



Biology Revision

(Trimester2 & Trimester3)

Grade 9

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Dear students: you may need extra space for your answers or to construct your response, so you could use the back of the next sheet.

If you have any questions, feel free to contact me via email or through your classroom WhatsApp group.

Best regards

Chapter 4: Integumentary, Skeletal, and Muscular Systems

Q: Diagram the two layers of the skin.

Q: Summarize the types of tissues in the integumentary system and their functions.

Q: Generalize different ways the integumentary system helps a human survive.

Q: Sequence the process of skin repair in response to a cut.

Q: Compare effects of first-degree, second-degree, and third-degree burns.

Q: Explain the difference between the terms in each set.

1. epidermis, dermis
2. melanin, keratin
3. sebaceous glands, hair follicles.....

Understand Main Ideas

Q: Use the diagram below to answer the question.

- Which tissue type is responsible for “goose bump” formation?

- A. A C. C B. B D. D

- When are blackheads formed?

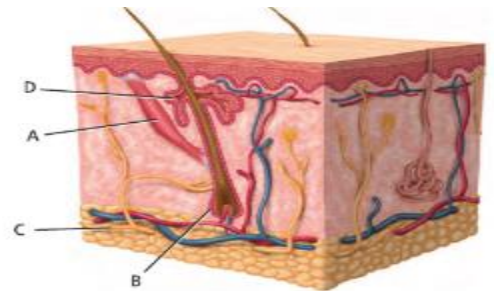
- A. when sebaceous glands become clogged
- B. when grooves in the epidermis gather dirt
- C. when hair follicles grow inward rather than outward
- D. when there is an excess of keratin produced

Q: How does the skin regulate body temperature?

- A. by increasing sweat production
- B. by retaining water
- C. by producing vitamin D
- D. by regulating fat content in the epidermis

Q: Which are not found in the dermis?

- A. muscles
- B. sweat and oil glands
- C. fat cells



D. nerve cells

Q: What could be inferred from suntans?

- A. Sunning for the purpose of tanning produces healthier skin.
- B. A tan might indicate sun damage to the skin.
- C. Tanning strengthens the elastic in the skin making the skin feel tight.
- D. Tanning promotes skin that has a more youthful appearance.

Q: What possible effects on the body might there be if the epidermis was absent?

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Q: Describe how the integumentary system contributes to homeostasis.

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Q: Explain why it does not hurt when you get a haircut.

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Q: Assess the reason why people with third degree burns do not feel pain at the site of the burn.

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Q: Identify and describe the functions of the axial skeleton and the appendicular skeleton.

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Q: Compare the compositions of red bone marrow and yellow bone marrow.

.....
Q: Compare the body's mechanism for repairing a fractured bone with the original development of bone.

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Q: Distinguish between compact and spongy bone based on appearance, location, and function.

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Q: Explain the difference between the terms in each set.

- spongy bone, compact bone.....
- tendons, ligaments
- osteoblasts, osteoclasts

.....
Q: Use the figure below to answer the question.

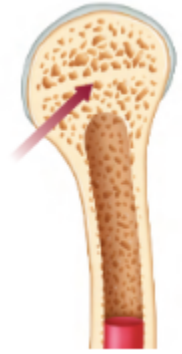
- Where would you find the type of joint shown above?

- A. hip C. elbow B. vertebrae D. skull

Q: Which is not a function of bone?



- A. production of vitamin D
- B. internal support
- C. protection of internal organs
- D. storage of calcium



Q: Use the diagram below to answer the question.

- What is a characteristic of the portion of the bone indicated by the arrow?

- A. It contains no living cells.
- B. It contains bone marrow.
- C. It is the only type of bone tissue in long bones.
- D. It is made of overlapping osteon systems.

Q: Which pair of terms is mismatched?

- A. cranium, sutures
- B. wrist, pivot joint
- C. shoulder, ball-and-socket joint
- D. knee, hinge joint

Q: What are the cells that remove old bone tissue called?

- A. osteoblasts
- B. osteocytes
- C. osteoclasts
- D. osteozymes

Q: Which is not part of the axial skeleton?

- A. skull
- B. ribs
- C. hip bone
- D. vertebral column



Q: Which is part of the appendicular skeleton?

- A. A
- C. C
- B. B
- D. D

Q: Compare the function of osteoclasts and osteoblasts.

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Q: A person enters the emergency room with an ankle injury. What structures of the patient's ankle need to be examined to determine the proper treatment?

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Q: what might happen to a woman's bones if she did not increase her intake of calcium during pregnancy?

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Q: Construct a chart that lists similarities and differences among the three types of muscles.

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Q: Identify which type of muscles are voluntary and which are involuntary.

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Q: Explain why aerobic respiration occurs before lactic acid fermentation in most muscles.

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Q: For each set of terms below, choose the one term that does not belong and explain why it does not belong.

- actin, melanin, myosin
- cardiac muscle, smooth muscle, fast-twitch muscle.....
- sarcomere, myofibril, myoglobin.....

Q: Which requires ATP?

- A. muscle contraction
- B. muscle relaxation
- C. both muscle contraction and relaxation
- D. neither muscle contraction nor relaxation

Q: Use the diagram below to answer the question.

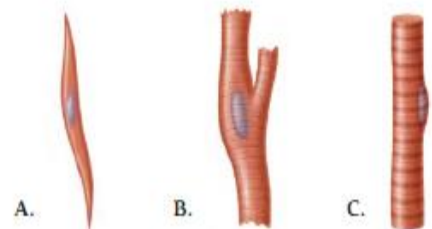
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Q: What muscles shown above are classified as voluntary muscles?

- A. the muscle type shown in A
- B. the muscle type shown in B
- C. the muscle type shown in C
- D. all muscles

Q: Which is a characteristic of fast-twitch muscle fibers?

- A. They contain more myoglobin than slow-twitch fibers.
- B. They are resistant to fatigue.
- C. They have fewer mitochondria than slow-twitch fibers.
- D. They require high amounts of oxygen in order to function.

Q: Compare and contrast the structure of skeletal, smooth, and cardiac muscle.



Chapter 5 : Circulatory, Respiratory, and Excretory Systems

Q: Explain the main functions of the circulatory system.

Q: Diagram the path of blood through the heart and body.

Q: Compare and contrast the structure of arteries and the structure of veins.

Q: Summarize the functions of the four components of blood.

Q: why exercise helps to maintain a healthy heart.

Q: Match each of the following definitions with the correct vocabulary.

- a vessel carrying oxygen-rich blood
- involved in blood vessel repair.....
- stimulates the heart to contract.....

Q: When blood leaves the heart, where does it exit?

- A. the aorta
- B. the capillaries
- C. the lungs
- D. the pulmonary vein

Q: Use the diagram below to answer the questions.

- Which represents the right ventricle?

- A. A
- B. B
- C. C
- D. D

- Into what part of the heart does oxygen-rich blood enter?

- A. A
- B. B
- C. C
- D. D

Q: If a teenager with type A blood is injured in an auto accident and needs a blood transfusion, what type of blood will he or she receive?

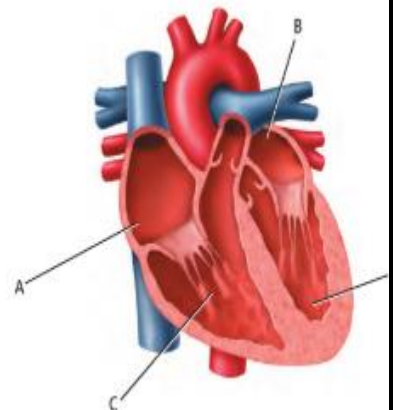
- A. only type A
- B. type A or type O
- C. only type AB
- D. only type O

Q: Where are one-way valves in the circulatory system located?

- A. arteries
- B. capillaries
- C. veins
- D. white blood cells

Q: When a small blood vessel in your hand is cut open, which plays an active defensive role against possible disease?

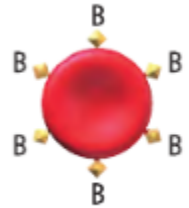
- A. plasma
- B. platelets
- C. red blood cells
- D. white blood cells



Q: Differentiate between the function of the atria and the function of the ventricles.

Q: Use the diagram to answer the question.

- A person has the blood type represented above. What type of blood can the person receive in a transfusion? Explain.



Q: Identify the main function of the respiratory system.

Q: Distinguish between internal and external respiration.

Q: Sequence the path of air from the nasal passages to the bloodstream.

Q: Describe the mechanics of inhalation and exhalation.

Q: Infer how the respiratory system would compensate for a circulatory disorder.

Q: Describe three disorders of the respiratory system.

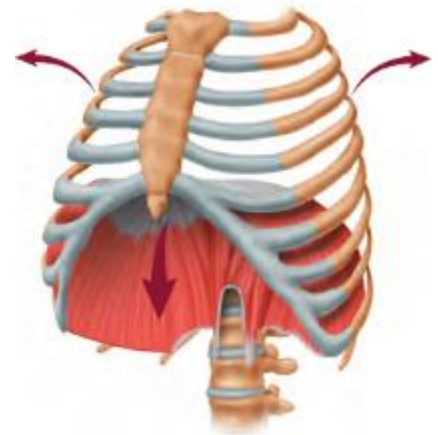
Q: In what structure does external respiration take place?

Q: Which term defines the exchange of gases between the blood and the body's cells?

Q: Which part of the air pathway branches off the trachea?

Q: Use the diagram below to answer the questions.

- Which process is shown above?
A. inhalation B. exhalation
C. cellular respiration D. filtration
- Which structure moves down as its muscles contract?
A. trachea B. diaphragm
C. pharynx D. ribs



Q: Which process occurs inside the tissue cells in your legs?

- A. filtration B. breathing
- C. external respiration D. internal respiration

Q: Which process causes the diaphragm to move back up?

- A. cellular respiration B. exhalation
- C. inspiration D. internal respiration

Q: Which gas is needed by all cells?

- A. sulfur C. carbon dioxide
- B. hydrogen D. oxygen

Q: How many breaths will a person take in one day if he or she takes 12 breaths per minute?

- A. about 1000 B. about 10,000
- C. about 17,000 D. about 1,000,000

Q: Differentiate between asthma, bronchitis, and emphysema.



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 Q: Use the photo below to answer the question.

- Describe the function of the structures above. Where would these structures be found?

-
 Q: Explain how the kidneys help maintain homeostasis.

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 Q: Diagram the excretion of waste from the Bowman's capsule to the urethra.

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 Q: Compare and contrast filtration and reabsorption in a nephron.

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 Q: Identify three types of kidney disorders.

.....
 Q: why kidney failure without dialysis can result in death.

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 Q: Where are nephrons located?

.....
 Q: Which waste product is found in urine?

.....
 Q: Where is the loop of Henle?

- A. renal tubule B. glomerulus
- C. Bowman's capsule D. urethra

Q: Which one of the kidney functions conserves water in the body?

- A. absorption C. reabsorption
- B. filtration D. breathing

Q: Which process returns glucose to the blood?

- A. excretion
- B. filtration
- C. reabsorption
- D. exhalation

Q: Use the table below to answer the questions.

Reabsorption of Some Substances in the Kidneys			
Chemical substance	Amount Filtered by Kidneys (g/day)	Amount Excreted by Kidneys (g/day)	Percent of Filtered Chemical Reabsorbed (per day)
Glucose	180	0	100
Urea	46.8	23.4	50
Protein	1.8	1.8	0

- Based on the data from the table above, how much urea is reabsorbed by the kidneys?

- A. 0.50 g/day
- B. 23.4 g/day
- C. 46.8 g/day
- D. 50.0 g/day

- Based on the table data above, what happens to glucose in the kidneys?

- A. It is reabsorbed into the blood.
- B. It is permanently filtered out of the blood.
- C. It is treated in the kidney like creatinine.
- D. It is treated in the kidney like urea.

- why proteins are not removed by nephrons.

- A. The collecting ducts are too small.
- B. Proteins cannot be filtered.
- C. Proteins never enter the nephron.
- D. Proteins are reabsorbed by nephrons.

Q: Explain the differences between filtration and reabsorption in the kidneys.

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Chapter 6 : Nervous System

Q: How is the nervous system similar to the Internet as a communication network?

Q: why energy is necessary to counteract the diffusion of Na⁺ and K⁺ ions across the plasma membrane of a neuron.

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Q: If the sensory nerves in a person's foot are nonfunctional, would the person feel pain if the foot was severely burned?

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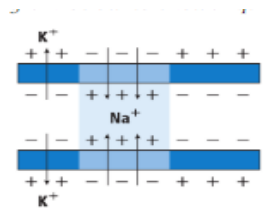
Q: For each set of terms below, choose the one term that does not belong and explain why it does not belong.

1. axon, dendrite, reflex arc

- 2. cell body, synapse, neurotransmitter
- 3. myelin, node, threshold

Q: Use the diagram below to answer the question.

- What is occurring in the diagram above?



- A. K^+ ions are entering the neuron.
- B. Negatively charged proteins are leaving the neuron.
- C. Na^+ ions are entering the neuron.
- D. The myelin coat has broken down, allowing ions to freely cross the plasma membrane.

Q: Which is the correct path that a nerve impulse will follow in a reflex arc?

- A. motor neuron \rightarrow interneuron \rightarrow sensory neuron
- B. interneuron \rightarrow motor neuron \rightarrow sensory neuron
- C. motor neuron \rightarrow sensory neuron \rightarrow interneuron
- D. sensory neuron \rightarrow interneuron \rightarrow motor neuron

Q: why it takes more energy for a nerve impulse to travel along an axon that lacks myelin as opposed to an axon that has myelin.

7. Explain the following analogy: A neuron is like a one-way street, while a nerve is like a two-way street.

Q: Compare the structures of the central nervous system with the structures of the peripheral nervous system and explain their relationships.

Q: Assess the similarities and differences between the somatic nervous system and the autonomic nervous system.

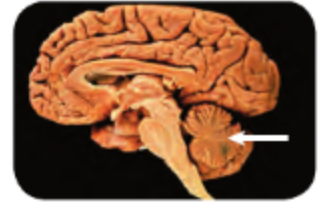
Q: Which part of the nervous system is involved in a fight-or-flight response? Why is such a response important?

Q: For each set of terms below, choose the one term that does not belong and explain why it does not belong.

- somatic system, parasympathetic system, sympathetic system
- cerebrum, pons, medulla oblongata.....
- autonomic nervous system, somatic nervous system, central nervous system

Q: Which is characteristic of the sympathetic division of the autonomic system?

- A. stimulates digestion
- B. dilates the bronchi
- C. slows the heart rate
- D. converts glucose to glycogen



Q: Use the diagram below to answer the question.

- If the portion indicated by the arrow was damaged as a result of trauma, what effect would this person most likely experience?

- A. partial or complete memory loss
- B. body temperature fluctuations
- C. trouble maintaining balance
- D. rapid breathing

Q: Which nervous system is the hypothalamus most involved in regulating?

- A. voluntary
- B. peripheral
- C. sensory
- D. autonomic

Q: The human cerebrum is disproportionately large compared to the cerebrum of other animals. What advantage does this give to humans?

.....
 Q: Diagram the route of a sound wave from the auditory canal until it causes a nerve impulse to be generated.

Q: what might be the result if the cornea was damaged.

.....
 Q: Analyze the importance of the kind of receptors found in the fingers.

.....
 Q: Explain why it might be difficult to taste when you have a cold and your nasal passages are clogged.

.....
 Q: Distinguish between the terms in each of the following sets.

- rods , cones
- cochlea, semicircular canals
- retina, taste buds

Q: If there was a power outage in a movie theater and only a few dim emergency lights were lit, which cells of the retina would be most important for seeing your way to the exit?

- A. rods
- B. cones
- C. Rods and cones are equally important.

Q: Which represents the correct sequence as sound waves travel in the ear to trigger an impulse?

- A. cochlea, incus, stape, eardrum
- B. tympanum, bones in the middle ear, cochlea, hair cells
- C. auditory canal, tympanum, hair cells, cochlea
- D. hair cells, auditory canal, cochlea, malleus

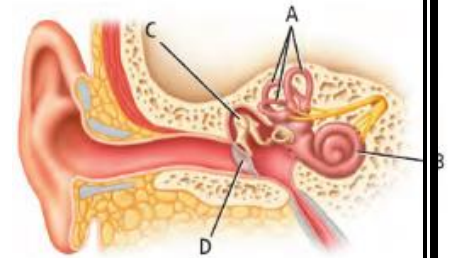
Q: With which sense are free nerve endings associated?

- A. taste
- B. hearing
- C. touch
- D. sight

Q: Use the diagram below to answer the question.

- Some rides at amusement parks cause a person to become dizzy when the ride stops. Which structure in the diagram is most likely involved with the dizzy feeling?

- A. A
- B. B
- C. C
- D. D



Q: Explain You have receptors for light (soft) touch all over your body. In terms of what you know about the nervous system, why are you not always conscious of things such as wearing clothes or a wristwatch?

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 Q: Describe four ways that drugs can influence the nervous system.

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 Q: Explain why the effects of stimulants and depressants do not necessarily counteract each other.

.....
 Q: Infer why students who abuse drugs are likely to experience failing grades.

.....
 Q: Discuss how, on a cellular level, a person can become addicted to a drug.

.....
 Q: Explain the difference between the terms in each set. Then explain how the terms are related.

- stimulants, depressants
- tolerance, addiction.....
- dopamine, drug.....

Q: Use the diagram below to answer the question.

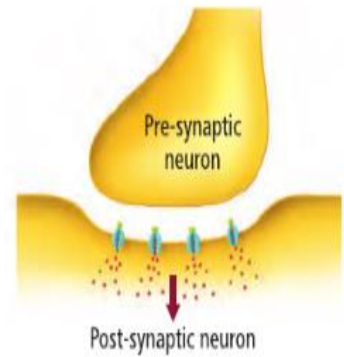
- If a person is suffering from depression, which drug is one recommended treatment of the presynaptic neuron?

- A. one that increases the reuptake of dopamine

- B. one that increases the production of dopamine
- C. one that decreases the receptors for dopamine
- D. one that decreases the reuptake of dopamine

Q: What does it mean when someone is addicted to a drug?

Q: Discuss what consequences might arise if a person's gene for the production of dopamine is defective.



Chapter7: Human Reproductive System and Growth

Q: Describe how hormones regulate sperm and egg cells.

Q: Summarize the structures of the reproductive systems and their functions.

Q: Describe the origin and importance of substances found in semen.

Q: Explain the major events that take place in the endometrium and in the ovary during the menstrual cycle.

Q: Suppose a female began menstruating at age 12 and stopped menstruating at age 55. If she never became pregnant and her menstrual cycles averaged 28 days, how many eggs did she ovulate during her reproductive years?

Q: Explain the difference between the terms in each pair below, and then explain how the terms are related.

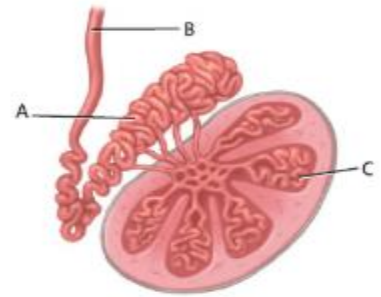
1. urethra, semen
2. oocyte, oviduct.....
3. menstrual cycle, polar body.....

Q: What would happen if the testes were located inside the body cavity?

- A. Sperm would not be produced because it is too warm.
- B. Testosterone levels would increase because of the warm temperature.
- C. The seminal vesicles would no longer be needed.
- D. Hormones from the testes would have difficulty entering the bloodstream.

Q: Use the diagram below to answer the questions.

- What occurs in the structure labeled C in the illustration?



- A. sperm cell storage and maturation
- B. sperm cell production
- C. secretion of sugar
- D. production of FSH

Q: What is the function of the structure labeled A in the illustration?

- A. sperm cell storage and maturation
- B. sperm cell production
- C. secretion of sugar
- D. production of FSH

Q: Why are the secretions of the male reproductive glands so important to sperm?

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Q: Compare the actions of FSH and LH in the ovaries and testes.

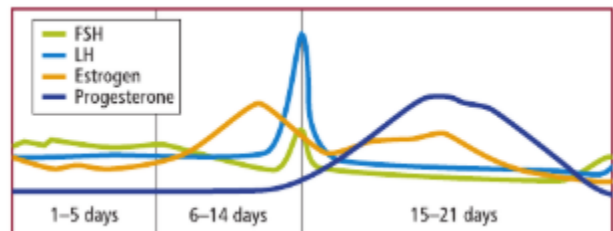
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Q: What advantages are there for the formation of one egg and polar bodies as compared to four eggs?

.....

Q: Use the diagram below to answer the question.

- Cause and Effect Based on what you know about the hormonal control of a woman's reproductive cycle shown above, explain the hormonal basis of why a woman cannot get pregnant again while she is pregnant.



-

Q: Describe the changes that the zygote undergoes during the first week following fertilization.

.....

Q: Summarize the development that occurs during each trimester in a concept map.

.....

Q: Compare and contrast hormonal regulation during pregnancy with hormonal regulation during the menstrual cycle.

Q: Describe each of the following vocabulary terms.

- morula
- Blastocyst.....
- amniotic fluid.....

Q: Where in the human female reproductive tract does fertilization usually occur?

- A. in the uterus
- B. in the vagina
- C. in the corpus luteum
- D. in an oviduct

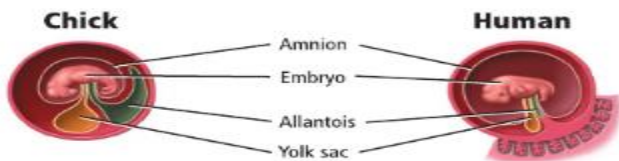
Q: Which of the following describes the proper sequence of development?

- A. zygote, blastocyst, morula
- B. morula, zygote, blastocyst
- C. zygote, morula, blastocyst
- D. morula, blastocyst, zygote

Q: Which is produced by the placenta?

- A. human chorionic gonadotropin
- B. estrogen and progesterone
- C. oxytocin
- D. endometrial birth hormone

Q: Use the diagram below to answer the question.



- Why is the human yolk sac shown in the illustration smaller than that of the chick?

- A. The yolk in humans is converted into muscle.
- B. The yolk sac in chicks keeps the embryo warm.
- C. Developing humans get their nourishment from the placenta.
- D. The yolk sac serves no purpose for a developing human.

Q: When can a pregnant woman first feel the movements of her fetus?

- A. in the first trimester
- B. in the second trimester
- C. in the third trimester
- D. in the last month only

Q: Why is it important that the endometrium is refreshed each cycle?

Q: Explain the difference between the terms in each pair below. Then explain how the terms are related.

- labor, placental stage

- dilation, expulsion
- adolescence, adulthood.....

Understand Main Ideas

Q: At which measurement is the cervix fully dilated?

- A. 10 mm C. 10 cm B. 2 cm D. 20 cm

Q: When a pregnant woman tells her doctor that “her water broke,” what does she mean?

- A. The amniotic sac has torn.
- B. There is a lot of pressure on her bladder.
- C. The yolk sac has torn.
- D. The placenta is leaking.

Q: Use the diagram below to answer the questions.

- What is the name of the structure labeled A in the illustration?

- A. uterus C. fetus B. placenta D. cervix

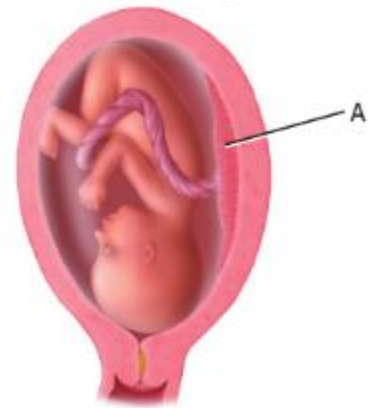
- During which stage of birth does structure A leave the female’s body?

- A. first B. second C. third D. fourth

Q: During which year of a person’s life does the most rapid rate of growth occur?

- A. the first year of infancy B. the first year of puberty
- C. the second year of puberty D. the first year of adulthood

Q: Compare puberty in females with puberty in males.



Q: Use the graph above to answer the question.

- Change During which period shown on the graph is the rate of change in head circumference greatest.

Chapter 8 : Sexual Reproduction and Genetics

Q: Analyze how meiosis produces haploid gametes.

Q: Indicate how metaphase I is different from metaphase in mitosis.

Q: Diagram a cell with four chromosomes going through meiosis.

Q: Assess how meiosis contributes to genetic variation, while mitosis does not.

Q: Compare and contrast mitosis and meiosis, by creating a Venn diagram.

Q: Imagine you are a chromosome going through meiosis. Describe what happens to you and the other chromosomes.

Q: When two cells with n number of chromosomes fuse, what type of cell results?

Q: During which process are gametes formed?

Q: What process results in an exchange of genes between homologous chromosomes?

Q: How many chromosomes would a cell have during metaphase I of meiosis if it has 12 chromosomes during interphase?

A. 6

C. 24

B. 12

D. 36

Q: Use the diagram below to answer the questions.

- Which stage of meiosis is illustrated above?

A. prophase I

C. metaphase I

B. prophase II

D. metaphase II

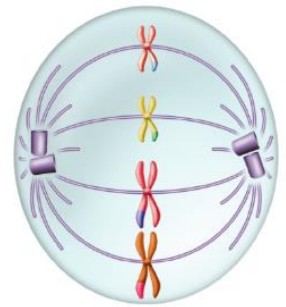
- What is the next step for the chromosomes illustrated above?

A. They will experience replication.

B. They will experience fertilization.

C. Their number per cell will be halved.

D. They will divide into sister chromatids.



Q: Which is not a characteristic of homologous chromosomes?

A. Homologous chromosomes have the same length.

B. Homologous chromosomes have the same centromere position.

C. Homologous chromosomes have the exact same type of alleles.

D. Homologous chromosomes pair up during meiosis I.

Q: Relate the terms meiosis, gametes, and fertilization in one or two sentences.

Q: Use a Punnett square to explain how a dominant allele masks the presence of a recessive allele.

Q: Apply the law of segregation and the law of independent assortment by giving an example of each.

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.....

Q: Use a Punnett square In fruit flies, red eyes (R) are dominant to pink eyes (r). What is the phenotypic ratio of a cross between a heterozygous male and a pink-eyed female?

.....

.....

Q: Explain the differences between the vocabulary terms in the following sets.

- dominant, recessive
- genotype, phenotype.....

Q: If a black hamster (Bb) were crossed with a white hamster (bb) what would be the resulting phenotypic ratio?

- A. 0:1 black to white
- B. 1:0 black to white
- C. 1:1 black to white
- D. 3:1 black to white

Q: In garden peas, purple flowers (P) are dominant to white (p) flowers, and tall plants (T) are dominant to short plants (t). If a purple tall plant (PpTt) is crossed with a white short plant (pptt), what is the resulting phenotypic ratio?

- A. 1:1:1:1 purple tall to purple short to white tall to white short
- B. 3:2 purple tall to purple short
- C. 9:3:3:1 purple tall to purple short to white tall to white short
- D. all purple tall

Q: Use the figure below to answer the questions.

- The unusual cat shown was crossed with a cat with noncurled ears. All the kittens born from that cross had noncurled ears. Later, when these offspring were crossed with each other, the phenotypic ratio was 3:1 noncurled to curled ears. What conclusions can be made about the inheritance of curled ears?



- A. Curled ears are a result of crossing over.
- B. It is a dominant trait.
- C. It is a recessive trait.
- D. More crosses need to be done to determine how the trait is inherited.

- What might occur in the F3 generation of the curly-eared cat shown above if the F2 generation all reproduce with cats that have noncurly ears?

Q: If there are five boys and no girls born into a family, does that increase the likelihood that the sixth offspring will be a girl?

Q: There are two types of American rat terrier dogs—those without hair and those with hair. The presence of hair is a genetically determined trait. Some female rat terriers with hair produce only puppies with hair, whereas other females produce rat terrier puppies without hair. Explain how this can occur.

Q: How crossing over is related to variation.

Q: Suppose genes C and D are linked on one chromosome and genes c and d are linked on another chromosome. Assuming that crossing over does not take place, sketch the daughter cells resulting from meiosis, showing the chromosomes and position of the genes.

Q: how polyploidy is used in the field of agriculture.

Q: Construct a chromosome map for genes A, B, C and D using the following crossing over data: A to D=25 percent; A to B=30 percent; C to D=15 percent; B to D=5 percent; B to C=20 percent.

Q: what advantage polyploidy would give to a plant breeder.

Q: Replace the underlined words with the correct vocabulary Term.

- Human growth hormone has been used in agriculture to increase the size of flowers.

Q: Which does not contribute to genetic variation?

- A. chromosome number
- B. crossing over
- C. meiosis
- D. random mating

Q: Which concept is considered an exception to Mendel's law of independent assortment?

- A. crossing over
- B. gene linkage

C. polyploidy

D. law of segregation

Q: Use the figure below to answer the questions.



- A housefly, shown in the photo above, has six pairs of chromosomes. If two houseflies are crossed, how many possible types of fertilized eggs could result from the random lining up of the pairs?

- A. 256 C. 4096 B. 1024 D. 16,384

- For the housefly with its six pairs of chromosomes, how many possible combinations of gametes can be produced by the random lining up of pairs in meiosis?

- A. 32 C. 64 B. 48 D. 120

Q: What three processes increase genetic variation?

.....

31. Crossing over provides genetic variation, eventually changing the gene pool in a population. Yet some sexually reproducing organisms do not seem to display recombination mechanisms. Why might it be advantageous for these organisms to reduce genetic recombination

Chapter 9 : Principles of Ecology

Q: Compare and contrast biotic and abiotic factors.

.....

Q: Describe the levels of organization of an organism that lives in your biome.

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Q: Describe at least two populations that share your home.

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Q: Differentiate between the habitat and niche of an organism that is found in your community.

.....

Q: Replace each underlined word with the correct vocabulary term.

- A niche is the place in which an organism lives.
- The presence of interbreeding individuals in one place at a given time is called a biological community.

- A group of biological communities that interact with the physical environment is the biosphere.

Q: Which of these levels of organization includes all the other levels?
A. community C. individual B. ecosystem D. population

Q: Which would be an abiotic factor for a tree in the forest?
A. a caterpillar eating its leaves
B. wind blowing through its branches
C. a bird nesting in its branches
D. fungus growing on its roots

Q: Use the photo below to answer the questions.

- The insect in the photo above is gathering pollen and nectar for food, but at the same time is aiding in the plant's reproduction. What does this relationship demonstrate?



A. predation C. mutualism
B. commensalism D. parasitism

Q: What term best describes the bee's role of gathering pollen?

A. niche C. parasite
B. predator D. habitat

Q: Use the illustration below to answer the question.

Which type of heterotroph best describes this snake?

A. herbivore C. omnivore
B. carnivore D. detritivore



Q: Explain the difference between a habitat and a niche.

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Q: Describe how abiotic factors affect biotic factors in your environment. Give specific examples.

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Q: why most ecologists do not study the biosphere level of organization.

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Q: why it is advantageous for organisms such as fungi and algae to form mutualistic relationships.

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Q: Compare and contrast autotrophs and heterotrophs.

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Q: Illustrate the flow of energy through a simple food chain that ends with a lion as the final consumer.

Q: Classify a pet dog as an autotroph or heterotroph and as an herbivore, carnivore, or omnivore. Explain your answer.

Q: Evaluate the impact on living organisms if the Sun began to produce less energy and then finally burned out.

Q: Draw an energy pyramid for a food chain made up of grass, a caterpillar, tiger beetle, lizard, snake, and a roadrunner. Assume that 100 percent of the energy is available for the grass. At each stage, show how much energy is lost and how much is available to the next trophic level.

Q: Explain how the terms in each set below are related.

- heterotroph, omnivore, carnivore
- food chain, food web, trophic level.....
- decomposer, heterotroph, carnivore.....
- autotroph, food chain, heterotroph.....

Q: How does energy first enter a pond ecosystem?

- A. through growth of algae
- B. through light from the Sun
- C. through decay of dead fish
- D. through runoff from fields

Q: Which statement is true about energy in an ecosystem?

- A. Energy for most ecosystems originates from the Sun.
- B. Energy most often is released as light from an ecosystem.
- C. Energy flows from heterotrophs to autotrophs.
- D. Energy levels increase toward the top of the food chain.

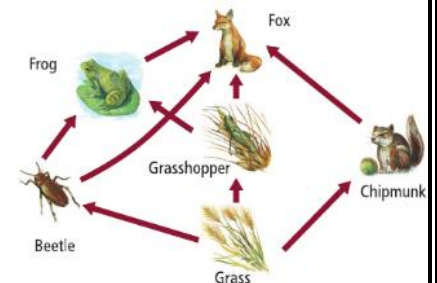
Q: Use the illustration below to answer the questions.

- What does the illustration represent?

- A. a food web
- B. a food chain
- C. an ecological pyramid
- D. a pyramid of energy

- Which organism in the illustration is an autotroph?

- A. frog
- B. grasshopper
- C. fox
- D. grass



Q: Which is a detritivore?

- A. cat C. sunflower B. mouse D. crayfish

Q: Create a food web that occurs in your community. Explain the importance of the autotrophs in the food web.

Q: Describe why food webs usually are better models for explaining energy flow than food chains.

Q: Determine approximately how much total energy is lost from a three-step food chain if 1000 calories enter at the autotroph level.

Q: Name four important biogeochemical processes that cycle nutrients.

Q: Compare and contrast two of the cycles of matter.

Q: Explain the importance of nutrients to an organism of your choice.

Q: Describe how phosphorus moves through the biotic and abiotic parts of an ecosystem.

Q: Each of the following sentences is false. Make each sentence true by replacing the italicized word with a vocabulary term.

- Because nitrogen is required for growth, it is considered an essential nitrate.
- Converting nitrogen from a gas to a useable form by bacteria is denitrification.
- The movement of chemicals on a global scale from abiotic through biotic parts of the environment is a lithospheric process.

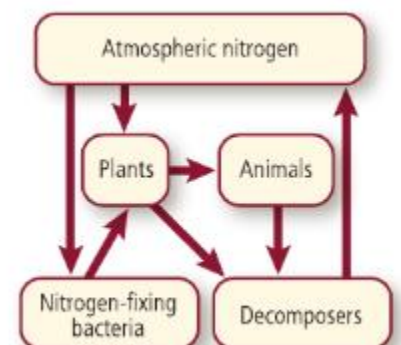
Q: What is the name of the process in which bacteria and lightning convert nitrogen into compounds that are useful to plants?

- A. ammonification C. nitrate cycling
B. denitrification D. nitrogen fixation

Q: Use the following diagram to answer the question.

- Where is the largest concentration of nitrogen found?

- A. animals C. bacteria
B. atmosphere D. plants



Q: What are the two major life processes that involve carbon and oxygen?

- A. coal formation and photosynthesis
- B. photosynthesis and respiration
- C. fuel combustion and open burning
- D. death and decay

Q: Which process locks phosphorus in a long-term cycle?

- A. organic materials buried at the bottom of oceans
- B. phosphates released into the soil
- C. animals and plants eliminating wastes
- D. rain eroding mountains

Q: what is meant by the following statement:

- Grass is just as important as mice in the diet of a carnivore such as a fox.
-

Q: The law of conservation of matter states that matter cannot be created or destroyed. How does this law relate to the cycling of carbon in an ecosystem?

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Q: Explain the role of decomposers in the nitrogen cycle.

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Q: Use the illustration below to answer the question.

- Predict the effect of additional mountain building in the Rocky Mountains on the levels of phosphorus in the surrounding valleys.
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Q: Explain how decomposers supply phosphorus to soil, groundwater, oceans, lakes, ponds, and rivers.

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