

Lesson Title

DNA and Inheritance

06/11/2020

Learning Intent

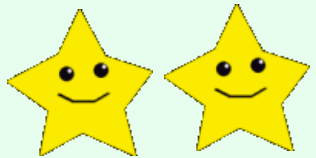
How are traits inherited, what is the structure of DNA?

Success Criteria



Know the number of chromosomes in adult cells and gametes

3



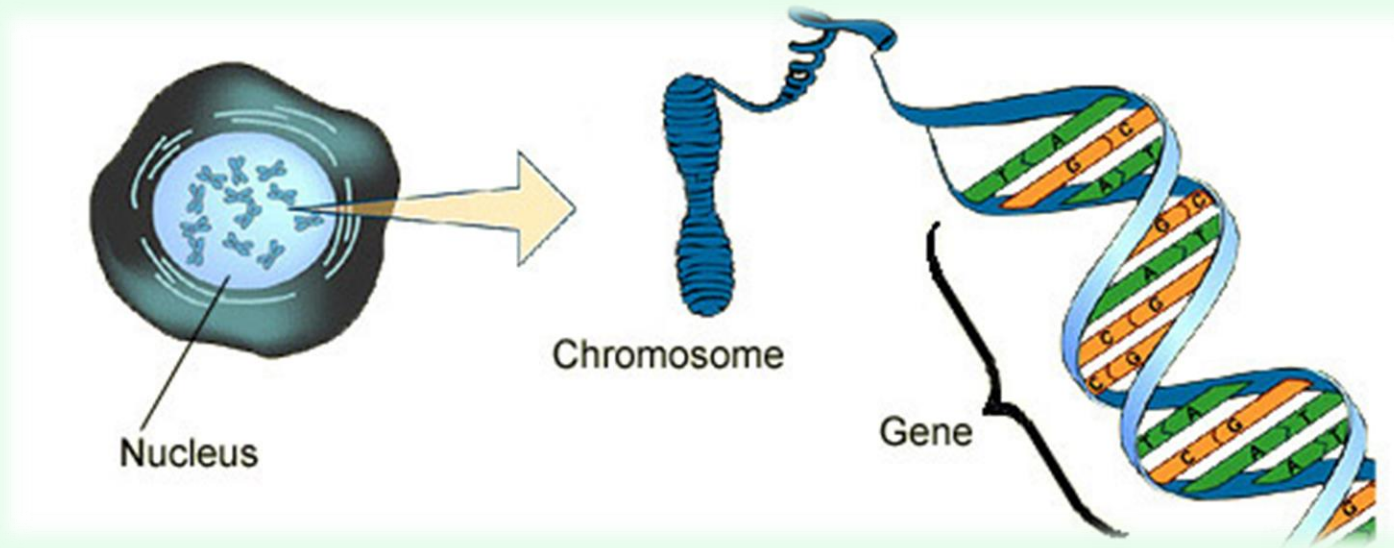
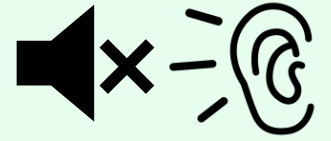
Describe how chromosomes combine from parents to form offspring

4



Determine the sequence of DNA using genes

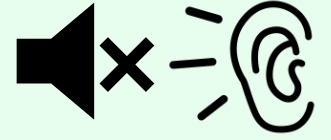
5-6



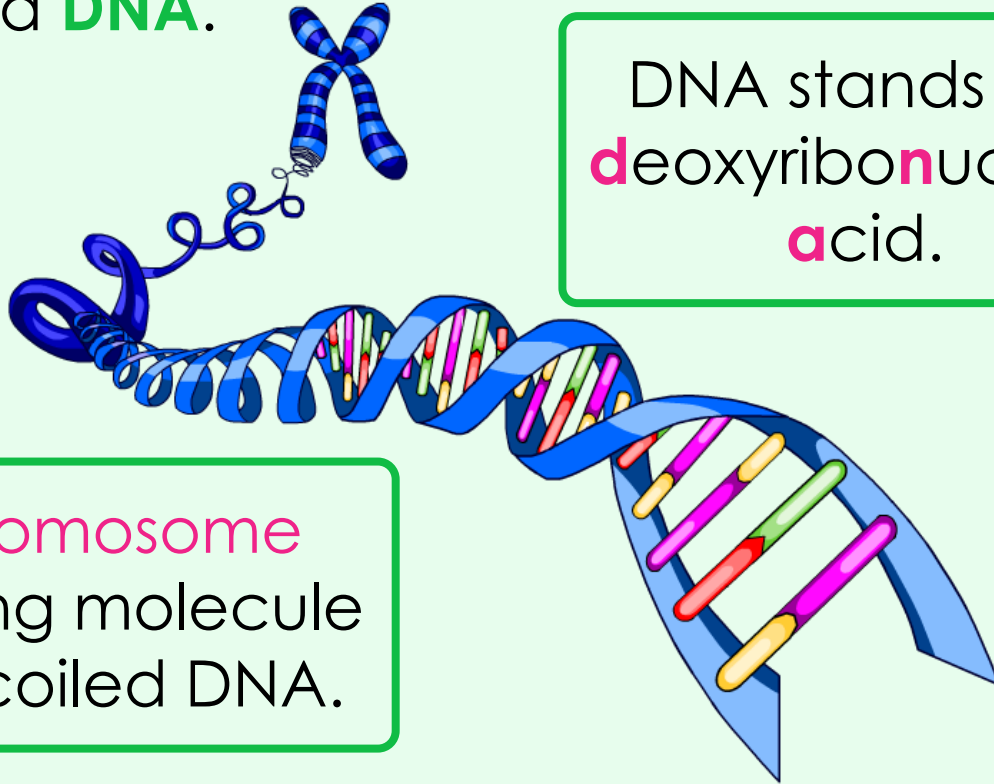
- The nucleus of living cells contain **chromosomes** which are made up of a string of **genes**.
- Different genes control the development of **different characteristics** by issuing instructions to the cell.

What is DNA?

New learning



Chromosomes and their genes are made of a molecule called **DNA**.

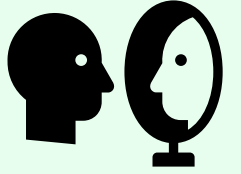


Each **chromosome** is a very long molecule of tightly coiled DNA.

DNA stands for **d**eoxyribon**n**ucleic **a**cid.


The DNA molecule looks like a twisted ladder this spiral shape is called a **DOUBLE HELIX**

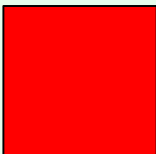
DNA molecules carry the code that controls what cells are made of and what they do.

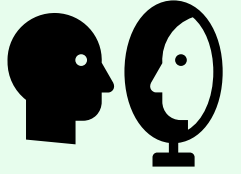


Where in the cell is DNA found?

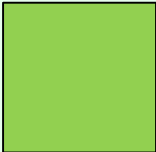
 In the cytoplasm as chromosomes

 In the nucleus as chromosomes

 In the nucleus as a double helix

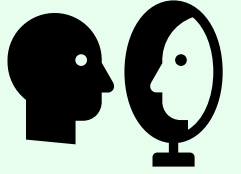


What is does DNA stand for?

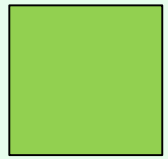
 Deoxyribonuclease acid

 Deoxyribonucleic acid

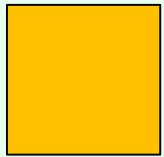
 Deoxyribonucleus acid



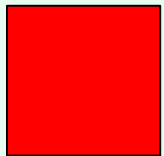
What is the function of genes?



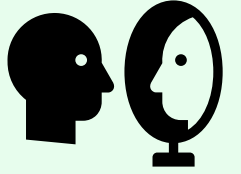
Codes for a person's genetically inherited characteristics



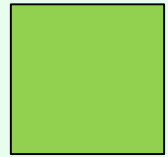
Ensures that the person is healthy and fully functioning



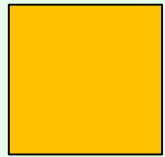
Determines the exact appearance of a person for their lifetime.



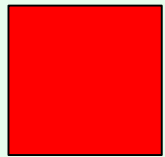
Which is correct?



Cell → Nucleus → Chromosomes → Gene →
DNA



Cell → Chromosome → Nucleus → Gene →
DNA

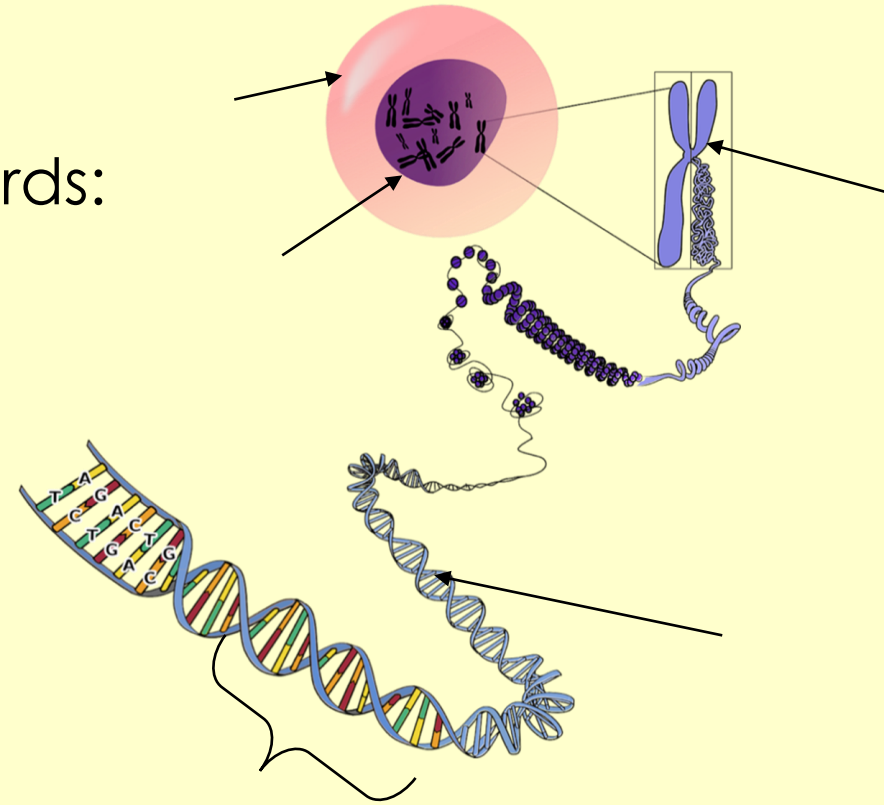


Cell → Nucleus → Chromosomes → DNA →
Gene

Task:

Label your diagram with these key words:

- Cell
- DNA
- Gene
- Nucleus
- Chromosome



Pair Whisper

Copy and correct the sentence:

The cell's genetic information is stored in the nucleus/cytoplasm of the cell as tightly packed chromosomes. Chromosomes are threadlike/round structure made up of a double helix of DNA/genes which code for certain genes/appearances which determine certain characteristics.

Genes are small sections of the chromosomes/DNA and sometimes a person can have different version of the genes, called alleles (e.g. hair colour).

Thinking time



50% similar to a banana



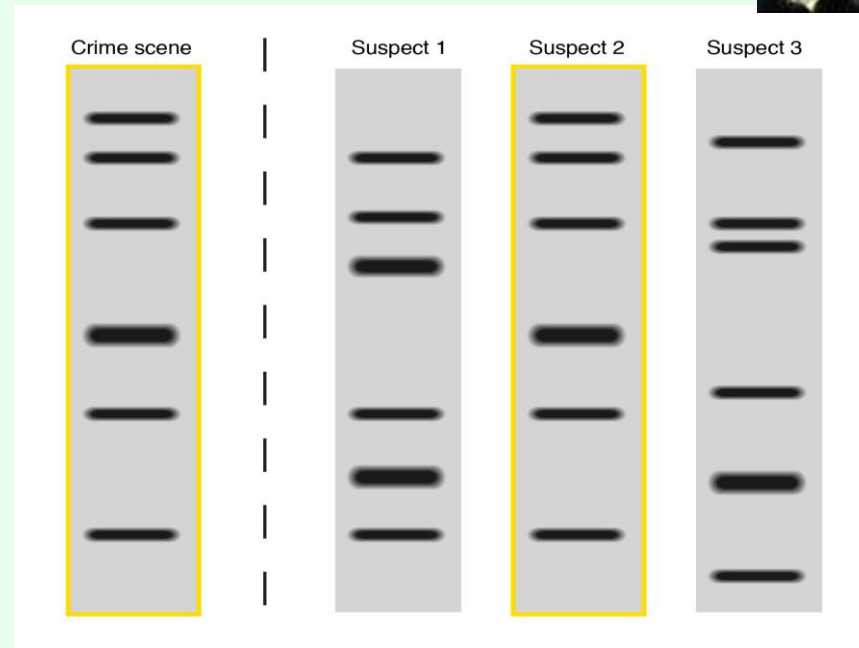
97.5% similar to a mouse



98% similar to a chimp



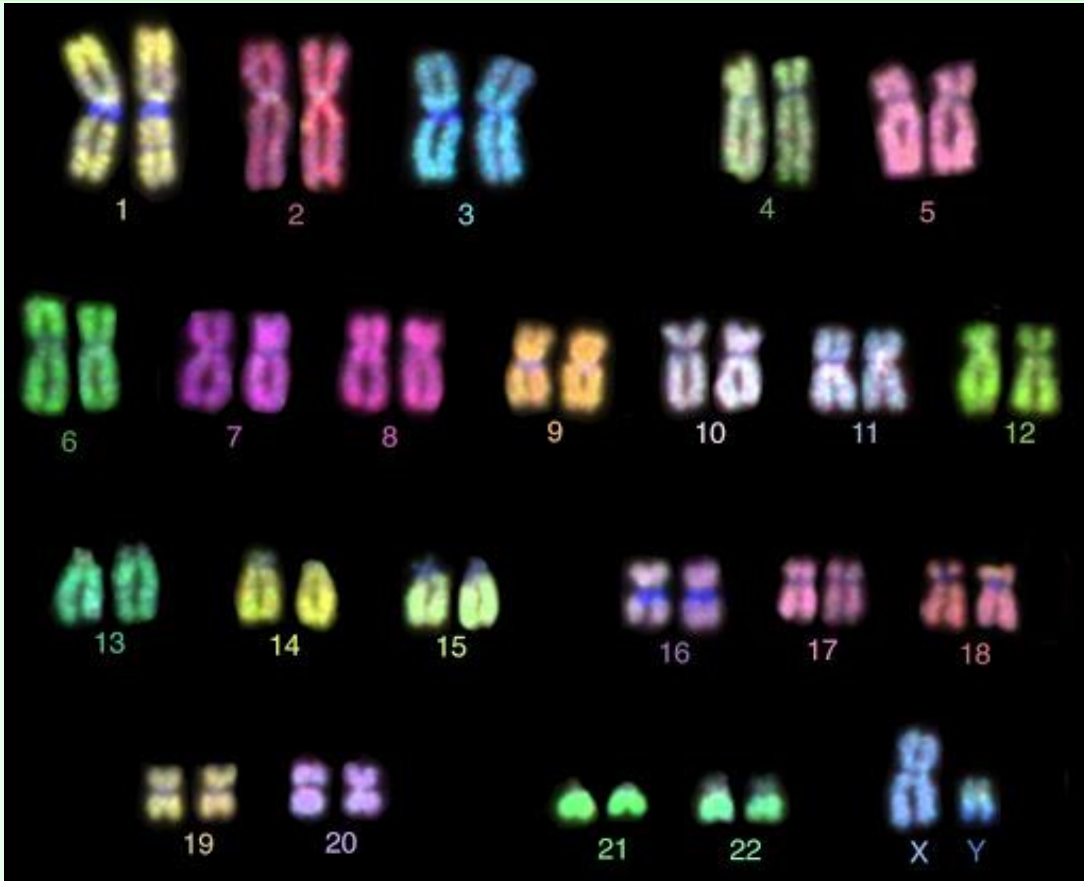
99% similar to each other



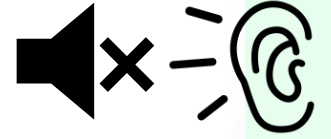
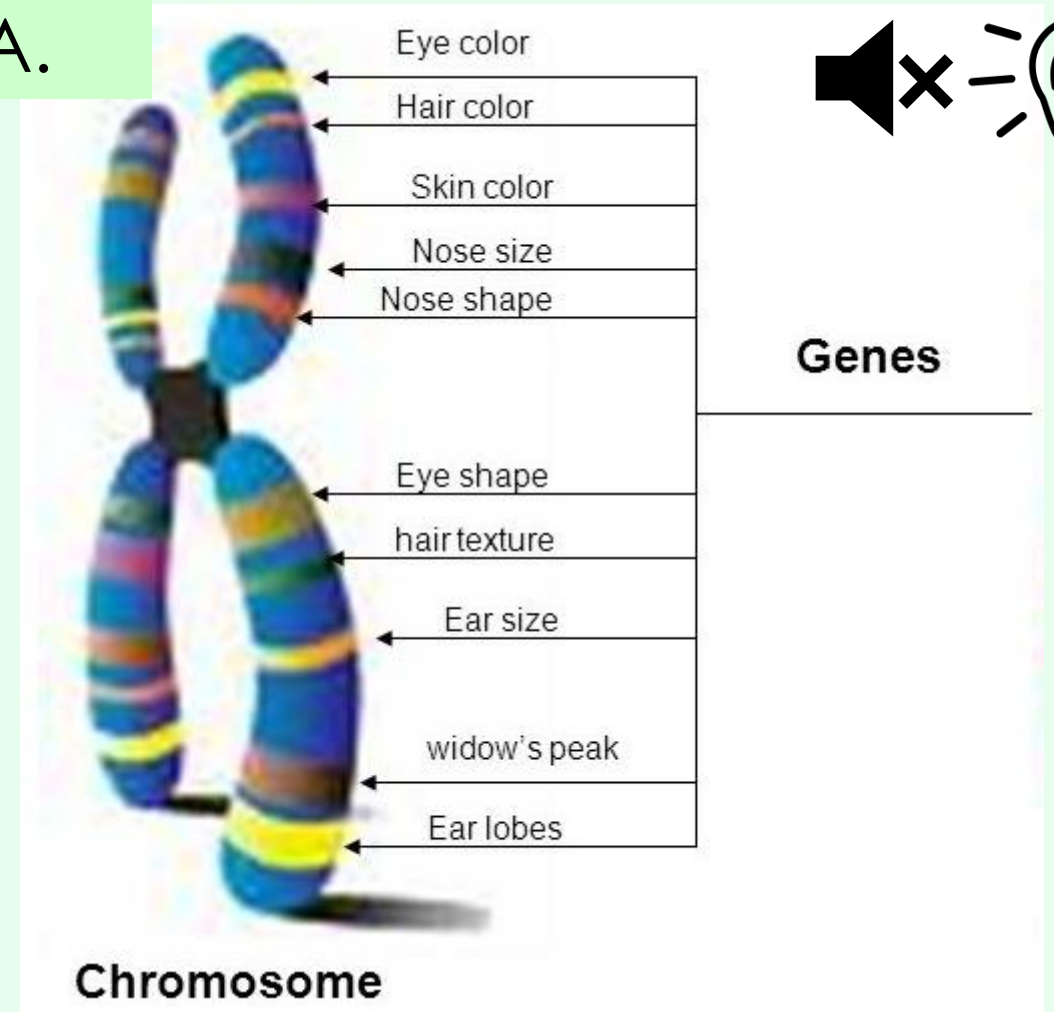
Why are identical twins exactly the same?

But are they really identical?
Why not?

L3: Determine the sequence of DNA.



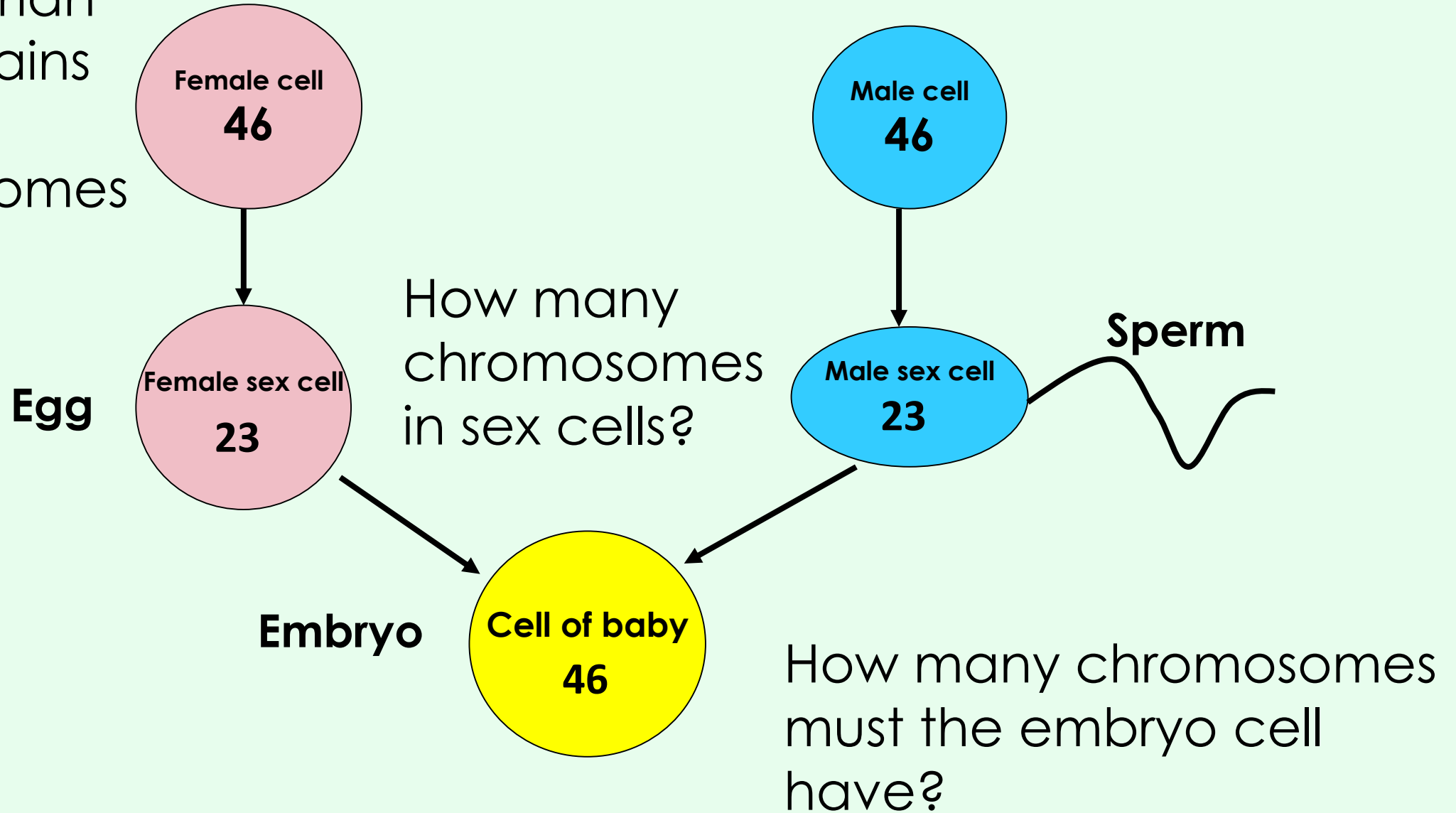
The **genes** on chromosomes determine the person's **heritable characteristics**.



L1: Know the number of chromosomes in adult cells and gametes

Chromosomes in human reproduction

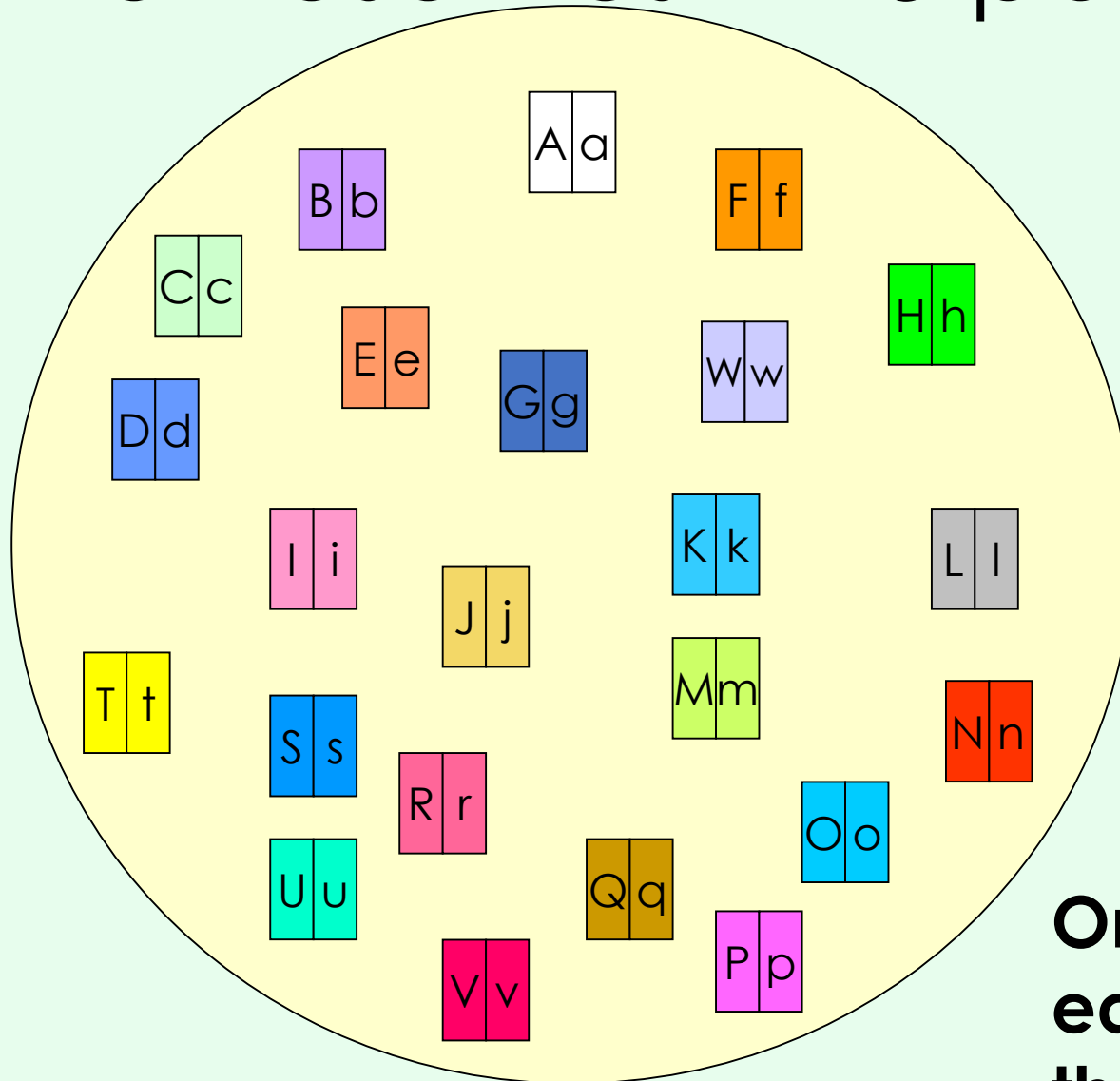
Each human cell contains 46 chromosomes



L1: Know the number of chromosomes in adult cells and gametes

46 chromosomes = 23 pairs

**Each cell
contains 23
pairs**

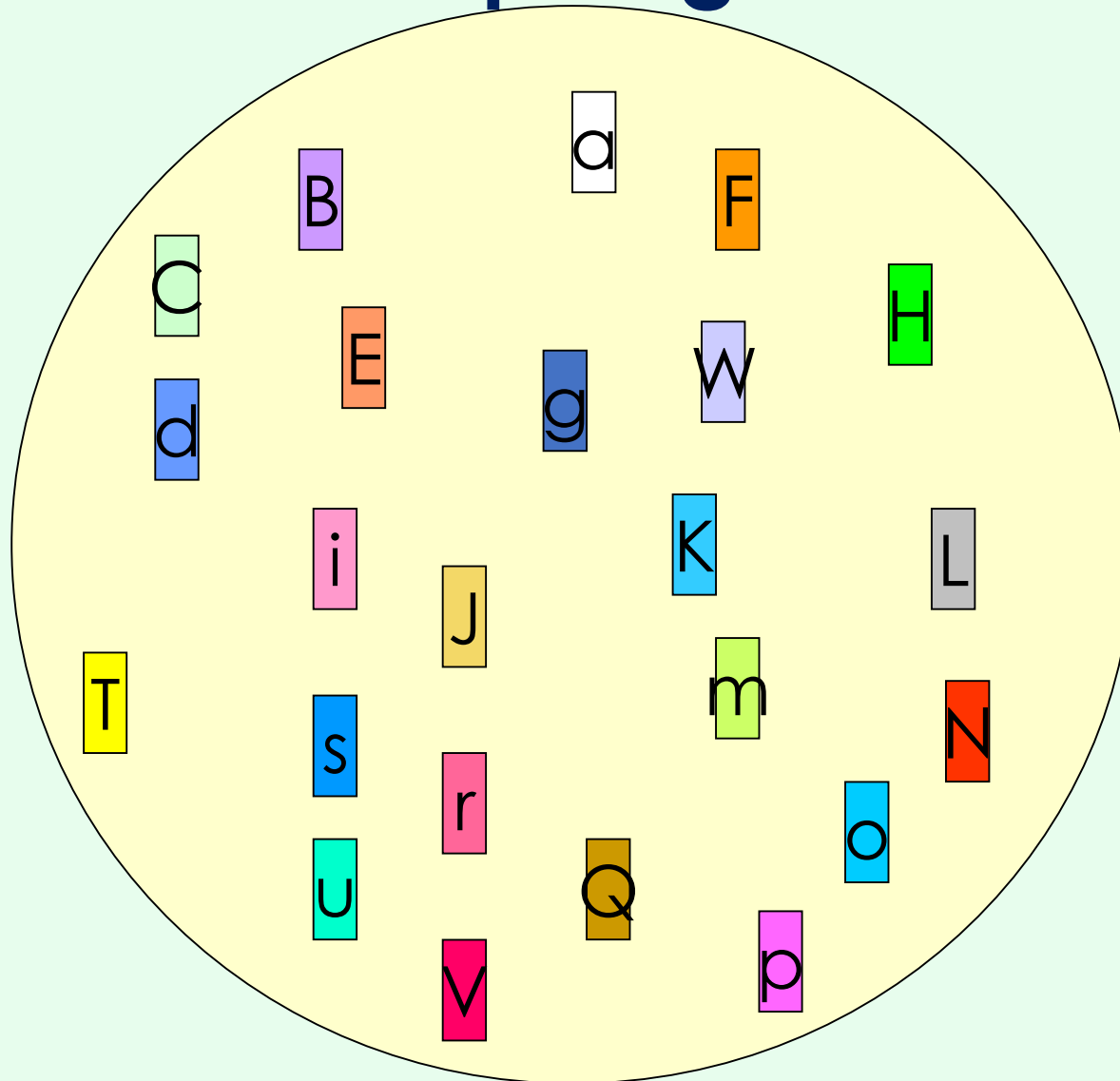


**Only one half of
each pair goes to
the sex cell**

L1: Know the number of chromosomes in adult cells and gametes

Only one of each pair goes to the sex cell

**Human sex
cells contain
23
chromosomes**



**23 from male
sex cell and
23 from
female**

L1/2: Describe how chromosomes combine to form offspring and outline how genes are inherited.

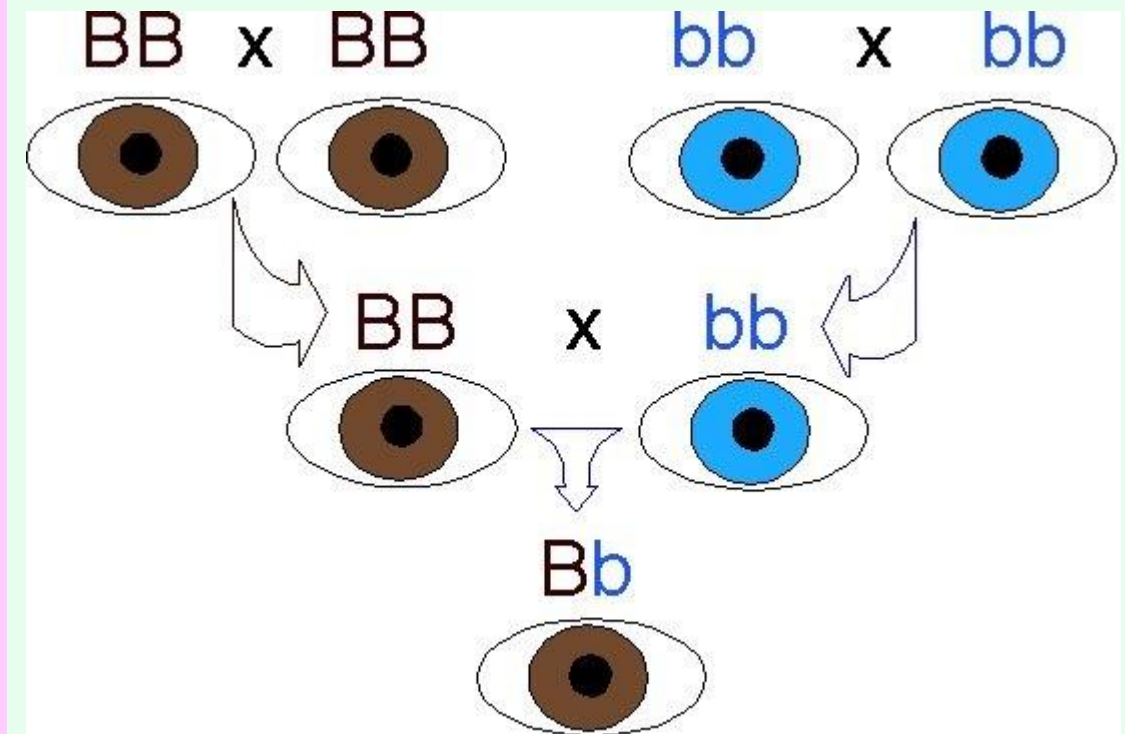
Practice with aid

Pair Whisper



Task: Complete the worksheet to summarise the basis of genetic inheritance.

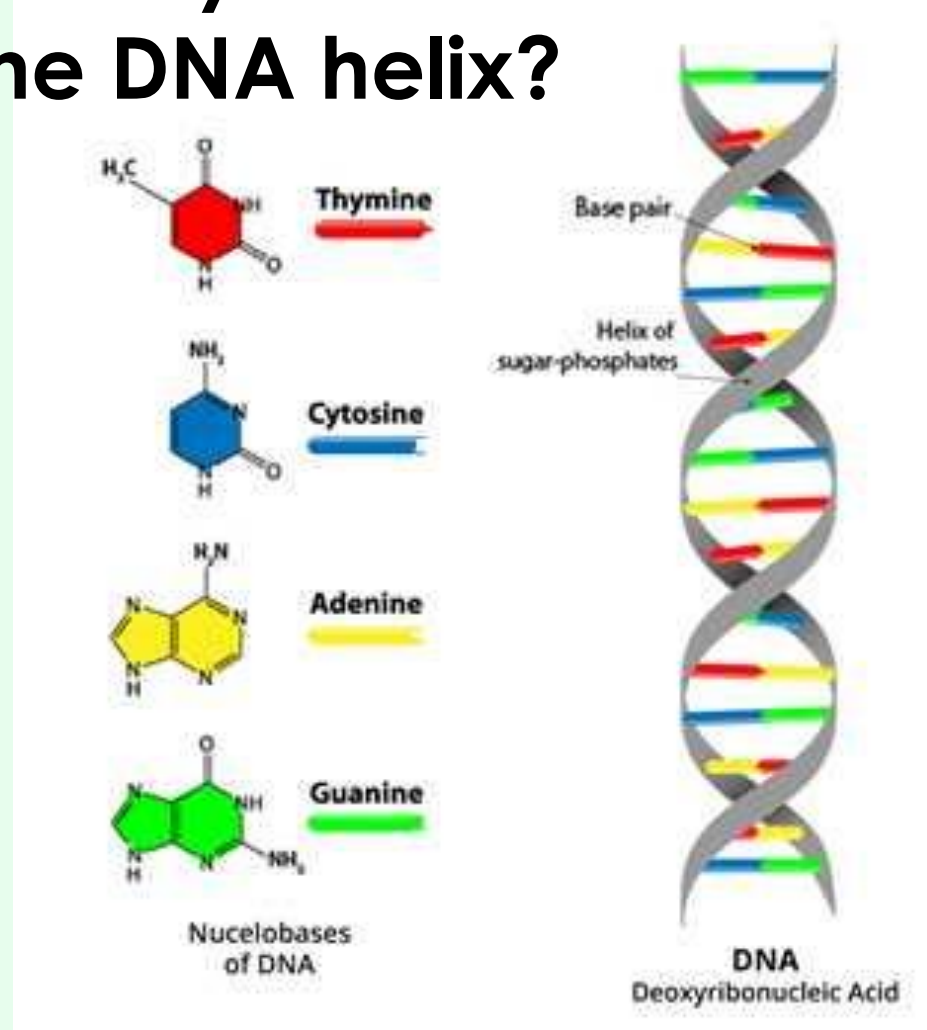
Challenge: Describe how genes from a parent are passed onto offspring. Use the words: gametes, chromosomes, dominant, recessive, fertilisation and alleles in your answer.





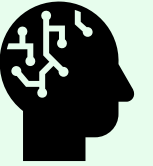
L3: Determine the sequence of DNA.

What do you notice about the colours on the DNA helix?



Adenine always pairs with Thymine (A-T)

Cytosine always pairs with Guanine (C-G)



L3: Determine the sequence of DNA.

Complete the DNA helix for your imaginary person:

Choose from the combination of bases below to get a certain appearance.

The DNA of my cartoon character is:

Base	Pair	Feature
T	A	eyes
C	G	
A	T	
G	C	
		nose
		hair
		eyebrows
		mouth

GTACA – small and round
ACGGT – long and thin

CTGCC - ginger
CTAAC - blonde
TTGCA - brown

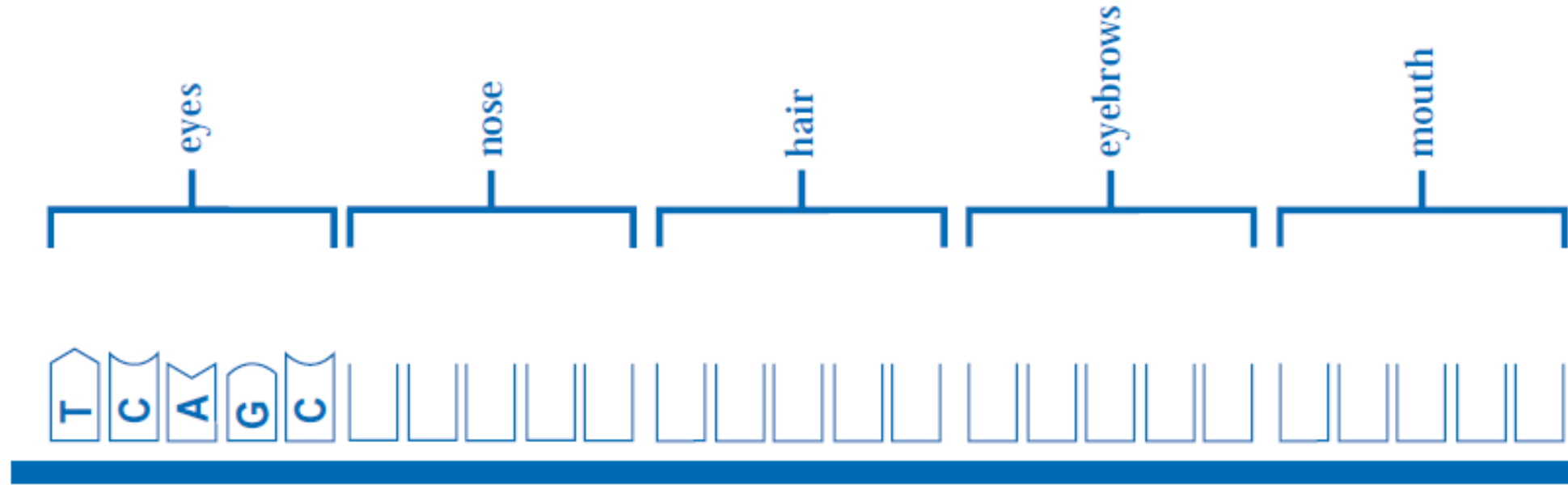
ATTGC - rounded
GACCT – long and thin

CGCCT – long and wide
TCGGC – thin and narrow

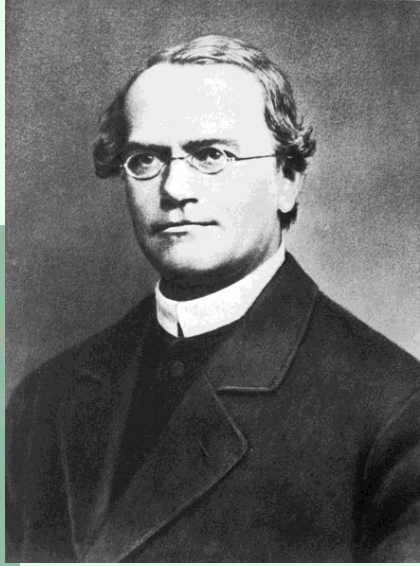
Challenge:

What happens if there is a mutation in the base pairs and one changes?
Suggest some of the consequences of this.

The DNA of my
cartoon character is:



HOW MENDEL'S
PEA PLANTS
HELPED US UNDERSTAND
GENETICS



Title: Genetic inheritance

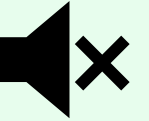
06/11/2020

Do-now:

Answer these Q on your whiteboards.

1. What do we call this structure? **Chromosome**
2. What is the name of the male and female sex cells? **Sperm and Egg (Gametes)**
3. What is the difference between an allele and a gene?

Genes are small sections of a DNA, while alleles are different forms of the same gene.



Lesson Title

Genetic Inheritance

06/11/2020

Learning Intent

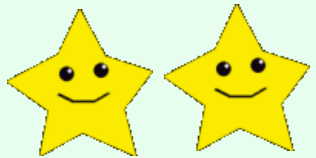
How are traits inherited?

Success Criteria



Know the meaning of key genetic terms

3



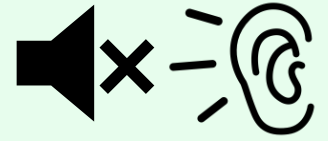
Complete the Punnet square to show genetic crosses

4



Present the outcomes of crosses using percentages

5-6



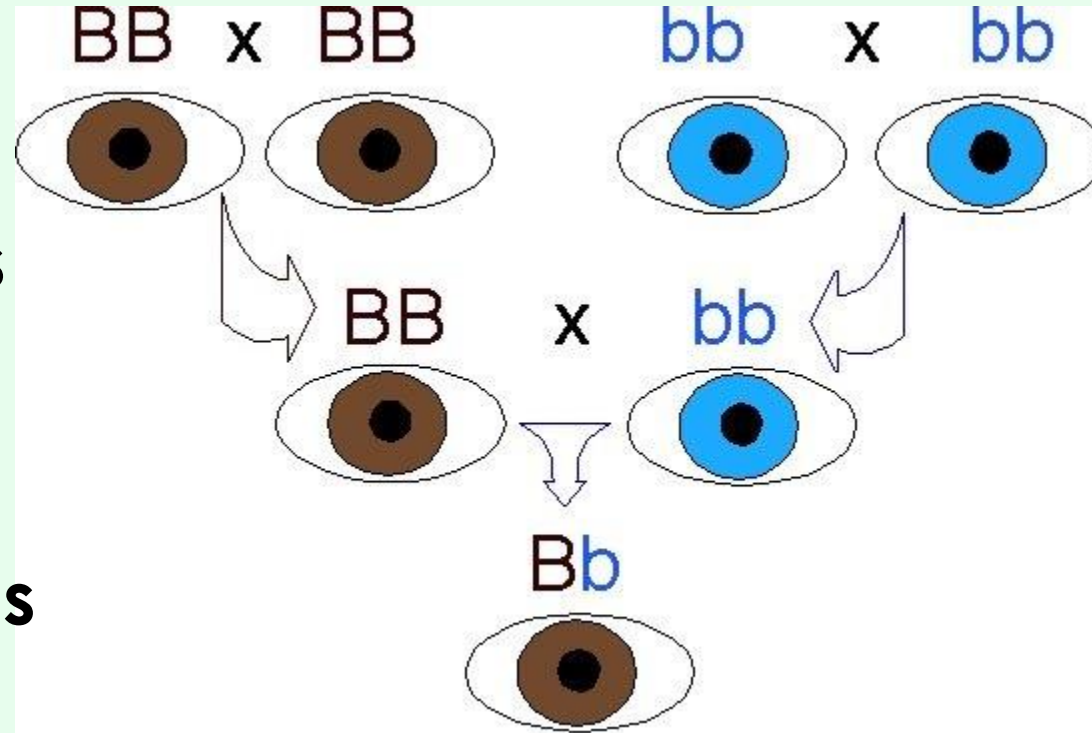
Genotype: BB, Bb or bb

Phenotype: **Brown** or **Blue**

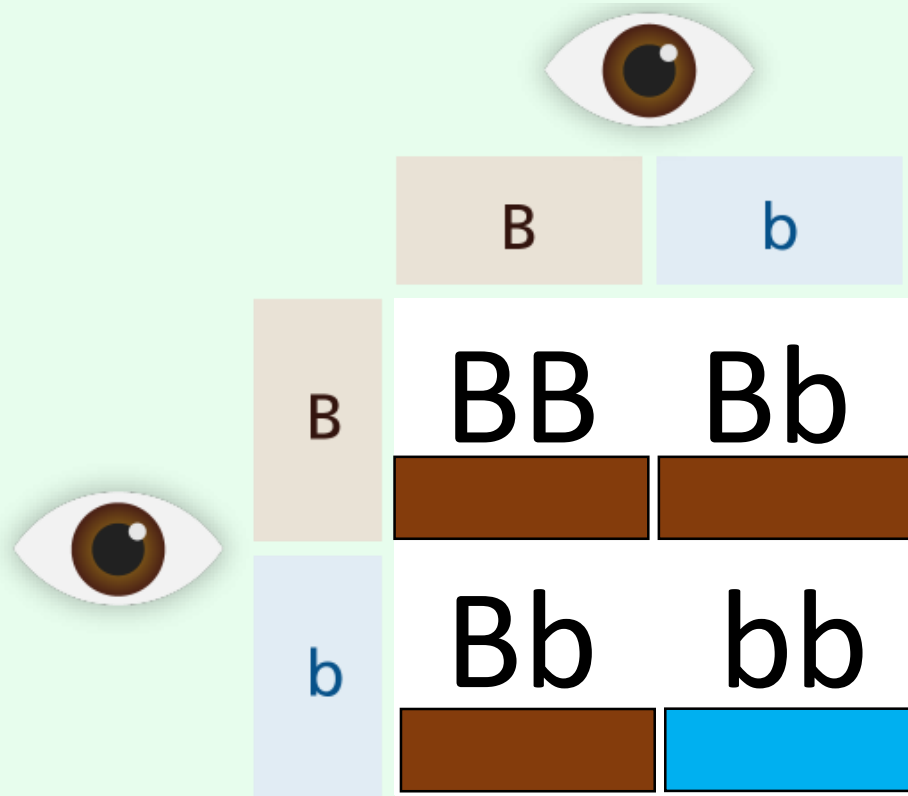
BB – Homozygous
B – Dominant

Bb – Heterozygous

bb – Homozygous
b – Recessive

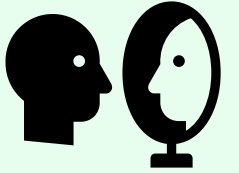


Thinking time






B - dominant brown eye allele

b - recessive blue eye allele



L2/3: Complete the Punnet square to show outcomes of genetic crosses

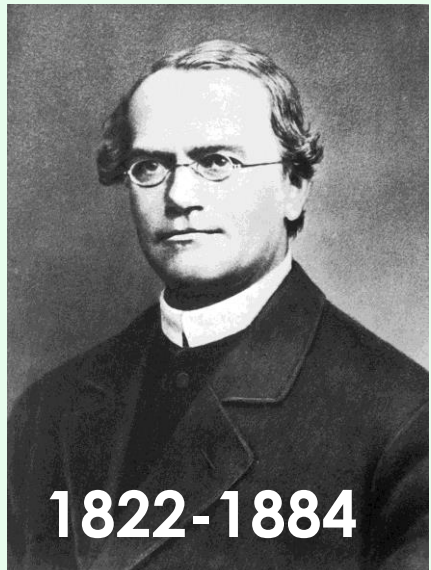
Genotypes	Phenotypes
AA	 Yellow
Aa	 Yellow
aa	 Green



	A	a
A		
a		

1. Show the genotypes and phenotypes.
2. How many would be green and yellow?
3. Can you convert these to a %.

3:1 yellow : green
75% yellow and 25% green



1822-1884

Application of learning



Independent
Whisper

L2/3: Complete the Punnet square to show outcomes of genetic crosses

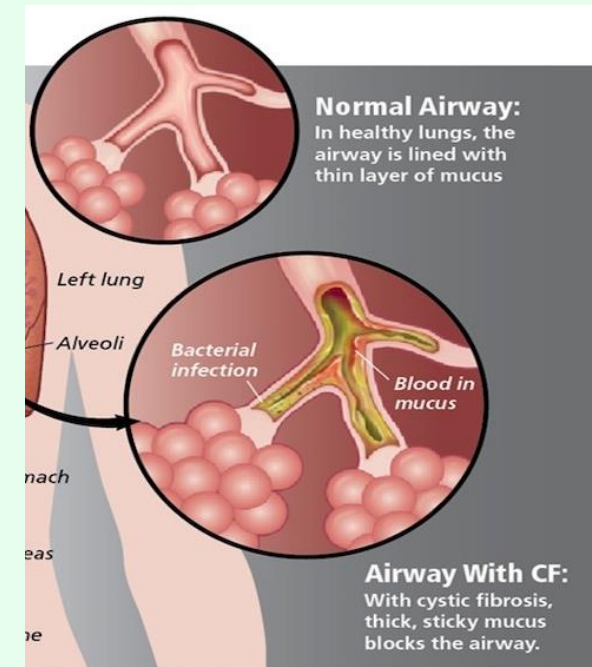
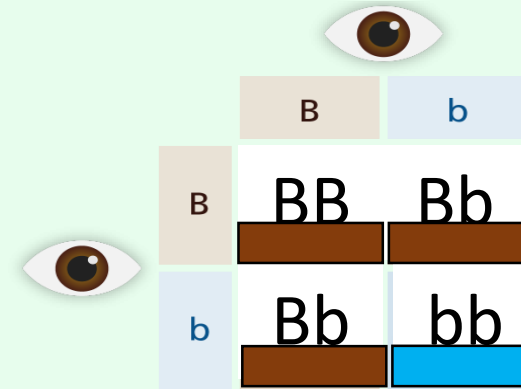
Task:

Complete the genetic crosses for the Simpsons family.

Either the **easier** or **harder** one.

Challenge:

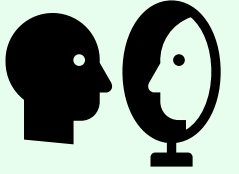
Cystic fibrosis is a **recessive** disease (**ff**). What is the likelihood of a child having cystic fibrosis when two **heterozygous parents** (carriers) have children? (Hint: Use the Punnet Square).



Answers to Punnet squares worksheet

1) Hair Colour

Reflection and Reteach



	B	B
b	Bb	Bb
b	Bb	Bb

2 marks

What is the percentage chance that the child will have black hair?

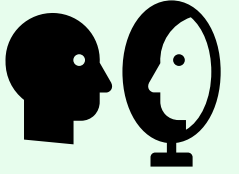
100%



Answers to Punnet squares worksheet

2) Nose Shape

Reflection and Reteach



	R	r
r	Rr	rr
r	Rr	rr

2 marks

What is the percentage chance that the child will have a pointy nose?

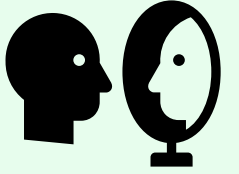
50%



Answers to Punnet squares worksheet

3) Eye Shape

Reflection and Reteach



	R	r
r	Rr	rr
r	Rr	rr

2 marks

What is the percentage chance that the child will have a round eyes?

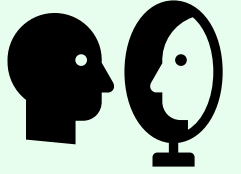
50%



Answers to Punnet squares worksheet

4) Tongue rolling

Reflection and Reteach



	T	t
T	TT	Tt
t	Tt	tt

2 marks

What is the percentage chance that the child can roll their tongue?

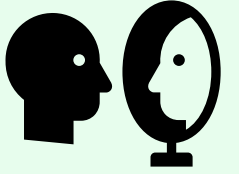
75%



Answers to Punnet squares worksheet

Hair Colour

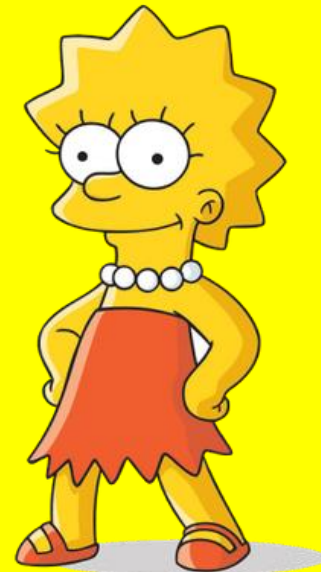
Reflection and Reteach



	B	b
B	BB	Bb
b	Bb	bb

2) What is the percentage chance that the child will have yellow hair?

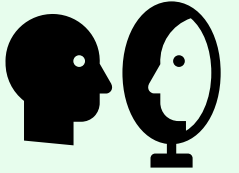
25%



Answers to Punnet squares worksheet

Hair colour

Reflection and Reteach



	B	b
B	BB	Bb
b	Bb	bb

3) What is the percentage chance that the child will have blue hair?

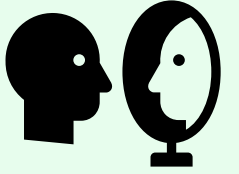
75%



Answers to Punnet squares worksheet

Hair Colour

Reflection and Reteach



	B	b
B	BB	Bb
b	Bb	bb

4 marks

4) Which is the dominant allele?

B

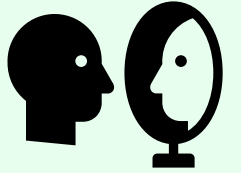
5) Which is the recessive allele?

b

Answers to Punnet squares worksheet

Nose Shape

Reflection and Reteach



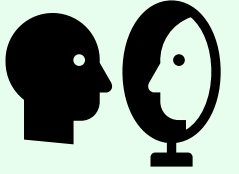
	R	r
R	RR	Rr
R	RR	Rr

2) What is the percentage chance of a rounded nose?

50%



MATT GROENING



	R	r
R	RR	Rr
R	RR	Rr

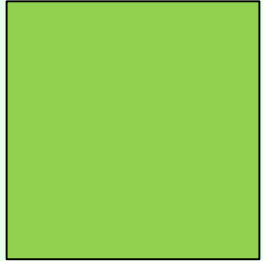
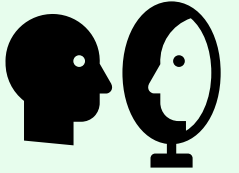
4 marks

4) Which is the dominant allele?

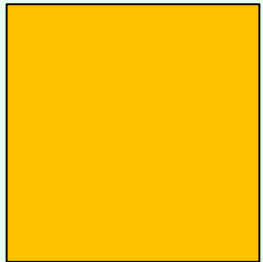
R

5) Which is the recessive allele?

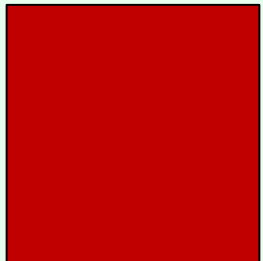
r



6-8



3-5



0-2

