

Science Knowledge Organiser – B2 Keeping healthy

B2.1 How do our bodies resist infection?

Symptoms	The ill feelings that you get when you are unwell.
Microorganism	A living organism that can only be seen through a microscope. They include bacteria, viruses and fungi.
Antibody	Proteins made by white blood cells to fight microorganisms. Different microorganisms need different antibodies.
Antigen	The proteins on the surface of a cell. Each cell has unique antigens.
White blood cell	A blood cell that fights microorganisms. Some white blood cells engulf and digest invading microorganisms, others produce antibodies.
Memory cell	A long lived white blood cell able to respond very quickly (produce antibodies) when it encounters a microorganism for the second time.
Reproduction in bacteria	In suitable conditions (warmth, nutrients and moisture) bacteria can split (reproduce) every 20 minutes.

B2.2 What are vaccines and antibiotics and how do they work?

Immune system	A group of organs and tissues in the body that fight infections.
Immune	Able to react to an infection quickly, stopping the microorganisms before they can make you ill.
Vaccine	Contains dead or weakened microorganisms so that the body makes antibodies to the disease without being ill.
Herd immunity	A form of immunity that occurs when a significant proportion of a population is vaccinated. This makes it difficult for the disease to spread and offers protection to individuals who are not immune.
Antimicrobial	Chemicals that can kill, or inhibit, bacteria, fungi and viruses.
Antibiotic	A type of antimicrobial that is effective against bacteria.
Antibiotic resistance	Microorganisms that are not killed by antibiotics.
Mutation	A change in the DNA.
Open-label trial	A clinical trial in which both the patient and the doctor know whether the patient is taking the new drug.
Blind trial	A clinical trial in which the patient does not know whether they are receiving the new drug, but their doctor does.
Double blind trial	A clinical trial in which neither the doctor nor the patient know whether the patient is taking the new drug.
Placebo	A fake drug. It looks like the drug being tested but contains no actual drug.
How to prevent antibiotic resistance	1. Only take antibiotics when they are needed. 2. Always finish the course.
Why drugs are tested	To check that they are effective against the disease and safe for use.
Stages in drug trials	1. Human cells – to check safety and effectiveness. 2. Animal tests – to check that they work as well in a whole animal. 3. Clinical trials – first on healthy volunteers to check safety, then people with the disease to check long term effectiveness.
Why vaccines are not considered to be 'completely risk free'.	People differ genetically and will react differently to medical treatments including vaccines.

B2.3 What factors increase the risk of heart disease?

Arteries	Blood vessels that carry blood <u>a</u> way from the heart. Thick, elastic walls can withstand the high pressure created by the heart.
Veins	Blood vessels that take blood <u>i</u> nto the heart. Thinner walls as the blood is at lower pressure. Valves ensure blood flows in one direction.
Capillaries	Take blood to and from tissues. Thin walls to allow quick diffusion of substances between blood and cells.
Blood pressure	The pressure of the blood on the walls of the artery. The higher value is when the heart is contracting, the lower value is when the heart is relaxed.
Heart rate	Can be measured by recording the pulse rate. It is the number of times the heart contracts in a minute and is given in beats per minute (BPM).
Lifestyle disease	A disease not caused by microorganisms but triggered by other factors e.g. smoking, diet or exercise.
Epidemiological study	A scientific study that examines the causes, spread and control of a disease in a human population.
The heart as a double pump	The right side of the heart receives deoxygenated blood from the body and pumps it to the lungs to pick up oxygen. The left side of the heart receives oxygenated blood from the lungs and pumps it to the rest of the body.
Why the heart needs a good blood supply	Blood delivers nutrients and oxygen to the cells so that they can supply energy. Without energy the heart would stop.
Heart disease	Any illness of the heart e.g. a blocked coronary artery or heart attack.
Heart attack	Fat deposits in arteries can cause a blockage. If a blot clot forms the heart muscle cells are starved of oxygen and die.

B2.4 How do our bodies keep a healthy water balance?

Homeostasis	Maintenance of a constant internal environment.
Receptor	Detects the stimuli (change).
Processor	Receives the information and coordinates a response.
Effector	Produces an automatic response.
Negative feedback	A system whereby any change results in actions that reverse the original change.
Kidney	The organs that control water balance in the body.
ADH	Hormone that causes the reabsorption of water. (Anti-diuretic hormone).
Effect of alcohol	Suppresses the production of ADH. Less water is reabsorbed. Large volumes of dilute urine produced. It can lead to dehydration.
Effect of Ecstasy	Increases the production of ADH. More water is reabsorbed. Small volumes of concentrated urine produced. Increased body fluid can cause brain damage.
How water gained	Through food and drink and water gained in respiration.
How water lost	Exhaled air, sweat, urine and faeces.

B2 Opportunities for mathematics

- Calculate the population growth of microorganisms given appropriate data
- carry out calculations using experimental data, including finding the mean and the range
- extract information from charts, graphs and tables including data from epidemiological studies
- use ideas about correlation in the context of health risk factors
- use ideas about probability in the context of risk