Heredity Worksheet 1

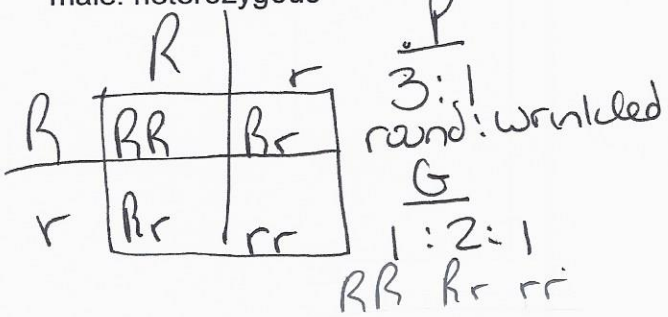
Use the following table to complete questions 1, and 2 .

	Trait					
	Stem length	Seed shape	Seed colour	Seed coat colour	Pod shape	Pod colour
Dominant	tall	round	yellow	coloured	inflated	green
Recessive	short	wrinkled	green	white	constricted	yellow

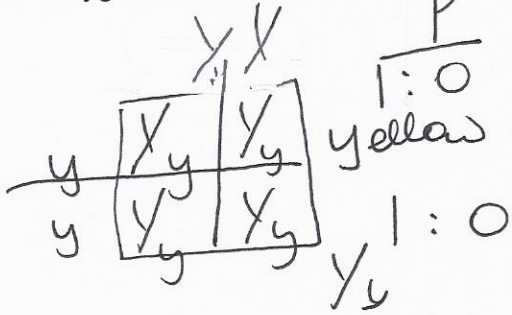
1. Give all the possible alleles which could represent the following:
   a) round seeds? RR or Rr
   b) short plant? tt
   c) white seed coat? cc
   d) wrinkled seeds? rr
   e) green seeds? yy
   f) yellow seeds? ~~Yy or yy~~

2. Draw the Punnett squares that would result from each of the following crosses and give the genotype and phenotype ratios for each.

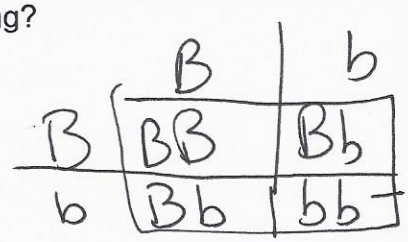
a) trait: seed shape
female: heterozygous
male: heterozygous



b) trait: seed colour
female: homozygous dominant
male: homozygous recessive



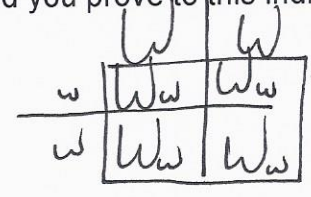
3. In guinea pigs, a black coat is dominant over a brown coat. What would be the chance for 2 guinea pigs that are heterozygous for this trait to have a brown offspring?



25% or 1/4

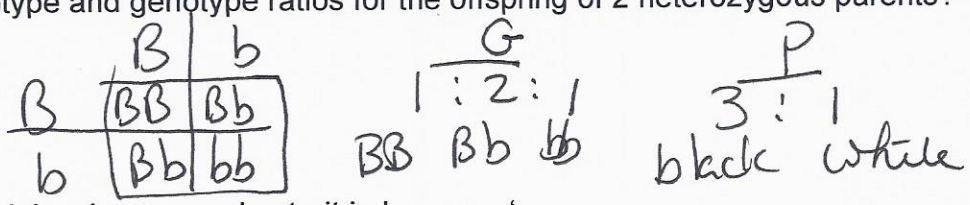
4. White (W) is dominant over black (w) in sheep. Sir Curlylocks is your prize ram by all ram-judging standards. An individual wishes to purchase the ram from you for 2 million dollars!! The only condition for the sale is that he will never produce any black offspring. How could you prove to this individual that you ram is indeed 'pure'?

Mate prize ram w/ a black ram over & over



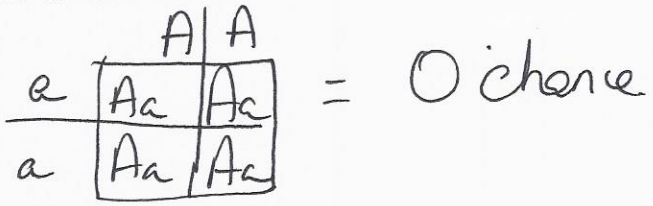
← all offspring white ∴ prize ram = WW

5. In guinea pigs, black fur is dominant (B) to white fur (b). What are the phenotype and genotype ratios for the offspring of 2 heterozygous parents?

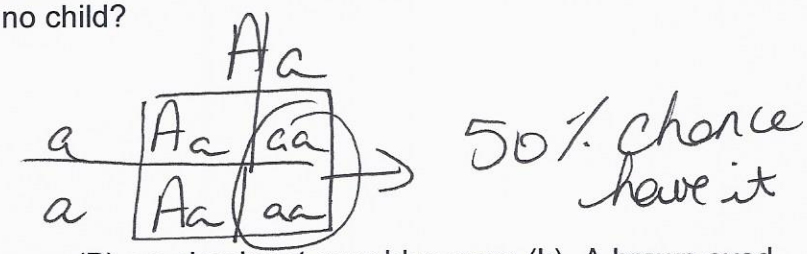


6. Albinism is a recessive trait in humans. '

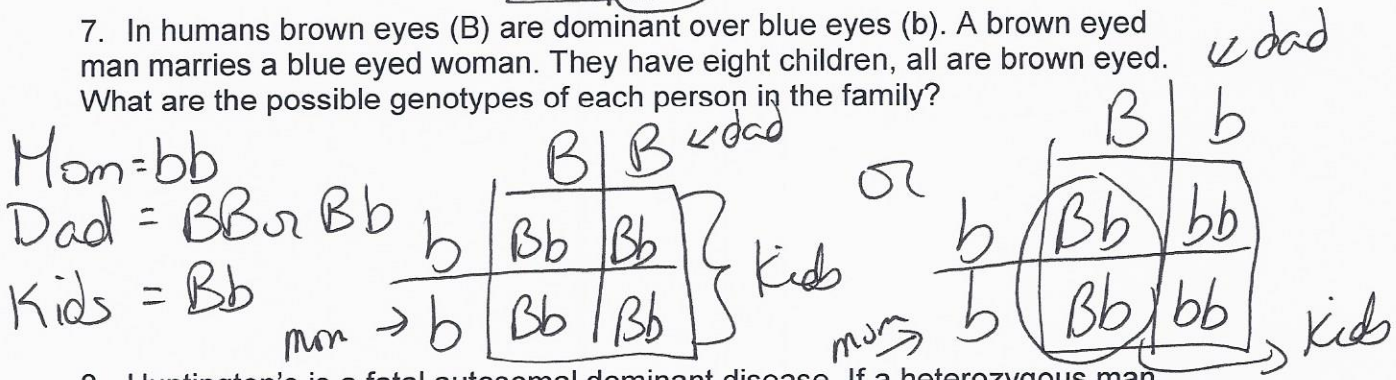
a) What chance is there that an albino father and a homozygous normal mother could produce an albino child?



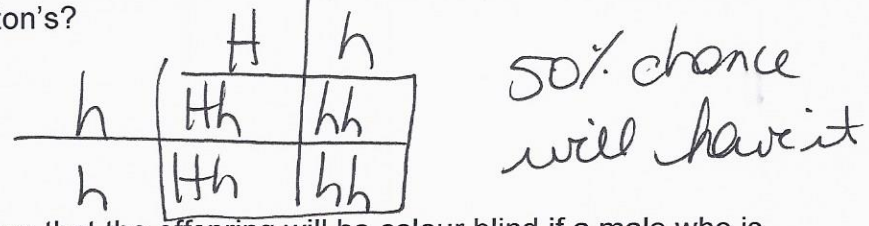
b) What chance is there that an albino mother and a heterozygous normal father could produce an albino child?



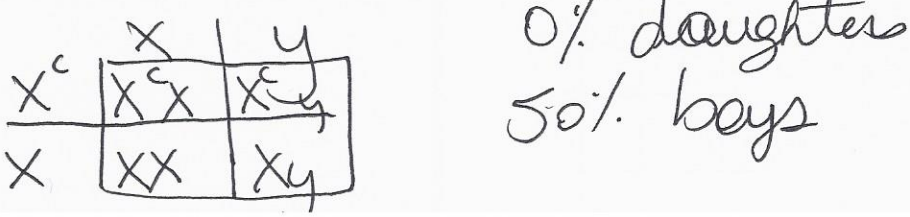
7. In humans brown eyes (B) are dominant over blue eyes (b). A brown eyed man marries a blue eyed woman. They have eight children, all are brown eyed. What are the possible genotypes of each person in the family?



8. Huntington's is a fatal autosomal dominant disease. If a heterozygous man who has Huntington's marries a normal female, what are the chances that their child will have Huntington's?



9. What are the chances that the offspring will be colour blind if a male who is not colour blind has children with a carrier?



10. Complete the Punnett square that would show the F_1 generation when 2 heterozygous black, rough-coated guinea pigs are crossed. (Genes for black and rough are dominant.) BbRr x BbRr

	BR	Br	bR	br
BR	BBRR	BBRr	BbRR	BbRr
Br	BBRr	BBrr	BbRr	Bbrr
bR	BbRR	BbRr	bbRR	bbRr
br	BbRr	Bbrr	bbRr	bbrr

a) How many of the offspring will be black and rough? 9
b) How many of the offspring will be black and smooth? 3
c) How many of the offspring will be white and rough? 3
d) How many of the offspring will be white and smooth? 1

11. If a man with hairy ears has a child with a woman who does not have hairy ears, what are the chances that their children might have hairy ears?

	X	Y^c
X	XX	XY^c
X	XX	XY^c

girls = 0%
boys = 100% ☹

12. A pea plant is heterozygous for both seed shape and seed color. It is crossed with a dented homozygous yellow pea. S is the allele for the dominant, spherical shape characteristic; s is the allele for the recessive, dented shape characteristic. Y is the allele for the dominant, yellow color characteristic; y is the allele for the recessive, green color characteristic. What will be the percentage distribution of these two alleles in this plant's gametes?

	sY	sY	sY	sY
SY	SsYY	SsYY	SsYY	SsYY
Sy	SsYy	SsYy	SsYy	SsYy
sY	ssYY	ssYY	ssYY	ssYY
sy	ssYy	ssYy	ssYy	ssYy

P
50% spherical + yellow
50% dented + yellow

G
50% SsYY 50% ssYY
50% SsYy 50% ssYy

HhAa x hhAa

13. Albinism is a recessive disease and Huntington's is a dominant disease.
Female: Heterozygous for Huntington's and Albinism
Male: Recessive for Huntington's and heterozygous for Albinism.
Give all possible genotypes and phenotypes.

	hA	hA	ha	ha
HA	HhAA	HhAA	Hh Aa	HhAa
Ha	HhAa	HhAa	Hhaa	Hhaa
ha	hhAa	hhAa	hhaa	hhaa
hA	hhAA	hhAA	hhAa	hhAa

37.5% = hunt + no alb
37.5% = no hunt + no alb
12.5% = hunt + alb
12.5% = no hunt + ALB

12.5% HhAA + Hh aa
hh AA + hh aa

25% Hh Aa
hh Aa

14. Nancy and Yves are delighted, after years of trying to conceive a child they are now expecting quadruplets (4 children). To their delight they have 2 girls and 2 boys. As the kids get older they realize one daughter and one son are colour blind and the other 2 are not. Which answer explains how this can be?
A) Both Nancy and Yves are colour blind
B) Nancy is a carrier and Yves is not colour blind
C) Nancy is a carrier and Yves is colour blind
D) Nancy is colour blind and Yves is not colour blind

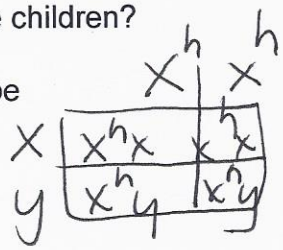
	X	X
X^c	X^cX	X^cX
Y	X^cY	XY

15. Mendel's experiments on pea plants established many of the rules of heredity that are still used today. In pea plant seeds, round shaped seeds are dominant over wrinkled shaped seeds and yellow seeds are dominant over green seeds. Which of the following correctly identifies ALL of the possible phenotypes and genotypes of the pea plants?

	ALL Possible Phenotypes	ALL Possible Genotypes
A)	YY, yy RR, rr	Yellow Seeds or Green Seeds Round-shape or Wrinkled-shape
B)	YY, Yy, yy RR, Rr, rr	Yellow Seeds or Green Seeds Round-shape or Wrinkled-shape
C)	Yellow Seeds or Green Seeds Round-shape or Wrinkled-shape	YY, yy RR, rr
D)	Yellow Seeds or Green Seeds Round-shape or Wrinkled-shape	YY, Yy, yy RR, Rr, rr

16. What will result if a female with hemophilia and a normal male have children?

(A) The daughters will be carriers and the sons will be hemophiliac.
B) The daughters could be carriers or have hemophilia. The sons will be hemophiliac.
C) The daughters will be normal and all the sons will be carriers.
D) The daughters and the sons will be hemophiliac.



17. Which of the following examples refer to genotypes only?

a- Chromosome 21 is not normal.
b- A baby has blond hair.
c- The sex chromosomes are the 23rd.
d- A girl has blue eyes.
e- A boy has olive skin.

A) a, b and c (B) a and c C) b, d and e D) a, d and e

18. Eye colour could be represented as "BB". Looking at all the terms below, which ones can be used to describe "BB"?

1- Gametes
2- Heterozygous
3- Dominant genes
4- Recessive genes
5- Genotype
6- Phenotype
7- Pure line
8- Hybrid
9- Generation
10- Allele

(A) 3, 5, 7, and 10
~~B~~ 2, 3 and 6
~~C~~ 1, 2, 4, 7 and 9
~~D~~ 3, 5, 7, 8 and 10

19. Character traits such as eye colour are inherited from our parents. Brown eye colour, B, is dominant over blue eyes, b. Tom has brown eyes. He has two children with Karen who has blue eyes. They have a boy with blue eyes and a girl with brown eyes.

a) What is the genotype of each person in the family?
b) Using the parent's genotype you determined above, describe the children's phenotypes using appropriate scientific terminology.

a) Tom = Bb Karen = bb Son = bb daughter = Bb

b) The son has blue eyes because he inherited the "b" allele from each parent.

The daughter has brown eyes because she inherited the "B" from her dad and the "b" allele from mom.