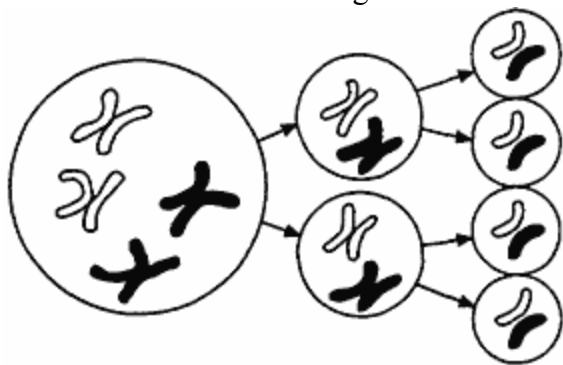


- Which cell process occurs only in organisms that reproduce sexually?  
A) mutation                      B) replication  
C) meiosis                        D) mitosis
- Which sequence represents the correct order of processes that result in the formation and development of an embryo?  
A) meiosis → fertilization → mitosis  
B) mitosis → fertilization → meiosis  
C) fertilization → meiosis → mitosis  
D) fertilization → mitosis → meiosis
- Which diagram correctly represents a step in the normal process of human reproduction?

Key
$(2n)$ = total genetic material of a human cell
$(n)$ = one half of the total genetic material of a human cell

- A)  $(2n) + (2n) \longrightarrow (n)$                       B)  $(n) + (n) \longrightarrow (2n)$   
C)  $(2n) + (n) \longrightarrow (3n)$                       D)  $(2n) + (2n) \longrightarrow (4n)$

- The distribution of chromosomes in one type of cell division is shown in the diagram below.

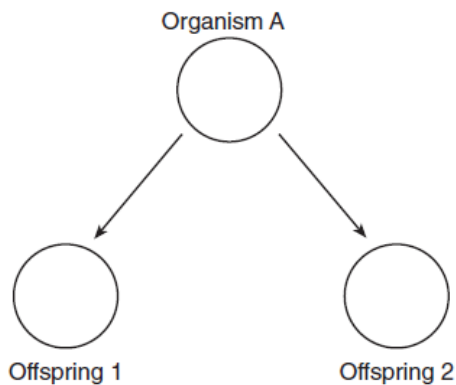


Which process is represented in the diagram?

- A) asexual reproduction  
B) meiosis  
C) mitosis  
D) vegetative propagation

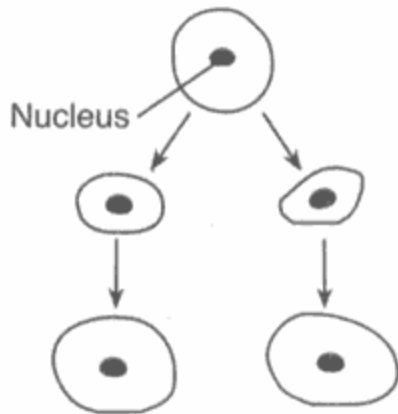
## Unit 4 - Reproduction

5. The diagram below represents a form of cellular reproduction.



As a result of this process, offspring 1 and offspring 2 will have

- A) the same number of genes but different traits
  - B) a different number of genes but the same traits
  - C) the same number of genes and the same traits
  - D) a different number of genes and different traits
6. A pattern of reproduction and growth in a one-celled organism is shown below.



Which statement best describes this pattern of reproduction?

- A) All genetic material comes from one parent.
- B) Only some of the genetic material comes from one parent.
- C) The size of the parent determines the amount of genetic material.
- D) The size of the parent determines the source of the genetic material.

7. The greatest degree of genetic variation would be found in offspring that result from

- A) binary fission
- B) fertilization
- C) regeneration
- D) grafting

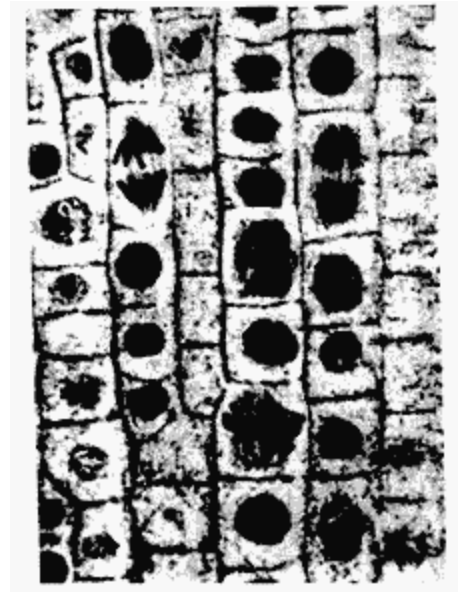
8. A sperm cell of an alligator has 16 chromosomes. What is the total number of chromosomes normally present in a stomach cell of this alligator?

- A) 8
- B) 16
- C) 32
- D) 48

9. Which process allows a mammal to continue to grow in size?

- A) mitosis of sex cells
- B) mitosis of body cells
- C) meiosis of sex cells
- D) meiosis of body cells

10. A photomicrograph of cells involved in various stages of nuclear division is shown below.

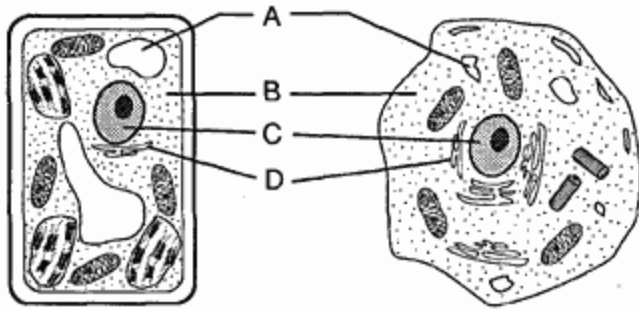


Which title is most appropriate for this photomicrograph?

- A) Mitosis in an Onion Root Tip
- B) Cell Division in Human Blood Cells
- C) Meiosis in Male Gametes
- D) Gametogenesis in Yeast Cells

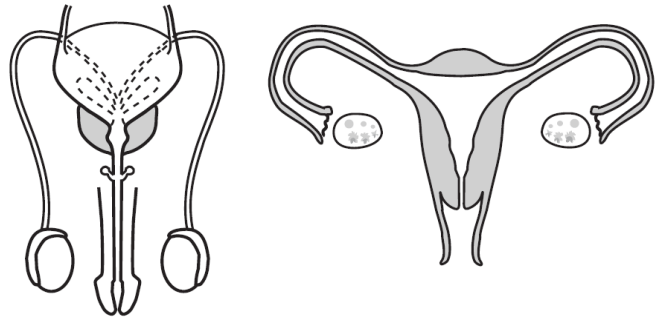
## Unit 4 - Reproduction

11. In the diagram below, which letter indicates the cell part in which the changes involved in mitosis first become evident?



- A) *A*    B) *B*    C) *C*    D) *D*
12. A cell in the stem tip of a corn plant contains 20 chromosomes. After this cell divides, how many chromosomes should each resulting daughter cell contain?
- A) 10    B) 20    C) 30    D) 40
13. The primary function of the human male reproductive system is to
- A) provide a site for fertilization  
B) produce and transport gametes  
C) protect and nourish the embryo  
D) prevent urine from leaving the body

14. The diagrams below represent a human organ system.

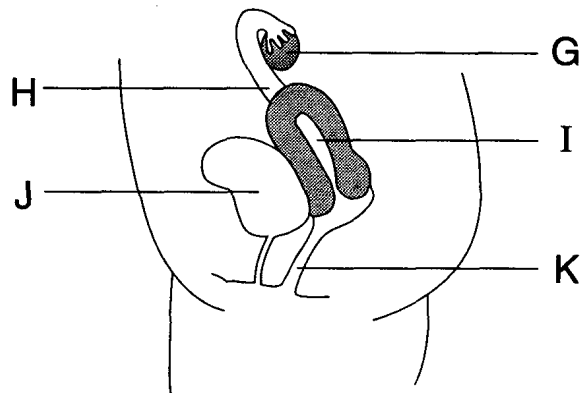
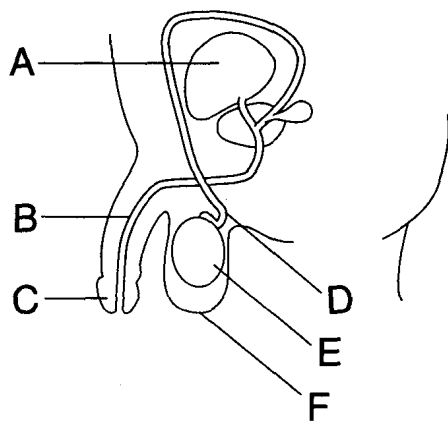


The major function of the system is to

- A) provide immunity essential for the survival of each individual in a population  
B) provide cells that are necessary for the survival of the species  
C) produce chemical messages that are necessary for nerve cell development  
D) control the passage of nutrients into and out of a developing fetus

## Unit 4 - Reproduction

15. Base your answer to the following question on the diagrams below and on your knowledge of biology.



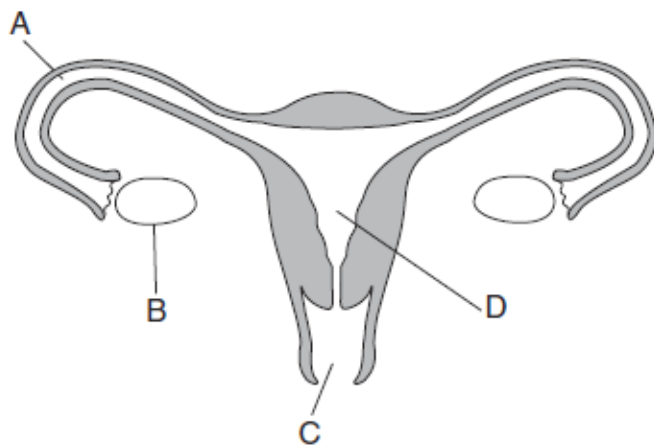
Gametogenesis occurs within structures

- A) *A* and *J*      B) *E* and *G*      C) *B* and *I*      D) *D* and *H*

16. Testosterone directly affects the

- A) formation of a zygote  
B) changes within an ovary  
C) production of sperm cells  
D) development of a placenta

17. The human female reproductive system is represented below.



Within which structure does the placenta normally develop?

- A) *A*      B) *B*      C) *C*      D) *D*

18. The reproductive cycle in females is regulated primarily by

- A) estrogen and testosterone  
B) estrogen and progesterone  
C) progesterone and insulin  
D) progesterone and testosterone

19. Essential materials needed for development are transported to a human fetus through the

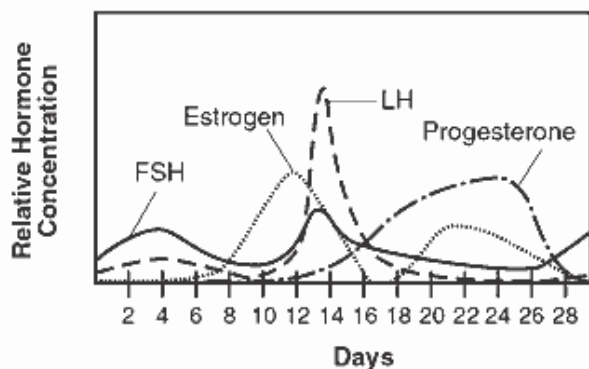
- A) reproductive hormones  
B) egg cell  
C) placenta  
D) ovaries

20. Which statement best describes the relationship between the blood of a human fetus and the blood of the mother?

- A) Their blood systems are separate only at certain times in development and connected at other times.  
B) The blood flows directly from the mother into the fetus.  
C) Their blood systems are separate and no materials are exchanged.  
D) Their blood systems are separate, but certain materials pass from one to the other.

## Unit 4 - Reproduction

21. Some chemical interactions in a human are shown in the graph below.



This graph represents hormones and events in the

- A) process of fetal growth and development  
B) process of meiotic cell division during sperm development  
C) reproductive cycle of males  
D) reproductive cycle of females
22. In the menstrual cycle, which event usually occurs immediately after the follicle stage?
- A) The thickened uterine lining is shed.  
B) An egg is released from the ovary.  
C) The corpus luteum forms in the ovary.  
D) The blastula stage of the embryo develops.

Base your answers to questions 23 through 25 on the information in the chart below and on your knowledge of biology.

### Stages of the Menstrual Cycle

Stage	Event
A	Periodic shedding of the thickened uterine lining
B	Release of the egg
C	Production of progesterone by tissue in a follicle
D	Maturation of the egg and secretion of estrogen

23. Which structure does the egg that is released in stage B normally enter first?
- A) cervix                      B) vagina  
C) uterus                     D) oviduct

24. Which stage is represented by letter A?

A) ovulation                      B) menstruation  
C) follicle                        D) corpus luteum

25. Which sequence best represents the order of the stages in the menstrual cycle?

A) D → B → C → A    B) A → B → D → C  
C) C → A → B → D    D) A → B → C → D

26. Which sequence represents the order of some events in human development?

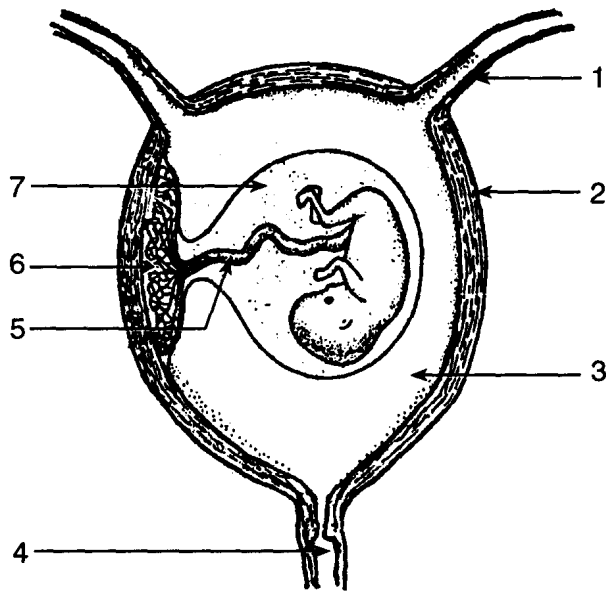
A) fertilized egg → sperm → tissues → egg  
B) fetus → tissues → fertilized egg → egg  
C) fertilized egg → tissues → organs → fetus  
D) sperm → fertilized egg → organs → tissues

27. Human reproduction usually involves

A) internal fertilization and internal development  
B) external fertilization and external development  
C) internal fertilization and external development  
D) external fertilization and internal development

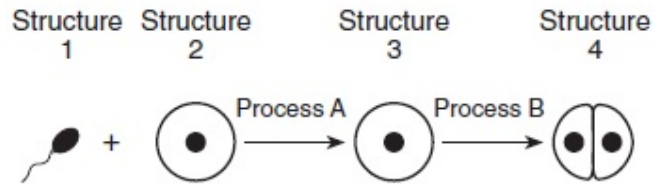
## Unit 4 - Reproduction

Base your answers to questions 28 through 30 on the diagram below, which represents a necessary part of human reproduction.



28. Estrogen stimulates the production of additional blood vessels in structure  
A) 1    B) 2    C) 5    D) 7
29. The embryo is protected from shock by a substance located at  
A) 6    B) 7    C) 3    D) 4
30. Within which structure does fertilization normally occur?  
A) 1    B) 2    C) 6    D) 4
31. What is an advantage of internal fertilization and development over external fertilization and development?  
A) there is a greater chance for genetic variation  
B) only one sperm is needed to fertilize the egg  
C) genes can pass directly from the mother to the embryo  
D) the chance for zygote survival is increased

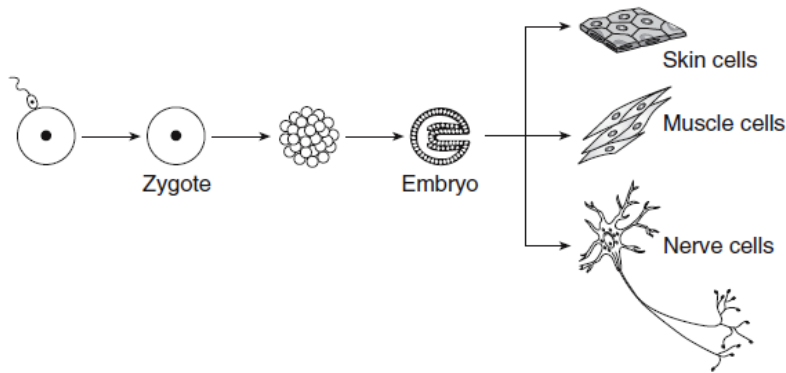
32. The diagram below represents some processes in the early development of a multicellular organism.



- Which statement describing this diagram is correct?
- A) The cell represented by structure 3 has the same genetic content as structure 2.  
B) Process A represents the process of meiosis.  
C) Each cell in structure 4 has the same genetic content as that in structure 3.  
D) Processes A and B both occur in the placenta.
33. In animals, the process of cleavage is best described as the  
A) fertilization of a mature egg cell by an immature sperm cell  
B) production of daughter cells having twice the number of chromosomes as the parent cell  
C) production of daughter cells having half the number of chromosomes as the parent cell  
D) division of cells resulting in the development of an embryo from a zygote

## Unit 4 - Reproduction

34. The development of nerve, muscle, and skin cells is represented in the diagram below.



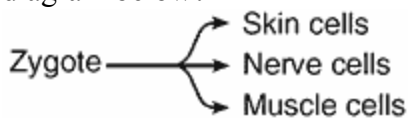
Which statement best explains how each of the different cell types can develop from the same embryo?

- A) The cells have identical genetic instructions, but different parts of these instructions are being expressed in each cell.
- B) The cells have identical genetic instructions, and all parts of these instructions are being expressed in each cell.
- C) The cells are produced by asexual reproduction and contain identical genetic instructions.
- D) The cells contain genetic instructions from two different parents and will express the instructions from one parent, only.

35. Although all of the cells of a human develop from one fertilized egg, the human is born with many different types of cells. Which statement best explains this observation?

- A) Developing cells may express different parts of their identical genetic instructions.
- B) Mutations occur during development as a result of environmental conditions.
- C) All cells have different genetic material.
- D) Some cells develop before other cells.

36. Which developmental process is represented by the diagram below?



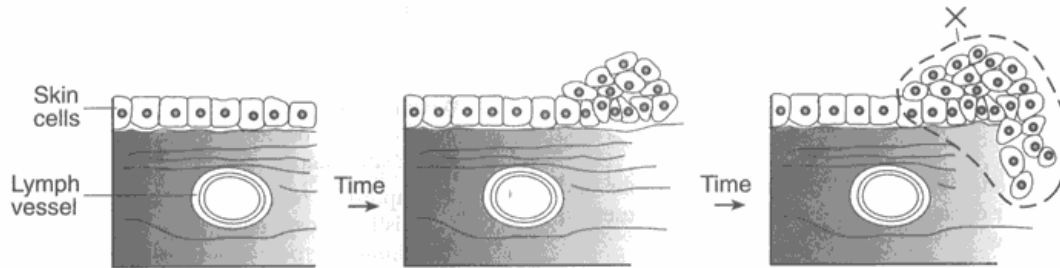
- A) fertilization
- B) differentiation
- C) evolution
- D) mutation

37. Which expression correctly represents a reproductive process that usually occurs in humans where  $2n$  is equal to the number of chromosomes in each body cell?

- A)  $n + n \rightarrow n$
- B)  $n + n \rightarrow 2n$
- C)  $n + 2n \rightarrow 2n$
- D)  $2n + 2n \rightarrow 4n$

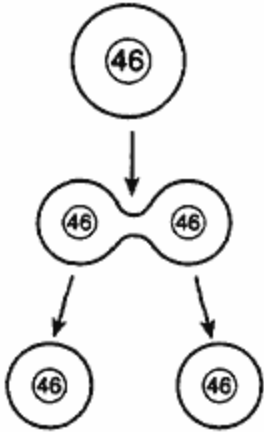
## Unit 4 - Reproduction

38. The diagram below shows the growth pattern of skin cells in the human body after they have been exposed to ultraviolet radiation.



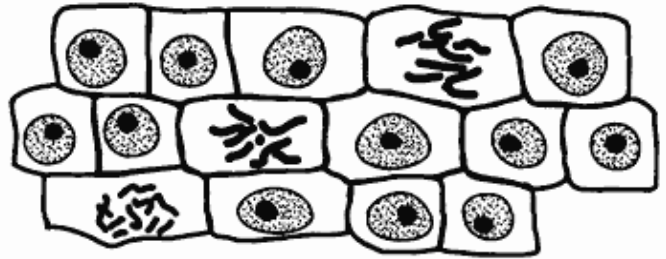
What do the cells in area X most likely represent?

- A) red blood cells  
B) cancer cells  
C) white blood cells  
D) sex cells
39. The diagram below can be used to illustrate a process directly involved in



- A) tissue repair  
B) meiosis  
C) recombination  
D) sexual reproduction

40. The diagram below shows some cells in the meristematic region of a root tip.



Which statement about these cells is correct?

- A) About 20 percent of the cells are dividing.  
B) About 80 percent of the cells are dividing.  
C) Most of the cells are undergoing meiosis.  
D) Most of the cells will never undergo mitosis.