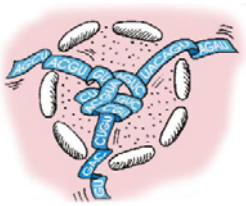
Nucleus



Number: One in each cell.

Size: This varies quite a lot. On average **0.01mm** across.

Mass: Not applicable.

Complexity level: Part of a cell. Rating of **2**.

Function: Contains coded instructions called genes. These control the cell. Genes are made of a chemical called DNA.

Vulnerability for organism: Rating of **10**.

Cell membrane

Number: One cell membrane around each cell.

Size: It surrounds the whole cytoplasm, but it is only **0.000007mm** thick.

Mass: Not applicable.

Complexity level: Part of a cell. Rating of **2**.

Function: Holds the cell together. Controls what substances can pass in and out of the cell.

Vulnerability for organism: Rating of **9**.

Cell wall

Number: One cell wall around each cell.

Size: It surrounds the whole of a plant cell, and gets thicker with age. On average it is 0.00005mm thick.

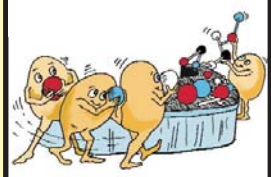
Mass: Not applicable.

Complexity level: Part of a cell. Rating of **2**.

Function: Makes a plant cell rigid (firm) so it does not burst.

Vulnerability for organism: Rating of **9**.

Cytoplasm



Number: Cytoplasm contains lots of different cell parts, so this is a bit unfair, but each cell has **one** unit of cytoplasm.

Size: It fills most of a cell, so the average width is about **0.05mm**.

Mass: Not applicable.

Complexity level: Part of a cell. Rating of **2**.

Function: The chemical reactions for the cell to work happen here. It is a thick jelly-like material inside the cell.

Vulnerability for organism: Rating of **10**.

Chloroplast

Number: This varies, but the average for a typical palisade cell is **35**. Remember, not all plant cells have chloroplasts.

Size: The biggest ones are just **0.005mm** long.

Mass: Not applicable.

Complexity level: Part of a cell. Rating of **2**.

Function: Contains a green substance called chlorophyll. Chlorophyll absorbs light energy for photosynthesis. This is how plant cells make their own food (sugar).

Vulnerability for organism: Rating of **7**.

Nerve cell

Number: Not applicable

Size: They are very thin, but some can be up to **2m** long.

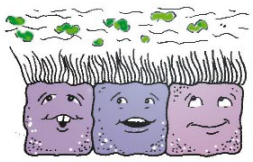
Mass: Not applicable.

Complexity level: This is one kind of cell. Rating of **4**.

Function: Carries electrical impulses between cells, so they can communicate. There are two main types of nerve cell. One type carries impulses from the sense organs to the brain. The second type carries impulses from the brain to make muscles work.

Vulnerability for organism: Rating of **5**.

Ciliated epithelium cell



Number: In a human body the estimated number is **35,000**.

Size: **0.05mm** across

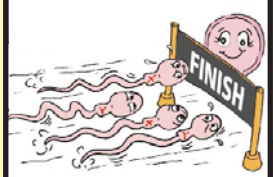
Mass: Not applicable.

Complexity level: This is one kind of cell. Rating of **4**.

Function: Cilia are tiny hairs. They beat backwards and forwards to move materials in one direction.

Vulnerability for organism: Rating of **4**.

Sperm cell



Number: Each day a testis in an adult male makes **150 million** sperm.

Size: **0.01mm** across

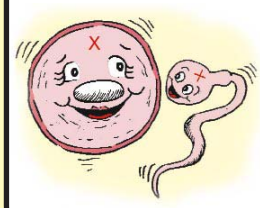
Mass: Not applicable.

Complexity level: This is one kind of cell. Rating of **4**.

Function: The nucleus carries a set of genes from a male to an ovum (egg cell). The sperm cell has a tail so it can swim to the ovum.

Vulnerability for organism: Rating of **1**.

Ovum



Number: On average a woman produces **one** ovum each month.

Size: 0.7mm across

Mass: Not applicable.

Complexity level: This is one kind of cell. Rating of 4.

Function: The nucleus carries a set of genes from a female. When this nucleus joins with a sperm cell nucleus the ovum is fertilised and can develop into a new individual.

Vulnerability for organism: Rating of 1.

Root hair cell

Number: An average plant has **thousands** of these, but it varies a lot.

Size: 0.07mm across

Mass: Not applicable.

Complexity level: This is one kind of cell with a very simple structure. Rating of 4.

Function: Has a tube, like a tiny hair, to give it a large surface area. It takes in water and minerals from the soil.

Vulnerability for organism: Rating of 10.

Red blood cell

Number: 5 million per mm^3 (a drop)

Size: 0.007mm across

Mass: Not applicable.

Complexity level: This is one kind of cell. Rating of 4.

Function: Carries oxygen around the body. The cell is full of a chemical called haemoglobin. This joins onto the oxygen when the red cells go through blood vessels in the lungs.

Vulnerability for organism: Rating of 4.

White blood cell

Number: 7,000 per mm^3 (a drop)

Size: 0.009mm across

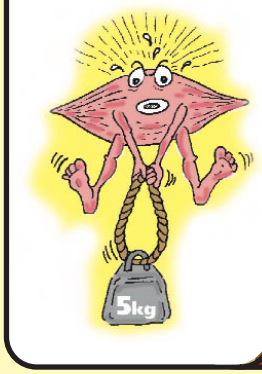
Mass: Not applicable.

Complexity level: This is one kind of cell. Rating of 4.

Function: Protects the body from dangerous microbes. Some white blood cells digest the microbes. A different type of white blood cell make chemicals called antibodies that destroy microbes.

Vulnerability for organism: Rating of 9.

Muscle cell



Number: In a human body there are three different types of muscle tissue called smooth, skeletal and cardiac.

Size: Skeletal muscle cell length = **0.08mm**

Mass: Not applicable.

Complexity level: Tissue. Rating of **6**.

Function: Muscle cells can contract (get shorter). This moves parts of the body.

Vulnerability for organism: Rating of **8**.

Bicep

Number: Two

Size: Length = **40cm**

Mass: 450g

Complexity level: Organ. Rating of **8**.

Function: This muscle pulls the lower arm upwards to bend the arm at the elbow.

Vulnerability for organism: Rating of **3**.

Salivary gland

Number: Three pairs = six

Size: Main salivary gland length = **2.5cm**

Mass: 25g

Complexity level: Organ. Rating of **8**.

Function: Makes saliva. This keeps food moist so it is easier to swallow. It also has a special chemical, a kind of enzyme, which starts to break down (digest) carbohydrate molecules in food.

Vulnerability for organism: Rating of **2**.

Skeleton

Number: One

Size: An average person has a skeleton of **170cm** long.

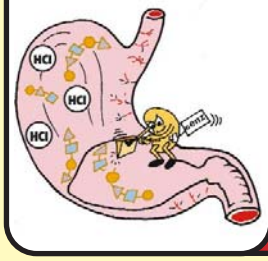
Mass: Normally this is 35% of a person's body weight. E.g. For a 71kg person, skeleton mass = **25kg**.

Complexity level: Organ system. Rating of **10**.

Function: Supports and protects the body and lets you move when muscles pull on the bones.

Vulnerability for organism: Rating of **5**.

Stomach



Number: One

Size: Volume = 1.5 litres

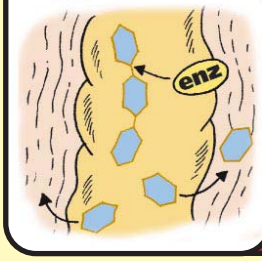
Mass: 200g

Complexity level: Organ. Rating of 8.

Function: Adds a protein digesting enzyme to food and churns it up. The stomach also makes hydrochloric acid that kills microbes in food. The protein digesting enzyme in the stomach works best at acid pH.

Vulnerability for organism: Rating of 6.

Small intestine



Number: One

Size: Length = 5 metres

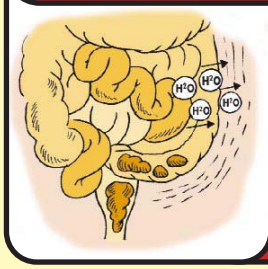
Mass: 425g

Complexity level: Organ. Rating of 8.

Function: Makes enzymes to digest different kinds of food. Small molecules then pass across the small intestine lining into the blood. This is called absorbing. The lining has a large surface area, so this happens quickly.

Vulnerability for organism: Rating of 6.

Large intestine



Number: One

Size: Length = 1.5m

Mass: 300g

Complexity level: Organ. Rating of 8.

Function: Absorbs water from food into the blood. If your large intestine isn't working properly you get diarrhoea, because there is too much water in your faeces.

Vulnerability for organism: Rating of 6.

Kidney

Number: Two

Size: Length = 10cm [Width = 6cm, thickness = 2.5cm]

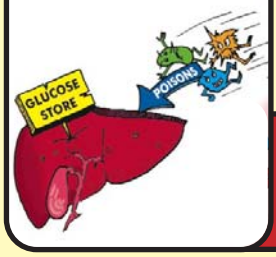
Mass: 300g

Complexity level: Organ. Rating of 8.

Function: Filters a waste product called urea out of the blood. Kidneys also take out extra salt and water that the body does not need. These things are all got rid of (excreted) in urine.

Vulnerability for organism: Rating of 7.

Liver



Number: One

Size: Length = **15cm** [Width = 25cm, thickness = 10cm]

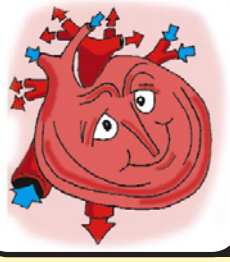
Mass: 1.35kg

Complexity level: Organ. Rating of 8.

Function: Breaks down poisonous substances (toxins) in the body. The liver also stores extra glucose for when you need it.

Vulnerability for organism: Rating of 8.

Heart



Number: One

Size: Length = **12cm** [Widest part = 9cm, thickness = 6cm]

Mass: 300g

Complexity level: Organ. Rating of 8.

Function: Pumps blood to the lungs to collect oxygen and around the body to deliver oxygen and food to cells. The blood collects wastes from cells and takes them to other parts of the body to be got rid of (excreted).

Vulnerability for organism: Rating of 10.

Diaphragm

Number: One

Size: Length = **32cm**

Mass: Not applicable.

Complexity level: Organ. Rating of 8.

Function: When this muscle contracts it gets flat and moves down. This makes more space in the chest, so air pushes in and you take a breath.

Vulnerability for organism: Rating of 10.

Lung

Number: Two

Size: Length = **15cm** [Width = 22cm, thickness = 8cm]

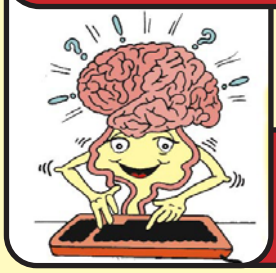
Mass: 300g

Complexity level: Organ. Rating of 8.

Function: Air pushes in and out of the lungs to give you a fresh supply of oxygen and get rid of waste carbon dioxide.

Vulnerability for organism: Rating of 8.

Brain



Number: One

Size: Length = **18cm** [Width = 15cm, height = 12cm]

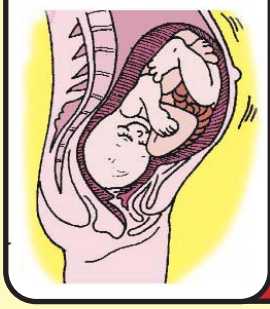
Mass: 1.3kg

Complexity level: Organ. Rating of **8**.

Function: Gets information from different parts of the body and co-ordinates it. Then the brain sends nerve impulses to other cells in the body so they can react to changes. Stores information in memory.

Vulnerability for organism: Rating of **10**.

Uterus



Number: One

Size: Shaped like an upside down pear. Length = **8cm** [Width = 5cm, thickness = 2.5cm]

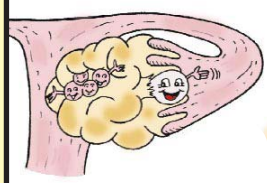
Mass: 200g (Depends on whether or not the woman has had children.)

Complexity level: Organ. Rating of **8**.

Function: This is where a foetus grows. It is nourished by the placenta and protected from damage by floating in a bag of liquid.

Vulnerability for organism: Rating of **2**.

Ovary



Number: Two

Size: Length = **3cm** [Width = 3.5cm, thickness = 2cm]

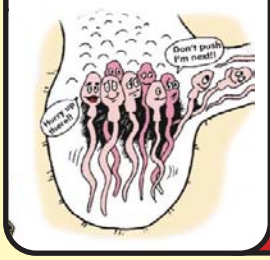
Mass: 25g

Complexity level: Organ. Rating of **8**.

Function: When a girl is born her ovaries already contain egg cells (ova), but they are not mature. After puberty her ovaries release one ovum a month, so genes can be passed on to the next generation.

Vulnerability for organism: Rating of **2**.

Testis



Number: Two

Size: Length = **3cm** [Width = 4cm, thickness = 3cm]

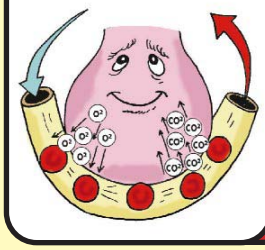
Mass: 30g

Complexity level: Organ. Rating of **8**.

Function: When a boy reaches puberty his testes start to make sperm cells, so genes from the man can be passed on to the next generation.

Vulnerability for organism: Rating of **2**.

Alveolus



Number: In each lung 350 million.

Size: Diameter = 0.1mm

Mass: Not applicable.

Complexity level: Part of Organ. Rating of 8.

Function: These tiny air sacs are covered with blood capillaries. Oxygen passes from the air into the blood. Carbon dioxide passes from the blood into the air. This is called gas exchange.

Vulnerability for organism: Rating of 7.

Categories

Number: This section tells you how many of the part there are in a living thing.

Size: This section tells you how big the part is.

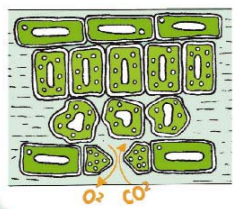
Mass: This section tells you what the mass of the part is.

Complexity level: This section tells you how complicated the part is. The part has a rating. The higher the rating, the more complicated the part is.
Parts of cells: Rating = 2
These are the simplest. They do very particular jobs for a cell.
Cells: Rating = 4
Different cells are specialised to do particular jobs. They have a special structure so that they can do their job.
Tissues: Rating = 6
Groups of the same kind of cell that work together to do a job.
Organs: Rating = 8
Several different tissues joined together to do jobs.
Organ systems: Rating = 10
Several organs that work together to do complicated jobs.

Function: This section tells you what the part does.

Vulnerability for organism: This section tells you how well the living thing can survive if the part is not working properly. The higher the number, the worse it would survive.

Leaf



Number: Not applicable.

Size: The average horse chestnut tree leaf length = 15cm

Mass: The average horse chestnut tree leaf mass = 0.75g

Complexity level: Organ. Rating of 8.

Function: Cells in the leaf do photosynthesis to make glucose (food) for the plant. Pores on the bottom surface of the leaf let oxygen and carbon dioxide pass in and out of the leaf.

Vulnerability for organism: Rating of 6.