1. A heterozygous yellow pea plant is crossed with a homozygous green pea plant. Yellow is the dominant trait for pea plants:

A) Key:
\( Y = \text{yellow} \)
\( y = \text{green} \)

B) Genotype of yellow pea plant: ____Yy____

C) Genotype of green pea plant: ____yy____

D) Draw the Punnett square of the cross

\[
\begin{array}{c|c|c}
 & Y & y \\
\hline
y & Yy & yy \\
\hline
y & Yy & yy \\
\end{array}
\]

E) What percentage of the offspring will be yellow? ___50%____

2. In people, freckles are dominant over not having freckles. Two people who are both have freckles get married. The husband is homozygous and the wife is heterozygous

A) Key:
\( F = \text{freckles} \)
\( f = \text{no freckles} \)

B) Genotype of the husband: _____FF____

C) Genotype of the wife: ______Ff____

D) Draw a Punnett square of the cross between the two people.

\[
\begin{array}{c|c|c}
 & F & F \\
\hline
F & FF & FF \\
\hline
f & Ff & Ff \\
\end{array}
\]

E) What is the probability that they will produce an offspring that has freckles? _100%_
3. Brown eyes are dominant over blue eyes. A brown-eyed couple already has a child with blue eyes.
A) Key:

B = brown
b = blue

B) Genotype of the couple: ___both are Bb_______

C) Draw a Punnett square of the cross between the two people.

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4. Type I diabetes has been found to be inherited (in some cases) through a recessive autosomal allele. A non-diabetic woman, whose father was a diabetic, marries a diabetic man.

A) Key:

D = normal
d = diabetes

B) Genotype of the wife: _____Dd_______

C) Genotype of the husband: _dd___________

D) Draw a Punnett square of the cross between the two people.

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B) What is the probability that their next child would be expected to have diabetes? 50%
5. What are the possible genotypes of the children if the mother has Type B blood and the father has type O blood? (Draw a Punnett square to verify your answer, you may need more than one Punnett square.)

A) Genotype (or types) of the mother: \( \underline{BB} \) or \( \underline{Bo} \)

B) Genotype of the father: \( \underline{oo} \)

C) Draw a Punnett square(s) of the cross between the two people.

\[
\begin{array}{c|c|c}
& B & B \\
\hline
o & Bo & Bo \\
\hline
o & Bo & Bo \\
\end{array}
\]

Possible genotypes of children: \( Bo \) or \( oo \)

6. A mother has blood type O, her child is type O. She claims a man of type AB is the father. Could he be? ___No__________ Draw a Punnett Square of the cross.

\[
\begin{array}{c|c|c}
& A & B \\
\hline
o & Ao & Bo \\
\hline
o & Ao & Bo \\
\end{array}
\]

Could a man of type A, type B, or type O be the father? _yes if Ao or Bo_____.

Draw the punnett squares of the crosses

\[
\begin{array}{c|c|c}
& B & o \\
\hline
o & Bo & oo \\
\hline
o & Bo & oo \\
\end{array}
\]

\[
\begin{array}{c|c|c}
& A & o \\
\hline
o & Ao & oo \\
\hline
o & Ao & oo \\
\end{array}
\]
7. Cystic fibrosis is an autosomal recessive disease. A couple comes to you for advice. Both of their fathers had cystic fibrosis. (neither the husband nor the wife have cystic fibrosis)

A) Key:

C = normal
c = cystic fibrosis

B) Genotype of the couple: _both are Cc________

C) Draw a Punnett square of the cross between the two people.

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D) What is the probability that their child will have cystic fibrosis ___25%________

E) What is the probability that their child will be a carrier for the disease. ___50%_____

8. Red-green color blindness is due to a sex-linked recessive allele on the X chromosome. Two normal visioned parents produce a color-blind son.

A) Key:

X = normal
X<sup>b</sup> = color blind

B) Genotype of the wife: _____X X<sup>b</sup> _______

C) Genotype of the husband: ___ X Y_________

D) Draw a Punnett square of the cross between the two people.

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<td>X&lt;sup&gt;b&lt;/sup&gt;Y</td>
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E) What is the probability that their next child will be color blind? __25%_______
9. Huntingtons disease is a dominant autosomal disease. What is the probability that a couple will have a child that will develop huntingtons if the husband is heterozygous for Huntingtons and the wife is homozygous recessive.

A) Key:

H = huntingtons
h = normal

B) Genotype of the wife: ____hh_______

C) Genotype of the husband: ___Hh________

D) Draw a Punnett square of the cross between the two people.

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E) What is the probability they will have a child that will develop huntingtons? 50%