


# Exceptions to Mendel

Review Activity

## Question 1

- The heterozygous phenotype is somewhere in between the two homozygous phenotypes. What exception is this.

## Answer 1

- Incomplete Dominance

## Question 2

2) Camellia flowers can be red, white or white and red. The red color is dominant. Fill in the Punnett square and determine the expected genotypes and phenotypes from crossing homozygous red and heterozygous red white parents.

| | R | R |
|---|---|---|
| R | | |
| W | | |

Genotypes: _____

Phenotypes: _____

_____

Is this an example of incomplete or codominance? _____

# Answer 2

2) Camellia flowers can be red, white or white and red. The red color is dominant. Fill in the Punnett square and determine the expected genotypes and phenotypes from crossing homozygous red and heterozygous red white parents.

| | R | R |
|---|---|---|
| R | RR | RR |
| W | RW | RW |

Genotypes: 2 RR, 2 RW

Phenotypes: 2 red, 2 white & red

Is this an example of incomplete or codominance? codominance

# Question 3

4) Blood types A and B are dominant over type O. Fill in the Punnett square and determine the expected genotypes and phenotypes from crossing a person who has heterozygous type B and a person with heterozygous type A.

| | $I^B$ | i |
|---|---|---|
| $I^A$ | | |
| i | | |

Genotypes: _____

Phenotypes: _____

_____

Is this an example of incomplete or codominance? _____

# Answer 3

4) Blood types A and B are dominant over type O. Fill in the Punnett square and determine the expected genotypes and phenotypes from crossing a person who has heterozygous type B and a person with heterozygous type A.

| | $I^B$ | i |
|---|---|---|
| $I^A$ | $I^AI^B$ | $I^Ai$ |
| i | $I^Bi$ | ii |

Genotypes: $I^AI^B$, $I^Ai$, $I^Bi$, ii

Phenotypes: IAB, IA, IB, IO

Is this an example of incomplete or codominance? codominance

# Question 4

1) In a chestnut horse, their coat (hair) color can be reddish brown (AA), light red/pink (Aa), and creamy white (aa). Fill in the Punnett square and determine the expected genotypes and phenotypes from crossing heterozygous and heterozygous parents.

| | | |
|---|---|---|
| | | |
| | | |

Genotypes: _____

Phenotypes: _____

Is this an example of incomplete or codominance? _____

# Answer 4

1) In a chestnut horse, their coat (hair) color can be reddish brown (AA), light red/pink (Aa), and creamy white (aa). Fill in the Punnett square and determine the expected genotypes and phenotypes from crossing heterozygous and heterozygous parents.

| | A | a |
|---|---|---|
| A | AA | Aa |
| a | Aa | aa |

Genotypes: 1 AA 2 Aa, 1 aa

Phenotypes: 1 reddish brown, 2 light red/pink, 1 creamy white

Is this an example of incomplete or codominance? incomplete

# Question 5

4) Color blindness is a recessive sex-linked genetic disorder located on the X chromosome. Fill in the Punnett square for a cross of a male who is color blind and a female who is a carrier for color blindness.

| | $X^B$ | $X^b$ |
|---|---|---|
| $X^b$ | | |
| Y | | |

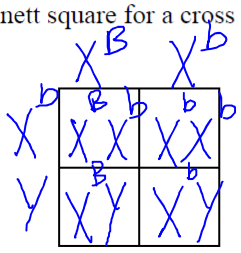
Genotypes: _____

Circle all phenotype(s): normal male, male with colorblindness, normal female, carrier female, female with colorblindness

% of kids with disorder: _____ Circle their gender(s) male / female

# Answer 5

4) Color blindness is a recessive sex-linked genetic disorder located on the X chromosome. Fill in the Punnett square for a cross of a male who is color blind and a female who is a carrier for color blindness.



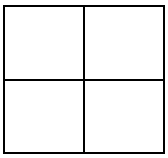
Genotypes: $X^BX^b$, $X^bX^b$, $X^BY$, $X^bY$

Circle all phenotype(s): normal male, male with colorblindness, normal female, carrier female, female with colorblindness

% of kids with disorder: 50% Circle their gender(s) male / female

# Question 6

6) Color blindness is a recessive sex-linked genetic disorder located on the X chromosome. Fill in the Punnett square for a cross of a color blind male and a color blind female.



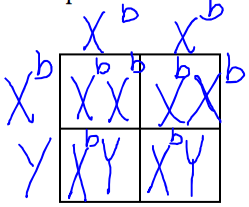
Genotypes: _____

Circle all phenotype(s): normal male, male with colorblindness, normal female, carrier female, female with colorblindness

% of kids with disorder: _____ Circle their gender(s) male / female

# Answer 6

6) Color blindness is a recessive sex-linked genetic disorder located on the X chromosome. Fill in the Punnett square for a cross of a color blind male and a color blind female.



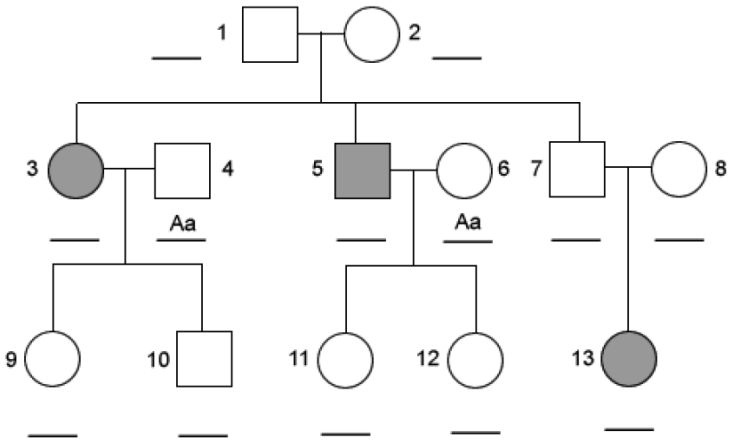

Genotypes: 2 $X^bX^b$, 2 $X^bY$

Circle all phenotype(s): normal male, male with colorblindness, normal female, carrier female, female with colorblindness

% of kids with disorder: 100% Circle their gender(s) male / female

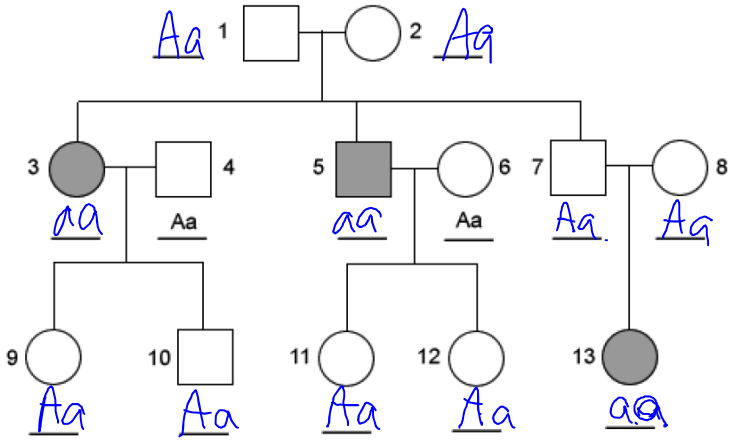
# Questions 7

9) Albinism (Albino) causes a deficiency of pigmentation in skin, hair, and eyes. Albinism is recessive and autosomal. When a single gene affects many traits, like albinism, it is called pleiotropy. Below is an autosomal pedigree tracing the passing of the albinism gene through 3 generations. Write in the genotypes on the line next to / below each individual.



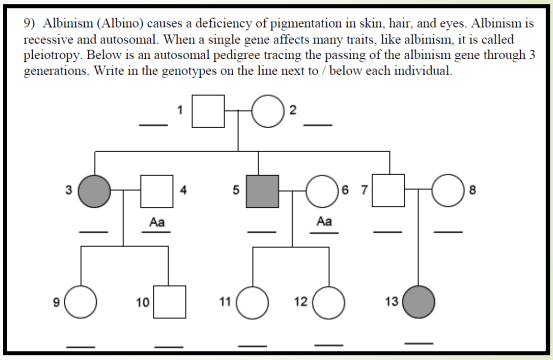
# Answer 7

9) Albinism (Albino) causes a deficiency of pigmentation in skin, hair, and eyes. Albinism is recessive and autosomal. When a single gene affects many traits, like albinism, it is called pleiotropy. Below is an autosomal pedigree tracing the passing of the albinism gene through 3 generations. Write in the genotypes on the line next to / below each individual.



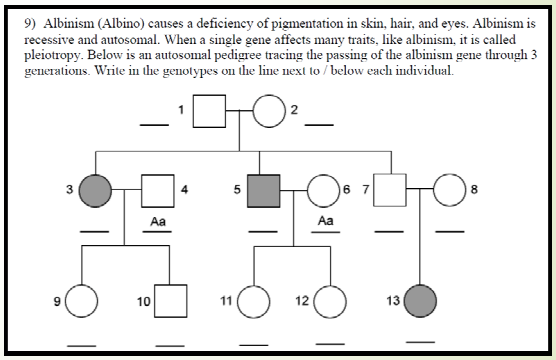

# Question 8

- How are number 3 and number 7 related?



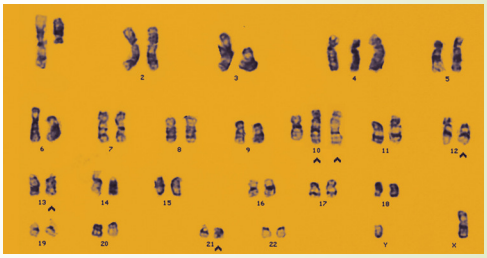
## Answer 8

- Brother and sister



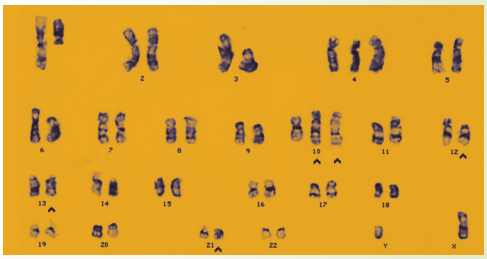

## Question 9

What is this image called? It shows all your chromosomes paired up.



## Answer 10

- Karyotpe



## Question 11

- A gene that can interfere with other genes is called ___.

## Answer 11

**Epistatic Gene**

## Question 12

- **Traits are controlled by two or more genes.** Example: eye color.

| GENE NAME | DOMINANT ALLELE | RECESSIVE ALLELE |
|---|---|---|
| BEY1 | brown | blue |
| BEY2 | brown | blue |
| GEY | green | blue |

Order of dominance: brown > green > blue

# Answer 12

- Polygenic traits

Order of dominance: brown > green > blue.

| GENE NAME | DOMINANT ALLELE | RECESSIVE ALLELE |
|---|---|---|
| BEY1 | brown | blue |
| BEY2 | brown | blue |
| GEY | green | blue |

# Questions 13

- No individual can have more than two alleles, but more than two alleles can exist in a population. What is this called?

## Answer 13

- Multiple Alleles
  - Ex: Human blood type