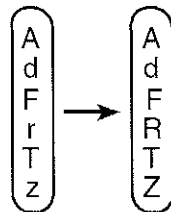
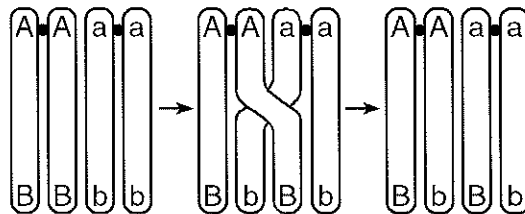




- 10) The appearance of a recessive trait in offspring of animals most probably indicates that
- one parent was homozygous dominant and the other parent was homozygous recessive for that trait
  - both parents carried at least one recessive gene for that trait
  - neither parent carried a recessive gene for that trait
  - one parent was homozygous dominant and the other parent was hybrid for that trait
- 11) Two pea plants, hybrid for a single trait, produce 60 pea plants. Approximately how many of the pea plants are expected to exhibit the recessive trait?
- 15
  - 30
  - 60
  - 45
- 12) A student crossed wrinkled-seeded ( $rr$ ) pea plants with round-seeded ( $RR$ ) pea plants. Only round seeds were produced in the resulting plants. This illustrates the principle of
- segregation
  - dominance
  - independent assortment
  - incomplete dominance
- 13) In cabbage butterflies, white color ( $W$ ) is dominant and yellow color ( $w$ ) is recessive. If a pure white cabbage butterfly mates with a yellow cabbage butterfly, all the resulting ( $F_1$ ) butterflies are heterozygous white. Which cross represents the genotypes of the parent generation?
- $Ww \times Ww$
  - $WW \times ww$
  - $WW \times Ww$
  - $Ww \times ww$
- 14) In the diagram below of two homologous chromosomes, what do  $r$  and  $R$  represent?



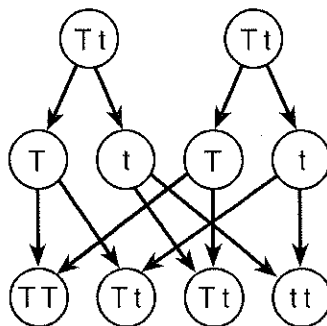
- two gametes that can form a zygote
  - two chromosomes in a hybrid pea plant
  - two identical alleles
  - two different alleles
- 15) The diagrams below represent paired double-stranded chromosomes that contain genes indicated by letters.



When does the process illustrated by the diagrams occur?

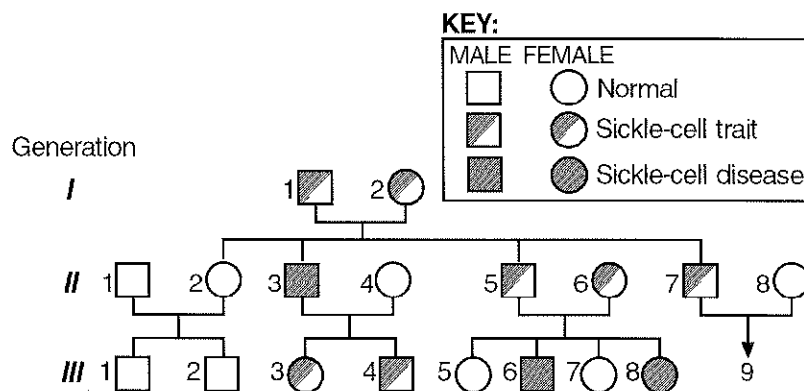
- in mitosis, after replication of chromosomes
- in mitosis, while chromosomes are attaching to spindle fibers
- in meiosis, during synapsis of homologous chromosomes
- in meiosis, after disjunction of homologous chromosomes

- 16) The diagram below represents the inheritance of stem height in garden peas.



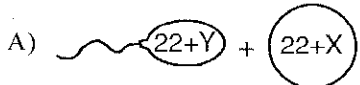







The diagram *best* illustrates

- A) segregation and recombination  
 B) sex linkage and codominance  
 C) intermediate inheritance  
 D) independent assortment
- 17) Polydactyly is a human characteristic in which a person has six fingers per hand. The trait for polydactyly is dominant over the trait for five fingers. If a man who is heterozygous for this trait marries a woman with the normal number of fingers, what are the chances that their child would be polydactyl?
- A) 100%                      B) 75%                      C) 0%                      D) 50%
- 18) When a mouse with black fur is crossed with a mouse with white fur, all  $F_1$  generation offspring have grey fur. Which phenotypic results can be expected in the  $F_2$  generation?
- A) 100% grey                      C) 25% black, 75% white  
 B) 25% black, 50% grey, 25% white                      D) 50% black, 50% white
- 19) In chickens, rose comb ( $R$ ) is dominant over single comb ( $r$ ). When a heterozygous rose-combed rooster is mated with several single-combed hens, what is the expected phenotypic ratio of the offspring?
- A) 100% single-combed                      C) 50% rose-combed and 50% single-combed  
 B) 100% rose-combed                      D) 75% rose-combed and 25% single-combed
- 20) A cross of a red cow with a white bull produces all roan offspring. This type of inheritance is known as
- A) mutation                      B) codominance                      C) sex linkage                      D) multiple alleles
- 21) The pedigree chart below represents the inheritance of sickle cell anemia through three generations.



Which symbols could be used to represent individual 9 in generation III?

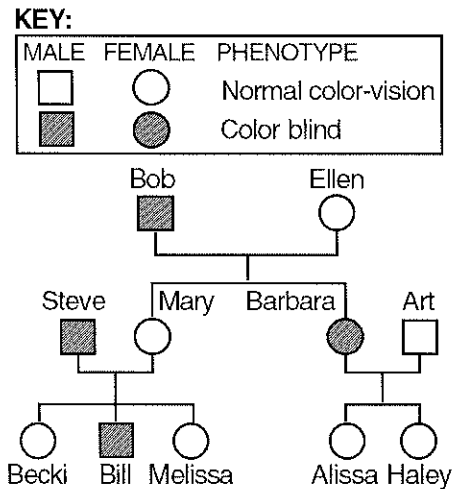
- A) and                      B) and   
 C) and                      D) and
- 22) In pea plants, round seed is dominant over wrinkled seed and yellow seed is dominant over green seed. When hybrid round, yellow plants are crossed, the offspring may include some round, green-seeded plants and some wrinkled, green-seeded plants. This phenomenon illustrates the genetic principle of
- A) gene mutation                      C) polyploidy  
 B) incomplete dominance                      D) independent assortment

- 23) The process by which homologous chromosomes exchange segments of DNA is  
 A) crossing-over  
 B) independent assortment  
 C) segregation  
 D) fertilization
- 24) A man of blood type AB marries a woman of blood type A. What are the possible blood types of their offspring if the woman's mother was blood type O?  
 A) A and B, only  
 B) A, B, and AB  
 C) AB, only  
 D) A, B, and O
- 25) Three brothers have blood types A, B, and O. What are the chances that the parents of these three will produce a fourth child whose blood type is AB?  
 A) 0%  
 B) 100%  
 C) 50%  
 D) 25%
- 26) A man heterozygous for blood type A marries a woman with blood type AB. The blood type of their offspring could *not* be  
 A) B  
 B) A  
 C) O  
 D) AB
- 27) A child with blood type O has a mother with blood type A and a father with blood type B. The parental genotypes for blood types must be  
 A)  $I^A I^B$  and  $I^B i$   
 B)  $I^A i$  and  $I^B I^B$   
 C)  $I^A I^A$  and  $I^B I^B$   
 D)  $I^A i$  and  $I^B i$
- 28) Which is a true statement about people with the genotype  $I^A I^B$  for blood type?  
 A) They are homozygous for blood type A.  
 B) They exhibit a type O phenotype.  
 C) They have two alleles that are codominant.  
 D) They can have only type O children.
- 29) The presence of only one X-chromosome in each body cell of a human female produces a condition known as Turner's syndrome. This condition most probably results from the process known as  
 A) hybridization  
 B) nondisjunction  
 C) crossing-over  
 D) polyploidy
- 30) Which statement correctly describes the normal number and type of chromosomes present in human body cells of a particular sex?  
 A) Males have 22 pairs of autosomes and 1 pair of sex chromosomes known as XX.  
 B) Females have 23 pairs of autosomes.  
 C) Males have 22 pairs of autosomes and 1 pair of sex chromosomes known as XY.  
 D) Males have 23 pairs of autosomes.
- 31) Traits controlled by genes on the X-chromosome are said to be  
 A) sex-linked  
 B) mutagenic  
 C) homozygous  
 D) incompletely dominant
- 32) The sex of a human baby is initially determined by the  
 A) DNA and RNA in both the sperm and the egg  
 B) DNA in the egg  
 C) DNA in the sperm  
 D) RNA in the sperm
- 33) Which pair of gametes can unite to produce a zygote that will develop into a normal human male embryo?  
 A)  +   
 B)  +   
 C)  +   
 D)  + 
- 34) A woman carrying the gene for hemophilia marries a man who is a hemophiliac. What percentage of their children can be expected to have hemophilia?  
 A) 0%  
 B) 75%  
 C) 100%  
 D) 50%
- 35) If a colorblind man marries a woman who is a carrier for color blindness, it is most probable that  
 A) half of their sons will be color blind  
 B) none of their children will have normal color vision  
 C) all of their sons will be color blind  
 D) all of their sons will have normal color vision

- 36) Which parental pair could produce a colorblind female?
- A) heterozygous normal-vision mother and colorblind father
  - B) heterozygous normal-vision mother and normal-vision father
  - C) colorblind mother and normal-vision father
  - D) homozygous normal-vision mother and colorblind father

Questions 37 and 38 refer to the following:

The pedigree chart below represents the inheritance of color blindness through three generations.



- 37) Mary and Steve are expecting another child. What is the probability that the new baby will be colorblind?
- A) 100%
  - B) 50%
  - C) 0%
  - D) 25%
- 38) Which is a true statement about the genotype of Alissa and Haley regarding color blindness?
- A) Both carry one recessive allele.
  - B) Both are homozygous recessive.
  - C) Alissa is a carrier, and Haley is homozygous dominant.
  - D) Alissa is homozygous dominant, and Haley is a carrier.

- 39) Students in a biology class placed equal numbers of corn seeds on wet paper towels in glass petri dishes as shown in the diagram below. Half of the seeds were placed in a sunny location to germinate, and the other half of the seeds were placed in a dark location to germinate. All of the corn seeds were produced by plants that were heterozygous ( $Cc$ ) for chlorophyll production. Corn plants that do not have the genetic ability to produce chlorophyll are known as albinos ( $cc$ ). Throughout the investigation, temperature and moisture were kept constant.

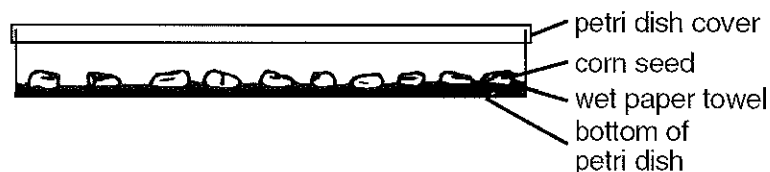


Table I indicates the class data for the number of green plants and the number of white plants produced by the germinated seeds.

**TABLE I**

Seeds Germinated in the Dark		Seeds Germinated in the Light	
0 green plants	150 white plants	109 green plants	38 white plants

All petri dishes were then placed in a sunny location. Table II indicates the class data for the number of green plants and the number of white plants observed one week later.

**TABLE II**

Seeds Moved from Dark to Light		Seedlings Remaining in Light	
116 green plants	34 white plants	109 green plants	38 white plants

Which statement is correct based on this investigation?

- A) Many mutations constantly occur within a plant to produce differences in plant color.  
 B) Albinism in corn plants is inherited and is controlled by sex-linked genes.  
 C) Corn plants require two factors to produce chlorophyll; they must have certain gene combinations and appropriate environmental conditions.  
 D) In an experiment, a small amount of data should be collected and recorded in order to obtain accurate results.
- 40) The following data tables summarize the results of an experiment using primroses grown under different conditions of temperature and relative humidity.

Temperature: 20°C Relative Humidity: 20%		Temperature: 31°C Relative Humidity: 95%	
GENOTYPE	PHENOTYPE	GENOTYPE	PHENOTYPE
AA	red	AA	white
Aa	red	Aa	white
aa	white	aa	white

Which conclusion could be drawn from these data tables?

- A) Color in primroses is caused by gene linkage.  
 B) There is an interaction between environment and heredity.  
 C) Many characteristics are not inherited.  
 D) Crossing-over occurs only when plants are grown at higher temperatures.

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1) C  | 2) D  | 3) A  | 4) B  | 5) D  |
| 6) A  | 7) D  | 8) C  | 9) A  | 10) B |
| 11) A | 12) B | 13) B | 14) D | 15) C |
| 16) A | 17) D | 18) B | 19) C | 20) B |
| 21) C | 22) D | 23) A | 24) B | 25) D |
| 26) C | 27) D | 28) C | 29) B | 30) C |
| 31) A | 32) C | 33) A | 34) D | 35) A |
| 36) A | 37) B | 38) A | 39) C | 40) B |