

Fold in half at the line ----->

Glue on this side

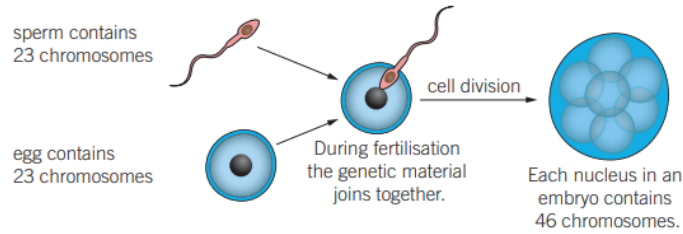
Inheritance

1	I can state that a gene is the unit of inheritance.
2	I know that genes are sequences of DNA and arranged on chromosomes.
3	I can discuss the roles of Watson, Crick, Wilkins and Franklin in the discovery and development of the DNA model
4	I can complete a genetic diagram using a Punnett square
5	I can explain what genetic modification is and identify useful examples.

	Keyword	Definition
1	allele	Different forms of a gene.
2	chromosome(s)	Thread-like structure containing tightly coiled DNA. It contains many genes.
3	DNA	A molecule found in the nucleus of cells that contains genetic information.
4	dominant (allele)	A dominant allele will always be expressed if it is present.
5	gene	A section of DNA that determines an inherited characteristic.
6	gene bank	A store of genetic samples, used for research and to try to prevent extinction.
7	inherited characteristic(s)	Features that are passed from parents to their offspring.
8	mutation	Change to DNA that can cause disease.
9	Punnett square	A diagram used to show the possible combinations of alleles inherited from the parents.
10	recessive	A recessive allele will only be expressed if two copies are present.

Inheritance

- Characteristics** are passed along from parents to their offspring
- Half of the genetic information comes from each parent, this is passed on through the sex cells in the process of fertilisation

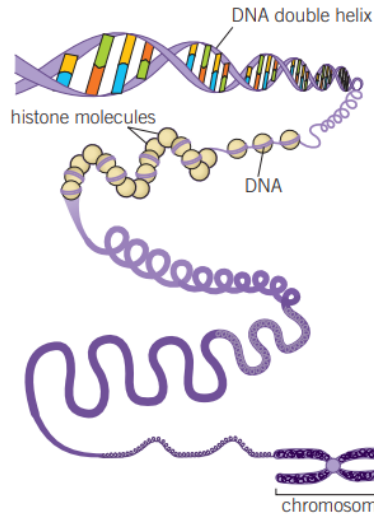


- DNA** is the material which contains all of this genetic information

DNA – in the shape of a double helix

Genes – a section of DNA which hold the information for a particular characteristic

Chromosomes – long strands of DNA which hold many genes, humans have 46 of these in the nucleus of cells



DNA molecule

DNA combined with histones

DNA – histone complex is coiled

Coils fold to form loops

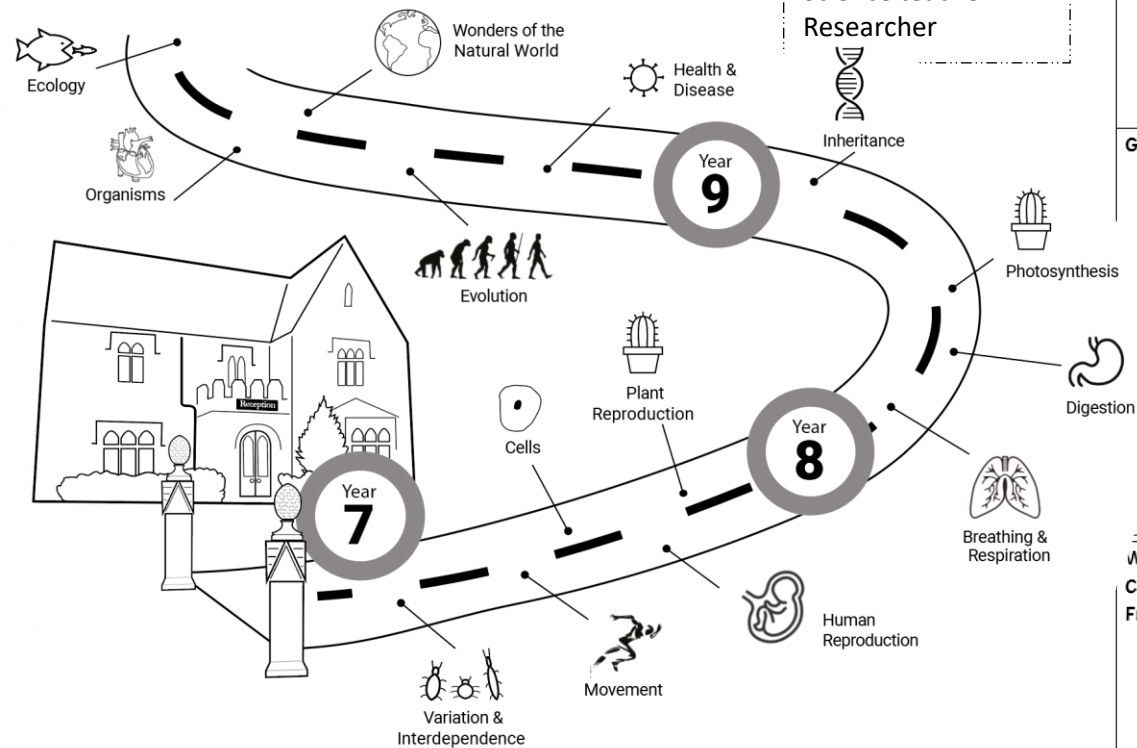
Loops coil and pack together to form the chromosome

Prior Knowledge From KS2:

In KS2 you have already studied that animals and plants are adapted to suit their environment, living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.

Careers:

Geneticist
Genetic engineer
Microbiologist
Biomedical scientist
Science teacher
Researcher



Punnett squares

Possible alleles from father			
Possible alleles from mother		B (dominant allele for brown eyes)	b (recessive allele for blue eyes)
	b (recessive allele for blue eyes)	Bb Offspring will have brown eyes as B is dominant	bb Offspring will have blue eyes as both alleles are recessive
	b (recessive allele for blue eyes)	Bb Offspring will have brown eyes as B is dominant	bb Offspring will have blue eyes as both alleles are recessive

Genetics

- For every characteristic an organism will have two **alleles**, this is two different genes which can code for the same characteristic, one is inherited from each parent
- Dominant** alleles will cause the characteristic to be displayed even if they are with another allele, this is represented by a capital letter
- Recessive** alleles will not be displayed as characteristics unless there are two of the same allele, they are the characteristic least likely to be shown, this is represented by a small letter
- We can predict the inheritance of characteristics using a **Punnett square**

Why?

With the advent of CRISPR, three parent embryos and genetically modified food / organism becoming normalised this topic allows for the understanding of advances in genetics. Gene mutations occur continuously and on rare occasions can affect the functioning of the animal or plant and therefore evolution of a species.

Future Learning:

At GCSE you will learn how variation generated by mutations and sexual reproduction is the basis for natural selection; this is how species evolve and how an understanding of these processes has allowed scientists to intervene through selective breeding to produce livestock with favoured characteristics.

Homework Menu Grid

Topic	1 Point	2 Points	4 Points	6 Points	10 Points
What is inheritance 	List three features you might inherit off a parent.	How many chromosomes are found in: A sperm cell An egg cell A skin cell	Arrange the following in order of size from largest to smallest: Chromosome, nucleus, cell, gene, DNA.	Draw a labelled diagram of how identical, and non-identical twins are formed.	Produce a news report on the topic of 'DNA mutation' what is it? Can you give some examples of mutations that could happen to humans.
DNA 	Find out what DNA stands for.	Describe the structure of DNA.	Write 3 truths and 2 lies about inheritance. Ask a friend to work out the truths.	Research what percentage of DNA we share with a chimpanzee and a banana. Why don't we look like either of those things?	Using any materials of your choice, create a model to show the structure of DNA. This could be done with sweets!
Genetics 	Write the definition of the term 'allele'	Give an example of a recessive allele, and a dominant allele.	Describe how you show if a gene is dominant or recessive	Research 'cystic fibrosis' and 'polydactyl'. Write one similarity and one difference between these two genetic diseases.	Write a 'rap' to summarise this topic so far.
Genetic modification 	Define genetic modification.	Create a list of keywords and definitions for this topic so far.	How might genetic modification end famine in developing countries? Discuss You must give one reason why it could, and one reason why it could not.	Research some more examples of genetically modified organisms.	Design your own genetically modified organism. What change have you made to its genes? Why is this beneficial?
Watson, Crick and Franklin 	What are the full names of Watson, Crick and Franklin.	Print off or draw a picture of photo 51. Write a caption to describe what the picture is showing.	Find a picture of Watson and Crick's model of DNA. Research which museum it is currently being displayed in.	Draw a series of pictures to show the history of the discovery of DNA.	Write a letter to Rosalind Franklin. Tell her how much her contributions to the structure of DNA are appreciated in this day and age.