Pedigree Charts Worksheet(s)

**Background Information:**
Pedigree charts are very important to many different fields of science. One reason they are important is because, they help scientists understand the genetic patterns of diseases. It is important to be able to interpret pedigree charts in order to learn the pattern of a disease or condition. Specifically, using a pedigree chart, you can tell if the disease or condition is autosomal, X-linked, dominant, or recessive.

**Before you start this activity it is important to review several symbols:**
- Unaffected male
- Affected male
- Carrier male
- Unaffected female
- Affected female
- Carrier female

**Procedure:**
A. First you need to become comfortable in making a pedigree chart. Complete the following examples. You may refer to your notes if necessary.

1. How can you tell if a couple is married on a pedigree? Write a one sentence description and draw an example.

   There will be a horizontal line between them and one of the individuals will not be connected to the original individual.

2. How can you tell if the couple who is married had children? Write a one sentence description and draw an example.

   A vertical line will descend from the middle of the parents (children) and a horizontal line will connect siblings.

3. Draw a pedigree that represents Mary married to Greg and with 2 sons (Scott and Tyler) and 1 daughter (Karen). Please label the pedigree with the names of the people.
4. Draw a pedigree that represents Mary married to Greg, with 2 sons and 1 daughter. Their son, Scott, married April and had Sutton (a boy) and Kendall (a girl). Their daughter, Karen, married Harry and had Eliq (a son) and Tariq (a son). Please label the pedigree with the names of the people.

5. Draw a pedigree that represents Julie married to Jeff, with one daughter, Josephine. Josephine married Joseph and had Jason and Joe. Joe married Julia and had Shannon and fraternal twin boys, Mark and Alex. Mark married Alison and had Ray and Scarlet. Please label the pedigree with the names of the people.

A. Identify the following pedigree charts as autosomal, X-linked, recessive, and dominant. Please explain your answer.

1. Is the following autosomal or X-linked? Is it dominant or recessive? Please explain.

   - Recessive: not in every generation, Has disorder
   - X-Linked: most of the men (more than \( \frac{1}{2} \)) are afflicted.

2. Is the following autosomal or X-linked? Is it dominant or recessive? Please explain.

   - Dominant: One parent in each generation has disorder
   - Autosomal: out of 14 individuals, 7 are afflicted, 50% = Autosomal
3. Is the following autosomal or X-linked? Is it dominant or recessive? Please explain.

B. Now you must make a pedigree chart from the descriptions given. Tell whether it is autosomal or X-linked and whether it is dominant or recessive. Also, state which type of muscular dystrophy the pedigree could be based off of the list your teacher has given you. Label the pedigree with the names of the individuals.

   a. Chad and Veronica got married and had Brittany, Kristin, and Harry. It was discovered that Harry had muscular dystrophy. Brittany married Larry and had Stephan and Stephanie. Stephan also had muscular dystrophy. Larry’s brother Barry also had muscular dystrophy but neither of their parents had the disorder.

Draw a pedigree:

Autosomal or X-linked? Dominant or recessive? Name the types of muscular dystrophy this pedigree chart could represent.

Afflicted: Harry, Barry, & Stephan
b. Lisa and Ashton got married and had three girls, Cari, Mary, and Terry. It was discovered that Lisa had muscular dystrophy. Terry married Perry and had two boys, Pike and Tike. It was discovered that Terry and Pike had muscular dystrophy.

Draw a pedigree:

**Dominant:** In every gen
**X-Linked:** Less than 50%

Autosomal or X-linked? Dominant or recessive? Name the types of muscular dystrophy this pedigree chart could represent.

**Affected:** Lisa, Terry, Pike

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c. Debbie married David and had three children, Darren, Dawn, and Derek. David, Darren and Derek discovered they have muscular dystrophy. Derek married Didi and had two children, Denise and Destiny. Denise also has muscular dystrophy and married Dirk. They had two children, Dee and Deven. Dee has muscular dystrophy.

Draw a pedigree:

**Dominant:** One in each generation comes affection

**X-Linked:** Most of the males are afflicted

Autosomal or X-linked? Dominant or recessive? Name the types of muscular dystrophy this pedigree chart could represent.

**David, Darren, Derek, Denise, Dee**
Monohybrid Cross Worksheet

Part A: Vocabulary

Match the definitions on the left with the terms on the right.

D. 1. genotypes made of the same alleles
A. 2. different forms of genes for a single trait
B. 3. gene that is always expressed
C. 5. genotypes made of two different alleles

Below each of the following words are choices. Circle the choices that are examples of each of those words.

6. Dominant allele (CAPITAL LETTERS)
   - D e k L N n R S

7. Recessive allele (LOWER CASE)
   - M n d F G r k P

8. Homozygous dominant
   - AA Gg KK mm uu Rr TT

9. Homozygous recessive
   - ee Ff HH Oo Qq Uu WW

10. Genotypes in which dominant gene must show
    - AA Dd EE ff Jj RR ss

11. Genotypes in which recessive gene must show
    - aa Gg Ff KK rr Oo Tt

Part B: Punnett Squares

12. Examine the following Punnett squares and circle those that are correct.

13. What do the letters on the outside of the Punnett square stand for?

   Parents' genotypes
14. What do the letters on the inside of the Punnett square stand for?  

Possible offspring genotypes

15. In corn plants, normal height, N, is dominant to short height, n. Complete these four Punnett squares showing different crosses. Then, shade red all the homozygous dominant offspring. Shade green all the heterozygous offspring. Leave all the homozygous recessive offspring unshaded.

16. In guinea pigs, short hair, S, is dominant to long hair, s. Complete the following Punnett squares according to the directions given. Then, fill in the blanks beside each Punnett square with the correct numbers.

a. One guinea pig is Ss and one is ss.

<table>
<thead>
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Expected number of offspring:

2 Short hair (SS or Ss)
1 Long hair (ss)

b. Both guinea pigs are heterozygous for short hair.

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<tbody>
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</tbody>
</table>

Expected number of offspring:

3 Short hair
1 Long hair

Part C: Monohybrid Cross Problems - Show your work.

17. Hornless (H) in cattle is dominant over horned (h). A homozygous hornless bull is mated with a homozygous horned cow. What will be the genotype and phenotype of the first generation?

P₁: Hornless (HH)  \( \times \) Horned (hh)

P₁:  \( \frac{HH}{hh} \)

18. In tomatoes, red fruit (R) is dominant over yellow fruit (r). A plant that is homozygous for red fruit is crossed with a plant that has yellow fruit. What would be the genotypes and
19. If two of the F1 generation from the above cross were mated, what would be the genotypes and phenotypes of the F2?

F1:
- 25% Homozygous Red (RR)
- 50% Heterozygous Red (Rr)
- 25% Heterozygous Yellow (Rr)

F2:
- 25% Homozygous Yellow (rr)

1:4

20. In humans, being a tongue roller (R) is dominant over non-roller (r). A man who is a non-roller marries a woman who is heterozygous for tongue rolling.

Father's phenotype: non-roller
Father's genotype: rr

Mother's phenotype: Roller
Mother's genotype: Rr

What is the probability of this couple having a child who is a tongue roller? 50%.

21. Brown eyes in humans are dominant to blue eyes. A brown-eyed man, whose mother was blue-eyed, marries a brown-eyed woman whose father had blue eyes.

What is the probability that this couple will have a blue-eyed child? 1:4, 25%.

Man's mother had blue eyes so she would be homozygous recessive. She can only pass down a recessive allele. The man's father had to have dominant brown eyes for his son to have them, so the man has to be heterozygous (Bb).

Woman has same scenario making her heterozygous as well.

B - Dominant Brown
b - recessive blue

B B B B b b
B B b b
Dihybrid Crosses Worksheet

1. How many traits are involved in a monohybrid cross?

2. How many boxes are used for a monohybrid Punnett square?

3. How many traits are involved in a dihybrid cross?

4. How many boxes are used for a dihybrid Punnett Square?

5. Write the genotype for each of the following: brown hair, brown eyes, & dwarfism are dominant. Double dominant dwarfism is lethal.
   a. blonde with blue eyes = \( \text{dd bb} \)
   b. heterozygous brunette with heterozygous brown eyes = \( \text{Dd Bb} \)
   c. homozygous brunette / average height = \( \text{DD ll} \)
   d. blue eyes / dwarf = \( \text{dd ll} \)

6. Why is dwarfism not often seen in the general population?
   
   Show the Punnett square and give all of the genotypes and phenotypes of the offspring as percentages for each of the crosses below.

7. In birds, brown feathers are dominant over gray colored feathers. Yellow legs are dominant over white. Cross a male bird that is heterozygous brown feathers and has white legs with a female bird that is homozygous brown feathers and heterozygous for leg color.

Choose Symbols:

<table>
<thead>
<tr>
<th>Feather color</th>
<th>Leg Color</th>
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<tbody>
<tr>
<td>Brown feathers = ( B )</td>
<td>Yellow legs = ( Y )</td>
</tr>
<tr>
<td>Gray feathers = ( b )</td>
<td>White legs = ( y )</td>
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</tbody>
</table>

(Female) (Male)

Phenotypes:

Brown x yellow

Genotypes:

\( BB yy \) x \( Bb yy \)

Possible Gametes:

(sex cells)

Punnett square:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>B</td>
<td>BB</td>
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<td>BB</td>
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<td>Bb</td>
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</table>

Phenotype Results:

Homozygous Brown (\( BB \)) \( \frac{2}{8} = \frac{1}{4} \)

Heterozygous Brown: \( BB \)
8. In pea plants, yellow seeds are dominant over green seeds. Round peas are dominant over wrinkled seeds. Cross two pea plants that are heterozygous for both traits.

Choose symbols

<table>
<thead>
<tr>
<th>Seed color</th>
<th>Seed Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow seeds = G</td>
<td>Round seeds = R</td>
</tr>
<tr>
<td>Green seeds = g</td>
<td>Wrinkled seeds</td>
</tr>
</tbody>
</table>

(Female) (Male)

Phenotypes: yellow round x yellow round

Genotypes: GGxGG

Possible Gametes: GxG

Punnett square:

Results:

Genotype:

Phenotype:
Below is a sampling of Punnett Square problems that you will be expected to solve. In order to do this, you will also have to understand the meaning of the terms below.

- **Genotype**: The letters that make up the individual. E.g. **TT** or **Tt**
- **Phenotype**: The physical characteristics of the particular trait. E.g. **Tall** or **short**
- **Dominant trait**: Signified by capital letter. E.g. **T**. If the traits you are using are dominant or recessive, this trait will "overpower" the recessive trait and will be expressed. E.g. **Tt**
- **Recessive trait**: Signified by small case letter-e.g. **t**. An organism with a recessive allele for a particular form of a trait will have that form only when the dominant allele for the trait is not present
- **Homozygous**: Has same letters. E.g. **TT** or **tt** (same alleles for trait)
- **Heterozygous**: Has different letters. E.g. **Tt** (different alleles for trait)
- **Purebred trait**: Also known as true breeding. Individuals genotype is homozygous and will only make one type of gamete. E.g. **TT** will always produce **T**, and **Tt** will always produce **T**, and **t**.
- **Gamete**: sex cells. Represented by letter **N** (meaning they are haploid-contain half the chromosomes
- **P generation**: The parental generation (Usually the first one in a genetic cross)
- **F<sub>1</sub> generation**: The **first** generation of offspring from **P** generation (means first filial Latin for "son")
- **F<sub>2</sub> generation**: The **second** generation of offspring from **P** generation (means first filial Latin for "son")
- **Monohybrid Cross**: Also known as a Single-Factor Cross. Only one trait is used in the genetic cross. E.g. **T=Tall, t=short**. Example: **Tt x Tt**
- **Dihybrid Cross**: Also known as a Two-factor Cross. Two trait are used in the genetic cross. E.g. **T=Tall** & **B=Black fur, b=white fur**. Example **TtBb x TTBB**
- **Incomplete Dominance**: One allele is not completely dominant over the other. There is a blending with the heterozygous offspring. E.g. **R=Red, r=Pink, and RR=white**
- **Co-dominance**: Both alleles contribute to the phenotype. Offspring will have combination of two alleles. E.g. **R=Red hair, r=Roan (mix of red and white hairs-almost looks pink)**, and **rr=white**
- **Sex-linked trait**: Genes located on the sex-chromosomes called **sex-linked genes**. Usually found on the **X chromosome**. X-linked alleles are always expressed in males because males have only one X chromosome.
- **Multiple Alleles**: There are more than two choices for the allele. Example is human blood group genes. There are three possible alleles for this gene. **I^A, I^B, and i**. **I^A** and **I^B** are **co-dominant**. There are four possible phenotypes: **A, B, AB, and O**.
- **Genotypic ratio**: The ratio of different genotype in the offspring from a genetic cross. E.g 1:2:1
- **Phenotypic ratios**: The ratio of different phenotypes in the offspring from a genetic cross. E.g 3:1

### Dominant and Recessive

**Cross**: **Tt x Tt**

- **T**
  - **TT**
  - **Tt**
- **t**
  - **Tt**
  - **tt**

**Genotypic ratio**: 1:2:1 (TT=25% Tt=50% tt=25%)
**Phenotypic ratio**: 3:1 (Tall=75% Short=25%)

### Incomplete Dominance

**Cross**: **Tt x Tt**

- **T**
  - **TT**
  - **Tt**
- **t**
  - **Tt**
  - **tt**

**Genotypic ratio**: 1:2:1 (TT=25% Tt=50% tt=25%)
**Phenotypic ratio**: 1:2:1 (Tall=25% Medium=50% Short=25%)
Co-dominance
(BB = Black & BW = tan & WW = white
Cross: BW x BW

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<tr>
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<tbody>
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<td>BB</td>
<td>BW</td>
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<tr>
<td>W</td>
<td>BW</td>
<td>WW</td>
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</tbody>
</table>

Genotypic ratio: 1:2:1 (BB=25% BW=50% WW=25%)
Phenotypic ratio: 1:2:1 (White=25% Tan=50% Black=25%)

Sex-linked
H = normal & h = hemophilia
Cross: X"hX x X"hY

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<thead>
<tr>
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<th>X</th>
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<tbody>
<tr>
<td></td>
<td>X&quot;hX</td>
<td>X&quot;hY</td>
</tr>
<tr>
<td>Xn</td>
<td>X&quot;nX</td>
<td>X&quot;nY</td>
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</tbody>
</table>

Genotypic ratio: 1:1:1:1
(X"nX =25% X"X =25% XY =25% X"nY =25%)
Phenotypic ratio: 1:1:1
Female carrier =25% Female hemophilia =25%
Male normal =25% Male hemophilia =25%

Multiple Alleles
Cross: AB x AO

<table>
<thead>
<tr>
<th></th>
<th>A</th>
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<tr>
<td>A</td>
<td>AA</td>
<td>AB</td>
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<tr>
<td>O</td>
<td>AO</td>
<td>BO</td>
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</table>

Genotypic ratio: 1:1:1:1
(AA =25% AB =25% AO =25% BO =25%)
Phenotypic ratio: 1:1:1:1
(Type A =50% Type AB =25% Type B =25%)

Dihybrid Cross
Dominant and Recessive
T=Tall, t=short
B=Black, b=white
Cross: TTBb x TtbB

<table>
<thead>
<tr>
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<th>T</th>
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<tbody>
<tr>
<td>T</td>
<td>TTBB</td>
<td>TTbb</td>
<td>TtBB</td>
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<tr>
<td>Tb</td>
<td>TTBb</td>
<td>TtbB</td>
<td>TbBb</td>
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<td>Tb</td>
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<tr>
<td>tb</td>
<td>TtBb</td>
<td>tbb</td>
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Genotypic ratio: 1:2:2:1:4:1:2:2:1
Phenotypic ratio: 9:3:3:1

Dihybrid Cross
Dom.-Rec. / Sex-linked
T=Tall, t=short
H=Normal, h=hemophilia
Cross: homoygous Tall female carrier w/ short male
Cross: X"XTT x XYtt

<table>
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<tr>
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<th>X&quot;T</th>
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<td>X&quot;YTt</td>
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<tr>
<td>Y</td>
<td>X&quot;YTt</td>
<td>X&quot;YTt</td>
<td>XYTt</td>
<td>XYTt</td>
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Genotypic ratio: 4:4:4:4 or 1:1:1:1
Phenotypic ratio: 4:4:4:4 or 1:1:1:1
10 Multiple choice questions

1. The scientific study of heredity.
   A. Segregation
   B. Genetics
   C. Genes
   D. Alleles

2. When a chromosome pairs with its corresponding homologous chromosome.
   A. Tetrad
   B. Haploid
   C. Diploid
   D. Hybrid

3. Sex cells.
   A. Genotype
   B. Genetics
   C. Gametes
   D. Alleles

4. The offspring of crosses between parents with different traits.
   A. Haploid
   B. Tetrad
   C. Hybrid
   D. Diploid

5. Organisms that have two different alleles for the same trait.
   A. Homologous
   B. Punnett square
   C. Homozygous
   D. Heterozygous

6. Chemical factors that determine traits.
   A. Alleles
   B. Genetics
   C. Genes
   D. Gametes

https://quizlet.com/226666588/test
1. A specific characteristic.
   A. Trait
   B. Phenotype
   C. Genes
   D. Genetics

2. The separation of alleles.
   A. Genetics
   B. Segregation
   C. Fertilization
   D. Phenotype

3. Genes for different traits can segregate independently during the formation of gametes.
   A. Punnett square
   B. Incomplete domination
   C. True-breeding
   D. Independent Assortment

4. Where male and female reproductive cells join.
   A. Multiple alleles
   B. Codominance
   C. Fertilization
   D. Segregation

10 True/False questions

1. Where both alleles contribute to the phenotype. → Fertilization
   - True
   - False

2. The different forms of a gene. → Genetics
   - True
   - False

3. Traits that are controlled by two or more genes. → Polygenic traits
   - True
   - False

4. Organisms that have two identical alleles for a particular trait. → Homozygous
   - True
   - False
5. A diagram that shows the gene combinations that might result from a genetic cross. → Punnett square
   - True
   - False

6. Genetic makeup. → Genotype
   - True
   - False

7. Where the heterozygous phenotype is somewhere in between the two homozygous phenotypes. → Incomplete dominance
   - True
   - False

8. When homologous chromosomes exchange portions of their chromatids. → Codominance
   - True
   - False

9. A map showing the relative locations of each known gene on one of the chromosomes of an organism. → Genetics
   - True
   - False

10. A process of reduction division in which the number of chromosomes per cell is cut in half through the separation of homologous chromosomes in a diploid cell. → Meiosis
    - True
    - False
10 Multiple choice questions

1. multiple alleles.
   A. The four basic principles of genetics that Mendel discovered in experiments were:
   B. A situation in which a gene has more than two alleles is known as
   C. A Punnett Square is used to determine the
   D. Why can multiple alleles result in many different phenotypes for a trait?

2. When male and female reproductive cells join in a process to produce a new cell.
   A. Crossing Over
   B. Codominance
   C. Independent Assortment
   D. Fertilization

   A. Genotype
   B. Phenotype
   C. Genetics
   D. Segregation

4. phenotype.
   A. How can a heterozygous guinea pig (Rr) have nine offspring with a homozygous guinea pig (rr) and all their coats are smooth? ('R' means rough coat and 'r' is smooth coat)
   B. Different forms of a gene are called
   C. Why can multiple alleles result in many different phenotypes for a trait?
   D. Physical characteristics of an organism are called its

5. Traits controlled by two or more genes.
   A. A gene map shows
   B. Punnett Square
   C. Polygenic Trait
   D. Tetrad
6. 4 chromosomes.
   A. The four basic principles of genetics that Mendel discovered in experiments were:
   B. Are an organism's characteristics determined only by its genes?
   C. An organism has the diploid number 2N=8. How many chromosomes do its gametes contain?
   D. Organisms that have two identical alleles for a particular trait are said to be

7. Genetic makeup of an organism.
   A. Zygote
   B. Phenotype
   C. Segregation
   D. Genotype

8. Alleles
   A. A Punnett Square is used to determine the
   B. Different forms of a gene are called
   C. Incomplete Dominance
   D. Independent Assortment

9. Mathematical probability used to help predict the genotype and phenotype combinations in genetic crosses.
   A. Punnett Square
   B. Fertilization
   C. Crossing Over
   D. Independent Assortment

10. A cell that contains both sets of homologous chromosomes, literally meaning "two sets."
    A. Hybrid
    B. Diphloid
    C. Homologous
    D. Haploid

10 True/False questions

1. Homozygous → Organisms that have two identical alleles for a particular trait are said to be
   ☐ True
   ☐ False

2. Process in which the number of chromosomes per cell is cut in half through the separation of homologous chromosomes in a diploid cell. → Meiosis
   ☐ True
   ☐ False
3. A set of chromosomes or a single set of genes, literally meaning 'one set.' → Diploid
   - True
   - False

4. Physical/expressed traits. → Genotype
   - True
   - False

5. When phenotypes from both alleles are clearly expressed. → Codominance
   - True
   - False

6. The offspring of crosses between parents with different traits. → Hybrid
   - True
   - False

7. Sex cell. → Gamete
   - True
   - False

8. Organisms that have two identical alleles for the same gene. (i.e. TT or tt) → Heterozygous
   - True
   - False

9. When genes for different traits segregate independently during the formation of gametes. → Independent Assortment
   - True
   - False

10. Organisms that have two different alleles for the gene. (i.e. Tt) → Heterozygous
    - True
    - False
4 Multiple choice questions

1. structure containing 4 chromatids that forms during meiosis

A. haploid
B. tetrad
C. gene map
D. diploid

2. term used to refer to a cell that contains only a single set of chromosomes and therefore only a single set of genes

Diploid (2n)  |  Haploid (n)
---|---
two sets of chromosomes | one set of chromosomes

A. meiosis
B. homologous
C. haploid
D. diploid

3. term used to refer to chromosomes that each have a corresponding chromosome from the opposite-sex parent

A. homologous
B. diploid
C. haploid
D. crossing-over
4. process in which homologous chromosomes exchange portions of their chromatids during meiosis

A. meiosis
B. crossing-over
C. Punnett square
D. homologous

4 True/False questions

1. diagram showing the gene combinations that might result from a genetic cross

   - gene map
   - True
   - False

2. term used to refer to a cell that contains both sets of homologous chromosomes

   - haploid
   - True
   - False

3. process by which the number of chromosomes per cell is cut in half through the separation of homologous chromosomes in a diploid cell

   - haploid
   - True
   - False
4. diagram showing the relative locations of each known gene on a particular chromosome

- Punnett square

- True

- False
10 Multiple choice questions

1. The Human Genome Project is an attempt to...
   A. An extra chromosome
   B. Cure genetic disorders
   C. One X chromosome
   D. Sequence all human DNA

2. Which of the following information CANNOT be obtained from the Human Genome Project?
   A. Iibl and Iбли
   B. Whether an allele is dominant or recessive
   C. One of the X chromosomes in a female cell
   D. Identifying the faulty gene that causes the disease

3. The sequencing of human chromosomes 21 and 22 showed that...
   A. Looking for the DNA sequence found in those alleles
   B. Identifying the faulty gene that causes the disease
   C. Some regions of chromosomes do not code for proteins
   D. No two people, except identical twins, have exactly the same DNA

4. In a pedigree, a circle represents a(an)
   A. One X chromosome
   B. All of the above
   C. Female
   D. The chromatids do not separate

5. A man who carries an X-linked allele will pass it on to:
   A. Inherited the recessive allele for the trait from both parents
   B. All of his daughters
   C. All of the above
   D. They usually have some normal hemoglobin in their red blood cells.

6. Which of the following is the first step in gene therapy?
   A. Iibl and Iбли
   B. One of the X chromosomes in a female cell
   C. A colorblind boy received the allele for colorblindness from his mother
   D. Identifying the faulty gene that causes the disease
7. What percentage of human sperm cells carry an X chromosome?
   A. XX
   B. 46
   C. 50%
   D. Female

8. Which of the following combinations of sex chromosomes represents a female?
   A. An extra chromosome
   B. XX
   C. ibib and lbib
   D. Identifying the faulty gene that causes the disease

9. How many chromosomes are shown in a normal human karyotype?
   A. XX
   B. 46
   C. ibib and lbib
   D. 50%

10. Gene therapy is successful if the...
    A. Identifying the faulty gene that causes the disease
    B. A colorblind boy received the allele for colorblindness from his mother
    C. One of the X chromosomes in a female cell
    D. Replacement gene is transcribed in the person's cells

10 True/False questions

1. A pedigree can be used to... → One X chromosome
   - True
   - False

2. If nondisjunction occurs during meiosis... → The X chromosome only
   - True
   - False

3. In humans, a male has... → One X chromosome
   - True
   - False

4. A person who has PKU... → Inherited the recessive allele for the trait from both parents
   - True
   - False
5. A cat that has spots of more than one color... → One X chromosome
   - True
   - False

6. Colorblindness is more common in males than in females because... → The allele for colorblindness is recessive and located on the X chromosome
   - True
   - False

7. Nondisjunction can involve... → All of the above
   - True
   - False

8. The process of DNA fingerprinting is based on the fact that... → No two people, except identical twins, have exactly the same DNA
   - True
   - False

9. Human females produce egg cells that have... → One X chromosome
   - True
   - False

10. A chimera... → One X chromosome
    - True
    - False