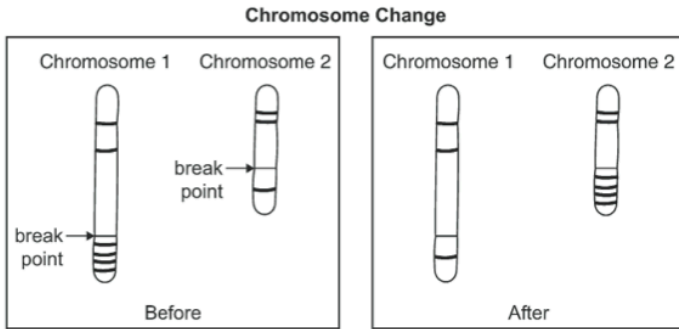
**Part A:** Identify the step during the process of meiosis when chromosomes would **most likely** fail to separate.

**Part B:** Describe how chromosome separation in meiosis is different from chromosome separation in mitosis.

**Part C:** Compare the effects of a disorder caused by chromosomes failing to separate during meiosis, such as Patau syndrome, to the effects of chromosomes failing to separate during mitosis.

# Keystone Type Example Questions

Use the diagram below to answer the question.

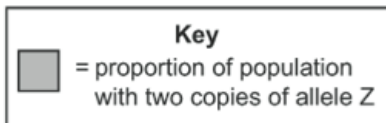
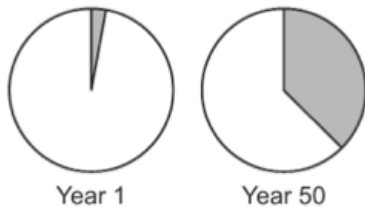


Which type of change in chromosome composition is illustrated in the diagram?

- A. deletion
- B. insertion
- C. inversion
- D. translocation

Use the circle graphs below to answer the question.

**Changes in Allele Frequency Over Time**



The graphs illustrate change in a lizard population over time. Which process **most likely** led to the change in the lizard population?

- A. natural selection acting on a harmful trait
- B. natural selection acting on a beneficial trait
- C. natural selection acting on a dominant trait
- D. natural selection acting on a recessive trait

Use the table below to answer the question.

**Student's Observations of a Pond Ecosystem**

Quantitative	Qualitative
37 fish and 3 frogs	Leaves lie on the bottom of the pond.
2 types of aquatic grass	Water insects move along the water's surface.
12 small rocks and 1 medium rock	All 3 frogs are sitting on a pond bank.
sand	

A group of students measured a ten-square-meter section of a pond ecosystem and recorded observations. Which statement is a testable hypothesis?

- A. The frogs living in the pond represent a population.
- B. Water is an abiotic component in the pond ecosystem.
- C. If the fish are given more food, then they will be happier.
- D. If the frogs are startled, then they will jump into the water.

Use the illustration below to answer the question.

**Cell Division**



Which statement **best** describes the phase of the cell cycle shown?

- A. The cell is in prophase of mitosis because the number of chromosomes has doubled.
- B. The cell is in prophase I of meiosis because the number of chromosomes has doubled.
- C. The cell is in telophase of mitosis because the cell is separating and contains two copies of each chromosome.
- D. The cell is in telophase of meiosis because the cell is separating and contains two copies of each chromosome.