

Name: Key

Date: _____

Directions: Navigate to <https://goo.gl/tCd8L4> to view the corresponding PowerPoint. **Be sure to click "PRESENT" in the upper right hand corner!** Answer the following questions from the PowerPoint. Note that the first 9 questions are from the opening video produced by Hortensia Jiménez Díaz.



1. To understand how traits pass from one living being to its descendants, we need to go back in time to the 19th century and a man named Gregor Mendel.
2. By breeding the pea plants he was growing in the monastery's garden, he discovered the principles that rule heredity.
3. And in this second generation, he got both yellow and green seeds, which meant that the green trait had been hidden by the dominant yellow.
4. He called this hidden trait the recessive trait.
5. Now we know that these factors are called alleles and represent the different variations of a gene.
6. We can have what we call a homozygous pea where both alleles are identical and what we call a heterozygous pea when the two alleles are different.
7. This combination of alleles is known as genotype and its result- being yellow or green- is called phenotype.
8. The uppercase Y always overpower his lowercase friend, so the only time you get green babies is if you have two lowercase y's.
9. These days, scientists know a lot more about genetics and heredity.

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Punnett Squares

What does DNA contain? Chromosome

Where is the information carried in the DNA? Sequence of nitrogen bases

Define **gene** the sequences of DNA that helps to create and regulate proteins

Define **genotype** the combination of genes in a person

How many different chromosomes do humans have? 23 How many of each? 2

How many total chromosomes do humans have? 46 in total

What do we call the first 22 pairs of chromosomes? autosomes

What do we call the 23rd pair of chromosomes? sex

What karyotype do males have? XY What karyotype do females have? XX

Define **allele** different versions of a gene

Define **phenotype** the physical appearance that results from the proteins

What are the two types of genes? dominant and recessive

Define **expressed** This means that they always appear as the phenotype

What type of gene is always expressed? dominant

What type of gene is only expressed some of the time? recessive

What does **homo-** mean? same What does **hetero-** mean? different

What does **-zygous** mean? joined together

Define **homozygous** the same alleles have joined together

Define **heterozygous** different alleles have joined together

Circle the following genotype(s) that are **homozygous**: GG Gg gg

Circle the following genotype(s) that are **heterozygous**: GG Gg gg

Use the information in the table below to answer the following questions.

1. What is the genotype of an animal that is homozygous dominant for eye color? BB

What would this animal's phenotype be?

green eyes

2. What is the genotype of an animal that is homozygous recessive for eye color? bb

What would this animal's phenotype be?

blue eyes

Allele	Trait	Type
G	Solid gray fur	Dominant
g	Striped gray fur	Recessive
B	Green eyes	Dominant
b	Blue Eyes	Recessive
T	Long tail	Dominant
t	Short tail	Recessive
E	Large ears	Dominant
e	Small ears	Recessive

3. What is the genotype of an animal that is heterozygous for eye color? Bb

What would this animal's phenotype be? green eyes

4. What is the genotype of an animal that is homozygous for solid gray fur? GG

What would this animal's phenotype be? solid grey fur

5. What is the genotype of an animal that is homozygous for striped gray fur? gg

What would this animal's phenotype be? striped grey fur

6. What is the genotype of an animal that is heterozygous for fur? Gg

What would this animal's phenotype be? solid grey fur

Description	Genotype	Phenotype
Homozygous recessive for tail length	tt	short tails
Heterozygous for ear size	Ee	large ears
Homozygous for short tails	tt	short tails
Heterozygous for tail length	Tt	long tails
Homozygous for blue eyes	bb	blue eyes
Homozygous dominant for fur	GG	solid grey fur
Homozygous for striped gray fur	gg	striped grey fur
Heterozygous for eye color	Bb	green eyes
Homozygous for long tails	TT	long tails

What do we use to predict genotypes and phenotypes? Punnett square

Is the placement of the male and female gametes that important? no, you will get the same answer

What does each box represent? a possible combination of genes that might be created

What percentage does each box in a Punnett square represent? 25%

How else do we describe the outcomes of Punnett squares? as a ratio

Complete the following Punnett squares and answer the questions go with each pair.

Use the table of information below to answer questions 1-4.

Allele	Trait	Type
G	Green feathers	Dominant
g	Yellow feathers	Recessive
L	Long beak	Dominant
l	Short beak	Recessive

	L	l
l	Ll	ll
l	Ll	ll

1. Ll (♂) x ll (♀)

What percentage of offspring will have short beaks?

50%

	L	l
L	LL	Ll
l	Ll	ll

2. Ll (♂) x Ll (♀)

What is the ratio of long beaks to short beaks in the offspring?

3:1

	G	g
G	GG	Gg
g	Gg	gg

3. Two birds which are heterozygous for feather color are crossed. What percentage of offspring will have yellow feathers?

25%

	G	G
G	GG	GG
g	Gg	Gg

4. GG (♂) x Gg (♀)

What percentage of offspring will have green feathers?

100%

Use this information for questions 5-12 on this page.

Allele	Trait
T	Tall
t	Short
S	Smooth peas
s	Wrinkled peas
P	Purple flowers
p	White flowers

	P	P
P	Pp	PP
p	Pp	PP

6. Pp (♂) x pp (♀)

What will be the ratio of purple flowers to white flowers in the offspring?

1:1

	S	s
S	SS	Ss
s	Ss	ss

5. Ss (♂) x Ss (♀)

What percentage of offspring will have wrinkled peas?

25%

	S	S
s	Ss	Ss
s	Ss	Ss

7. A plant which is homozygous for smooth peas is crossed with a plant that is homozygous for wrinkled peas. What percentage of offspring will have smooth peas?

100%

	t	t
T	Tt	Tt
t	Tt	Tt

8. A plant which is homozygous short is crossed with a plant that is heterozygous for height. What will be the ratio of tall plants to short plants in the offspring?

1:1

	P	p
P	PP	Pp
p	Pp	pp

9. A plant which is heterozygous for flower color is crossed with a plant that is also heterozygous for flower color. What will be the ratio of purple flowers to white flowers in the offspring?

3:1

	T	t
T	TT	Tt
t	Tt	tt

10. Tt (♂) x Tt (♀)

What percentage of offspring will be tall?

75%

	S	S
s	Ss	Ss
s	Ss	Ss

11. SS (♂) x ss (♀)

What percentage of offspring will be heterozygous?

100%

	P	p
P	PP	Pp
p	Pp	pp

12. Pp (♂) x Pp (♀)

What will be the ratio of purple flowers to white flowers in the offspring?

3:1

Use this information for questions 13-23 on this page.

Allele	Trait
R	red eyes
r	brown eyes
W	large wings
w	small wings
B	brown body
b	yellow body

	B	b
b	Bb	bb
b	Bb	bb

13. An insect which is heterozygous for body color is crossed with an insect that has a yellow body. What will be the ratio of brown bodies to yellow bodies in the offspring?

1:1

	W	w
W	WW	Nw
w	Ww	ww

16. WW (♂) x Ww (♀)

What percentage of offspring will have a heterozygous genotype?

50%

	W	w
W	WW	Nw
w	Ww	ww

14. Two insects which are heterozygous for wing size are crossed. What percentage of offspring will have small wings?

25%

	B	b
b	Bb	bb
b	Bb	bb

17. BB (♂) x bb (♀)

What percentage of offspring will have yellow bodies?

0%

	R	r
R	RR	Rr
R	RR	Rr

15. Rr (♂) x RR (♀)

What percentage of offspring will have brown eyes?

0%

	r	r
R	Rr	Rr
r	rr	rr

18. An insect which is homozygous recessive for eye color is crossed with an insect that is heterozygous for eye color. What percentage of offspring will have red eyes?

50%

	W	w
w	Ww	ww
w	Ww	ww

19. An insect which is heterozygous for wing size is crossed with an insect that is homozygous for small wings. What will be the ratio of large to small wings in the offspring?

1:1

	r	r
R	Rr	Rr
R	Rr	Rr

20. An insect with brown eyes is crossed with an insect that is homozygous for red eyes. What percentage of insects will have red eyes?

100%

	W	w
W	Ww	Nw
w	Ww	ww

21. ww (♂) x Ww (♀)

What percentage of offspring will have large wings?

50%

	B	b
B	BB	Bb
b	Bb	bb

22. Bb (♂) x Bb (♀)

What percentage of offspring will have brown bodies?

75%

	R	r
r	Rr	rr
r	Rr	rr

23. Rr (♂) x rr (♀)

What will be the ratio of red eyes to brown eyes in the offspring?

1:1