

Lesson 2: Chromosomes and genes

We have learnt that genetic traits determine what we look like and how our bodies function.

This means information about which particular genetic traits we have is stored somewhere in our bodies. Have you ever wondered where this information is found?

You have probably inferred correctly that it has something to do with genes and chromosomes.

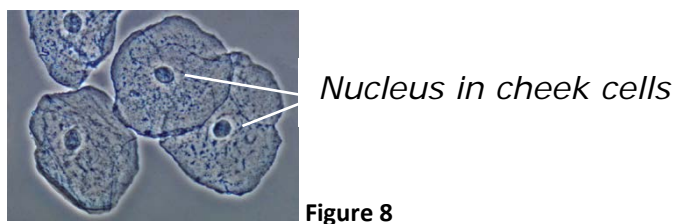
- Genes provide the information for all of our genetic traits. Our particular combination of genes makes us unique.
- Genes are on chromosomes.

What are chromosomes?

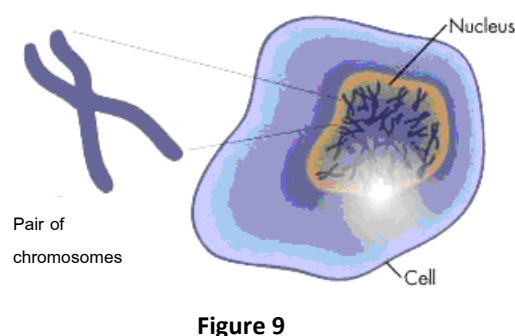
Chromosomes are thread-like structures found in the nucleus of cells.

Remember from your previous work in science that:

- All living things are made of tiny building blocks called cells.
- Cells have a nucleus.

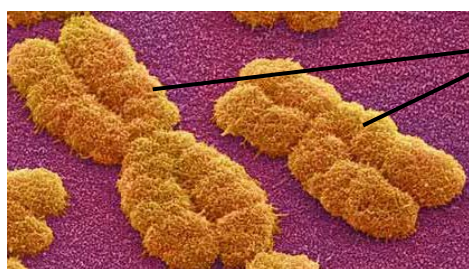


To find chromosomes we need to look inside the nucleus of a cell.



Chromosomes are thread-like structures in the nucleus. They are in pairs.

The chromosomes below have been magnified millions of times. They are in pairs.



The image shows a pair of chromosomes.

Figure 10

All living things have chromosomes and genes

The genetic traits of every living thing are determined by the genes carried on the chromosomes. Each type of organism has a specific set of chromosomes and a definite number of genes.

Organism	Number of pairs of chromosomes	Number of genes
fruit fly	4	13 600
human	23	20 000 to 30 000 (exact number unknown)
dog	39	25 000
mouse	20	23 000



Activity 4 – All living things have chromosomes and genes

Use the information in the table above to complete the following exercise.

A student has written a summary of the information in the table. Your task is to mark the summary by placing a tick next to the correct statements or, for those that are incorrect, write in the correct information

1. Fruit flies have 4 chromosomes.
2. A dog has more pairs of chromosomes than a human but less than a mouse.

3. Scientists have worked out the exact number of genes a human has.
4. A fruit fly has the least numbers of genes than any other living thing in the table.
5. A human has 23 pairs of chromosomes.



Check your response by going to the Suggested answers section.

All plants and animals have pairs of chromosomes in the nucleus of body cells but there are different numbers of chromosomes in each type of organism.

Humans have 23 pairs of chromosomes in the nucleus.

Below is an image of the 23 pairs of human chromosomes. These have been taken from a nucleus of a body cell, isolated, arranged and then greatly enlarged.

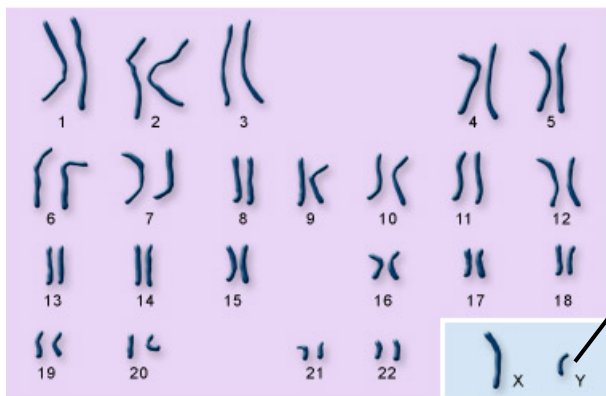


Figure 11

This pair of chromosomes is very special. We'll learn more about these later on in the topic.

Genes are on chromosomes. There are many genes on each pair of chromosomes.

Humans have between 20 000 to 30 000 genes. The exact number of human genes is not known yet. Scientists are still

researching to find out the exact number. They are also researching the exact location of every gene on a chromosome.

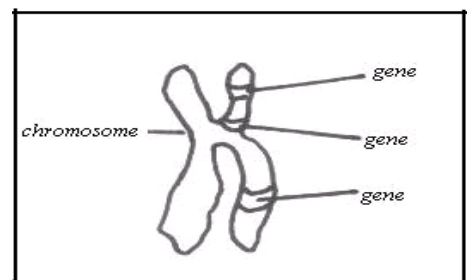


Figure 12



Activity 5 - Completing a summary

1. Use the word bank to fill in the blanks to make your summary.

nucleus	genes	person	unique
cells	chromosomes	23 pairs	genetic traits

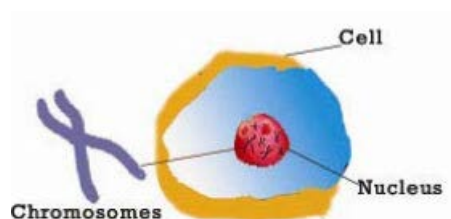
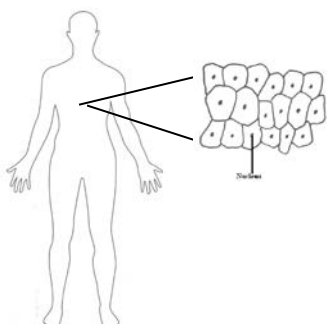


Figure 13

1. Each person is made up of millions of c_____.
2. Inside each cell is one n_____.
3. In each nucleus there are c_____.
4. Humans have _____ of chromosomes.
5. Each pair of chromosomes carries many _____.
6. Genes are the code for our _____.
7. Our genetic traits make us _____.
8. Each of us is a unique _____.



Figure 14



Check your response by going to the Suggested answers section.

Summary

- Genes are a code. The code determines genetic traits
- Chromosomes carry genes.
- Chromosomes are found in the nucleus of cells.
- Humans have 23 pairs of chromosomes.
- All living things have chromosomes and genes.



Complete the exercises for Lesson 2 in the Send-in exercises

Lesson 2

Finish each of the sentences with one of the phrases written in the box below.

.....that are long, thin thread-like structures.
.....and humans have billions of them.
.....or 46 altogether.
.....which is like the control centre for the cell.
.....that control the features we inherit from our parents.

There is a hint under each line, telling which information you need to look for in correct phrase.

a) Every living thing is made of cells _____

_____ *How many cells do humans have?*

b) Inside each cell is a nucleus _____

_____ *What job does the nucleus do?*

c) Packed inside the nucleus are chromosomes _____

_____ *What do chromosomes look like?*

d) Humans have 23 pairs of chromosomes _____

_____ *How many chromosomes are there altogether?*

e) Chromosomes carry genes _____

_____ *What do genes do?*