

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076121

CLE: a. Identify examples of adaptations that may have resulted from variations favored by natural selection (e.g., long-necked giraffes, long-eared jack rabbits) and describe how that variation may have provided populations an advantage for survival

DOK Level: 2

1.

The gopher snake uses its glottis to produce a hiss that sounds similar to a rattlesnake's rattle. What is the most likely reason a gopher snake would do this?

- A) to attract prey
- B) to attract a mate
- C) to confuse predators
- D) to increase adrenaline flow

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076703

CLE: a. Predict the impact (beneficial or harmful) a natural environmental event (e.g., forest fire, flood, volcanic eruption, avalanche) or human caused change (e.g., acid rain, global warming, pollution, deforestation, introduction of an exotic species) may have on the diversity of different species in an ecosystem

DOK Level: 2

2.

A population of salamanders that live in a river require clear, fresh water to survive. A flood causes tons of sediment to be suspended in the river. Which of these most likely will happen to the salamander population?

- A) The salamanders will adapt to life on land.
- B) The salamanders will move to another river.
- C) The salamanders will adapt to living in the muddy water.
- D) The salamanders will decrease in number because of the water quality.

2008 Biology SR Operational Form 1 (Released Form)

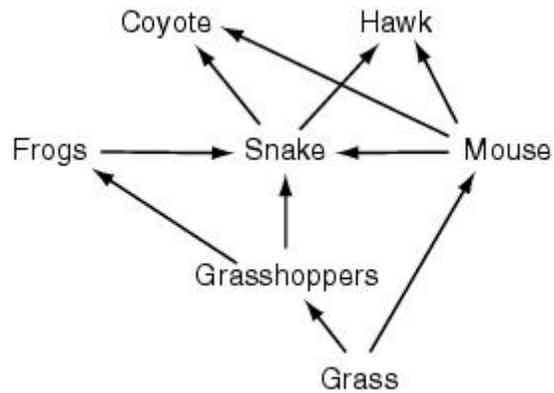
Item Code: 100076836

CLE: c. Predict how the use and flow of energy will be altered due to changes in a food web

DOK Level: 2

3.

The diagram below shows a food web.



A reduction in which of these would lead to a decrease in all the other populations in the web?

- A) coyote
- B) grass
- C) grasshoppers
- D) snake

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076167

CLE: a. Explain the interrelationship between the processes of photosynthesis and cellular respiration (e.g., recycling of oxygen and carbon dioxide), comparing and contrasting photosynthesis and cellular respiration reactions (Do NOT assess intermediate reactions)

DOK Level: 2

4.

Which of these best explains the difference between the way animals and plants exchange gases with their environments?

- A) Animals use only photosynthesis, while plants use both photosynthesis and respiration.
- B) Animals use only respiration, while plants use both photosynthesis and respiration.
- C) Animals use both photosynthesis and respiration, while plants use only respiration.
- D) Animals use both photosynthesis and respiration, while plants use only photosynthesis.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100075700

CLE: a. Explain the significance of the selectively permeable membrane to the transport of molecules

DOK Level: 2

5.

What is the main function of a selectively permeable cell membrane?

- A) storage of water
- B) storage of chemicals
- C) breaks down molecules within the cell
- D) regulates what enters and leaves the cell

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076502

CLE: b. Explain the importance of reproduction to the survival of a species (i.e., the failure of a species to reproduce will lead to extinction of that species)

DOK Level: 2

6.

The papaya mealybug is a pest that poses a threat to many tropical plants. Which fate of the mealybug would result from the inability of the species to reproduce?

- A) The species would mutate.
- B) The species would increase.
- C) The species would become extinct.
- D) The species would continue to thrive.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076454

CLE: a. Explain how genotypes (heterozygous and homozygous) contribute to phenotypic variation within a species

DOK Level: 2

7.

In a certain insect, round wings (R) are dominant to pointed wings (r). Which cross will produce the greatest number of genotypic and phenotypic variations?

A) $rr \times rr$

B) $Rr \times Rr$

C) $Rr \times RR$

D) $RR \times RR$

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076844

CLE: a. Predict the impact (beneficial or harmful) a natural environmental event (e.g., forest fire, flood, volcanic eruption, avalanche) or human caused change (e.g., acid rain, global warming, pollution, deforestation, introduction of an exotic species) may have on the diversity of different species in an ecosystem

DOK Level: 2

8.

Polar bears swim across large expanses of ocean while hunting for seals, their main source of food. The bears use sea ice as resting spots during their long swims. However, the sea ice is rapidly melting as a result of global warming. Which statement describes what most likely will happen if global warming continues at its present rate?

- A) Polar bear and seal populations will both increase.
- B) Polar bear populations will decrease, and seal populations will increase.
- C) Polar bear populations will increase, and seal populations will decrease.
- D) Polar bear populations will decrease, and seal populations will remain the same.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100075711

CLE: e. Identify possible external causes (e.g., heat, radiation, certain chemicals) and effects of DNA mutations (e.g., altered proteins which may affect chemical reactions and structural development)

DOK Level: 2

9.

A strand of DNA is exposed to intense heat. Which of these best describes what will happen to the strand of DNA?

- A) The chemical bonds of the DNA molecule will be broken.
- B) More nitrogen base pairs will add on to the DNA molecule.
- C) The chemical bonds of the DNA molecule will be strengthened.
- D) The nitrogen base pairs in the DNA molecule will switch places.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076320

CLE: b. Describe the structure of cell parts (e.g., cell wall, cell membrane, cytoplasm, nucleus, chloroplast, mitochondrion, ribosome, vacuole) found in different types of cells (e.g., bacterial, plant, skin, nerve, blood, muscle) and the functions they perform (e.g., structural support, transport of materials, storage of genetic information, photosynthesis and respiration, synthesis of new molecules, waste disposal) that are necessary to the survival of the cell and organism

DOK Level: 1

10.

Which structure is primarily responsible for directing all processes of a plant cell?

- A) chloroplast
- B) lysosome
- C) mitochondria
- D) nucleus

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076835

CLE: c. Explain how environmental factors (e.g., habitat loss, climate change, pollution, introduction of non-native species) can be agents of natural selection

DOK Level: 2

11.

The loss of habitat in a forest region has caused some plant species to become extinct, while others survive. The process by which some plant species survive and others do not in a changing environment is best explained by

- A) natural selection
- B) law of segregation
- C) biological magnification
- D) alternation of generations

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076826

CLE: a. Describe the chemical and structural properties of DNA (e.g., DNA is a large polymer formed from linked subunits of four kinds of nitrogen bases; genetic information is encoded in genes based on the sequence of subunits; each DNA molecule in a cell forms a single chromosome) (Assess the concepts – NOT memorization of nitrogen base pairs)

DOK Level: 1

12.

What is the role of hydrogen bonds in the structure of DNA?

- A) to code for proteins
- B) to synthesize proteins
- C) to separate the strands
- D) to connect the base pairs

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076456

CLE: a. Recognize cells both increase in number and differentiate, becoming specialized in structure and function, during and after embryonic development

DOK Level: 1

13.

Which process allows for an organism to increase the number of body cells during development?

- A) budding
- B) conjugation
- C) meiosis
- D) mitosis

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076822

CLE: c. Predict how the use and flow of energy will be altered due to changes in a food web

DOK Level: 2

14.

A forest fire destroys the majority of the trees in a state park. Which effect will this most likely have on secondary consumers in that ecosystem?

- A) The amount of available energy will increase because there will be fewer predators in the forest.
- B) The amount of available energy will increase because there will be less competition from producers.
- C) The amount of available energy will decrease because fewer primary consumers will survive the lack of vegetation.
- D) The amount of available energy will remain constant because secondary consumers are not reliant on primary consumers.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076711

CLE: b. Explain the importance of reproduction to the survival of a species (i.e., the failure of a species to reproduce will lead to extinction of that species)

DOK Level: 2

15.

The loulu tree in Hawaii reproduces by a seed encased in a fruit. Non-native species, such as pigs and rats, eat the fruit as a regular part of their diet, drastically reducing the regeneration rate of the loulu. What most likely would be the outcome for loulu trees in the next century without intervention?

- A) They would become extinct.
- B) They would rebound and thrive.
- C) They would remain at their current levels.
- D) They would evolve a new way to reproduce.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076691

CLE: b. Determine what factors affect the processes of photosynthesis and cellular respiration (i.e., light intensity, availability of reactants, temperature)

DOK Level: 2

16.

Which of these would lead to a lower rate of photosynthesis in a plant?

- A) an increase in the amount of oxygen in the air
- B) a decrease in the amount of oxygen in the air
- C) an increase in the amount of carbon dioxide in the air
- D) a decrease in the amount of carbon dioxide in the air

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076829

CLE: c. Explain how fertilization restores the diploid number of chromosomes

DOK Level: 1

17.

What is the result of the fertilization of an egg?

- A) It restores the diploid number of chromosomes.
- B) It deletes polypeptide chains in the chromosomes.
- C) It gives offspring more chromosomes than the parents.
- D) It gives offspring fewer chromosomes than the parents.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076832

CLE: e. Identify possible external causes (e.g., heat, radiation, certain chemicals) and effects of DNA mutations (e.g., altered proteins which may affect chemical reactions and structural development)

DOK Level: 1

18.

Which of these best describes the initial change caused by a DNA mutation?

- A) a change in the sequence of base pairs
- B) a change in the production of enzymes
- C) a change in the number of nucleosomes within a cell
- D) a change in the number of hydrogen bonds between the bases

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076754

CLE: b. Explain how cooperative (e.g., symbiotic) and competitive (e.g., predator/prey) relationships help maintain balance within an ecosystem

DOK Level: 2

19.

A new species of snake was introduced to a tropical region. Scientists then noticed a steady decline in the presence of field mice and an increase in the number of snakes. Which of these is the most likely explanation about why the population size of each animal changed?

- A) The snakes introduced to the region dominated the habitat, forcing the mice to find another place to live.
- B) The mice became prey to the introduced snakes, allowing the snake population to increase but decreasing the mice population.
- C) The snakes introduced to the region competed with the mice for food, allowing the snake population to increase but decreasing the mice population.
- D) The people in the surrounding area set traps that killed the mice, allowing the snakes to live without any predators and therefore to increase in number.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100075895

CLE: a. Describe the advantages and disadvantages of asexual and sexual reproduction with regard to variation within a population

DOK Level: 2

20.

Which statement best describes an advantage of asexual reproduction for a population of organisms?

- A) The population can increase in number more rapidly.
- B) The population can develop greater genetic diversity.
- C) The population can maintain the same number of organisms.
- D) The population can adapt more quickly to a changing environment.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100075714

CLE: c. Explain physical and chemical interactions that occur between organelles (e.g. nucleus, cell membrane, chloroplast, mitochondrion, ribosome) as they carry out life processes

DOK Level: 2

21.

The following cell structures are located within cells that make proteins.

- **nucleus**
- **ribosome**
- **endoplasmic reticulum (ER)**

Which description best explains the relationship among these cell structures in making a protein?

- A) nucleus makes protein → protein winds through the ER → protein folds into its active shape
- B) nucleus directs ER to assemble the protein → ribosomes surround protein → protein folds into its active shape
- C) ER creates protein → DNA in the nucleus codes for ribosomes to surround protein → protein folds into its active shape
- D) DNA in nucleus codes for protein → protein assembled in ribosomes and moves to ER → protein folds into its active shape

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076814

CLE: a. Explain the nature of interactions between organisms in predator/prey relationships and different symbiotic relationships (i.e., mutualism, commensalisms, parasitism)

DOK Level: 1

22.

Which of these best describes mutualism?

- A) a relationship between two species where both species benefit
- B) a relationship between two species where neither species benefits
- C) a relationship between two species where one species benefits and the other is not affected
- D) a relationship between two species where one species benefits and the other species is harmed

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076447

CLE: b. Predict the movement of molecules across a selectively permeable membrane (i.e., diffusion, osmosis, active transport) needed for a cell to maintain homeostasis given concentration gradients and different sizes of molecules

DOK Level: 2

23.

Which molecule would be least likely to diffuse across the phospholipid bilayer of a cell membrane?

- A) water
- B) oxygen
- C) sodium ions
- D) carbon dioxide

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076846

CLE: b. Determine what factors affect the processes of photosynthesis and cellular respiration (i.e., light intensity, availability of reactants, temperature)

DOK Level: 2

24.

How would a drop in temperature most likely affect the processes of cellular respiration and photosynthesis?

- A) The rates of both cellular respiration and photosynthesis would decrease.
- B) The rates of both cellular respiration and photosynthesis would remain constant.
- C) The rate of photosynthesis would increase, and the rate of cellular respiration would decrease.
- D) The rate of photosynthesis would decrease, and the rate of cellular respiration would increase.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076638

CLE: a. Identify and explain the limiting factors (biotic and abiotic) that may affect the carrying capacity of a population within an ecosystem

DOK Level: 2

25.

Which abiotic factor limits the altitude at which plants can grow?

- A) the presence of a parasite
- B) the temperature of the area
- C) the presence of herbivorous animals
- D) the concentration of microbes in the soil

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100075706

CLE: b. Recognize that during meiosis, the formation of sex cells, chromosomes are reduced to half the number present in the parent cell

DOK Level: 1

26.

How many daughter cells are formed in meiosis?

A)0

B)1

C)2

D)4

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076851

CLE: b. Recognize that DNA codes for proteins, which are expressed as the heritable characteristics of an organism

DOK Level: 1

27.

Which of these shows the steps by which proteins are coded and synthesized?

A) RNA → DNA → protein

B) DNA → RNA → protein

C) protein → RNA → DNA

D) protein → DNA → RNA

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076644

CLE: c. Explain how fertilization restores the diploid number of chromosomes

DOK Level: 1

28.

Two gametes containing 20 chromosomes fuse during fertilization. How many chromosomes will the zygote cell contain?

A) 10

B) 20

C) 40

D) 80

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100075899

CLE: b. Predict the movement of molecules across a selectively permeable membrane (i.e., diffusion, osmosis, active transport) needed for a cell to maintain homeostasis given concentration gradients and different sizes of molecules

DOK Level: 2

29.

A molecule can easily pass through the selectively permeable membrane of an animal cell. Which of these most likely describes the molecule?

- A) The molecule is very small and charged.
- B) The molecule is very large and charged.
- C) The molecule is very small and not charged.
- D) The molecule is very large and not charged.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076126

CLE: b. Describe the structure of cell parts (e.g., cell wall, cell membrane, cytoplasm, nucleus, chloroplast, mitochondrion, ribosome, vacuole) found in different types of cells (e.g., bacterial, plant, skin, nerve, blood, muscle) and the functions they perform (e.g., structural support, transport of materials, storage of genetic information, photosynthesis and respiration, synthesis of new molecules, waste disposal) that are necessary to the survival of the cell and organism

DOK Level: 1

30.

Which of these directly allows blood cells to transport oxygen to various parts of the body?

- A) carbon dioxide
- B) hemoglobin
- C) antibodies
- D) platelets

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076769

CLE: a. Identify and explain the limiting factors (biotic and abiotic) that may affect the carrying capacity of a population within an ecosystem

DOK Level: 2

31.

One species of Galapagos finches, the cactus finch, eats insects off cactus plants. A disease kills off most of the cacti in the Galapagos Islands. Which of these most likely would happen to the carrying capacity of the island?

- A) It would increase a small amount since the insect population would decrease.
- B) It would remain about the same since the finches would change to a different diet.
- C) It would increase exponentially since the insects would have limited places to hide.
- D) It would decrease considerably since the finches are specifically adapted to their niche.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076766

CLE: a. Describe the chemical and structural properties of DNA (e.g., DNA is a large polymer formed from linked subunits of four kinds of nitrogen bases; genetic information is encoded in genes based on the sequence of subunits; each DNA molecule in a cell forms a single chromosome) (Assess the concepts – NOT memorization of nitrogen base pairs)

DOK Level: 1

32.

The chromosome structure in a cell accounts for genetic variation based on the order of its

- A) sugar groups
- B) nitrogen bases
- C) hydrogen bonds
- D) phosphate groups

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100076448

CLE: c. Explain how water is important to cells (e.g., is a buffer for body temperature, provides soluble environment for chemical reactions, serves as a reactant in chemical reactions, provides hydration that maintains cell turgidity, maintains protein shape)

DOK Level: 2

33.

What will happen if an animal cell that has a solute concentration of 1% is placed in a 5% saltwater solution?

- A) It will shrink because there is less water outside of the cell than there is on the inside.
- B) It will burst because there is more water on the outside of the cell than there is on the inside.
- C) It will burst because there is more water on the inside of the cell than there is on the outside.
- D) It will remain the same size because there is an equal amount of water on the inside and outside of the cell.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100075890

CLE: a. Explain the interrelationship between the processes of photosynthesis and cellular respiration (e.g., recycling of oxygen and carbon dioxide), comparing and contrasting photosynthesis and cellular respiration reactions (Do NOT assess intermediate reactions)

DOK Level: 2

34.

Which statement describes a way in which cellular respiration differs from photosynthesis?

- A) Cellular respiration consists of two phases.
- B) Cellular respiration releases carbon dioxide.
- C) Cellular respiration provides energy for the cell.
- D) Cellular respiration is carried out in one specific organelle.

2008 Biology SR Operational Form 1 (Released Form)

Item Code: 100075880

CLE: a. Recognize the chromosomes of daughter cells, formed through the processes of asexual reproduction and mitosis, the formation of somatic (body) cells in multicellular organisms, are identical to the chromosomes of the parent cell

DOK Level: 1

35.

A cell with 24 chromosomes undergoes mitosis twice. How many chromosomes will each daughter cell have?

A) 6

B) 12

C) 24

D) 48