B3 Infection & response

Section 1: Pathogens and Diseases

	Disease	Pathogen	How it is spread	Effect	Prevention/ Control
1	**Measles**	**Virus**	**Droplets** from sneezes and coughs	Can be **fatal**	**Vaccination** of children
2	**HIV**	**Virus**	**Sexual contact, needle exchange**	**Damages** some **white blood cells**	**Antiretroviral drugs** when infected
3	**Tobacco Mosaic Virus**	**Virus**	**Direct contact**	Mottling of leaves, **reduces photosynthesis**	
4	**Salmonella**	**Bacteria**	**Infected food**	**Fever, abdominal cramps, diarrhoea, vomiting**	**Vaccination** of poultry (chickens).
5	**Gonorrhoea**	**Bacteria**	**Sexual contact**	**Discharge** from **penis/ vagina, pain** when **urinating**	Controlled by **antibiotics**. Spread prevented by **condoms**.
6	**Rose Black Spot**	**Fungus**	**Spores** carried by **water** or **wind**	**Leaves** turn **yellow, fall early. Photo-synthesis reduced.**	Treated by **fungicides** or **destroying affected leaves**.
7	**Malaria**	**Protist**	By a **vector – mosquito**	**Fever**, can be **fatal.**	**Preventing mosquitos from breeding**, using **mosquito nets**.

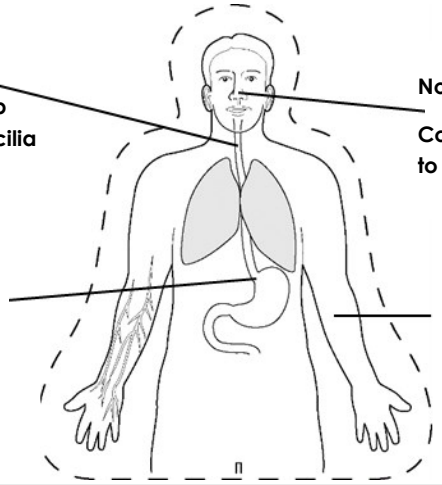
Section 2: Non-Specific Defences

Trachea and Bronchi

Produces **mucus** to **trap pathogens**. Contains **cilia** to **move mucus** for swallowing.

Stomach

Contains **hydrochloric acid** to destroy **pathogens.**



Nose

Contains hairs **and** mucus **to** trap pathogens.

Skin

A **physical barrier** to pathogens.

Section 3: Key terms

12 Pathogen	A **microorganism** that **causes disease**.
13 Bacteria	A type of **pathogen** that **produces toxins that damage tissues**.
14 Viruses	A type of **pathogen** that **lives and replicates within cells** and causes **cell damage**. It is **difficult to kill viruses without damaging cells**.
15 Antibodies	Some white blood cells (lymphocytes) produce antibodies. These **bind to pathogens** and **destroy them** or **stick them together**.
16 Antitoxins	Some white blood cells (lymphocytes) produce antitoxins. Antitoxins **neutralise toxins**.
17 Antibiotics	Antibiotics **kill bacteria**. **Specific antibiotics** should be used for **specific bacteria**. **Some bacteria are resistant** to antibiotics. **Do not kill viruses**.
18 Painkillers	Painkillers **relieve symptoms** but **don't kill pathogens**.
19 Phagocytosis	Some white blood cells (phagocytes) **engulf pathogens**.

Section 4: Drugs

22 Aspirin	Originates from the **willow** tree.
23 Digitalis	A **heart drug**. Originates from **foxglove** plants.
24 Penicillin	Discovered by Alexander Fleming from the ***Penicillium fungus.***
25 New drugs	Most new drugs are **synthesised by chemists in the pharmaceutical industry.** The **starting point** may be a **chemical extracted from a plant.**

20 Natural Immunity

Pathogen enters body

⇩

The correct white blood cell is found

⇩

Antibodies are produced

⇩

The white blood cells remain as memory cells

⇩

If the pathogen returns, antibodies will be produced quickly

21 Vaccination

Dead or weakened pathogen is injected

⇩

The correct white blood cell is found

⇩

Antibodies are produced

⇩

The white blood cells remain as memory cells

⇩

If the pathogen returns, antibodies will be produced quickly

Section 5: Clinical Trials

	Trial Stage	Purpose
26	1. **Preclinical – cells, animals**	Test for **toxicity** and **efficacy** before testing hu-mans
27	2. **Healthy volunteers**	**Very low doses** to test for **toxicity.**
28	3. **Patients**	Larger groups. Test for **tox-icity**, **efficacy** and **dose. Placebos** may be used in a **double-blind trial**.

Clinical Trial Key Terms

29	Placebo	A drug with **no active ingredients**, designed to **mimic a real drug**. Used to test if the effects of a drug on a patient are just **psy-chological**.
30	Double-blind trial	The volunteers do not know which group they are in, and neither do the researchers, until the end of the trial
31	Toxicity	How **harmful** the drug is. May have dangerous **side effects**.
32	Efficacy	How **effective** the drug is.
33	Dose	The **amount** of the drug given to the patient.