NAME Key

PUNNETT SQUARE PRACTICE #3 (SEX-LINKED CROSSES)

Use a Punnett Square to show the possible offspring from the crosses given and answer the questions:

IN HUMANS SOME GENETIC TRAITS ARE CARRIED ON A SEX CHROMOSOME:
When doing a Punnett square for these following your dominant/recesive rules.
Just put the letters on an X or Y and follow where it goes

EXAMPLE:

X-LINKED RECESSIVE:

Males with Hemophilia $X^h Y$ Males w/o hemophilia- $X^H Y$

Females with hemophilia $X^h X^h$ Females w/o hemophilia- $X^H X^H$ OR $X^H X^h$

Y-LINKED RECESSIVE:

Males with hairy pinna (ears) ($X Y^h$)

Males with Non-hairy pinna ($X Y^H$)

WHAT ARE THE GENOTYPES:

What is the genotype of:

a male with hemophilia? = $X^h Y$

a female without hemophilia with no hemophilia in her immediate family = $X^H X^H$

a female without hemophilia but who had a dad with hemophilia = $X^H X^h$

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MAKE A CROSS between a DAD with hemophilia and a MOM who has no hemophilia in her immediate family.

	X^h	Y
X^H	$X^H X^h$	$X^H Y$
X^H	$X^H X^h$	$X^H Y$

POSSIBLE OFFSPRING

GENOTYPE	PHENOTYPE
$X^H Y$	male no hemophilia
$X^H X^h$	female no hemophilia

What is the probability an offspring will be a male with hemophilia? 0%

What is the probability an offspring will be a female with hemophilia? 0%

What is the probability an offspring will be a male without hemophilia? 50%

What is the probability an offspring will be a female without hemophilia? 50%

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What is the genotype of:

a male with colorblindness? = X^cY

a female without colorblindness in her immediate family = X^CX^C

a female without colorblindness but who had a colorblind dad = X^CX^c

MAKE A CROSS between a colorblind DAD and a MOM who has no colorblindness in her immediate family.

	X^c	Y
X^C	X^CX^c	X^CY
X^C	X^CX^c	X^CY

POSSIBLE OFFSPRING

GENOTYPE	PHENOTYPE
X^CY	not colorblind boy
X^CX^c	not Colorblind girl

What is the probability an offspring will be a male with colorblindness? 0

What is the probability an offspring will be a female with colorblindness? 0

What is the probability an offspring will be a male without colorblindness? 50

What is the probability an offspring will be a female without colorblindness? 50

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WHAT IS THE PATTERN?

DAD WITH AN X-LINKED RECESSIVE DISORDER X MOM (W/O DISORDER IN HER IMMEDIATE FAMILY) can produce the following offspring (Circle ALL that are true)

A. males with the allele that show the trait
B. females with the allele that show the trait
(C.) females that don't show the trait but are carriers
D. females that don't have the allele and don't show the trait
(E.) males that don't have the allele and don't show the trait

Boys that show X-linked recessive disorders get the allele from their (MOM) DAD (circle one)

Girls must have (one) (two) X-Linked recessive alleles in order to show the disorder.

Which sex CAN'T BE A CARRIER FOR X-LINKED RECESSIVE TRAITS? males

MAKE A CROSS between
A DAD WITHOUT HEMOPHILIA and a MOM W/O HEMOPHILIA BUT WHO'S DAD HAD HEMOPHILIA.

PARENT GENOTYPES DAD $X^H Y$ MOM $X^H X^h$

	X^H	Y
X^H	$X^H X^H$	$X^H Y$
X^h	$X^H X^h$	$X^h Y$

POSSIBLE OFFSPRING

GENOTYPE	PHENOTYPE
$X^H X^H$	girl normal
$X^H X^h$	girl normal (carrier)
$X^H Y$	boy normal
$X^h Y$	boy hemophilia

What is the probability an offspring will be a male with hemophilia? 25%
What is the probability an offspring will be a female with hemophilia? 0
What is the probability an offspring will be a male without hemophilia? 25%
What is the probability an offspring will be a female without hemophilia? 50%

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MAKE A CROSS between a DAD WITHOUT COLORBLINDNESS X MOM WHO HAS A COLORBLIND DAD

PARENT GENOTYPES DAD $X^C Y$ MOM $X^C X^c$

	X^C	Y
X^C	$X^C X^C$	$X^C Y$
X^c	$X^C X^c$	$X^c Y$

POSSIBLE OFFSPRING

GENOTYPE	PHENOTYPE
$X^C X^C$	girl normal
$X^C X^c$	girl normal (carrier)
$X^C Y$	boy normal
$X^c Y$	boy colorblind

What is the probability an offspring will be a colorblind male? 25%
What is the probability an offspring will be a colorblind female? 0
What is the probability an offspring will be a male without colorblindness? 25%
What is the probability an offspring will be a female without colorblindness? 50%

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WHAT IS THE PATTERN?

MALES ~~WITH~~ WITHOUT AN X-LINKED RECESSIVE DISORDER X MOM (WHO HAS A DAD WITH THE DISORDER) can produce the following offspring (Circle ALL that are true)

(A.) males with the allele that show the trait
B. females with the allele that show the trait
(C.) females that don't show the trait but are carriers (can pass the allele onto their offspring)
(D.) females that don't have the allele and don't show the trait
(E.) males that don't have the allele and don't show the trait

Y-LINKED TRAITS:

MAKE A CROSS between a DAD hairy pinna and a MOM who has no hairy ears in her immediate family.

PARENT GENOTYPES DAD $X Y^H$ MOM XX

	X	Y^H
X	XX	XY^H
X	XX	XY^H

POSSIBLE OFFSPRING

GENOTYPE	PHENOTYPE
XX	normal girls
XY^H	boys w/ hairy ears

What is the probability an offspring will be a male with hairy ears? 50%
What is the probability an offspring will be a female with hairy ears? 0
What is the probability an offspring will be a male without hairy ears? 50%
What is the probability an offspring will be a female without hairy ears? 0

WHAT IS THE PATTERN?
Boys that show y-LINKED traits get it from their MOM (DAD)

Which sex can never show a y-linked trait? females

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