

2.3

CELL DIVISION

Name _____

LEARNING OUTCOMES
CCEA GCSE BIOLOGY: 2.3.1 - 2.3.14
UNIT 2.3 Cell Division & Genetics

	LEARNING OUTCOMES	PUPIL SELF-EVALUATION		
		Good	Average	Requires Attention
	Pupils should be able to:			
1	Use secondary data to investigate the growth of humans (height and mass), and understand the advantages and disadvantages of other measurements of growth, to include cell length, number of cells and dry mass			
2	Understand that mitosis allows organisms to grow, to replace worn out cells and to repair damaged tissue;			
3	Outline mitosis in terms of the exact duplication of chromosomes producing daughter cells that are genetically identical to parent cells (clones) – names of phases and details of DNA replication not required;			
4	Know that asexual reproduction in plants results in genetically identical offspring (clones) illustrated by tissue culture (outline only);			
5	Understand that cancer cells are produced by uncontrolled cell division which can result in two types of tumour - benign (encapsulated and not spreading) and malignant (capable of spreading)			
6	Understand the causes of cancer:			
	· radiation – UV radiation only;			
	· chemicals – smoking only;			
	· viruses – Human Papilloma Virus only			
7	Research secondary sources to examine the incidence of lung, skin and cervical cancer in Northern Ireland			
8	Understand the importance of early detection in improving the survival rate of cancer patients: screening programmes for breast, cervical, testicular and skin cancer			
9	Know various treatment methods for cancer: surgery, radiotherapy and chemotherapy			
10	Understand fertilisation as a means of restoring the diploid number and combining different sets of chromosomes			
11	Understand meiosis as reduction division (one cell producing four genetically different, haploid daughter cells) and as a process which, through independent assortment, re-assorts the chromosomes to provide variation (crossing over and stages of meiosis not needed)			
12	Understand and interpret genetic diagrams consisting of a single characteristic controlled by a single gene with two alleles (monohybrid cross) in plants, animals and humans			
	· dominant and recessive alleles;			
	· genotype, phenotype, gamete and offspring ratios, percentages and probabilities;			
	· homozygous and heterozygous genotypes;			
	· punnett squares to determine genotype frequencies;			
	· test (back) crosses to determine an unknown genotype;			
	· pedigree diagrams			
13	Understand how sex is determined in humans			
14	Understand and explain how some genetic disorders are sex linked (the inheritance of haemophilia and red/green colour blindness)			

Terminology

UNIT TEST RESULT:

%

GRADE:

PUPIL COMMENT

TEACHER COMMENT

Measuring Growth

Sketch graphs

Human height against time

Human mass against time

- Two methods to measure growth are _____ and _____.
- Other measurements of growth are _____;
_____; _____.
- Dry mass is _____

It is found by drying in an incubator until there is _____

Method	Advantages	Disadvantages	Organism measured this way
CELL LENGTH			
NUMBER OF CELLS			
DRY MASS			

Questions

- Jane is 20 years old and has had her height and mass measured at regular intervals over one year. Suggest why her mass showed greater variability than her height.

- Suggest why organisms need to be dried until there is a constant mass.

- Explain why dry mass is likely to be a more accurate measurement of plant growth than mass without drying.

Mitosis

- It is important _____

- This means _____

- This type of cell division _____

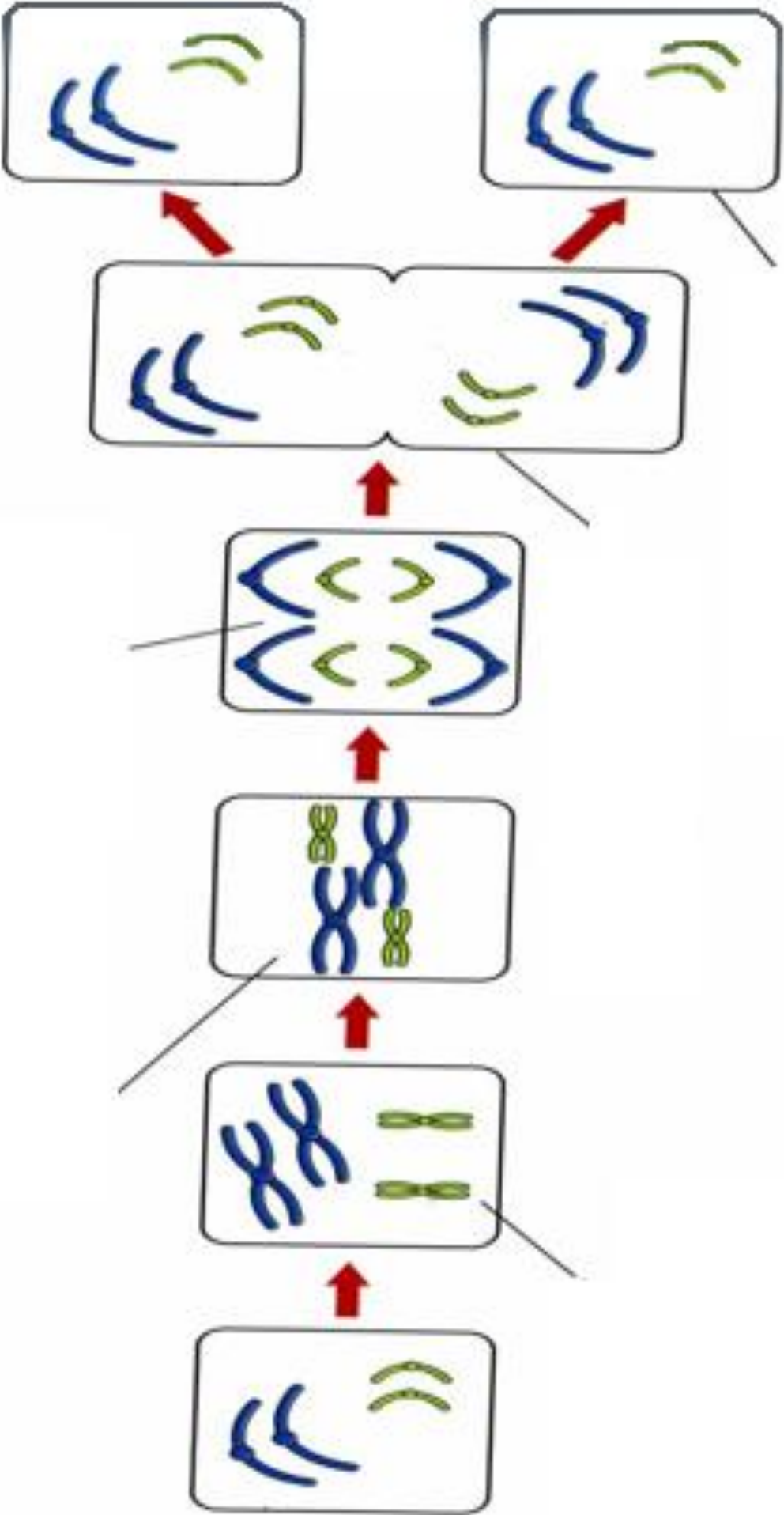
Mitosis is the type of cell division used in

1. _____
2. _____
3. _____

Chromosomes make an identical copy of themselves before the cell divides.

The copies are called _____ and are held together at the _____.

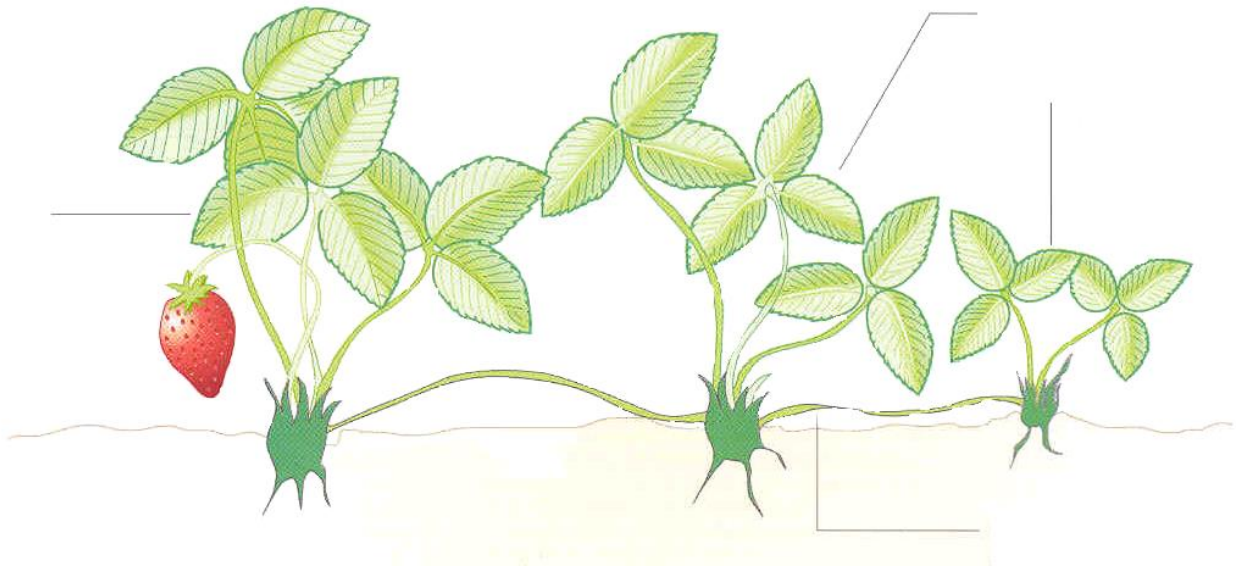
Mitosis (only two pairs of chromosomes are shown)



Asexual Reproduction in Plants

- This produces _____ offspring.
- Cells from the parent plant _____ of themselves.
- An example is _____ producing new plants.
- Because the new plants are genetically identical to the parent they are called _____

Propagation of Strawberry plants Natural cloning



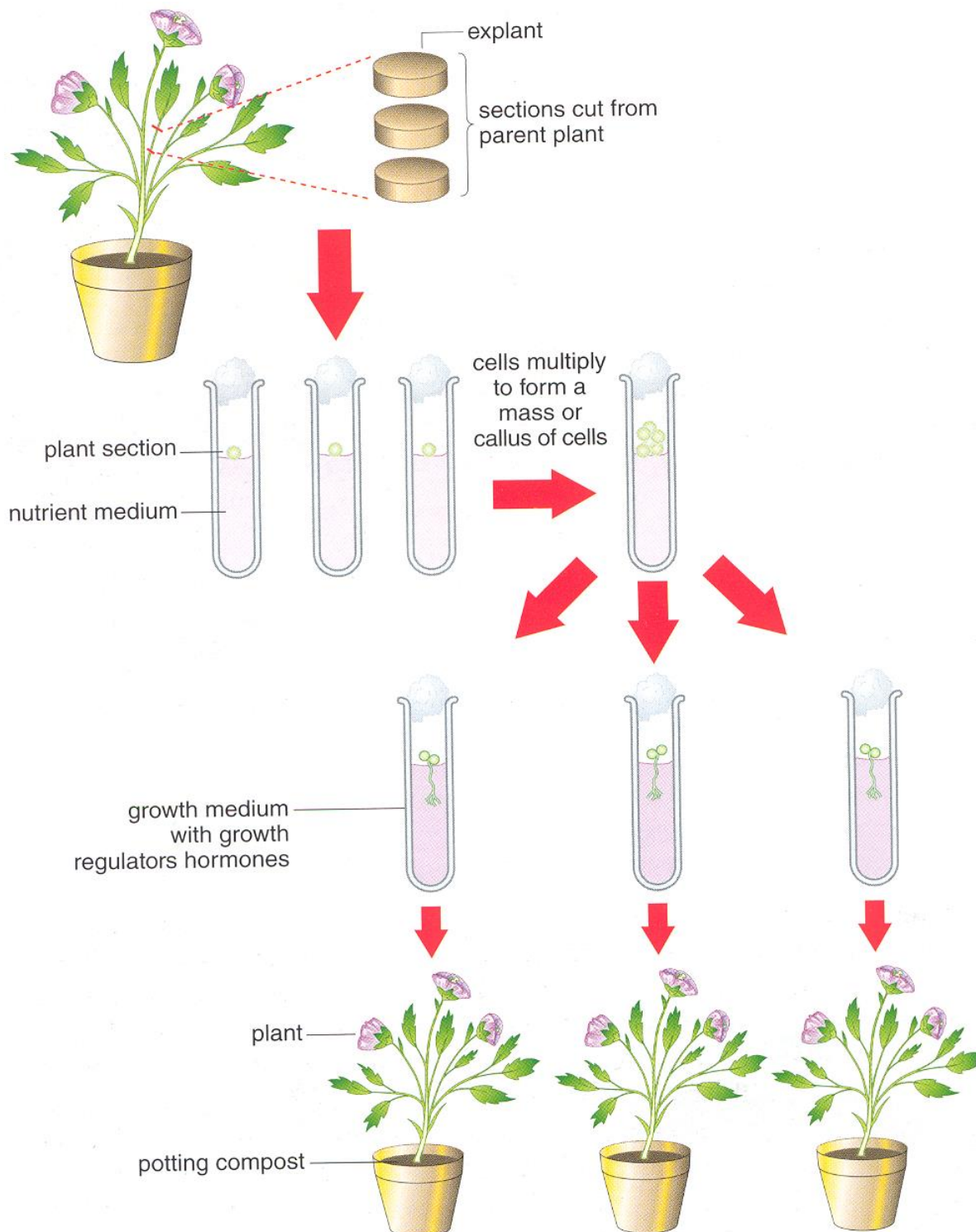
Taking Cuttings

Geranium cuttings

REVISE FROM Y11 1.8 COORDINATION IN PLANTS

Tissue Culture

- This is a type of cloning that **can be carried out all year** round in a lab.
- It must be carried out by scientists _____
producing disease free varieties
- This is used to conserve very rare plants e.g. _____



Advantages of Plant cloning

- _____

- _____

Disadvantages of Plant cloning

- _____

#Taking cuttings and Tissue culture



Tweet to your friend information about how to carry out taking cuttings and tissue culture. Remember your tweet cannot be more than 140 characters long.

Cancer

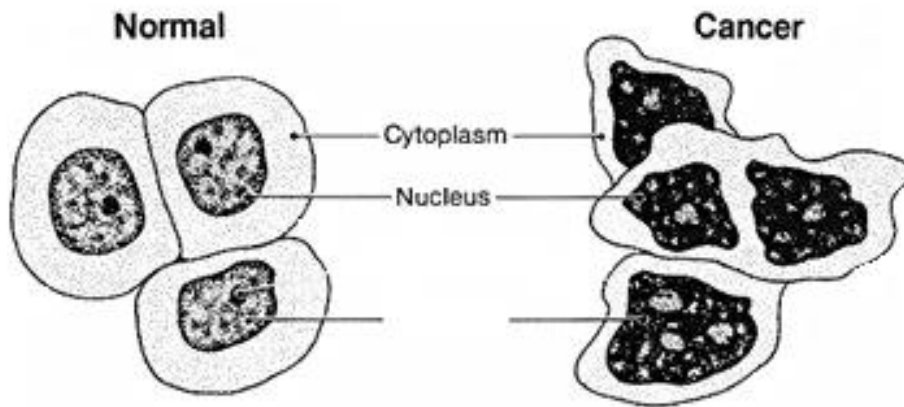
Cancer is produced by **uncontrolled cell division**.

Some causes of cancer include:

- **UV radiation**- this is produced from the sun or sunbeds and causes skin cancer.
- Chemicals in cigarette smoke namely **TAR** can cause lung cancer.
- **Viruses** eg Human papilloma virus which can cause cervical cancer.

Abnormal cells may:

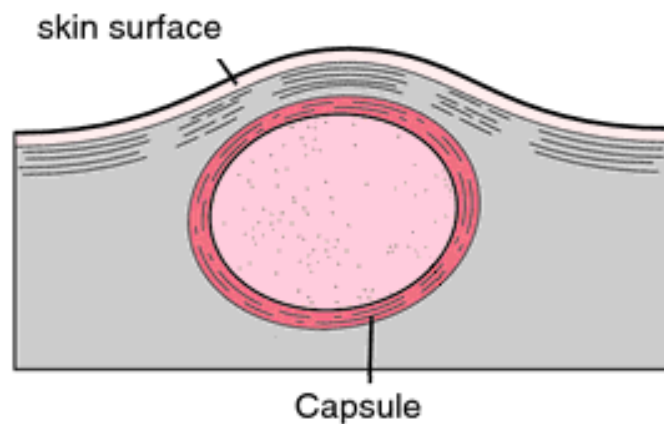
- _____
- _____
- _____
- _____
- _____



Cancer cells grow in clumps called T_____

Benign tumours

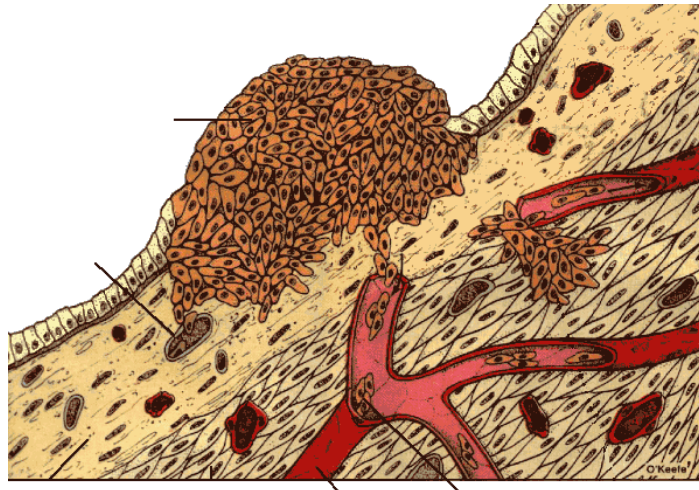
- _____
- _____
- _____



Malignant tumours

- _____
- _____
- _____
- _____

The cells of a malignant tumour can be carried to other parts of the body in the blood or lymphatic systems THEREFORE the cancer can spread and new tumours can grow in different parts of the body



The importance of detecting cancer early

- If a cancer is detected early the tumour will be _____

- It is also important to detect a malignant tumour _____

- Therefore early detection _____

Screening programmes

- These programmes aim to identify the cancer before _____

- These are available to detect _____

Treating Cancer

Once cancer has been identified there are a number of treatment options:

- _____
- _____
- _____

Meiosis

- Meiosis is another type of cell division
- It occurs in the _____ to produce sperm and eggs (gametes).
- The purpose of meiosis is to produce gametes with _____ the number of chromosomes of all the other cells in the body.
- As meiosis halves the chromosome numbers in the daughter cells it is also known as _____.
- Most human cells have _____ chromosomes arranged in _____.
- Sperm and eggs produced by meiosis have only _____ chromosomes.
- It is not just any 23 chromosomes from the 46 but _____.
- It could be either chromosome of a particular pair that passes into the sperm or egg. So there are millions of potential chromosome combinations **2^{23} possibilities**.
- This _____ of chromosomes in meiosis at gamete formation gives unique gametes helps produce _____.

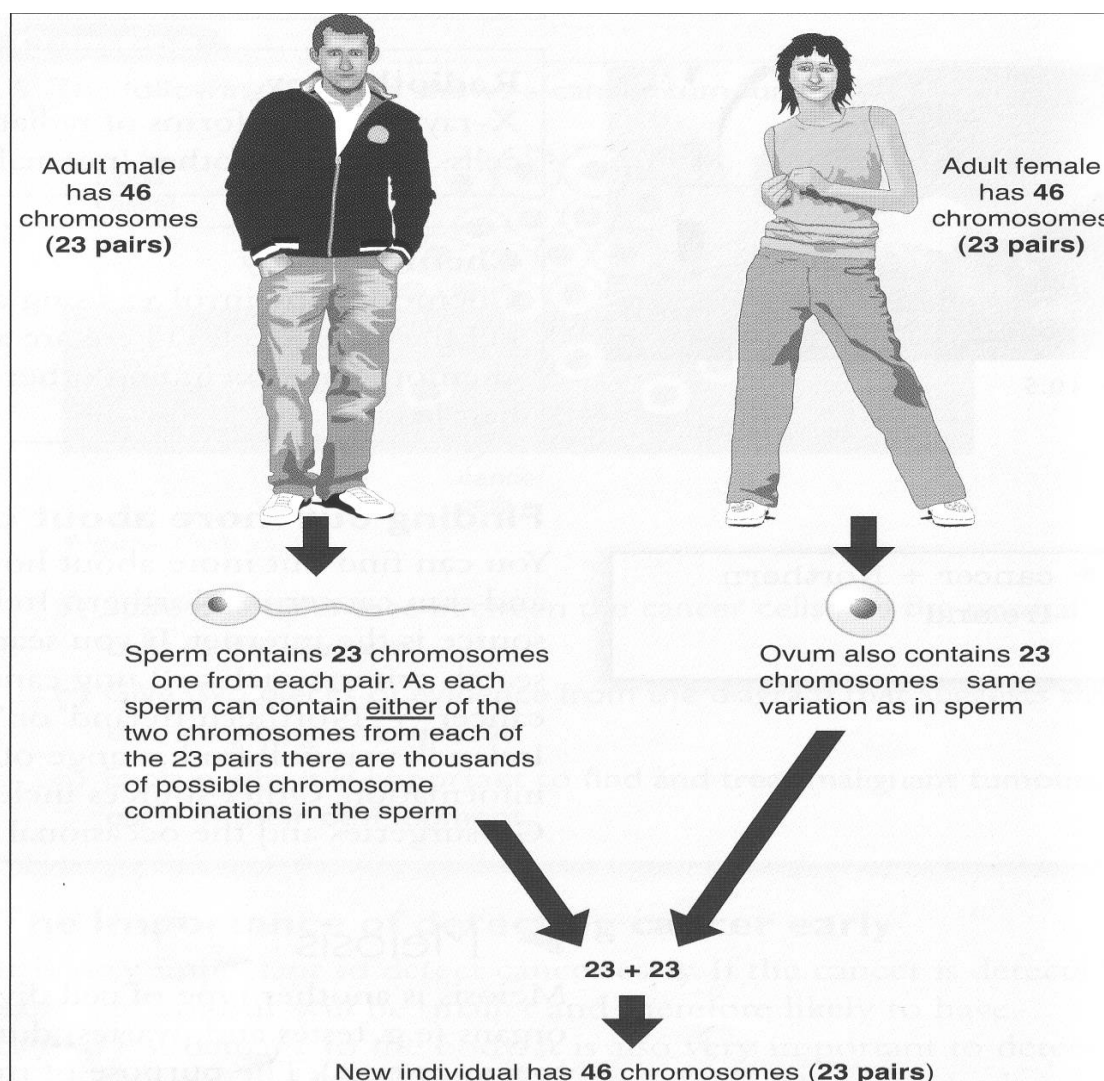


Figure 10.6 Chromosomes in human reproduction

Haploid and diploid

- The chromosome number in the gametes is termed the _____ (23 in humans).
- The normal number in an organism is termed the _____ (46 in humans).
- Therefore fertilisation _____ in the offspring and combines the different arrangements of chromosomes produced during meiosis.

The differences between mitosis and meiosis

Figure 10.7 summarises the differences between mitosis and m

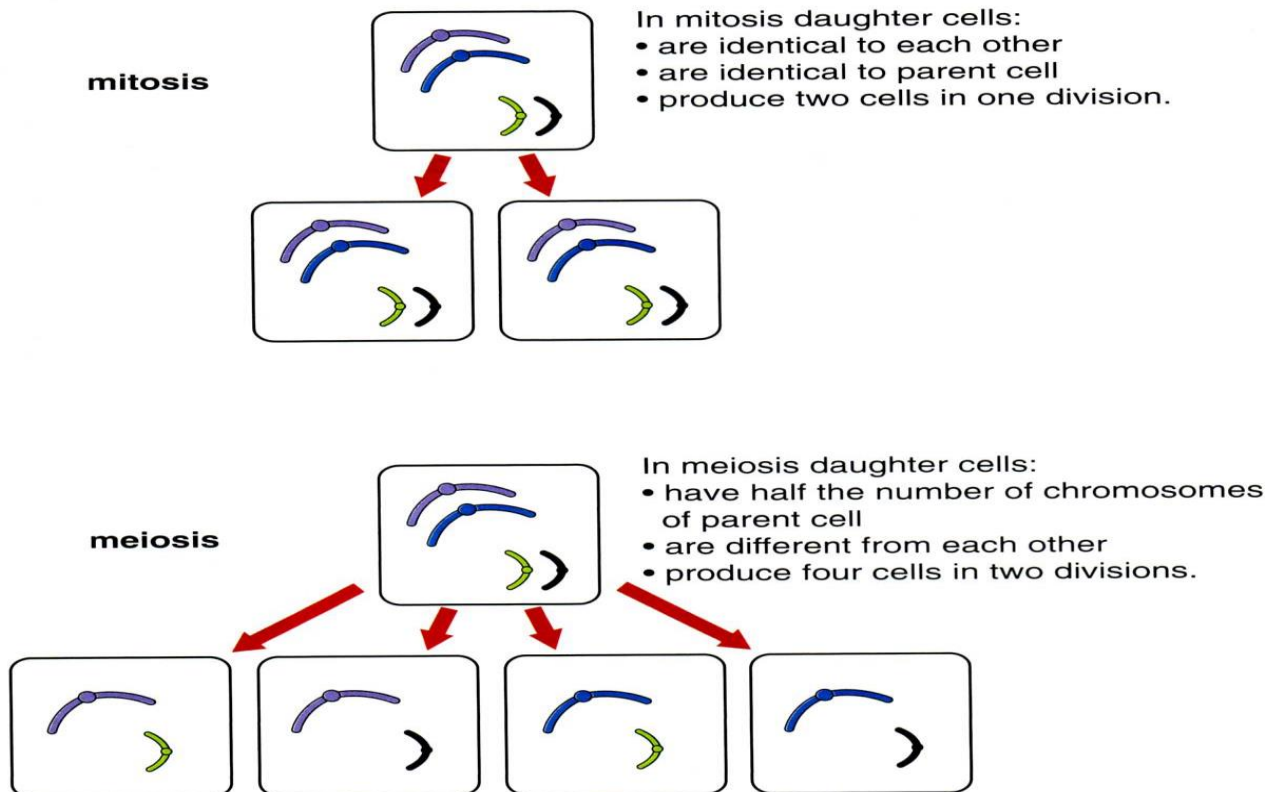


Figure 10.7 The differences between mitosis and meiosis (only two pairs of chromosomes are shown)