SCIENCE DEPARTMENT	Name …… Group …… Teacher ……

BIOLOGY

TRILOGY SCIENCE

Infection & Response

Core Assessment Guide		
L4. Communicable Disease Test	/ 20	
L6. Vaccination Exam Questions	/ 16	
L8. Exam Question on Painkillers	/ 10	
L10. Drug Development Exam Qs	/ 25	

Lesson 1-3 – Communicable (infectious) Diseases

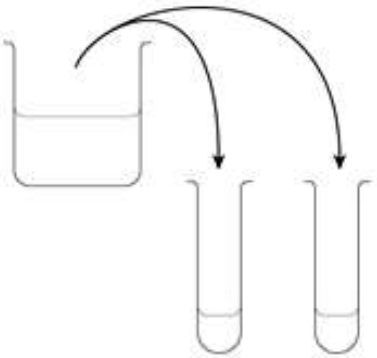
Q. What are pathogens?

Modelling the Spread of Infection:

1. Your teacher will give you a sample of a white liquid.

2. Use a small beaker to mix your sample with someone else's.

3. Then share the mixture between your tubes.



4. Wash out the beaker thoroughly.

5. Repeat steps **2–4** each time your teacher tells you to. Always choose a different person to mix with.

6. At the **end** of the experiment; Add a few drops of iodine solution to the mixture in your tube.

How is the model a good way of representing the spread of infection?

_____

_____

What are the problems with the model?

_____

_____

Pathogens are spread 5 different ways, your task is to find an example of disease caused by each and to explain how that disease spreads IN DETAIL.

Way Pathogen Is Spread	Example of Disease
Airborne	
Through contaminated food	
Direct physical contact	
Dirty water	
Passed by a vector	

Bacterial Disease Fact Files:

Bacteria are examples of _____ cells. These have specific organelles, these include _____.

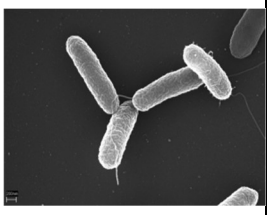
They do not have a _____ or _____ , _____ .

Membrane bound nucleus	Plasmids	Chloroplasts
Mitochondria	Prokaryote	Flagella
Slime capsule		

We use binomial Latin names for bacteria. E.g. *Escherichia coli or E.coli.*

Bacteria: *Salmonella*

Symptoms:



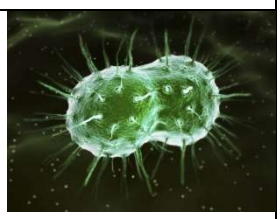
How is it spread?:

What does it affect? (Plant/Animal/Human):

Treatment:

Watch the following youtube video (https://www.youtube.com/watch?v=8M7yM7tI3Jc) and write down all the ways that you can prevent *salmonella* poisoning.

Bacteria: *Gonorrhoea*



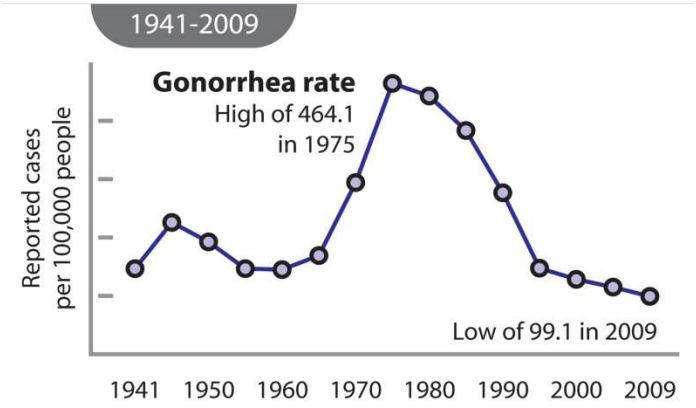
Symptoms:

How is it spread?:

What does it affect? (Plant/Animal/Human):

Treatment:

Describe the graph below and explain what could have caused the massive decrease in reported cases after 1975.



Viral Diseases Fact Files:

Virus: Measles

Symptoms:

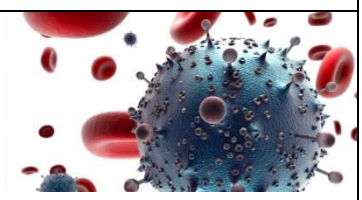
How is it spread?:

What does it affect? (Plant/Animal/Human):

Treatment:

1. At what age is the measles vaccination given in the UK?
2. Why might some parents choose not to have their child vaccinated?
3. Look at the table below. Calculate the total number of people affected by measles in 2015 and calculate the percentage of people affected in each town.

Virus: HIV



Symptoms:

How is it spread?:

What does it affect? (Plant/Animal/Human):

Treatment:

1. What does HIV and AIDS stand for?
2. What is the difference between HIV and AIDS?

3. How does the virus replicate?

4. Is there a cure for HIV, explain your answer.

5. How can HIV / AIDS be prevented?

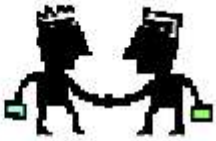
6. What system in the body does the HIV infect/affect?

7. People die from AIDS related diseases, explain what that means?

8. Which of these things can put you in danger of getting HIV (circle one).

Hugging

Getting a tattoo



Holding hands

Sharing a toilet

9. True or false?

Sentences	True	False
1) The immune system helps us fight infections.		
2) The HIV virus does not attack our immune system.		
3) The HIV virus can live in the blood, semen and vaginal fluids.		
4) If you use a condom correctly, you will not protect yourself from HIV.		
5) The only way to know if you have HIV is by getting an HIV test.		

Virus: Tobacco mosaic virus (TMV)

Symptoms:

How is it spread?:

What does it affect? (Plant/Animal/Human):

Treatment:

Use the TMV information sheet to complete the fact file and answer the following questions:

1. TMV affects tomatoes and how many other plant species?
2. What pattern is shown on leaves of plants affected with TMV?
3. Suggest what effect the disease will have on the rate of photosynthesis.

Fungal Disease Fact Files:

Fungal: Rose black spot

Symptoms:

How is it spread?:

What does it affect? (Plant/Animal/Human):

Treatment:

Use the following website (https://www.rhs.org.uk/advice/profile?PID=270) to complete the fact file as well as the questions below:

1. What colour spots develop on the leaves?
2. What is the scientific name for rose black spot?
3. What time of the year is the disease most likely to develop?
4. What affect will the disease have on the rate of photosynthesis?

Protist Disease Fact Files:

Protist: Malaria

Symptoms:

How is it spread?:

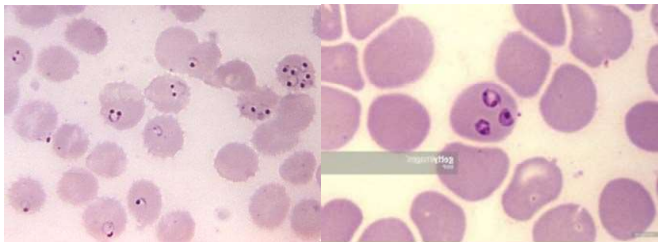
What does it affect? (Plant/Animal/Human):

Treatment:

Use the info. sheet and the video (https://www.youtube.com/watch?v=gwYIyjwYluc) to complete the fact file and answer the questions below:

1. Draw a flow chart to explain how a person can become infected with the malaria parasite.

2. Look at the microscope slides below and label healthy blood cells and those affected with the malaria parasite.



(3) Read the information about the development of a vaccine against malaria.

Scientists have removed two important genes in a malaria parasite. This malaria parasite causes the type of malaria most deadly to humans. When the genes are removed the malaria parasite stays in the liver infection phase, stopping the parasite spreading to the blood stream where the parasite can cause severe disease and death.

Scientists are using the genetically modified malaria parasites to develop a vaccine against malaria. Similar vaccines have been tested in mice and produce 100 per cent protection against malaria infection. Scientists hope that the vaccine will produce similar results in humans.

Although two genes have been removed, the parasite is alive and able to stimulate the body's protective immune system to recognise malaria parasites coming into the body. Scientists think the weakened parasites used in the vaccine will not become harmful again because the genes have been removed from the genetic material and the parasite could not recreate the gene.

Evaluate the use in humans of the new vaccine against the malaria parasite.

_____

_____

_____
_____
_____
_____
_____
_____

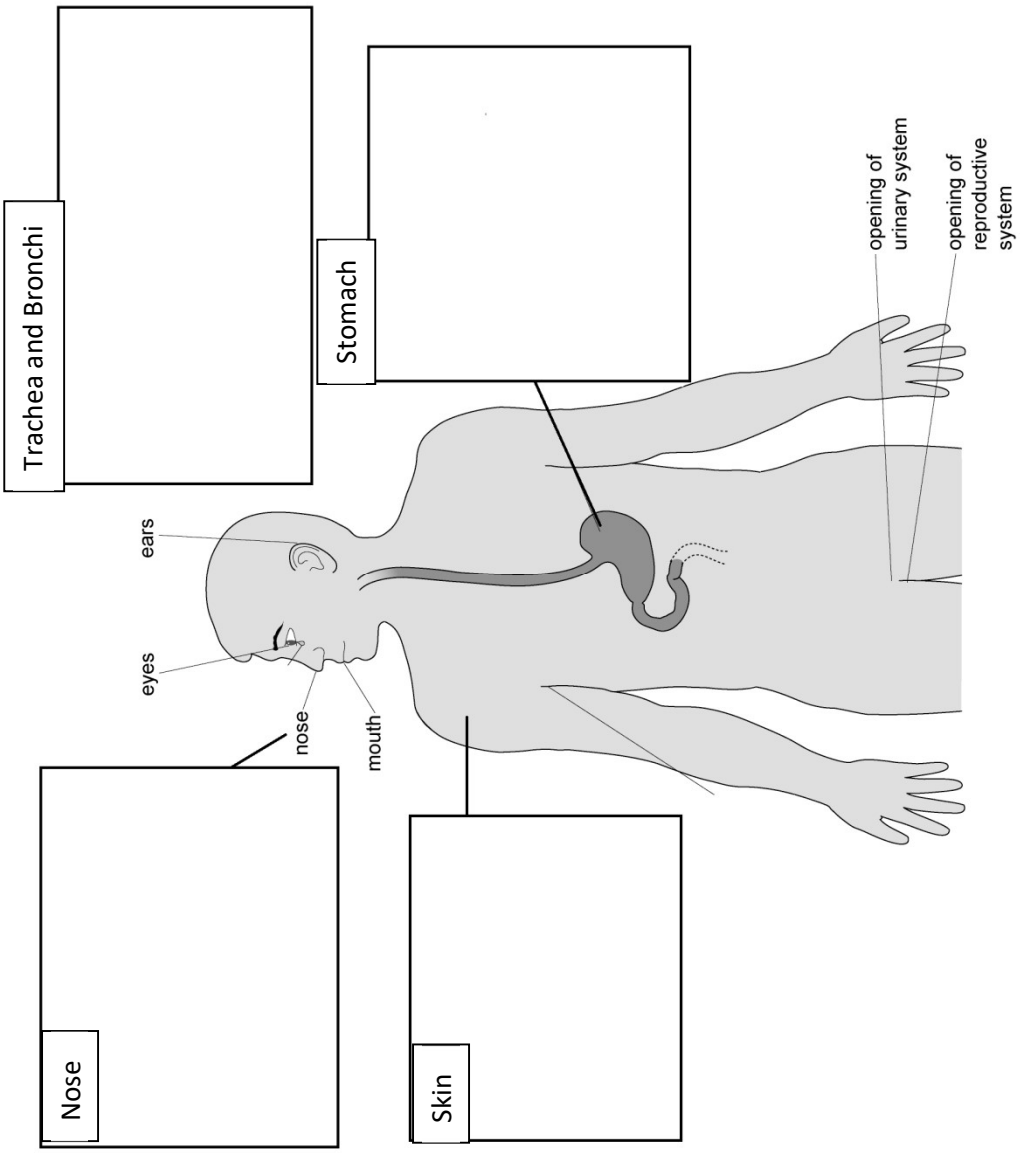
Lesson 4 – Human Defence Systems

First Line of Defence

There are ___ 'lines of defence' your body has against infection by _____.
Your immune system is responsible for preventing infection (_____),
detecting it if it does occur, and then responding _____ (_____) or
_____ (_____)

Pathogens	The third line	First line	specifically
Generally	3	the second line	

The first line of defence is your body's natural barrier to infection. These are not specific to the infecting pathogen, and so we describe them as non-specific.



There is no skin over your eyes. To prevent this, your eyes produce _____. These are usually produced to _____ or _____. Tears are mainly made of _____ and _____. They also contain antibacterial enzymes called L_____. These are able to break down bacterial cell walls. Tears also contain _____.

Second Line of Defence

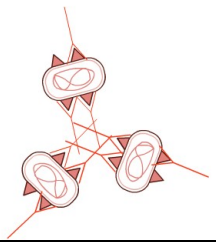
Just like the first line of defence, the second line of defence is also non-specific. What does this mean?

_____

The first and second line of defence could also be described as your innate immune system (i.e. inborn/natural).

Your blood contains a special type of white blood cell called _____.
These exist in very high numbers in the blood (approximately 6,000,000,000 per litre).
Phagocytes are attracted to any part of the body where an infection is present.

The stages of phagocytosis are below. Add a suitable diagram to illustrate each step:

1.	2. 	3.
All cells have markers (antigens) on their surface. These markers are unique to that type of cell.	Antibodies (see next lesson) cause pathogens to clump together. The pathogen attracts phagocytes to the area.	The phagocyte binds to the pathogen.
4.	5.	6.
The membrane of the phagocyte starts to surrounds the pathogen.	The phagocyte eventually flows all the way around the pathogen engulfing them in a vacuole in its cytoplasm.	Enzymes (lysosomes) get added to the vacuole which causes the break-down of the cell wall and membranes of the pathogen.

The pathogen is now destroyed.

<u>Lesson 5 – Third Line of Defence (Antibody and Antitoxin Production)</u>

The third line of defence against an invading pathogen is SPECIFIC. As a result of this the third line of defence isn't innate, we call it our SPECIFIC IMMUNE SYSTEM.

3 important terms need to be understood before we go any further. These are:

Antigen _____

Antibody _____

Antitoxin _____

Almost all cells have antigens on their surface, pathogens have different antigens from those found on your cells. Your lymphocytes recognise foreign invading antigens.

Use the lymphocyte fact sheet to discover all about this special type of blood cell, and its role in defence.

1. What type of cell is a lymphocyte?

2. How many lymphocytes are there in the blood?

3. What are the functions of lymphocytes?

4. How long does it take for antibodies to be produced against a pathogens antigens?

5. What is the key feature of antibodies?

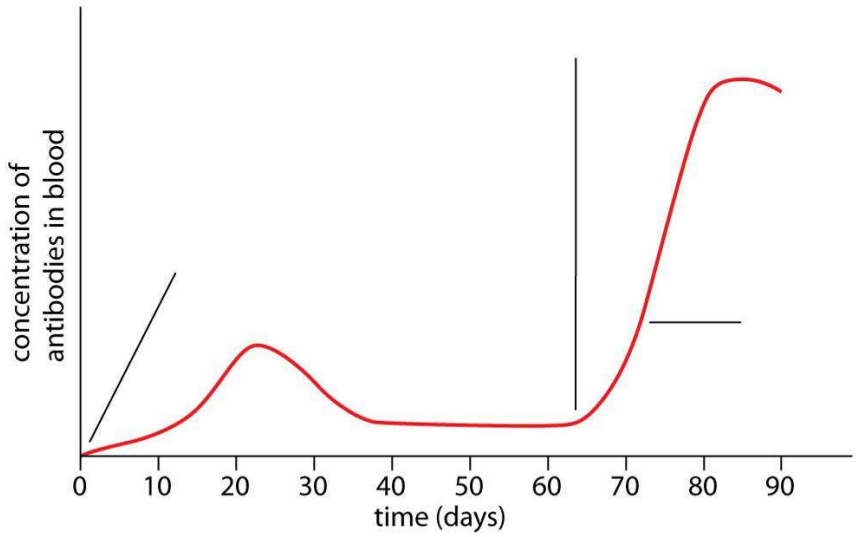
6. Describe / explain the graph over the page:

_____

_____

_____

_____



White Blood Cell and Pathogen Game

Evaluate the game/modelling pathogen and antibodies you've just carried out. You should include 2 good things about the game/model, 2 bad things about the game/model and state its educational value in your opinion.

Antitoxins

Copy and complete the summary paragraph on antitoxins.

As a final concluding task put the following events in order to sequence the process of immunity, the first and last one have been done for you:

1. James is infected by some **bacteria** that cause a disease.

One of James' **white blood cells** detects the bacteria.
It makes **antibodies** to destroy the bacteria.

Most of the white blood cells that make this antibody die.
But a few of them stay in the blood. These are called memory cells.

The bacteria reproduce.
James gets ill.

The white blood cells that make the right shaped antibody are still in James' blood.
So this time they are ready to kill the bacteria very quickly.

9. The bacteria are killed before they can make James ill.
He is immune to this disease.

The bacteria are all killed.

James gets better.

James is infected by the same bacteria again. With the same shaped antigen.

The white blood cells reproduce.

Now there are lots of them making the antibodies.

Lesson 6 – Vaccinations

Individuals can be vaccinated at a variety of different times in their life, when you were around 12 months you may have had the mumps, measles and rubella vaccination (MMR) or the combined vaccine for diphtheria, tetanus, whooping cough and polio at about 3 years old. A vaccination you may remember is the cervical cancer vaccine which reduces the likelihood of girls developing cervical cancer.

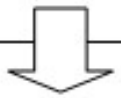
Vaccinations are made against mainly life threatening diseases, and thus reduces the number of people that die of certain diseases.

How Does A Vaccine Work?

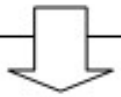
Use the key words to fill in the statements about how vaccines work, if you finish you could add a picture to the box at the side.

Antibodies	Engulfs	Pathogen	Memory	Phagocytes
Same	Antibodies	Same pathogen	Primary	Antigens
Quicker	Secondary	White		

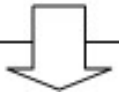
Small amounts of dead, genetically modified or inactive _____ are put into the body, often by injection. Crucially it must have the _____ antigens as the pathogen or your body won't recognise it.	



The _____ in the vaccine stimulate your _____ blood cells into making _____. This initiates the _____ immune response.	



The _____ stick to the antigens on the surface of the pathogen and cause them to clump together	



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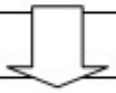
Another white blood cell _____ and destroys the pathogen, these are called _____. Because it takes a few days for lymphocytes to produce antibodies and anti-toxins you may feel ill after a vaccination.	



_____ cells are then retained which means you are now immune to future infections by the pathogen. This is because your body can produce a _____ and more amplified response the second time it encounters the _____ before it has the opportunity to make you feel poorly again. This is your _____ response.	

Here are some statements about vaccinations.

Underline any you agree with.
Put a *ring* around any that you think are wrong.

- Everyone who gets a vaccine will become immune to that disease.
- Vaccines are completely safe.
- People have different side effects from vaccines.
- Vaccines are safe for almost everyone who has them.

Q. Explain why you think it's difficult to produce a vaccine against HIV / common cold

.....
.....
.....

Complete the axis below to show the rate at which antibodies are produced after the first and second exposure to a pathogen:

For many vaccines, you are likely to have a booster injection several years after the first injections. These serve as a 'reminder' for your immune system and a 'refresh' for your memory lymphocytes.

T. On your graph add where a booster may have been given.

Herd Immunity:

The flip is also true, if a few people have a vaccine and a small number become infected the disease will spread much more quickly.

Benefits and Disadvantages of Vaccination

Advantages	Disadvantages

Lesson 6 Homework

The MMR vaccine is used to protect children against measles, mumps and rubella.

(a) Explain, as fully as you can, how the MMR vaccine protects children from these diseases.

.....

.....

.....

.....

.....

.....

.....

(3)

(b) Read the passage.

> Autism is a brain disorder that can result in behavioural problems. In 1998, Dr Andrew Wakefield published a report in a medical journal. Dr Wakefield and his colleagues had carried out tests on 12 autistic children.
>
> Dr Wakefield and his colleagues claimed to have found a possible link between the MMR vaccine and autism.
>
> Dr Wakefield wrote that the parents of eight of the twelve children blamed the MMR vaccine for autism. He said that symptoms of autism had started within days of vaccination.
>
> Some newspapers used parts of the report in scare stories about the MMR vaccine. As a result, many parents refused to have their children vaccinated.
>
> Dr Wakefield's research was being funded through solicitors for the twelve children. The lawyers wanted evidence to use against vaccine manufacturers.

Use information from the passage above to answer these questions.

(i) Was Dr Wakefield's report based on reliable scientific evidence?

Explain the reasons for your answer.

.....

.....

.....

.....

(2)

(ii) Might Dr Wakefield's report have been biased?

Give the reason for your answer.

.....

.....

.....

(1)

(Total 6 marks)

White blood cells protect the body against pathogens such as bacteria and viruses.

(a) (i) Pathogens make us feel ill.

Give **one** reason why.

.....

.....**(1)**

(ii) White blood cells produce antibodies. This is one way white blood cells protect us against pathogens.

Give **two** other ways that white blood cells protect us against pathogens.

1.....

.....

2.....

.....

(2)

(b) Vaccination can protect us from the diseases pathogens cause.

(i) One type of virus causes measles.

A doctor vaccinates a child against measles.

What does the doctor inject into the child to make the child immune to measles?

.....

.....

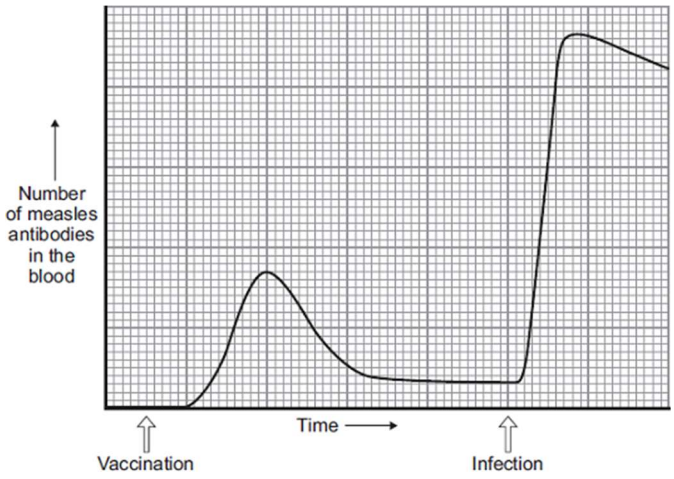
.....

.....

(2)

(ii) A few weeks after the vaccination, the child becomes infected with measles viruses from another person.

The graph shows the number of measles antibodies in the child's blood from before the vaccination until after the infection.



More measles antibodies are produced after the infection than after the vaccination.

Describe other differences in antibody production after infection compared with after vaccination.

.....

.....

.....

.....

.....

.....

(3)

(iii) Vaccination against the measles virus will **not** protect the child against the rubella virus.

Why?

.....

(1)

(c) What is the advantage of vaccinating a large proportion of the population against measles?

.....

(1)

(Total 10 marks)

Lesson 7: Antibiotics and Painkillers

Use the textbook to help you gather all the information on antibiotics and painkillers, your task is them to produce a 1 sided A3 sheet that covers all the information below.

1. What is a drug?
2. Give 2 examples of legal and illegal drugs.
3. What two groups of microbes do antibiotics work on?
4. Which microbe don't antibiotics work on & WHY?
5. What's the difference between an antibiotic and an antiseptic?
6. Give 2 ways in which antibiotics work.
7. When was penicillin discovered, how was it discovered, and who discovered it?
8. What is antibiotic resistance and why is this becoming a problem? You could include a diagram on your poster.
9. What is a painkiller and how does it killer to an anaesthetic?
10. Give examples of a painkillers and what effects they have on the body.
11. What problem can arise from taking too many painkillers?
12. Explain what is meant by 'over the counter medicines' and explain how someone would obtain a painkiller such as tramadol or morphine.

Lesson 8 Antibiotic Resistance and Painkillers 2:

MRSA

MRSA (sometimes referred to as the "superbug") stands for methicillin-resistant Staphylococcus aureus.

About one in three of us carry *Staph. aureus* on the surface of our skin, or in our nose, without developing an infection. This is known as being colonised by the bacteria. However, if *Staph. aureus* bacteria get into the body through a break in the skin they can cause infections such as boils, abscesses or impetigo. If they get into the bloodstream they can cause more serious infections.

Most *Staph. aureus* infections can be treated with antibiotics such as methicillin (a type of penicillin). However, *Staph. aureus* is becoming increasingly resistant to most commonly used antibiotics. MRSA bacteria are those types of *Staph. aureus* bacteria that are resistant to methicillin (and usually to some of the other antibiotics that are normally used to treat *Staph. aureus* infections).

MRSA is no more infectious than other types of *Staph. aureus* bacteria. However, MRSA infections are more difficult to treat due to the antibiotic resistance of the bacteria. Antibiotics can still be used to treat MRSA, the infection may simply require a much higher dose over a much longer period, or the use of an antibiotic to which the bacteria is not resistant.

<u>Answer these questions on paper and put in your booklet - use full sentences</u>

1. How would you test to see which antibiotics you would give to a patient who has a bacterial infection?
2. Where is *Staphylococcus aureus* usually found in humans?
3. *Staphylococcus aureus* is usually harmless but what does it cause if it enters the body?
4. Who is vulnerable from MRSA?
5. How can MRSA enter the body?
6. How might you tell if a wound is infected with MRSA?
7. What do hospitals do to prevent the spread of MRSA?
8. What do you think the public could do to prevent the spread of MRSA?

<u>Causes of MRSA</u>

Not all *Staph. aureus* are the same. Some will have a mutation (change) that allows them to survive when these bacteria encounter an antibiotic, such as methicillin. This is

known as resistance. These resistant bacteria survive, reproduce, and soon many bacteria will have this favourable mutation.

The number of antibiotic-resistant bacteria has increased in recent years due to:

- People not finishing the full course of antibiotics they have been prescribed. This allows some bacteria to survive, develop a resistance to the antibiotic, and then multiply.
- Antibiotics being overused. This has allowed bacteria to develop resistance to a wide range of antibiotics.
- MRSA is usually spread through person-to-person contact with someone who has an MRSA infection, or who is colonised by the bacteria. It can also spread through contact with towels, sheets, clothes, dressings or other objects that have been used by someone with MRSA. MRSA can also survive on objects or surfaces such as door handles, sinks, floors and cleaning equipment.
- Although MRSA infections usually develop in those being treated in hospital, particularly patients in intensive care units and on surgical wards, it is possible for hospital staff or visitors to become infected if they are in a higher risk groups.

9. What causes bacteria to become resistant to antibiotics?

10. Why do you think farmers give their cattle antibiotics in their feed?
11. What is an ethical issue?
12. The Government wants to eliminate local health centres and create larger 'super hospitals' where all patients can be cared for in one location. Some people argue that these 'super hospitals' will increase the rate of deaths by MRSA. Is this a valid argument?
13. A terminally ill patient has a bacterial infection that is resistant to multiple antibiotics. There is just one remaining antibiotic that is still known to be effective against it. List the arguments for and against treating the patient with the remaining effective antibiotic.

Aseptic Techniques Revisited

In the cells topic you explored aseptic techniques, this idea pops up again here. Bacteria can be tested for their resistance to antibiotics using a method called disc

diffusion. A sterile nutrient agar plant is prepared (this contains all the nutrients for the bacteria to grow). The bacteria to be tested is cultured (grown) in a broth.

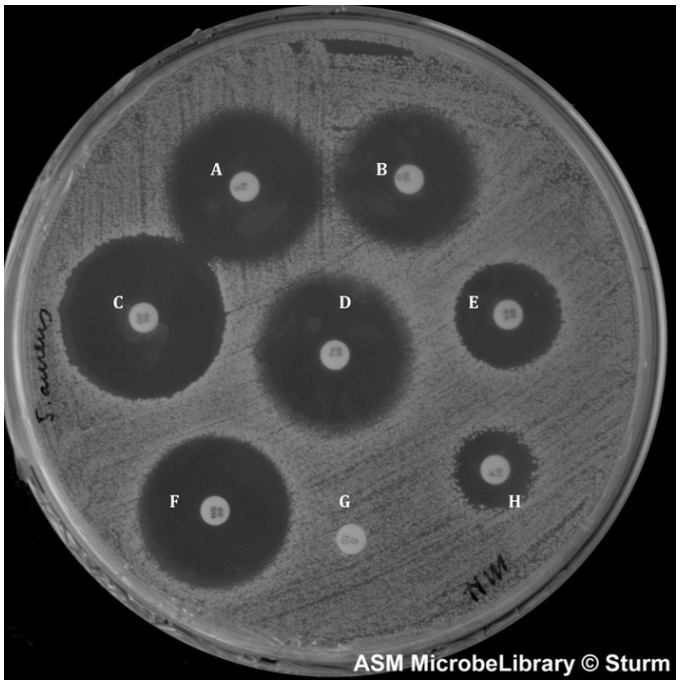
A sample of the broth containing the bacteria is spread onto the surface of a sterile agar plate using aseptic technique. Paper discs soaked in different antibiotics are then pressed lightly onto the surface of the agar. It is important that the discs are spread out evenly and not too close to the sides of the plate or to each other.

Q. Why is it important that the discs are spread out evenly and not too close to the sides of the plate or each other?

Q. Give 3 examples of things you must do when carrying out an aseptic technique procedure.

The agar plate is then incubated overnight. During incubation the antibiotic will diffuse out of the disc, meaning that the concentration of antibiotic decreases the further you get from the disc.

The results of the agar plate are as follows:



Q. What has caused the zone of inhibition (clear zone)?

Q. Calculate the area of each zone of inhibiton.
Remember area of a circle is calculated by pi (3.142) x r^2

Antibiotic	Radius ofcircle (cm)	Radius squared (cm)	Area (cm^2)
A			
B			
C			
D			
E			
F			
G			
H			

Q. Describe what the results show about the ability of the different antibiotics to kill the bacteria. You should include which antibiotic is the most effective to kill the bacteria and which is the worst.

_____

_____

_____

_____

_____

Q. What problem is there with calculating the area of the circle for determining which antibiotic is the most effective? (HINT: Look at the picture)

_____

_____

Exam Question

Scientists at a drug company developed a new pain-killing drug, drug **X**.

(a) Painkillers do **not** cure infectious diseases. Why?

.....

(1)

(b) The scientists compared drug **X** with two other pain-killing drugs, drug **A** and drug **B**.

In their investigation the scientists:

- chose 600 volunteers. The volunteers were all in pain
- gave 200 of the volunteers a standard dose of drug **A**
- gave 200 of the volunteers a standard dose of drug **B**
- gave 200 of the volunteers a standard dose of drug **X**.

Over the next seven hours the volunteers recorded how much pain they felt.

To get valid results the three groups of volunteers should be matched for as many factors as possible.

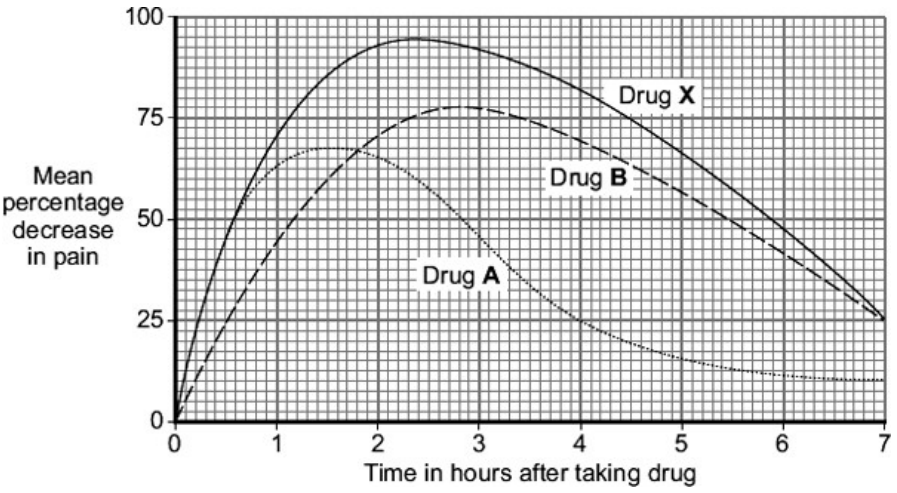
Suggest **two** of the factors that should be matched.

.....

.....

(2)

(c) The graph shows the results of the investigation.



(i) How much pain did the volunteers still feel, four hours after taking drug **A**?

..... percent

(1)

(ii) Give **one** advantage of taking drug **A** and **not** drug **B**.

.....

.....

(1)

(iii) Give **two** advantages of taking drug **B** and **not** drug **A**.

.....

.....

.....

(2)

(d) Drug **X** is much more expensive than both drug **A** and drug **B**.

A pharmacist advised a customer that it would be just as good to take drug **A** and drug **B** together instead of drug **X**.

Do you agree with the pharmacist's advice?

Give reasons for your answer.

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(3) (Total 10 marks)

Lesson 9 – Drug Development and Discovery

What makes a good drug?

Drug Development Overview

Stage 1 : Computer Modelling

Stage 2: Testing on live cells (Human &/or animal)

Stage 3: Clinical trials

A) Small number of healthy individuals.
B) Small number of sick patients.
C) Large number of patients.

If passes all these stages, the drug is then given a licence and manufactured and sold.

Cellpox Activity

Your task is to work for PharmaCell to find a new medicine to treat CellPox by considering a logical order of the stages on the information cards of what they should do, and recording these in your book. Once completed decide where stage 1 to 3 would be.

1.	2.	3.	4.	5.

6.	7.	8.	9.	10

Ext:

1. How do scientists find potential molecules to turn into medicines?

2. Why do scientists need to test these new molecules in animals if they appear to work in cells?

Clinical Trials:

1. How are volunteers organised into groups for a clinical trial?

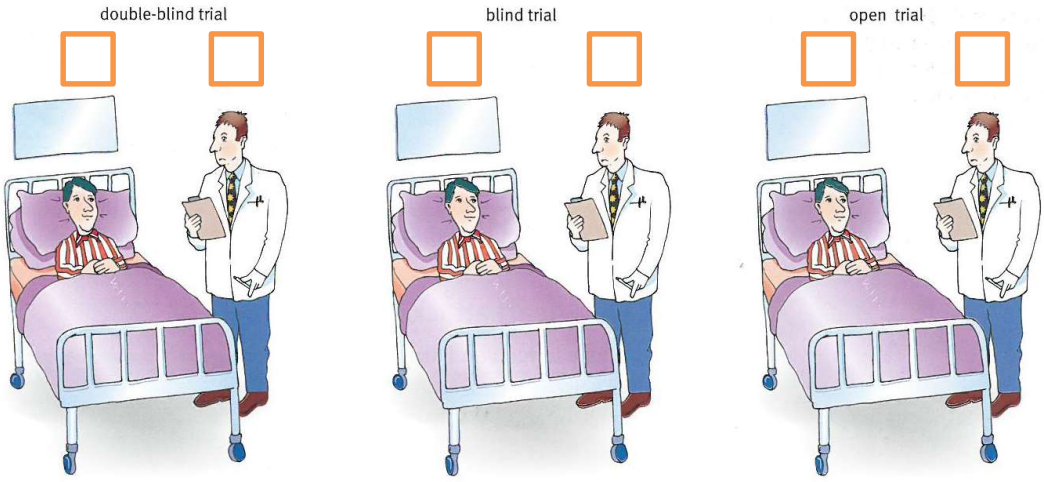
2. Why is it important this is done?

3. What is a placebo? Give an example of a placebo and why do scientists give volunteers a placebo?

Blind trials

In some trials the doctor is told which patients are being given the drug. This may be because they need to look very carefully for certain unwanted harmful effects. The patient still should not know. This method is called a **blind trial**.

In a drug trial the doctor and/or patient may (✓) or may not (✗) know if the treatment is the new drug.



Lesson 10 – Drug Discovery and Development 2

Recap: As the video is playing pick out all the stages previously explored for drug development and research.

Thalidomide

Using the questions and grade boundaries below, answer all the questions to the best of your ability. This should be done as an extended piece of writing. How you do this is up to you. You could turn your information into a newspaper article, an online blog or a letter for example. By doing this you are learning about the importance of clinical trials.

Grade 4
What is thalidomide?
What was it used to treat?
Who was thalidomide prescribed to?

Grade 5-6
Why did pregnant women use thalidomide?
Did they trial this drug?
Were there any significant side effects to using thalidomide?

Grade 7
How has the thalidomide incident impacted the pharmaceutical industry?
Are people still affected by thalidomide today?
How could this have been prevented?
Is it likely to happen again?

This task should be completed on lined / plain paper and put inside your folder.

Q1. Drugs affect the human body.

(a) Draw **one** line from each drug to the correct information about the drug.

Drug	Information
Cannabis	Used to boost heart rate
Steroid	Used to treat leprosy
Stimulant	May cause mental illness in some people
Thalidomide	Used to increase muscle growth
	Used to treat measles

(4)

(b) New drugs must be tested and trialled before being used.

(i) New drugs are tested in a laboratory before they are trialled on people.

What are new drugs tested on in a laboratory?

.....**(1)**

(ii) Why is it important that drugs are trialled before doctors give them to patients? Tick (✓) **two** boxes.

To check that the drug works ☐

To check the cost of the drug ☐

To find out if the drug is legal ☐

To find the best dose to use ☐

(2)

(iii) In a double blind drug trial, only some people know which patients have been given the drug.

Who knows which patients have been given the drug?

Tick (✓) **one** box.

The patient and the doctor ☐

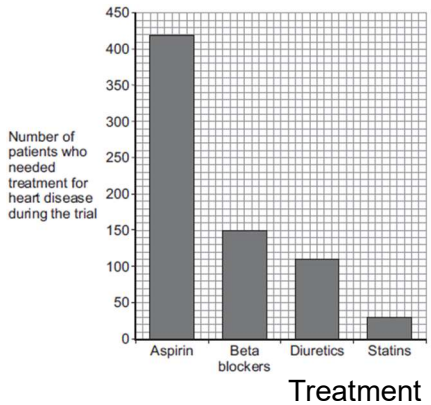
Only the doctor ☐

Only scientists at the drug company ☐

(1)

(c) Doctors trialled four different treatments for reducing the risk of heart disease. Each treatment was trialled on the same number of patients for 5 years. The patients did **not** have heart disease at the start of the trial.

The graph below shows the results.



(i) How many patients who took aspirin needed treatment for heart disease during the trial?

Number of patients = ...**(1)**

(ii) Based **only** on the evidence in the graph, which would be the best treatment to reduce the risk of developing heart disease?

.....**(1)**

(iii) Suggest **one** other factor that a doctor might consider before deciding which treatment to use for a patient.

.....

(1)
(Total 11 marks)

Q2. (a) **List A** gives the names of three stages in trialling a new drug.

List B gives information about the three stages.

Draw a line from each stage in **List A** to the correct information in **List B**.

List A Stage	**List B Information**
Tests on humans including a placebo	Used to find if the drug is toxic
Tests on humans using very small quantities of the drug	The first stage in the clinical trials of the drug
Tests on animals	Used to find the optimum dose of the drug
	Used to prove that the drug is effective on humans

(3)

(b) Read the passage.

Daily coffee dose delays development of Alzheimer's in humans.

Alzheimer's is a brain disease that causes memory loss in elderly people. Scientists studied 56 mice that had been genetically engineered to develop Alzheimer's.

Before treatment all the mice did badly in memory tests.

Half the mice were given a daily dose of caffeine in their drinking water. The dose was equivalent to the amount of caffeine in six cups of coffee for a human.

The other mice were given ordinary water.

After two months, the caffeine-drinking mice did better in memory tests than the mice drinking ordinary water.

The headline for the passage is not justified.
Explain why as fully as possible.

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.....**(3)**

(Total 6 marks)

Q3. Drugs may harm the human body.

(a) The drug thalidomide was originally developed in the 1950s.

(i) What was the drug thalidomide originally developed to treat?

.....**(1)**

(ii) Soon after it was developed, thalidomide was found to be useful in treating another condition.

What was this other condition?

.....**(1)**

(iii) Describe **one** harmful effect of thalidomide.

.....**(1)**

(iv) Suggest why this harmful effect had **not** been detected during clinical drug trials on thalidomide.

.....

.....**(1)**

(b) Using a recreational drug may cause a person to become dependent on the drug.

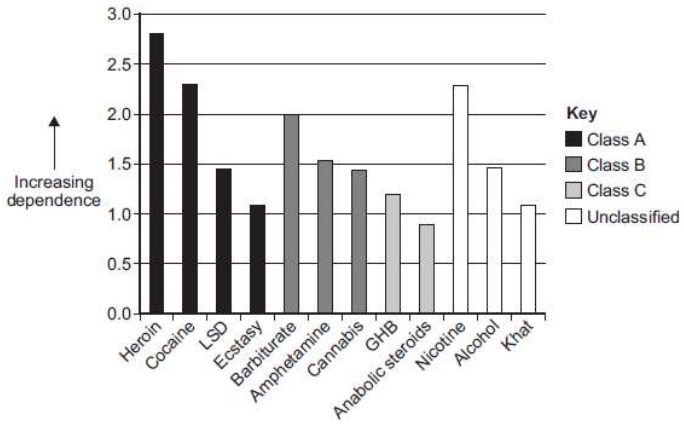
(i) What happens in the body to make someone dependent on a drug?

.....

.....**(1)**

(ii) Doctors rated different recreational drugs according to how

dependent users had become on them. The graph below shows the results.



It is illegal (against the law) to take Class A, B or C drugs.
Unclassified drugs are legal.

Some people think that some legal drugs should be made illegal.
What evidence is there in the graph above to support this view?

.....

.....

.....

.....**(2)**

(iii) Suggest **one** other piece of information about legal drugs that would need to be considered before the classification of these drugs was changed.

.....**(1)**

B3 Infection and Response

Can you…?	☺	😐	☹
3.1 Communicable diseases			
Explain how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants.			
Define the term pathogen			
Explain how bacteria and viruses may reproduce in the body and why they make you fell ill			
Give examples of how the spread of diseases can be reduced			
Know that Measles is a viral disease and describe the symptoms			
Explain the effects of HIV and how it is transmitted			
Describe tobacco mosaic virus (TMV)			
Know that Salmonella food poisoning is spread by bacteria ingested in food, or on food prepared in unhygienic conditions.			
Describe the symptoms of salmonella food poisoning			
Know how Gonorrhoea is a transmitted andx how its spread can be reduced.			
State the cause of Gonorrhoea and describe the symptoms and how it is treated			
Describe rose black spot and state its cause			
Know how rose black spot is spread in the environment and how it can be treated			
Describe malaria and state its cause			
Know how malaria is spread and how to reduce the spread of the disease			
Define some of body's natural defences to infection			
Explain to role of white blood cells			
Describe the process of vaccination			
Explain "herd immunity"			
State what antibiotics can treat and explain the development of antibiotic resistance bacteria			

Define painkillers			
Explain why it is difficult to develop drugs that kill viruses			
Know that traditionally drugs were extracted from plants and microorganisms and give some common examples including who discovered Penicillin and from what			
State that most new drugs are synthesised by chemists in the pharmaceutical industry. However, the starting point may still be a chemical extracted from a plant.			
For new medicinal drugs explain the stages in preclinical and clinical trial			
Define placebo			
Explain double blind trials			