

Name: _____

GCSE

Infection and

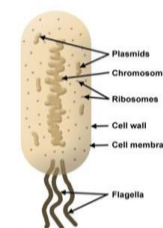
Disease

Booklet

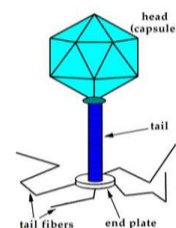
LESSON CONTENT		😊	😐	😞
1	Pathogens			
2	Bacterial, viral and fungal diseases			
3	Microbiology			
4	Protist diseases - Malaria			
5	Body defences			
6	White blood cells			
7	Vaccinations			
8	Antibiotics			
9	Antibiotic resistance			
10	Developing drugs and Painkillers			
11	Plant diseases and identification			
12	Plant defences			

BACTERIA	VIRUSES	FUNGI
Need Microscope to see them	Smaller than Bacteria	Single Cells (Yeast) or threads (Mushrooms)
Need warmth, moisture, nutrients	Depend on living hosts	Need warmth, moisture, nutrients
Divided into Aerobes and Anaerobes	'Non' Living	Aerobes or Anaerobes
Saprophytes or Parasites	Always Parasites	Saprophytes or Parasites
Can be harmful or Useful	Always Harmful	Can be Harmful or Useful
Harmful: cause diseases, eg tetanus, TB, pneumonia, sore throats, food poisoning, Cholera etc	Cause diseases, eg Measles, Mumps, Poli, Flu, Cold Sores, Aids...	Cause diseases, may be poisonous, decay food
Uses: antibiotics, rot things		Uses: eaten, beer and bread making, antibiotics

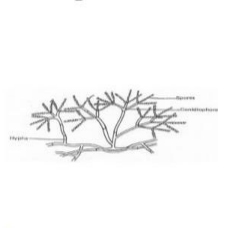
acteria



Virus



Fungus

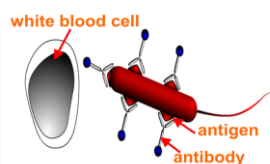
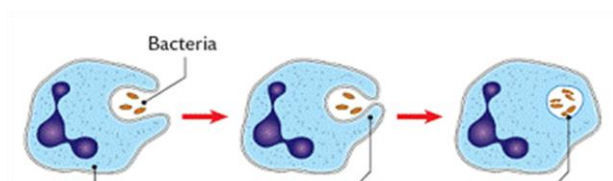


Immune system – how the body defends against pathogens if they get in

White blood cells recognise invaders because the invaders' **antigens** (bits of protein sticking out of their cell membranes) are a different shape from the body's own antigens.

White blood cells defend the body in three ways:

1. They **ingest** (surround and digest) pathogens.



2. They make **antibodies**, which stick to antigens on the pathogens' surface, and this destroys the pathogens.

3. They make **antitoxins**, which neutralise **toxins** (poisons) made by bacteria.

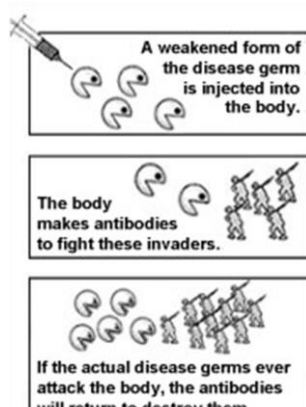
Infection Type	Bacterial	Fungal	Viral
Treatment	Antibiotic medication	Antifungal medication	None, or antiviral meds
Can antibiotics work?	Yes	No; Antifungals instead	No; Antivirals instead
Do vaccines exist for the infection?	Yes	Not many	Yes
Example	Staph infection, treated with penicillin	Ringworm, treated by miconazole	Influenza, treated by oseltamivir (Tamiflu)

Vaccination (also called 'immunisation')

A vaccination makes a person immune to a disease caused by one particular bacterium or virus. The person is injected either with dead or inactivated versions of the pathogen, or just with its antigens. They aren't dangerous but the body doesn't realise that, so it defends itself by learning to make the right antibodies.

White blood cells learn to make the right shaped antibodies by practising on dead or broken pathogens

If the real, living pathogens get into the body, the white blood cells know immediately what shaped antibodies to make, rather than taking a while to get it right. So the pathogens get killed straight away and you don't get ill.



Antibiotics

Antibiotics are a type of medicine. Some types of medicine, like paracetamol, lemsip or aspirin, treat **symptoms** of an illness (e.g. pain, fever), whereas antibiotics actually kill the pathogens which are making you ill. BUT – they only work on bacteria, not viruses. That's because viruses are hidden away inside your cells, where the antibiotics can't get to them.

Unfortunately, if we use antibiotics when we don't need to, or if we *don't* finish all the pills the doctor gives us, then bacteria are more likely to become **resistant** to the antibiotics.



Three stages of testing drugs

New medical drugs have to be tested to ensure that they work, and are safe, before they can be prescribed. There are three main stages of testing.

1. The drugs are tested using computer models and human cells grown in the laboratory. Many substances fail this test because they damage cells or do not seem to work.
2. Drugs that pass the first stage are tested on animals. In the UK, new medicines have to undergo these tests. But it is illegal to test cosmetics and tobacco products on animals. A typical test involves giving a known amount of the substance to the animals, then monitoring them carefully for any side-effects.
3. Drugs that have passed animal tests are used in clinical trials. They are tested on healthy volunteers to check they are safe. The substances are then tested on people with the illness to ensure they are safe and that they work.

