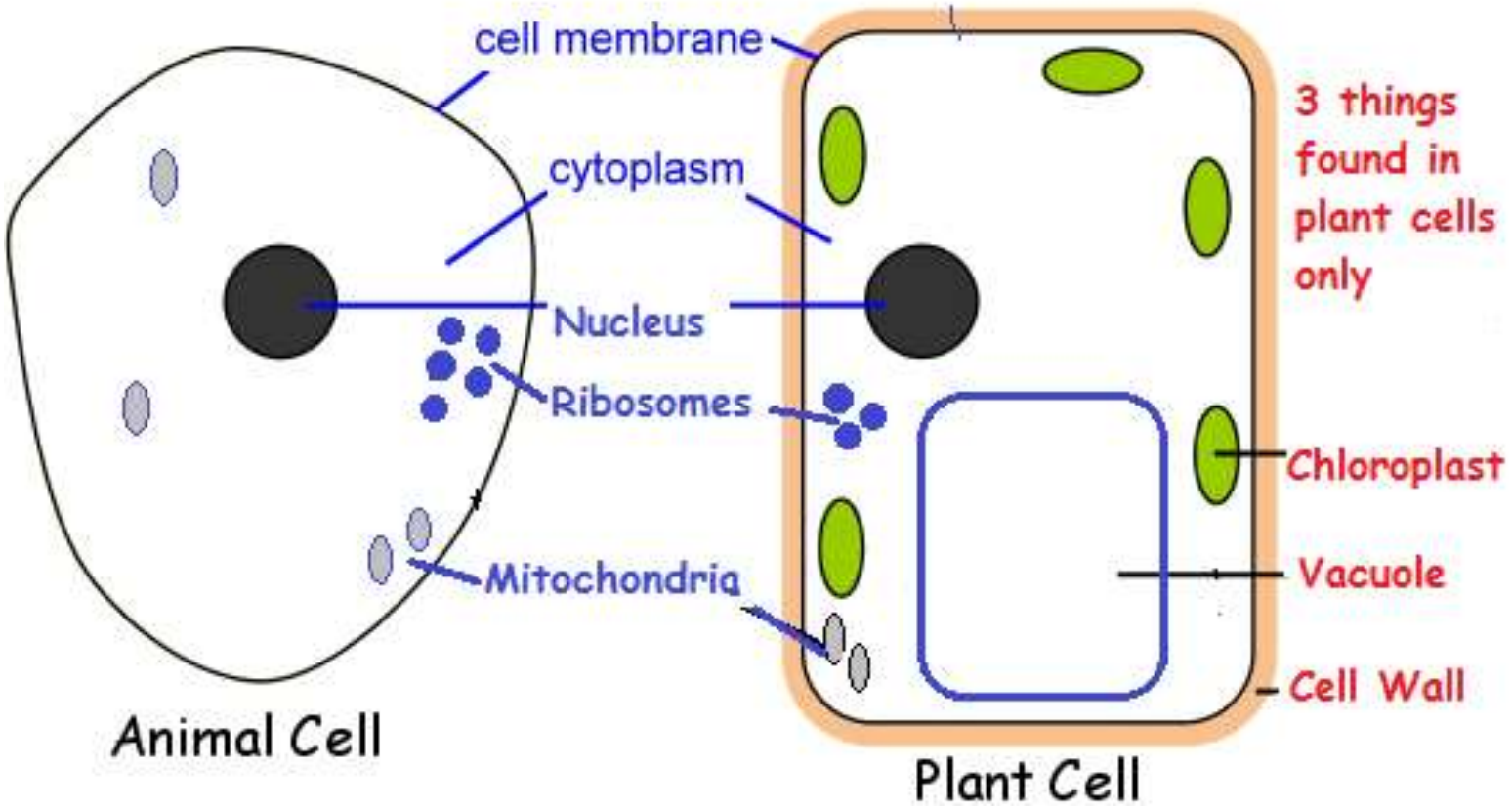
Biology Revision

- Cells, tissues and organs
- Organisms in the environment
- Enzymes
- Respiration
- Inheritance
- Species

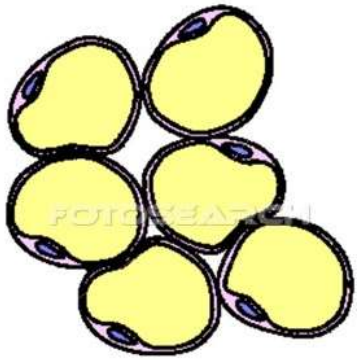
Cells, Tissues and Organs



Nucleus	Controls the activity in the cell. Contains the DNA (chromosomes and genes). Carries the instructions for making new cells**.**
Cytoplasm	A jelly like liquid where most the chemical reactions take place.
Cell membrane	Controls what comes in and out of the cell (gas exchange)
Mitochondria	The site of respiration, oxygen is used here to release energy for the body.
Ribosomes	Protein synthesis. All the proteins needed in the cell are made here.
Cell wall	Made of cellulose provides structure and support for the cell.
Chloroplasts	Found in green parts of a plant, they contain chlorophyll. Chlorophyll is needed to absorb sunlight during photosynthesis.
Permanent vacuole	A space in the cytoplasm that is filled with cell sap. Important for keeping the cells rigid for support.

Cells, Tissues and Organs

Specialised cell – A cell adapted to do a particular job



Cells, Tissues and Organs

Diffusion

- Movement of particles in a liquid or gas from high concentration to low concentration
- Speed up diffusion by increasing concentration gradient or the temperature

Osmosis

- The movement of water across a cell membrane

Cells, Tissues and Organs

- **Tissue** – A group of cells carrying out the same function

- **Organ** – A group of different tissues working together to carry out a function

- **Organ System** – A group of organs working together to carry out a function

Organisms in the environment

Carbon Dioxide + Water (+light energy) → Oxygen + Glucose

Limiting factors (something that limits the rate of photosynthesis)

- **Light** – Light is essential
- **Temperature** – enzymes get denatured above 40oC
- **Carbon Dioxide** – More means faster photosynthesis

Organisms in the environment

How plants use glucose

- For respiration (no light)
- Convert it to starch for storage
- Produce fats, proteins or cellulose for cell walls

Making the most of photosynthesis

- Greenhouses – control light, temperature and Carbon dioxide levels
- Artificial light at night and during winter

Organisms in the environment

Mean/Average – Add all number together and divide by the number of values

Range – take away the smallest number from biggest number

Mode – Most common value

Median – Middle number when they are in order

Validity – investigating what you have said (Controlled other variables)

Reliability – how close results are to the true value (improved by repeating and bigger sample size)

Organisms in the environment

Quadrat

- Sample an area
- Random method
- Take several samples
- Count number of organisms in each quadrat
- Calculate an average from the samples
- Multiply the average by the area of the field
- Improve results by taking more samples

Organisms in the environment

Transect

- Line
- Measure out an area
- Good for investigating changing habitats
- Place quadrat at regular intervals
- Record organisms
- Repeat on different line to collect average


5
4
3
2
1
Tape

Enzymes

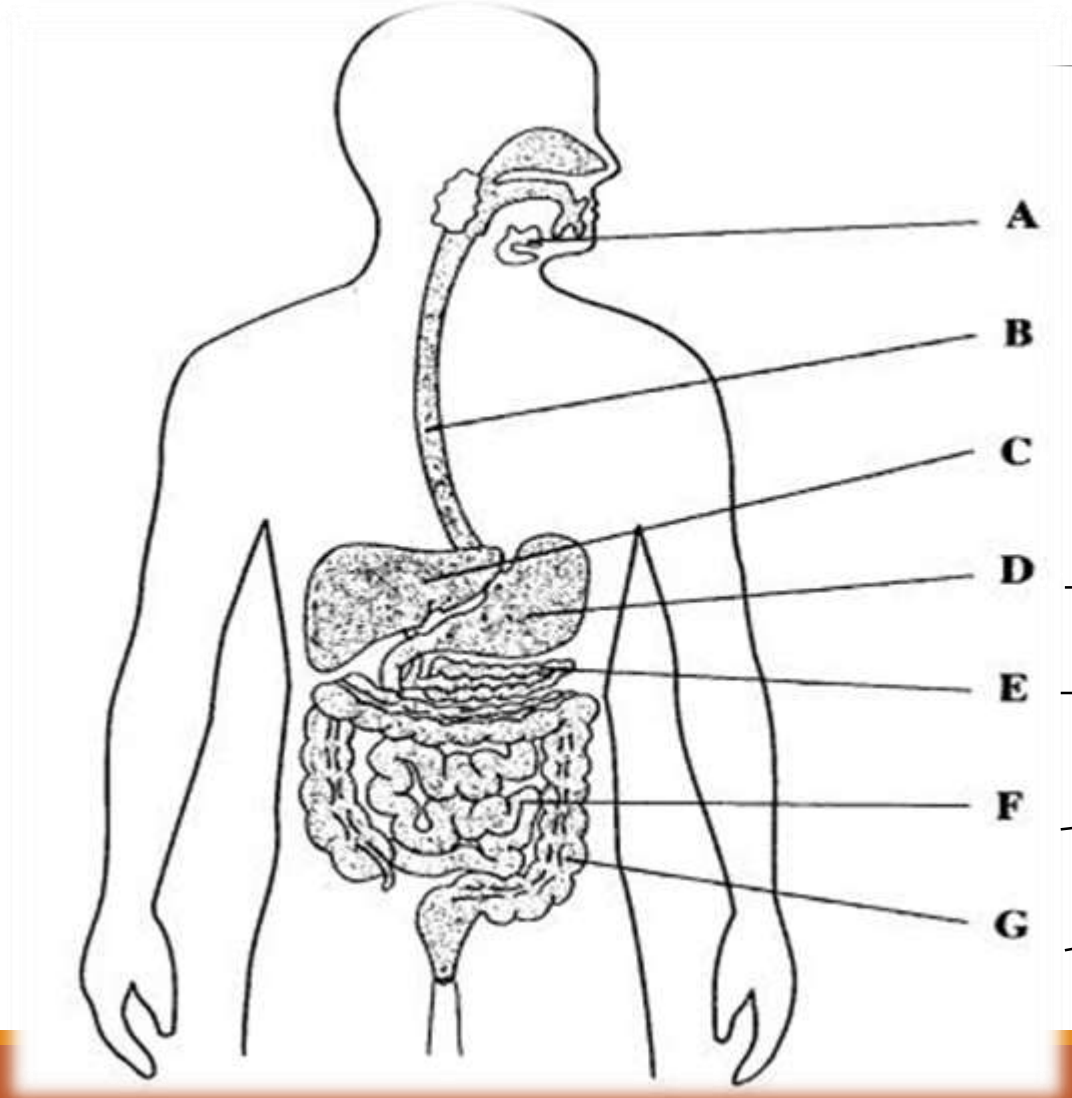
What are they?

- Protein molecules made up of amino acids
- Biological catalyst
- Speed up chemical reactions in the body

Things that denature enzymes

- Denature means the active site is destroyed
- Temperature: optimum 37^0C
- pH: different enzymes have different optimum levels

Digestive enzymes



Salivary glands

Oesophagus

Liver

Stomach

Pancreas

Small intestine

Large intestine

Enzyme	Where it is made	Where it works	What is does
Amylase/ Carbohydrase	Salivary glands Pancreas Small intestine	Salivary glands Small intestine	Breaks down **starch** into **sugars**
Protease	Stomach Pancreas Small intestine	Stomach Small intestine	Breaks down **protein** into **amino acids**
Lipase	Pancreas Small intestine	Small intestine	Breaks down **fats** into **fatty acid and glycerol**

Digestive enzymes

Hydrochloric acid (HCl)

The stomach produces HCl. The enzymes in the stomach work most effectively in acidic conditions (protease)

Bile

- Produced by the liver
- Stored in gall bladder
- Released into small intestine
- Neutralises acid from the stomach
- Enzymes in small intestines need alkali conditions
- Bile emulsifies fat

Enzymes

Biological detergents

- Contain protease and lipase
- Break down protein and fats in stains

Baby food

- Protease
- Pre digest proteins

Diet products

- Carbohydrases used to convert starch into sugar
- Starch is cheap
- Sweeter taste so less is needed

Respiration

Aerobic respiration

- Glucose + Oxygen → Carbon Dioxide + Water (+ energy)
- Mitochondria – site of respiration
- Need respiration for controlling body temp, muscles and to build molecules
- Muscles store glucose as glycogen – can be converted back during exercise

Anaerobic respiration

- No oxygen present (during vigorous exercise)
- Lactic acid produced

Inheritance

Alleles – A version on a gene e.g. eye colour

Number of chromosomes – 23 pairs, 46 total (sex cells only have 23)

Mitosis – Cell division where cells are copied (cloned)

Meiosis – Cell division that makes sex cells with only 23 (half) chromosomes

Dominant – Only need 1 allele to have that feature

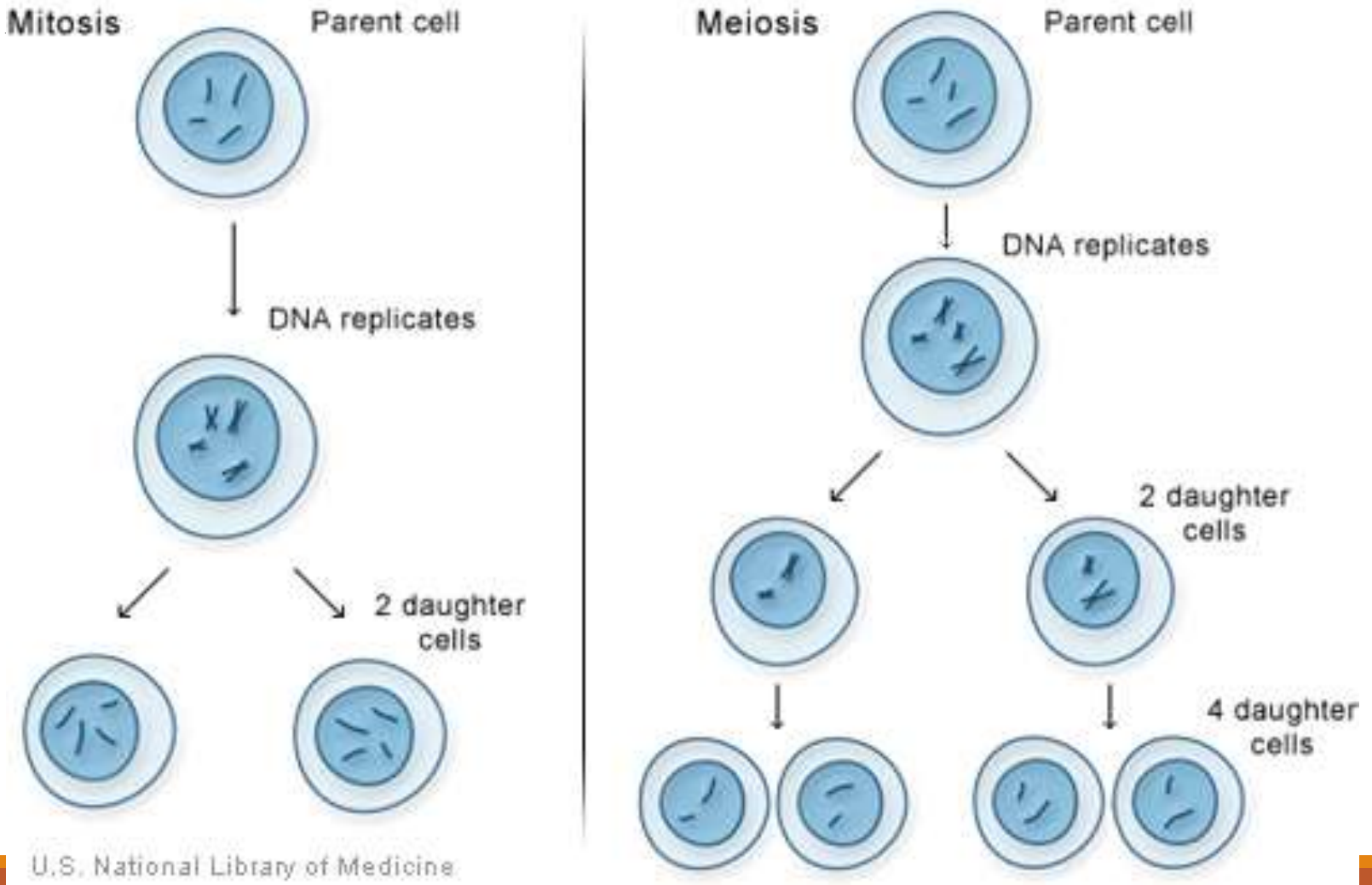
Recessive – Need 2 alleles to have that feature

Carrier – Have a recessive gene that can be passed on

Differentiation – Adapted or specialised for a particular job e.g. sperm, blood or root hair cell

Sex chromosomes – XX (Female), XY (Male)

Inheritance



Inheritance

Mitosis

Produces 2 identical cells

Asexual reproduction

46 chromosomes

Creates body cells

Skin cells

Inheritance

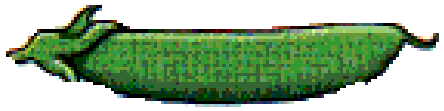
Meiosis

Contain 23 chromosomes

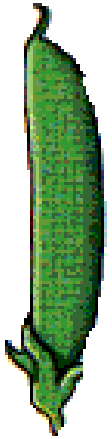
Produces gametes (sex cells)

Creates 4 unique cells

Inheritance



F1
Green



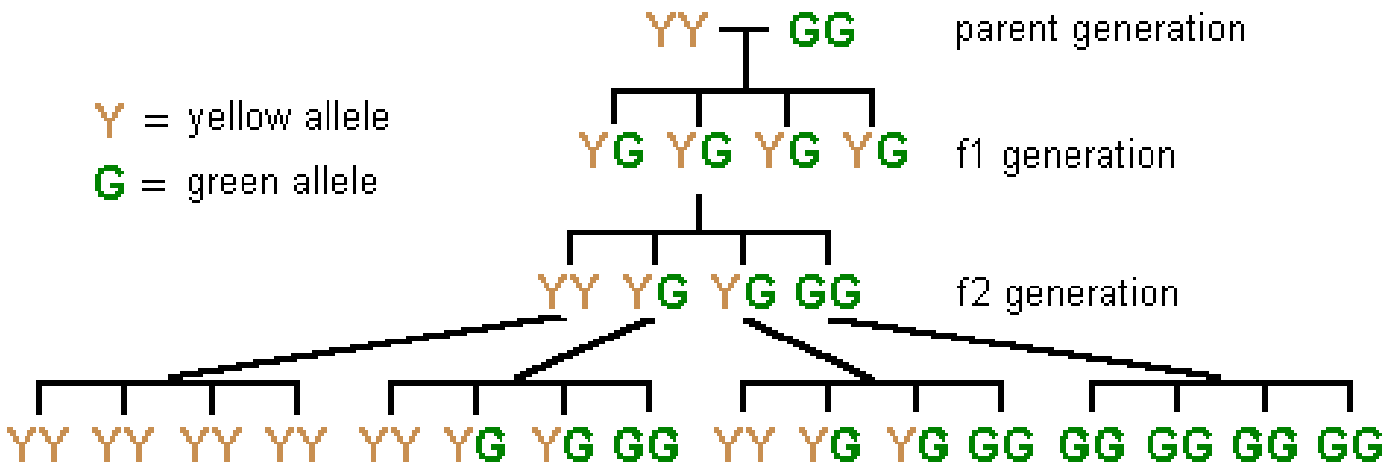
F1
Green

	G	g
G	GG 	Gg 
g	Gg 	gg 

Inheritance

Gregor Mendel

- link between parents and inheritance
- Identified dominant and recessive genes
- Worked with pea plants



Inheritance

Stem cells

- Undifferentiated, can be made into any type of cell
- Found in embryos, bone marrow and umbilical cords
- Embryos usually taken from unused IVF treatments
- Used to treat paralysis, Huntington's, blindness, spinal injuries etc.

Ethics

- Taken from embryos – they have the right to life
- Can cure/treat many illnesses
- Embryos cannot give permission
- Could be used to grow organs

Inheritance

Cystic fibrosis

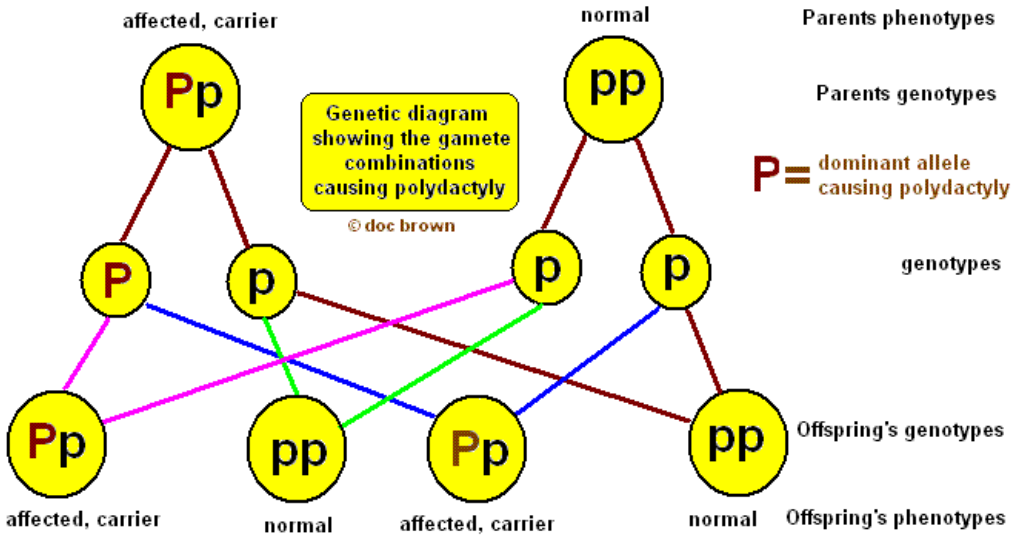
- Caused by recessive allele
- Affects lungs and the pancreas mainly
- Thick sticky mucus
- Struggle to digest food
- Get infections easily
- Have a shorter life span
- Parents can be carriers (Cc)

f is the cystic fibrosis allele		mother	
		F	**f**
father	**F**	FF	Ff
	f	Ff	ff

Inheritance

Polydactyly

- Caused by dominant allele
- Born with extra fingers or toes
- It can be removed
- Doesn't limit or affect life



Inheritance

Embryo Screening

- Embryos are made using IVF
- They are tested for the disease
- Only healthy embryos are implanted

Good: stops illnesses, prevents painful life for child, reduces medical costs needed

Bad: Destroy unwanted embryos, all have the right to live

Species

Hard parts that do not decay easily such as teeth and bones.

Whole organism preserved in **ice.**

Hard parts of an organism get replaced by other **minerals..**
…most common.

Traces of plants or animals are left behind.

Species

Extinction

- Loss of the whole species
- Causes - New predators, New disease, Natural disasters and Climate change

Evolution

- Gradual change of a species over millions of years
- Fossils provide evidence of a evolution
- Fossils show change of a species over time