

# FY20 Biology 1 Midterm

Practice Questions - Student Version

## Unit 1: Sample Question SC.912.L.18.1

Proteins are long molecules that are built from smaller molecules called monomers. What is the name given to monomers of proteins?

- A. fatty acids
- B. amino acids
- C. nucleic acids
- D. carbonic acids

## Unit 1: Sample Question SC.912.L.18.1

Which characteristic of carbon makes it essential to living organisms?

- A. Carbon forms crystals
- B. Carbon can exist as a solid, liquid or gas
- C. Carbon bonds in many ways
- D. Carbon has a high heat capacity

# Unit 1: Sample Question SC.912.L.18.11

As food travels through the digestive system, it is exposed to a variety of pH levels. The stomach has a pH of 2 due to the presence of hydrochloric acid (HCl), and the small intestine has a pH ranging from 7 to 9. HCl converts pepsinogen into pepsin, an enzyme that digests proteins in the stomach. Which of the following most likely happens to pepsin as it enters the small intestine?

- A. It becomes inactive.
- B. It begins to replicate.
- C. Its shape changes to engulf large proteins.
- D. Its activity increases to digest more proteins.

# Unit 1: Sample Question SC.912.L.18.11

Which of the following best explains why the clear protein in an egg white changes when the egg is cooked?

- A. The DNA is mutated.
- B. Protein formation stops.
- C. The protein structure is altered.
- D. The protein is transformed into fat

# Unit 1: Sample Question SC.912.L.18.12

Compared to most other substances, a great deal of heat is needed to raise the temperature of water by a given amount. Which property of water makes it resist this change in temperature?

- A. Water is acidic.
- B. Water is a universal solvent.
- C. Water has a high heat capacity.
- D. Water is a good thermal conductor.

# Unit 1: Sample Question SC.912.L.18.12

Blood is 90% water. Which property of water makes it an ideal component of blood?

- A. Water is acidic.
- B. Water is a universal solvent.
- C. Water has a high heat capacity.
- D. Water is a good thermal conductor.

# Unit 1 Resources

[Macromolecules](#)

[Enzymes](#)

[Properties of Water](#)

## Unit 2: Sample Question SC.912.L.14.1

The cell theory was first proposed in 1838. Evidence obtained through additional scientific investigations resulted in the current cell theory. Which statement describes a component of the original cell theory that was removed because of the new scientific knowledge?

- A. All living things are made of cells.
- B. All cells come from other preexisting cells.
- C. Cells form through spontaneous generation.
- D. Cells are the basic structural and functional units of life.

## Unit 2: Sample Question SC.912.L.14.1

Which of the following is an example of a part of the cell theory?

- A. Bacterial cells divide on a cell culture plate.
- B. Mitochondria replicate during the cell cycle.
- C. A virus infects the lungs, causing a cold.
- D. All organisms use the same genetic code.

## Unit 2: Sample Question SC.912.L.14.2

Which of the following pairs **incorrectly** matches a cell structure with its function?

- A. vacuole: storage
- B. chloroplast: energy conversion
- C. lysosome: protein synthesis
- D. nucleus: information (DNA) storage

## Unit 2: Sample Question SC.912.L.14.2

Which of the following organelles is needed to produce oxygen?

- A. mitochondria
- B. golgi body
- C. chloroplast
- D. ribosome

## Unit 2: Sample Question SC.912.L.14.3

There are some similarities between prokaryotic and eukaryotic cells. Which of the following structures is found in both prokaryotic and eukaryotic cells?

- A. Lysosome
- B. Mitochondrion
- C. Nucleus
- D. Cell wall

## Unit 2: Sample Question SC.912.L.14.3

Which of the following structures are found only in eukaryotic cells?

- A. Cell Wall
- B. Cell membrane
- C. Endoplasmic Reticulum
- D. Ribosome

## Unit 2: Sample Question SC.912.L.14.4

Why might scientists use colored dyes when viewing items under a compound light microscope?

- A. to make them more visible
- B. to make them more attractive
- C. to make them appear more realistic
- D. to make them appear more three-dimensional

## Unit 2: Sample Question SC.912.L.14.4

Which of the following describes a difference between a scanning electron microscope and a transmission electron microscope?

- A. The SEM is used to view live cells, while the TEM can only view dead cells.
- B. The TEM is used to view live cells, while the SEM can only view dead cells.
- C. The SEM is used to view the interior features of a cell while the TEM can only see surface features.
- D. The TEM is used to view the interior features of a cell while the SEM can only see surface features.

## Unit 2: Sample Question SC.912.L.18.10

ATP is a cell's main form of energy "currency." How is energy released from an ATP molecule?

- A. Adding a phosphate group to ATP produces ADP and releases energy.
- B. Adding a phosphate group to ADP produces ATP and releases energy.
- C. ADP breaks down to produce ATP and a phosphate group, releasing energy.
- D. ATP breaks down to produce ADP and a phosphate group, releasing energy.

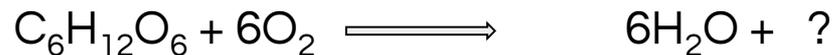
## Unit 2: Sample Question SC.912.L.18.10

Cyanide is a potent poison because it inhibits an enzyme in mitochondria, preventing the transfer of energy during cellular respiration. Which molecule is cyanide **most likely** impacting?

- A. ATP
- B. Carbon dioxide
- C. Glucose
- D. Oxygen

## Unit 2: Sample Question SC.912.L.18.8

The equation below represents a cellular process.



Which of the following **correctly** pairs the process with the waste product released into the environment?

- A. Cellular respiration: carbon dioxide
- B. Fermentation: carbon dioxide
- C. Glycolysis: oxygen
- D. Photosynthesis: glucose

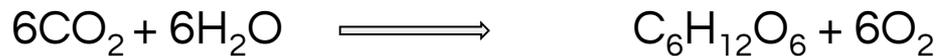
## Unit 2: Sample Question SC.912.L.18.8

How do cells release energy from food when oxygen levels are low?

- A. Cells increase the rate of cellular respiration and produce more carbon dioxide.
- B. Cells switch to aerobic respiration and burn less glucose.
- C. Cells switch to anaerobic respiration and produce more lactic acid.
- D. Cells switch to anaerobic respiration and produce more ATP.

## Unit 2: Sample Question SC.912.L.18.7

Mary found the equation below in a textbook about cells.



What process is described by this equation?

- A. cellular respiration
- B. fermentation
- C. glycolysis
- D. photosynthesis

## Unit 2: Sample Question SC.912.L.18.7

Which substance is used by plants in order to capture sunlight?

- A. glucose
- B. chlorophyll
- C. carbon dioxide
- D. water

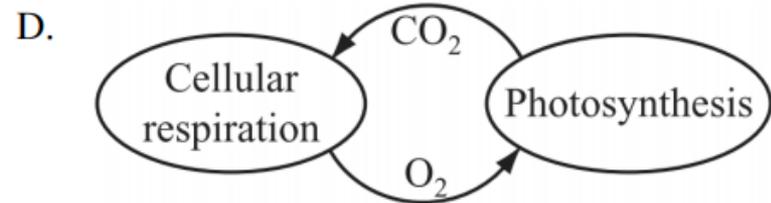
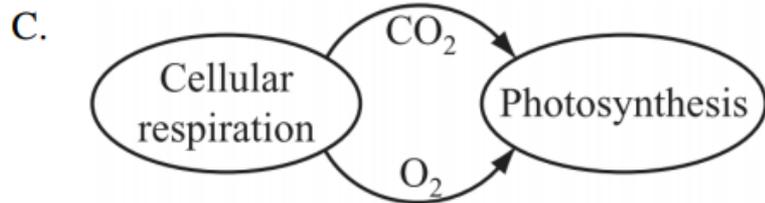
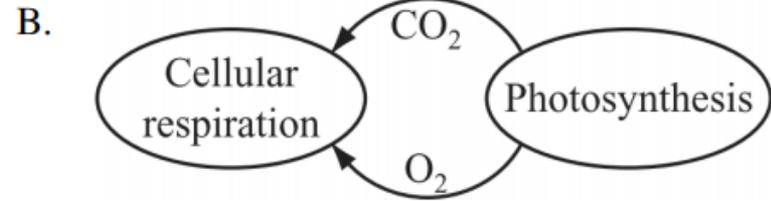
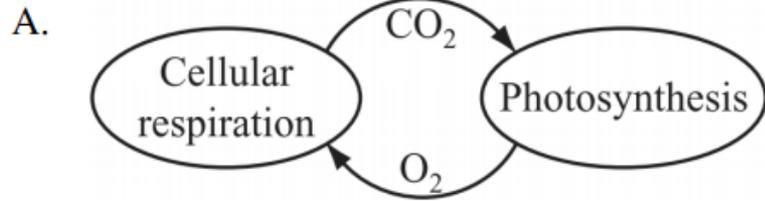
## Unit 2: Sample Question SC.912.L.18.9

Which statement describes how photosynthesis and cellular respiration are interrelated?

- A. Oxygen is produced during cellular respiration and stored during photosynthesis.
- B. Carbon dioxide and water released by cellular respiration are used in photosynthesis.
- C. Photosynthesis releases the energy that is stored during the process of cellular respiration.
- D. Glucose is used during cellular respiration to produce food that is broken down during photosynthesis.

# Unit 2: Sample Question SC.912.L.18.9

Which of the following diagrams accurately represents the use of gases in both cellular respiration and photosynthesis?



## Unit 2: Sample Question SC.912.L.14.7

Which of the following best describes how plants obtain the reactants of photosynthesis?

- A. Roots capture water, and chloroplasts capture sunlight.
- B. Stomata capture water, and mitochondria capture sunlight.
- C. Chloroplasts capture carbon dioxide, and chlorophyll captures sunlight.
- D. Stomata capture oxygen, and chlorophyll captures water.

## Unit 2: Sample Question SC.912.L.14.7

Which is a true statement regarding the waste products produced by plant processes?

- A. Plants produce oxygen and carbon dioxide.
- B. Plants produce oxygen and nitrogen.
- C. Plants produce only carbon dioxide.
- D. Plants produce only oxygen.

# Unit 2 Resources

[Cell Theory](#)

[Cell Structure](#)

[Cell Membranes and Transport](#)

[Prokaryotic and Eukaryotic Cells](#)

[ATP & Respiration](#)

[Cellular Respiration](#)

[Photosynthesis & Cellular Respiration](#)

[Photosynthesis](#)

[Microscopes](#)

[Parts of the Plant](#)

## Unit 3: Sample Question SC.912.L.16.14

During which phase in mitosis do chromatids separate and move to opposite ends of the cell?

- A. anaphase
- B. metaphase
- C. prophase
- D. telophase

## Unit 3: Sample Question SC.912.L.16.14

What is the result when a single cell reproduces by mitosis?

- A. Two cells that are identical to the parent cell
- B. Two cells with half the genetic material of the parent cell
- C. Four cells with half the genetic material of the parent cell
- D. Four cells that are identical to the parent cell

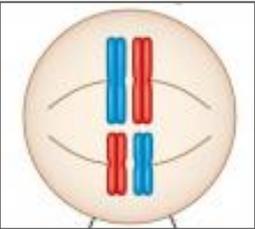
## Unit 3: Sample Question SC.912.L.16.16

Crossing-over contributes to the recombination of genetic material in offspring. When does crossing-over happen during meiosis?

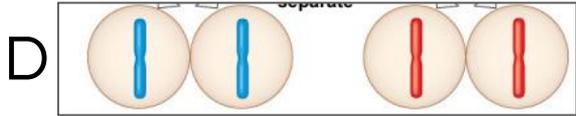
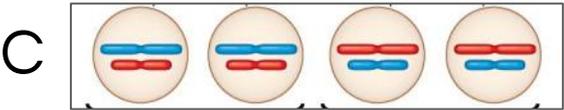
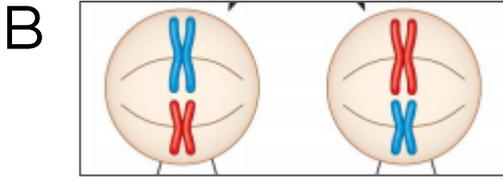
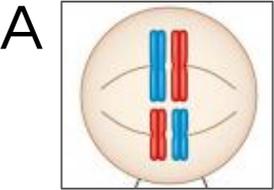
- A. when the DNA of the diploid cell is copied
- B. when homologous chromosomes move to opposite ends of the dividing cell
- C. when spindle fibers move the chromosomes toward the midline of the dividing cell
- D. when homologous chromosome pair and portions of the chromatids break off and are exchanged

# Unit 3: Sample Question SC.912.L.16.16

The image below shows a cell about to undergo meiosis.



Which of the following is the most likely result of this process?



## Unit 3: Sample Question SC.912.L.16.17

Mitosis and meiosis are processes involved in cellular reproduction. Which of the following describes an event that results from **mitosis** but **NOT** meiosis?

- A. independent assortment
- B. replication of cellular genetic material
- C. two identical daughter cells that are identical to the parent cell
- D. four identical daughter cells that are different from the parent cell

## Unit 3: Sample Question SC.912.L.16.17

Mitosis and meiosis are processes involved in cellular reproduction. Which of the following describes an event that results from **meiosis** but **NOT** mitosis?

- A. independent assortment of chromosomes
- B. replication of cellular genetic material
- C. two identical daughter cells that are identical to the parent cell
- D. four identical daughter cells that are different from the parent cell

# Unit 3 Resources

[Mitosis](#)

[Crossing Over](#)

[Comparing Mitosis and Meiosis](#)

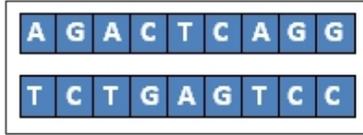
## Unit 4: Sample Question SC.912.L.16.3

The sequence of bases on one strand of a DNA molecule is AGCCTAG. After replication of the strand of DNA, what is the sequence of nitrogen bases on the complementary strand?

- A. AGCCTAG
- B. CTAGGCA
- C. GATCCGA
- D. TCGGATC

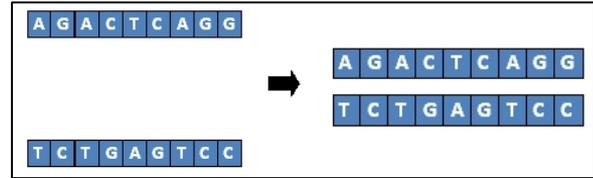
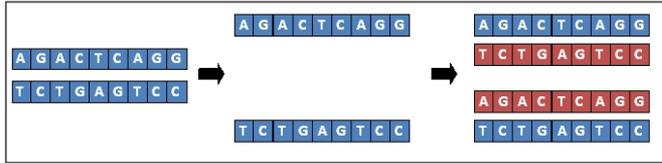
# Unit 4: Sample Question SC.912.L.16.3

The image below shows a strand of DNA.

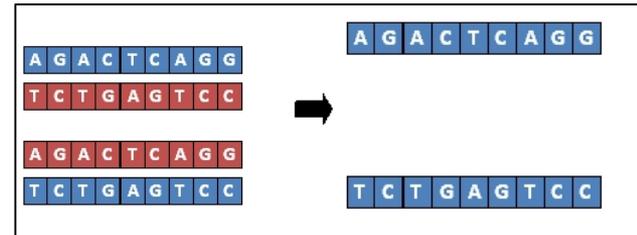
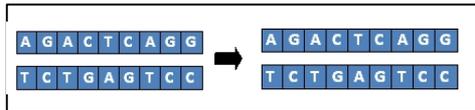


Which of the following correctly shows the process of replication?

A.



B.



D

## Unit 4: Sample Question SC.912.L.16.4

A single change in the sequence of nitrogenous bases in a DNA molecule would most likely result in which of the following?

- A. crossing over
- B. polyploidy
- C. nondisjunction of chromosomes
- D. gene mutation

# Unit 4: Sample Question SC.912.L.16.4

## Codons Found in Messenger RNA

		<i>Second Base</i>				
		U	C	A	G	
<i>First Base</i>	U	Phe	Ser	Tyr	Cys	<i>Third Base</i>
		Phe	Ser	Tyr	Cys	
		Leu	Ser	Stop	Stop	
		Leu	Ser	Stop	Trp	
	C	Leu	Pro	His	Arg	
		Leu	Pro	His	Arg	
		Leu	Pro	Gln	Arg	
		Leu	Pro	Gln	Arg	
	A	Ile	Thr	Asn	Ser	
		Ile	Thr	Asn	Ser	
		Ile	Thr	Lys	Arg	
		Met	Thr	Lys	Arg	
	G	Val	Ala	Asp	Gly	
		Val	Ala	Asp	Gly	
		Val	Ala	Glu	Gly	
		Val	Ala	Glu	Gly	

A strand of mRNA containing the repeating sequence AAGAAGAAGAAG could code for which of the following amino acid sequences?

A. lys-arg-glu-lys

B. ser-ser-glu-glu

C. lys-arg-lys-arg

D. lys-lys-lys-lys

## Unit 4: Sample Question SC.912.L.16.5

Which of the following has the greatest effect on the protein molecule produced by a ribosome?

- A. the sugars in the RNA molecule
- B. the nitrogenous bases in DNA
- C. the hydrogen bonds in the tRNA
- D. the phospholipids in the cell membrane

# Unit 4: Sample Question SC.912.L.16.5

Which of the following diagrams illustrates the central dogma of biology?



## Unit 4: Sample Question SC.912.L.16.8

Some genes code for the proteins that regulate cell growth and division. Which of the following are caused by uncontrolled, abnormal cell division?

- A. cancers
- B. mutagens
- C. oncogenes
- D. transposons

## Unit 4: Sample Question SC.912.L.16.8

Scientists and doctors are working hard to find a way to cure cancer. Which cellular process are they studying to try cure this disease?

- A. Regulation of meiosis
- B. Regulation of mitosis
- C. Regulation of translation
- D. Regulation of codon length

## Unit 4: Sample Question SC.912.L.16.9

The genetic material of all living organisms is composed of which of the following?

- A. carbohydrate
- B. lipids
- C. nucleic acids
- D. proteins

## Unit 4: Sample Question SC.912.L.16.9

Scientists are often able to insert genes from the cells of one organism into another so that the the gene is expressed in the recipient cell. For example, the gene for producing insulin in humans can be inserted into bacteria so that they produce insulin to treat diabetic patients.

Which of the following explains why this is possible?

- A. All organisms use DNA replication to produce proteins.
- B. All organisms use mRNA to direct the synthesis of codons.
- C. All living organisms use the same 4 letters to code for amino acids.
- D. All living organisms use the same proteins to regulate chemical reactions.

# Unit 4 Resources

[DNA Replication](#)

[Mutation](#)

[Transcription and Translation](#)

[Cell Cycle and Cancer](#)

[Genetic Code](#)

# Nature of Science: Sample Question SC.912.N.1.1

A student reads that some seeds must be exposed to cold before they germinate. She wants to test seeds from one kind of plant to see if they germinate faster after freezing. The student put the seeds in the freezer, took some samples out at certain times, and tried to germinate them. Then she recorded her results in the table.

<b>Germination Rate for Seeds Stored in a Freezer</b>	
Time in Freezer at $-15^{\circ}\text{C}$	Germination Rate
30 days	48%
60 days	56%
90 days	66%
120 days	52%

According to the results of this experiment, how many days should seeds be stored in the freezer before planting for quickest germination?

- A. 30
- B. 60
- C. 90
- D. 120