

Lesson Title

**DNA and Inheritance**

06/11/2020

Learning Intent

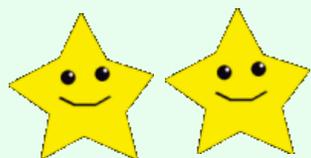
How are traits inherited, what is the structure of DNA?

Success Criteria



Know the number of chromosomes in adult cells and gametes

3



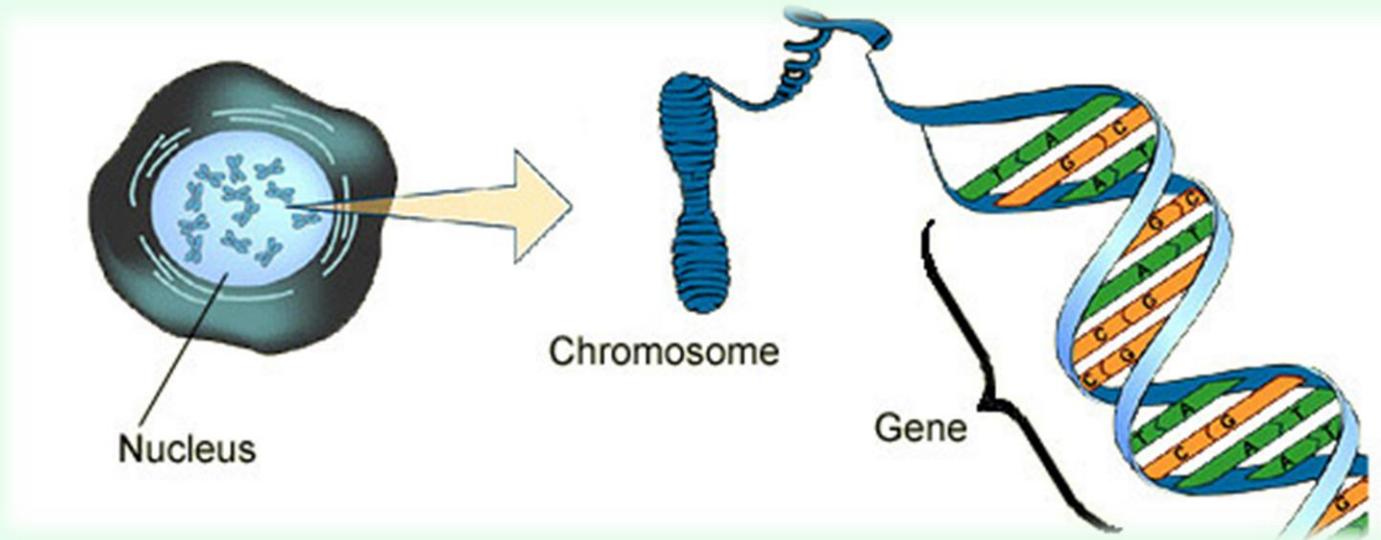
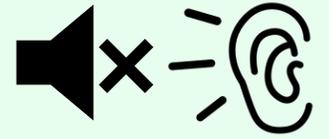
Describe how chromosomes combine from parents to form offspring

4



Determine the sequence of DNA using genes

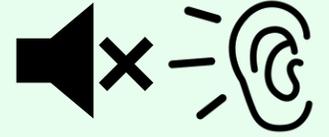
5-6



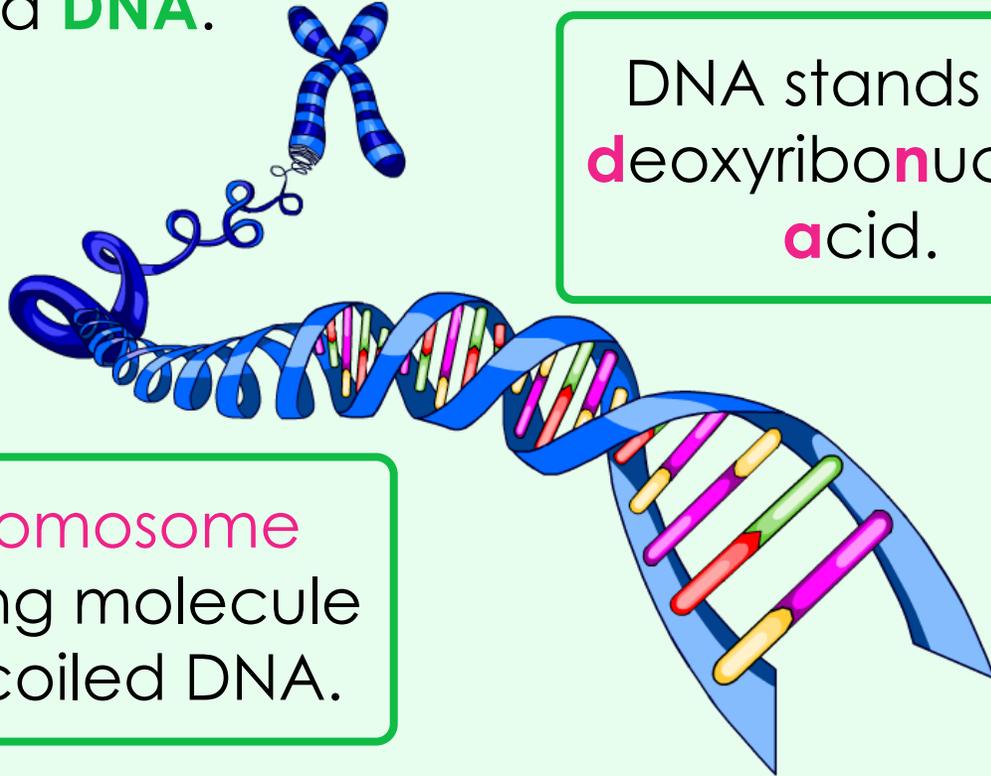
- The nucleus of living cells contain **chromosomes** which are made up of a string of **genes**.
- Different genes control the development of **different characteristics** by issuing instructions to the cell.

# What is DNA?

New learning



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

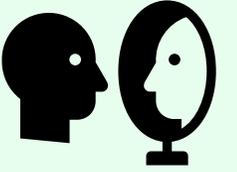


DNA stands for **d**eoxyribon**n**ucleic **a**cid.

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

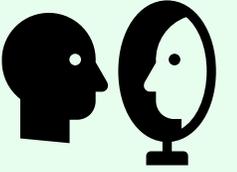
The DNA molecule looks like a twisted ladder this spiral shape is called a **DOUBLE HELIX**

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

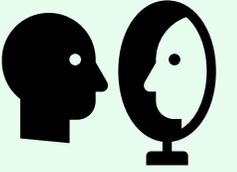


What does DNA stand for?

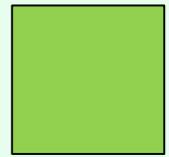
Deoxyribonuclease acid

Deoxyribonucleic acid

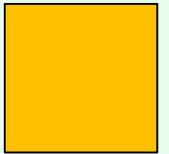
Deoxyribonucleus acid



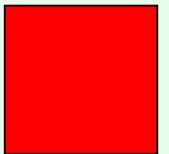
What is the function of genes?



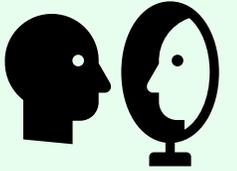
Codes for a person's genetically inherited characteristics



Ensures that the person is healthy and fully functioning

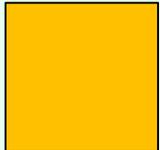


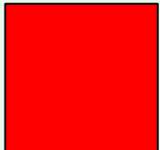
Determines the exact appearance of a person for their lifetime.



Which is correct?

 Cell → Nucleus → Chromosomes → Gene → DNA

 Cell → Chromosome → Nucleus → Gene → DNA

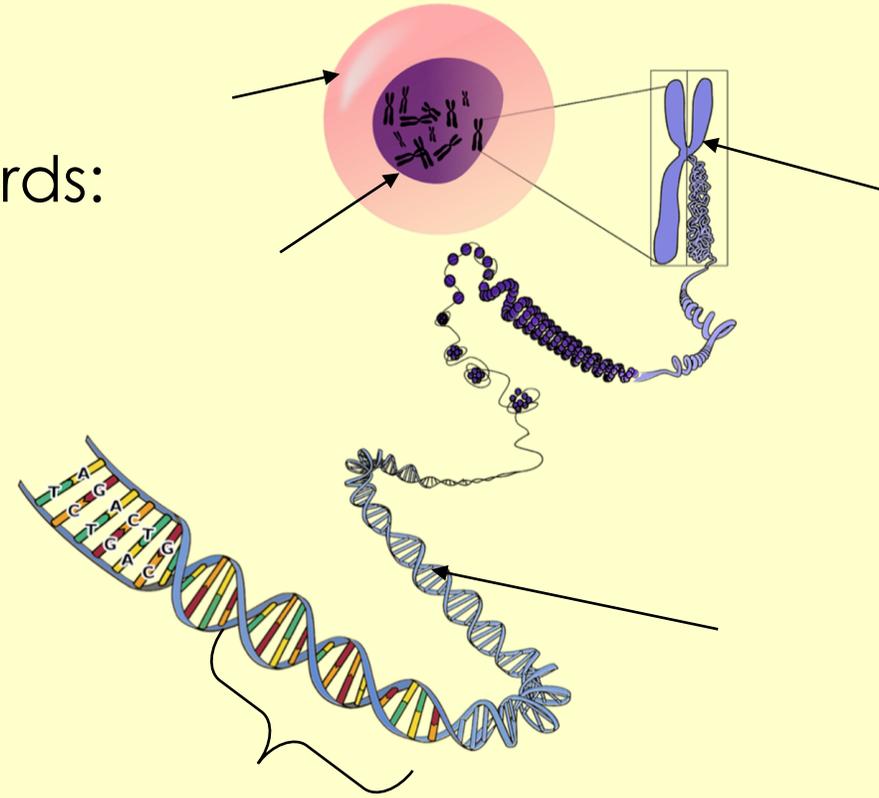
 Cell → Nucleus → Chromosomes → DNA → Gene

## Practice with aid

### Task:

Label your diagram with these key words:

- Cell
- DNA
- Gene
- Nucleus
- Chromosome



### 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



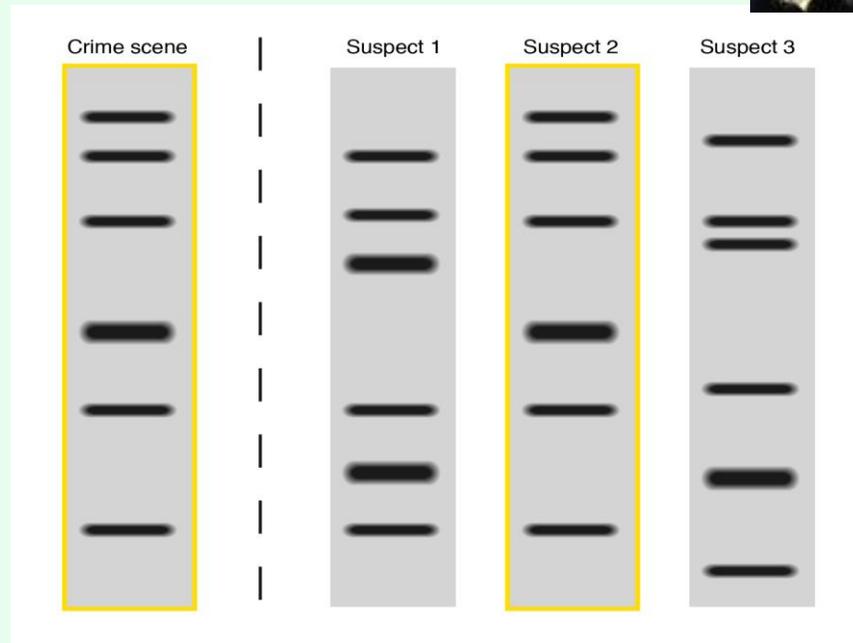
97.5% similar to a mouse



98% similar to a chimp



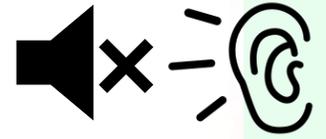
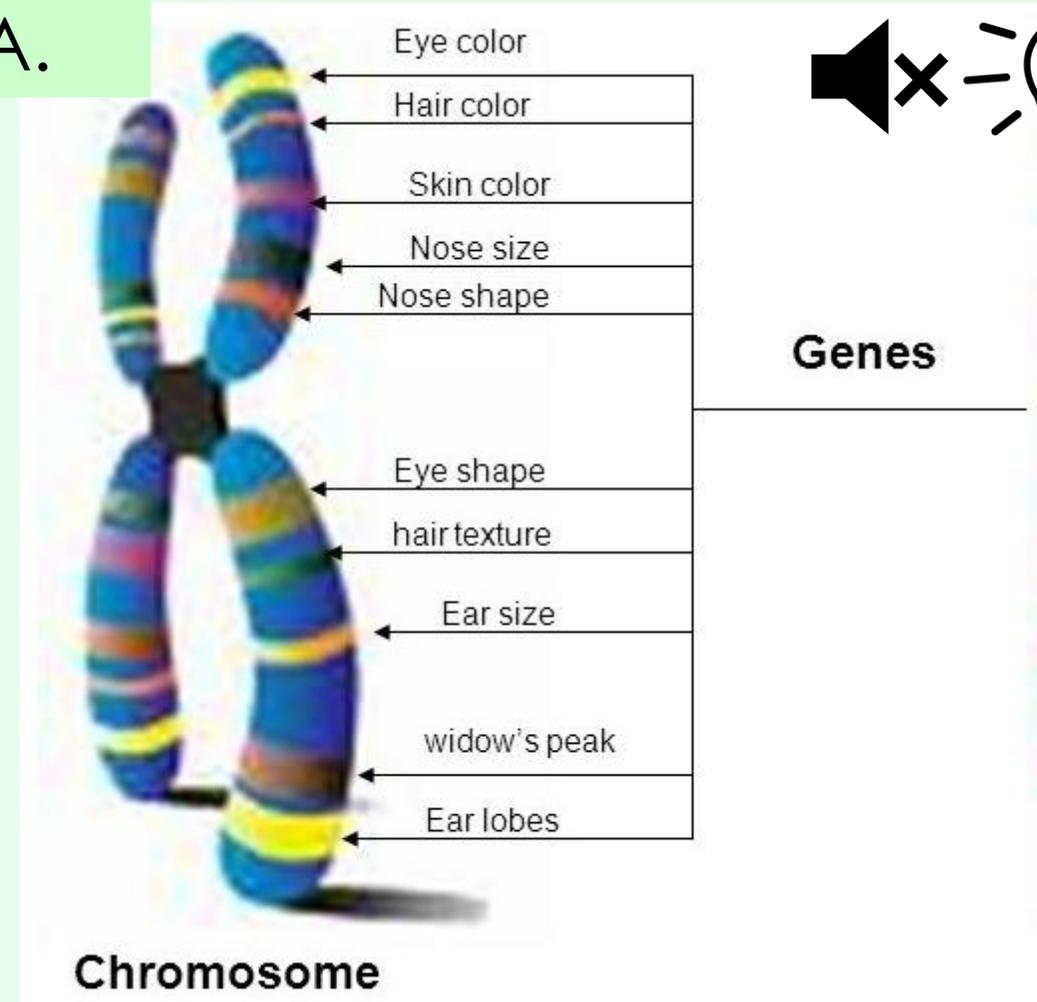
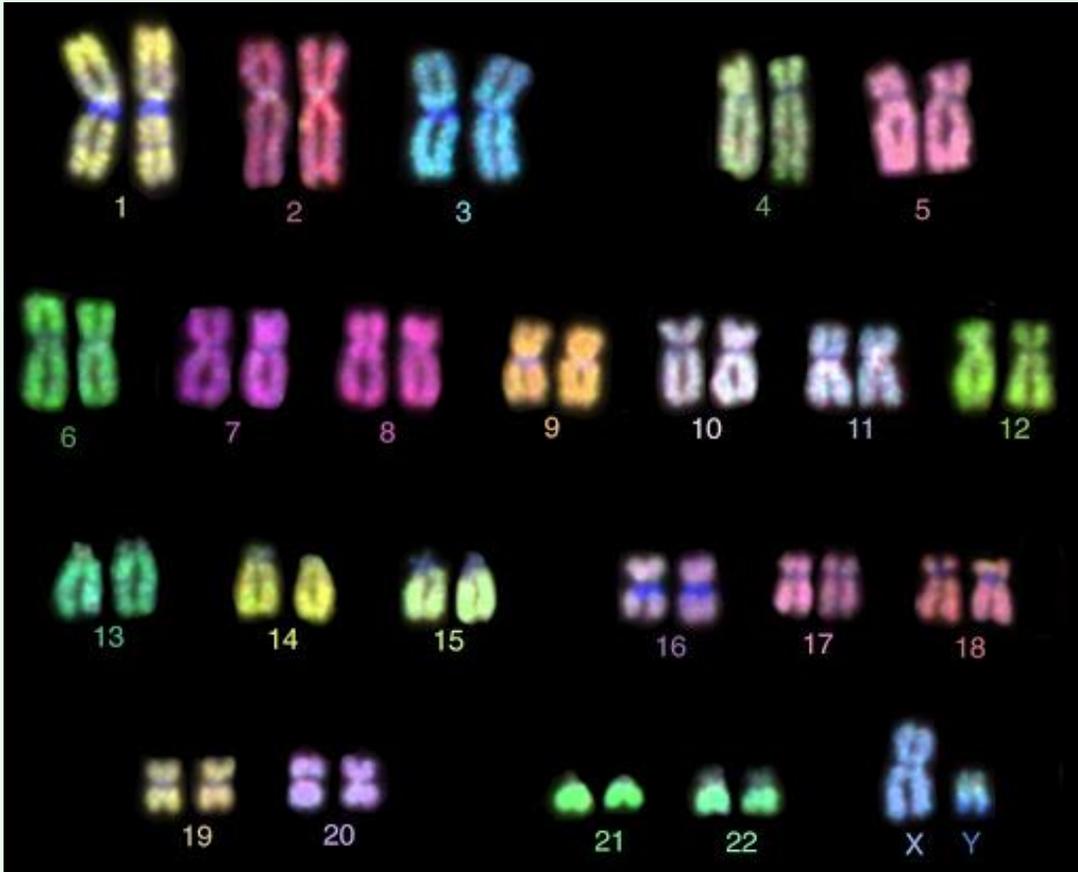
99% similar to each other



Why are identical twins exactly the same?

But are they really identical?  
Why not?

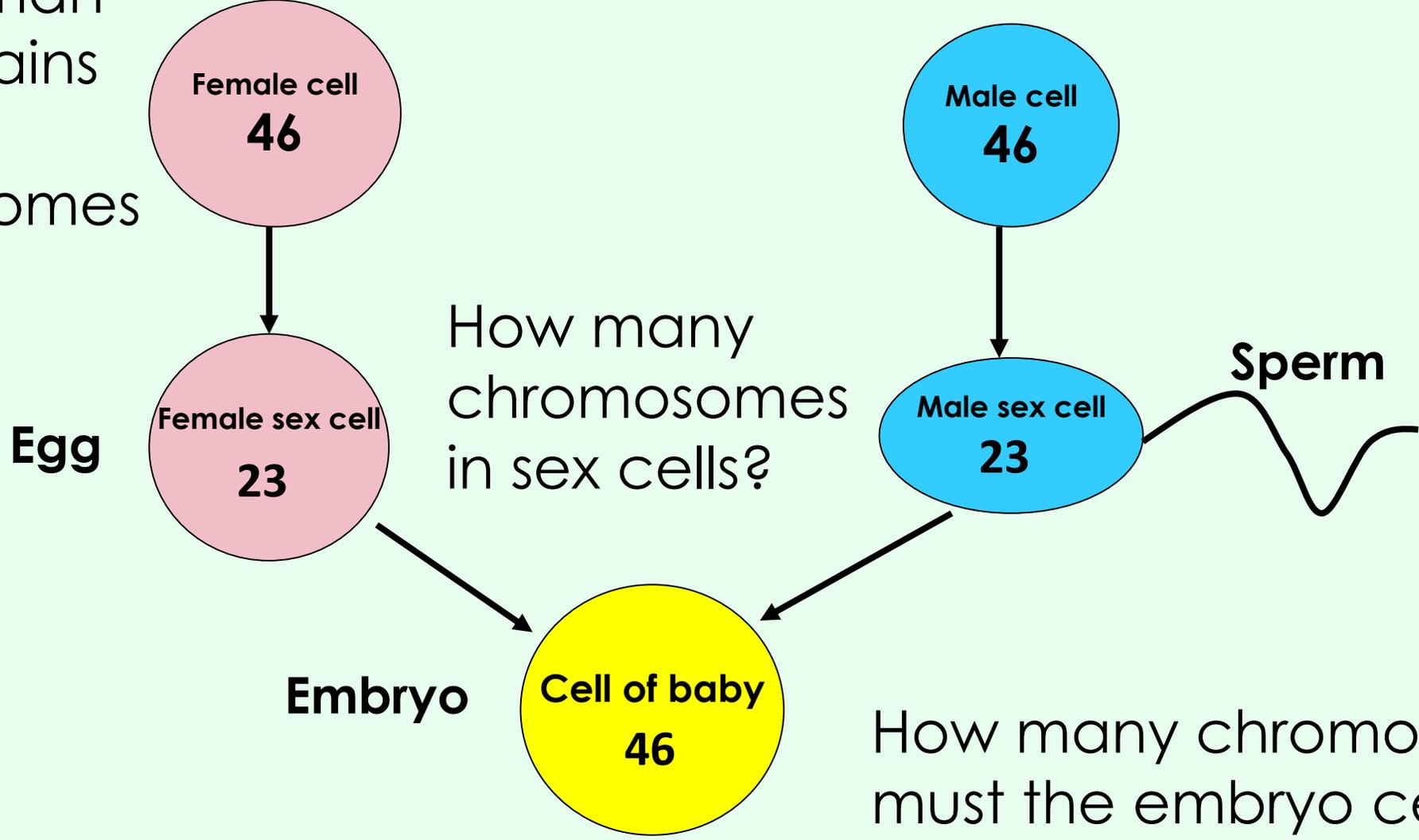
## L3: Determine the sequence of DNA.



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

# Chromosomes in human reproduction

Each human cell contains 46 chromosomes



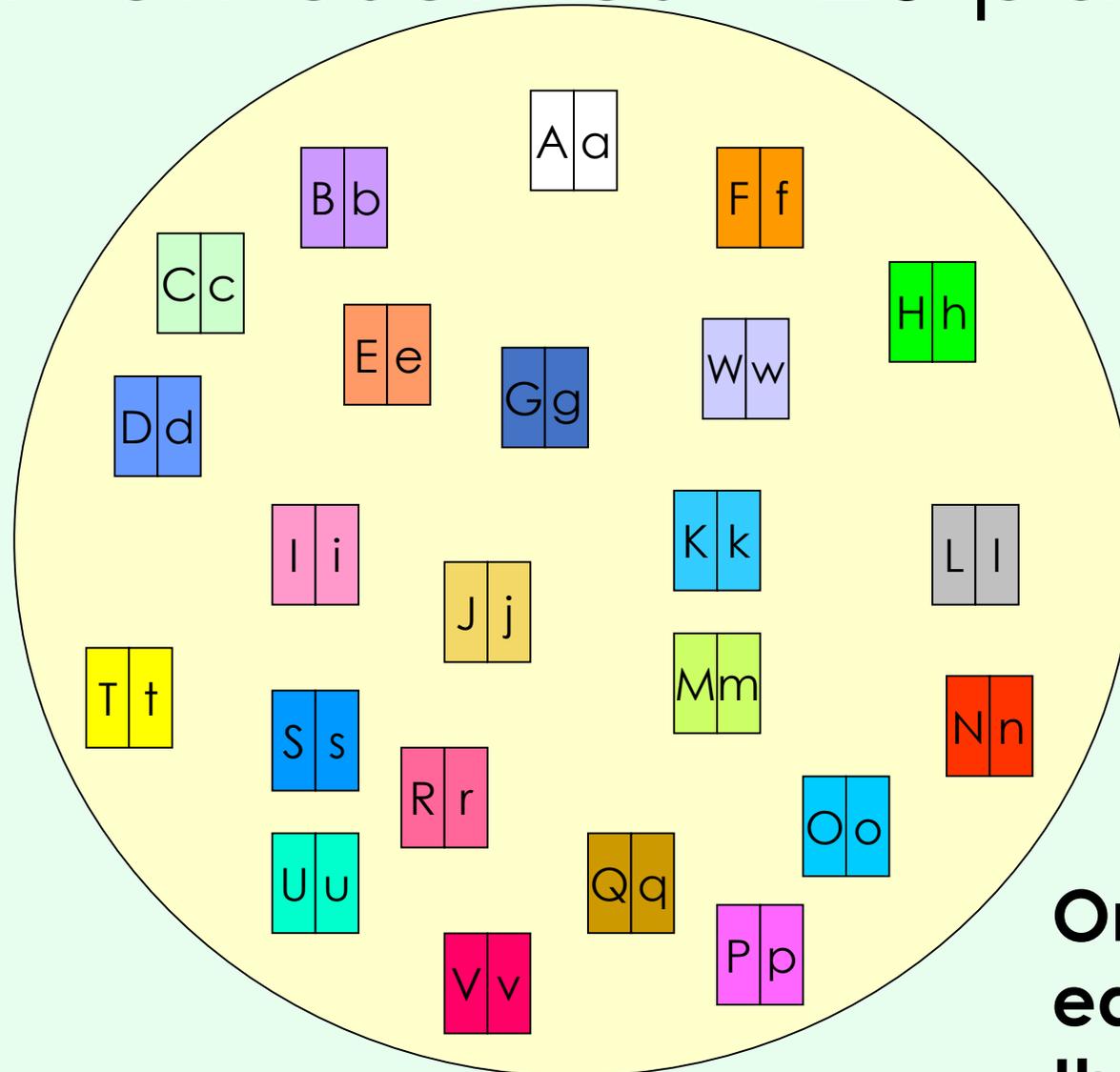
How many chromosomes in sex cells?

How many chromosomes must the embryo cell have?

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

46 chromosomes = 23 pairs

**Each cell  
contains 23  
pairs**

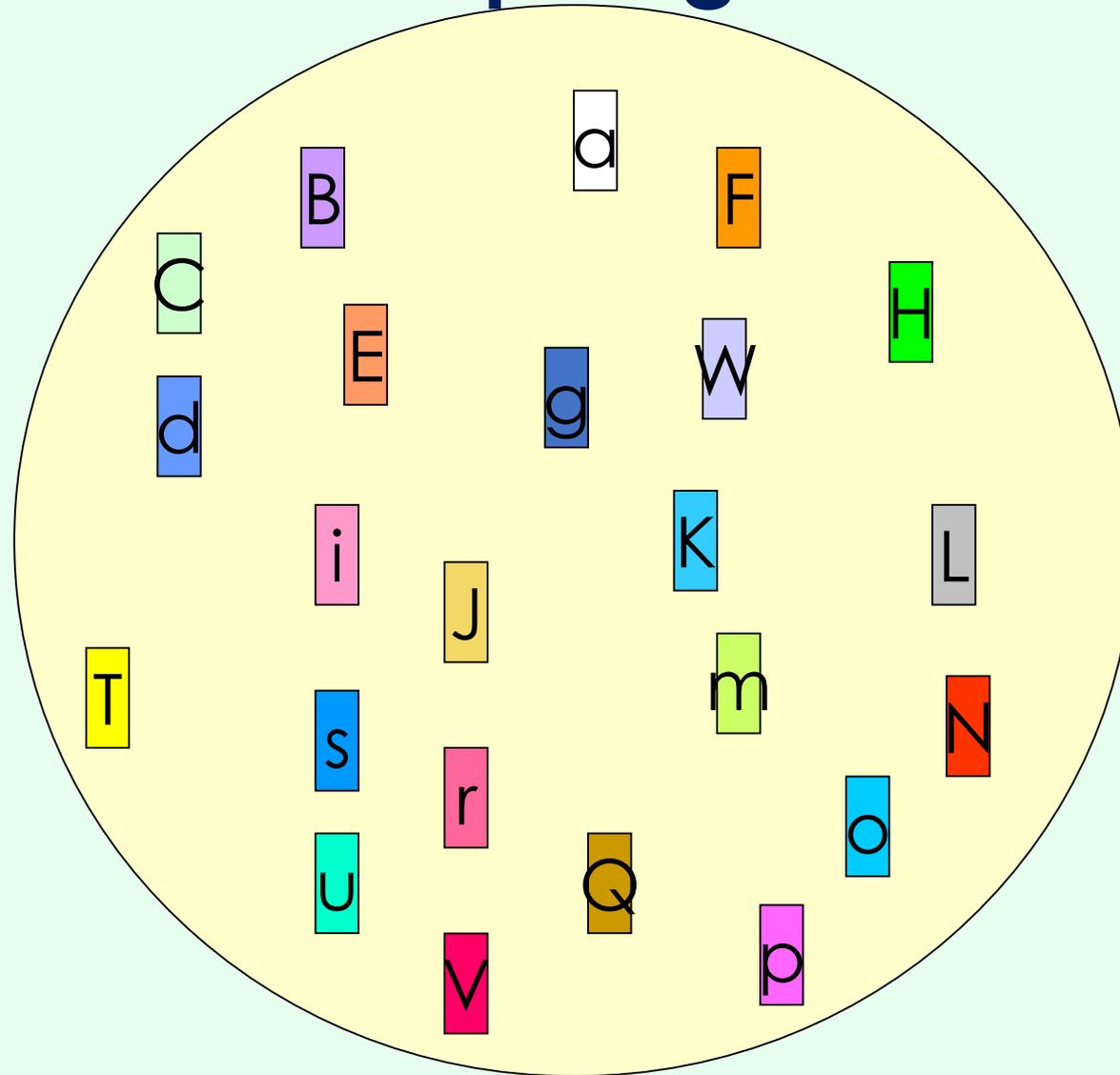


**Only one half of  
each pair goes to  
the sex cell**

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.

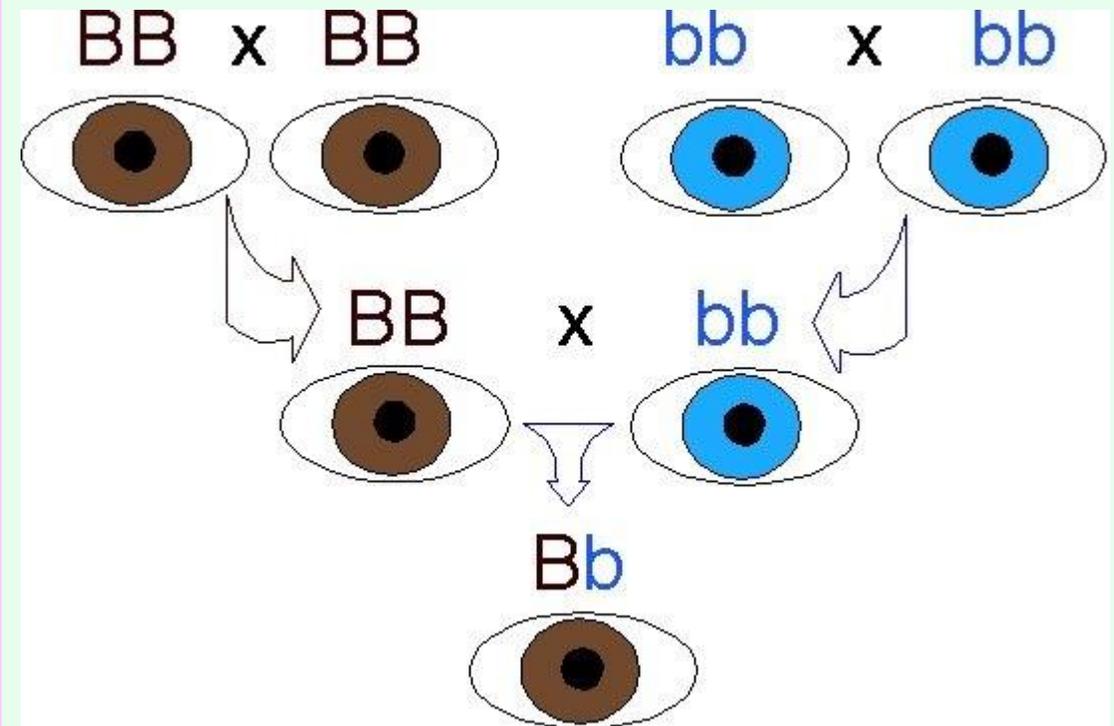
**Practice with aid**

Pair Whisper



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

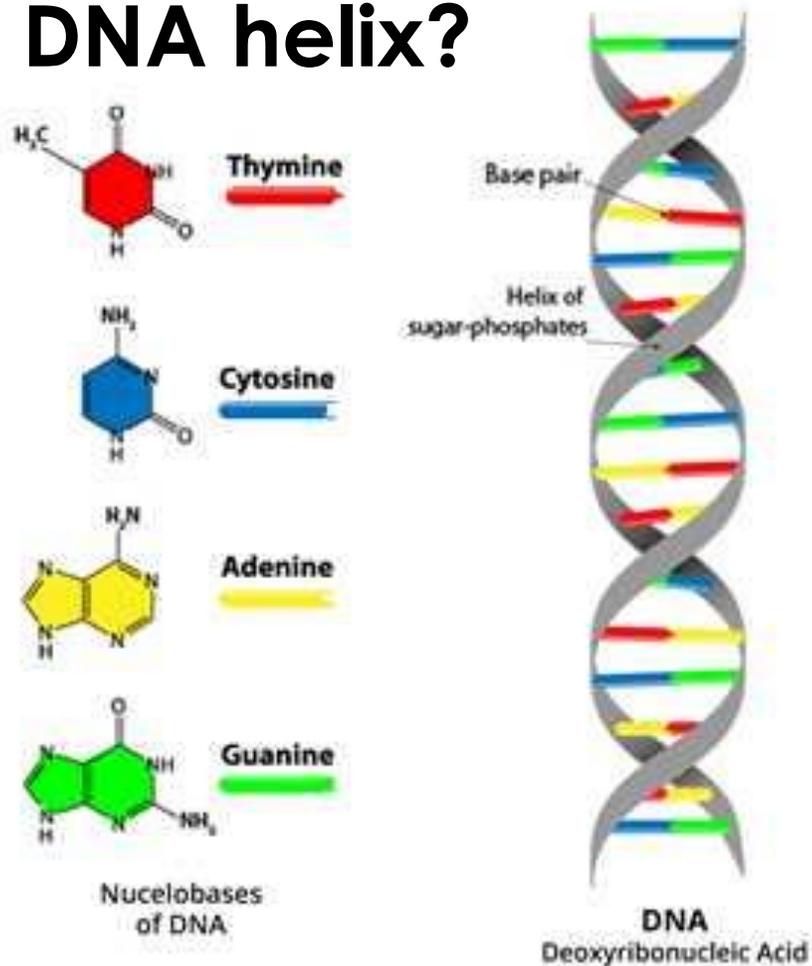
**Challenge: Describe how genes from a parent are passed onto offspring. Use the words: gametes, chromosomes, dominant, recessive, fertilisation and alleles in your answer.**





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)

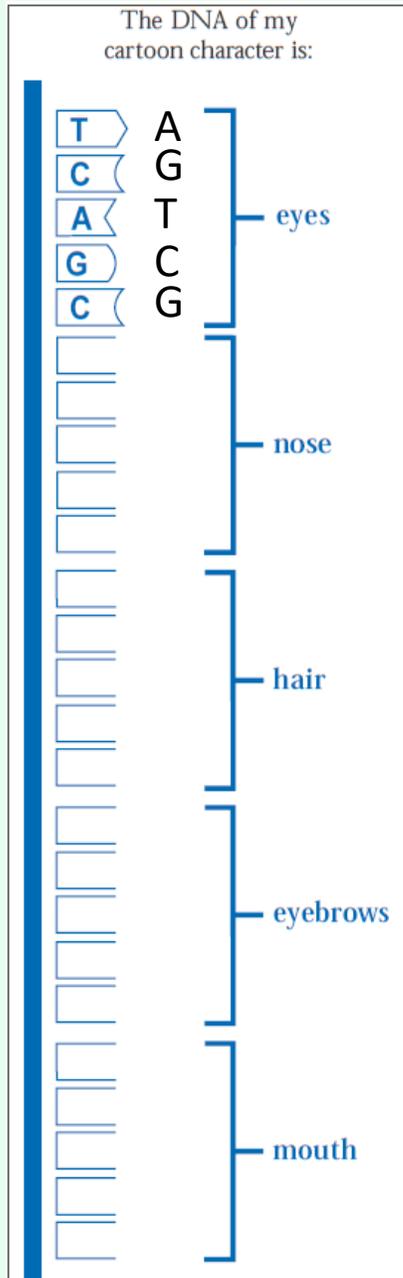


Independent  
Whisper

## 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.



**GTACA – small and round**  
**ACGGT – long and thin**

**CTGCC - ginger**  
**CTAAC - blonde**  
**TTGCA - brown**

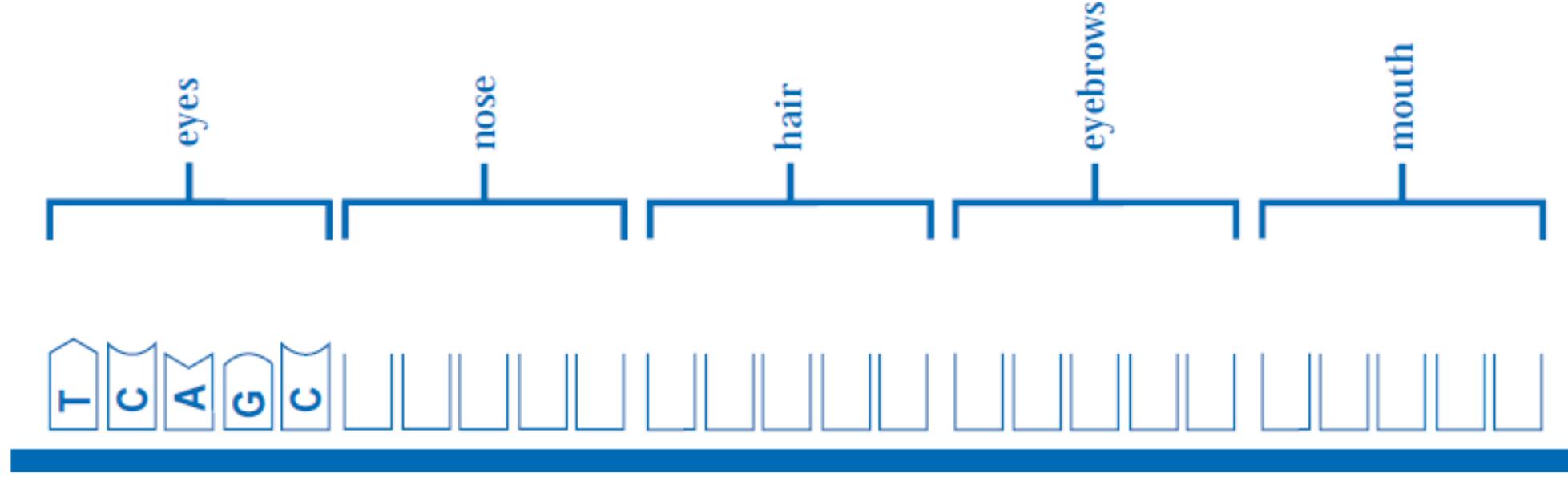
**ATTGC - rounded**  
**GACCT – long and thin**

**CGCCT – long and wide**  
**TCGGC – thin and narrow**

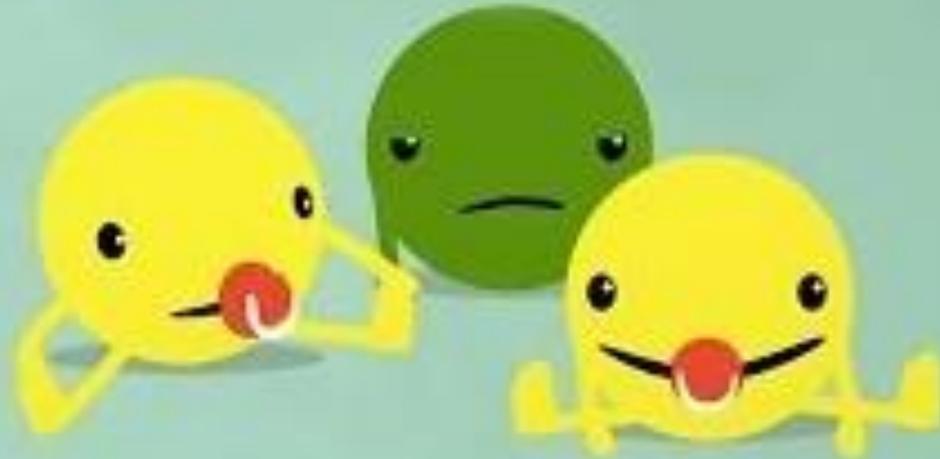
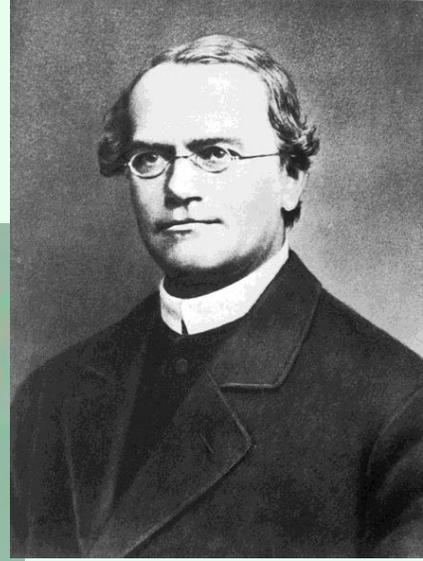
### Challenge:

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

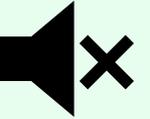
06/11/2020

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

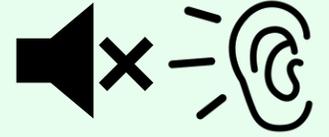
4



Present the outcomes of crosses using percentages

5-6

New learning



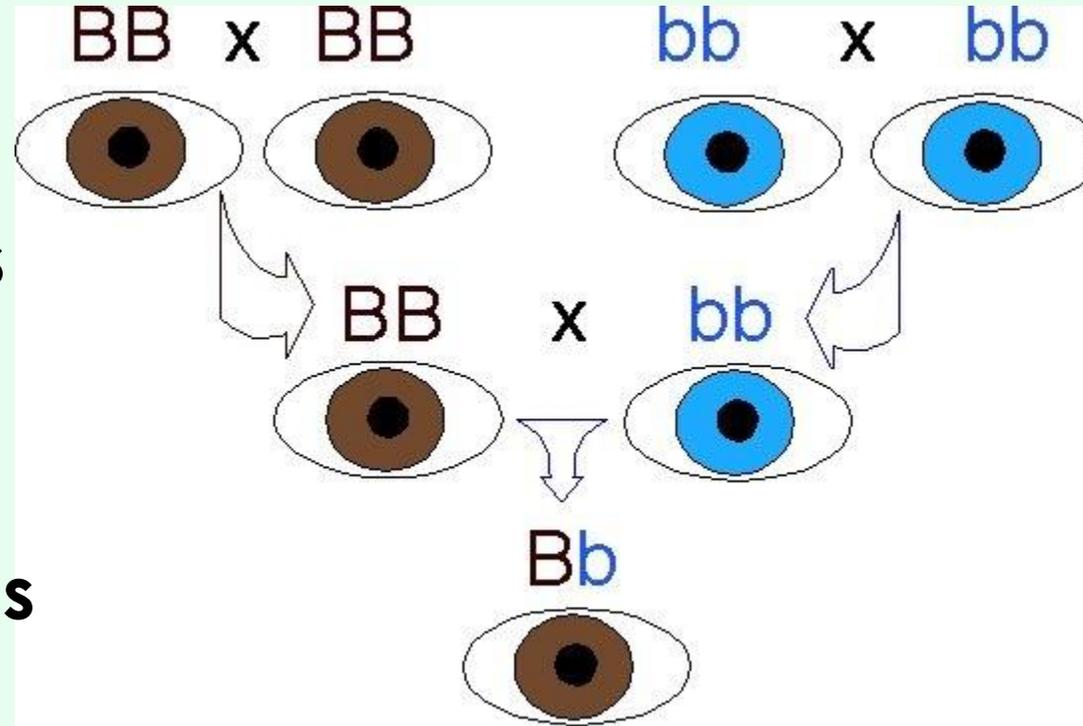
Genotype: BB, Bb or bb

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

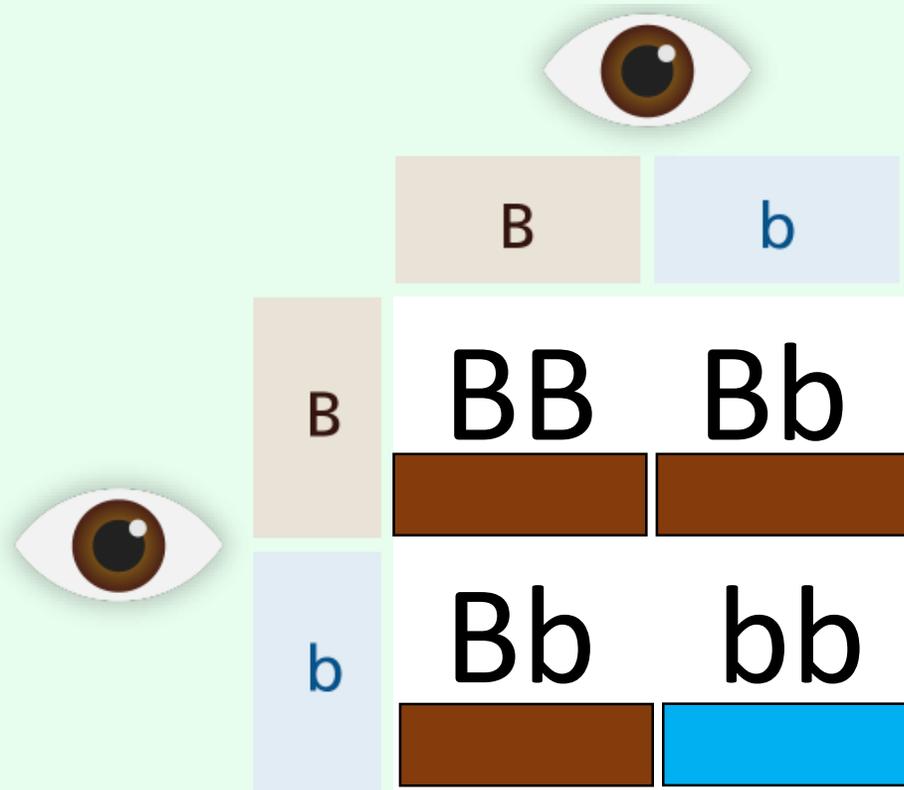
**BB** – Homozygous  
**B** – Dominant

**Bb** – Heterozygous

**bb** – Homozygous  
**b** – Recessive

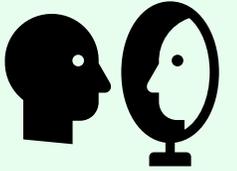


Thinking time



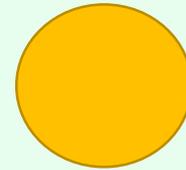
B - dominant brown eye allele

b - recessive blue eye allele

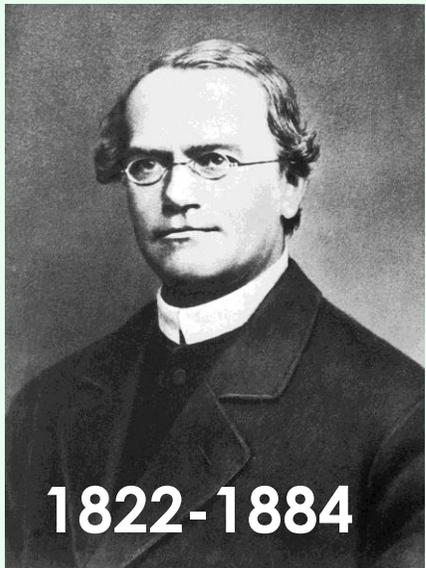


L2/3: Complete the Punnet square to show outcomes of genetic crosses

Genotypes	Phenotypes
AA	 Yellow
Aa	 Yellow
aa	 Green



	A	a
A		
a		



1822-1884

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

# Application of learning



Independent  
Whisper

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

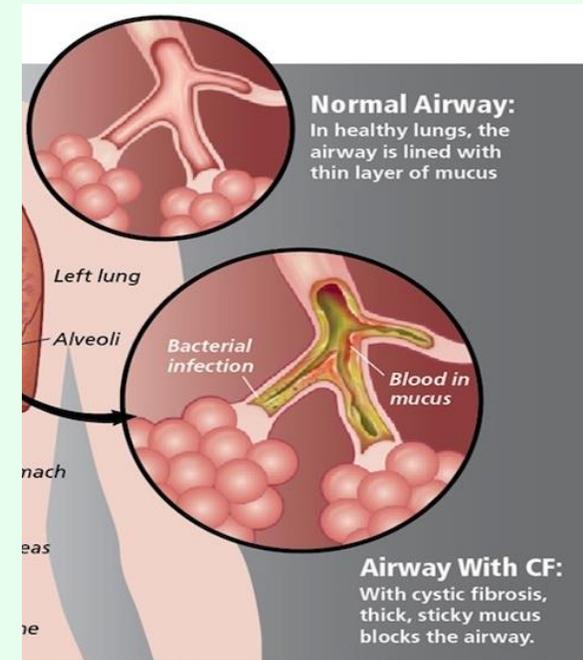
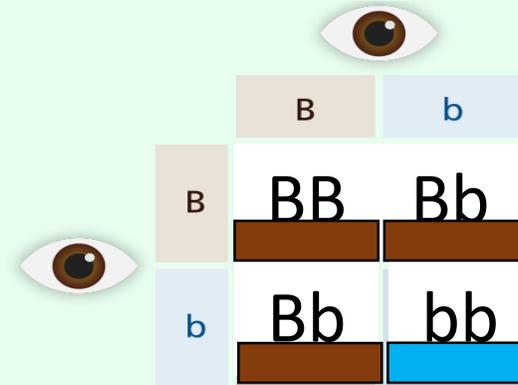
## Task:

Complete the genetic crosses for the Simpsons family.

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

## Challenge:

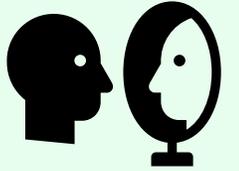
Cystic fibrosis is a **recessive** disease (**ff**). What is the likelihood of a child having cystic fibrosis when two **heterozygous parents** (carriers) have children? (Hint: Use the Punnet Square).



# Answers to Punnet squares worksheet

## 1) Hair Colour

Reflection and Reteach



	<b>B</b>	<b>B</b>
<b>b</b>	<b>Bb</b>	<b>Bb</b>
<b>b</b>	<b>Bb</b>	<b>Bb</b>

2 marks

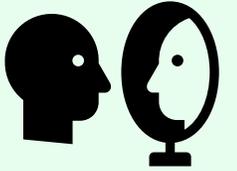
What is the percentage chance that the child will have black hair?

**100%**



# Answers to Punnet squares worksheet

## 2) Nose Shape



	<b>R</b>	<b>r</b>
<b>r</b>	<b>Rr</b>	<b>rr</b>
<b>r</b>	<b>Rr</b>	<b>rr</b>

**2 marks**

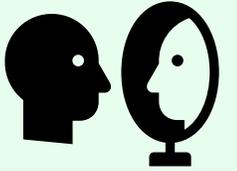
What is the percentage chance that the child will have a pointy nose?

**50%**



# Answers to Punnet squares worksheet

## 3) Eye Shape



	<b>R</b>	<b>r</b>
<b>r</b>	<b>Rr</b>	<b>rr</b>
<b>r</b>	<b>Rr</b>	<b>rr</b>

**2 marks**

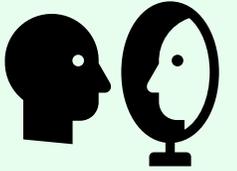
What is the percentage chance that the child will have a round eyes?

**50%**



# Answers to Punnet squares worksheet

## 4) Tongue rolling



	T	t
T	TT	Tt
t	Tt	tt

2 marks

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

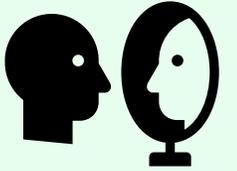
75%



# Answers to Punnet squares worksheet

## Hair Colour

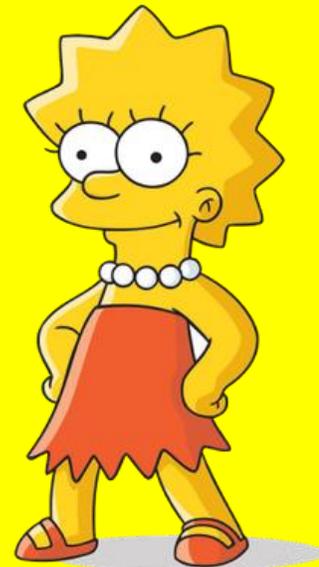
Reflection and Reteach



	<b>B</b>	<b>b</b>
<b>B</b>	<b>BB</b>	<b>Bb</b>
<b>b</b>	<b>Bb</b>	<b>bb</b>

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

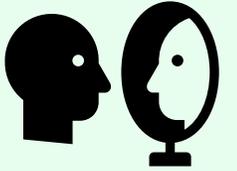
**25%**



# Answers to Punnet squares worksheet

## Hair colour

### Reflection and Reteach



	<b>B</b>	<b>b</b>
<b>B</b>	<b>BB</b>	<b>Bb</b>
<b>b</b>	<b>Bb</b>	<b>bb</b>

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

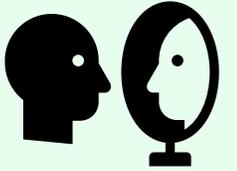
**75%**



# Answers to Punnet squares worksheet

## Hair Colour

### Reflection and Reteach



	<b>B</b>	<b>b</b>
<b>B</b>	<b>BB</b>	<b>Bb</b>
<b>b</b>	<b>Bb</b>	<b>bb</b>

**4 marks**

4) Which is the dominant allele?

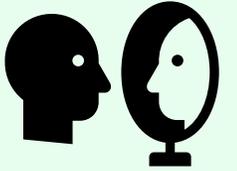
**B**

5) Which is the recessive allele?

**b**

# Answers to Punnet squares worksheet

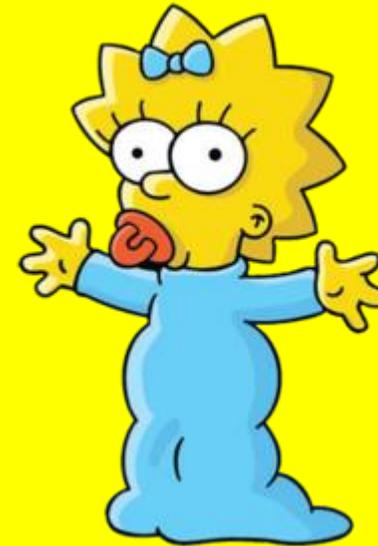
## Nose Shape



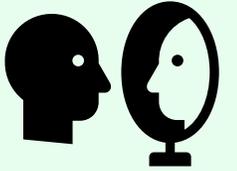
	R	r
R	RR	Rr
R	RR	Rr

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

**50%**



MATT GROENING



	<b>R</b>	<b>r</b>
<b>R</b>	<b>RR</b>	<b>Rr</b>
<b>R</b>	<b>RR</b>	<b>Rr</b>

**4 marks**

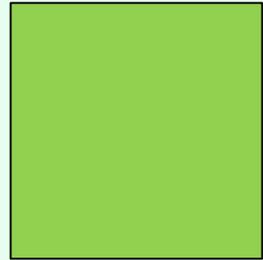
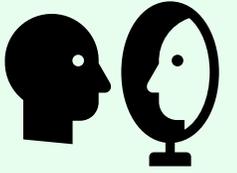
4) Which is the dominant allele?

**R**

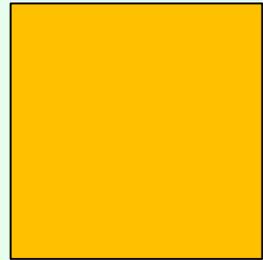
5) Which is the recessive allele?

**r**

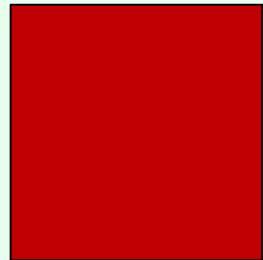
# Final Reflection



6-8



3-5



0-2

