Medicine in the 1900s

This half term we have covered three areas of medicine in the 1900s.

- Disease and Infection
- Surgery and Anatomy
- Public Health

All the work is in this pack. The text book pages you need are in a separate document.

You need to read the information on each page, highlight the important facts and then answer the questions.

ONLY do the work you have missed out on.

Watch - https://www.youtube.com/watch?v=my14ZuzjH5I&list=PLcvEcrsF_9zJ8AqMTFZycm46Ks4DdSaLM&index=5

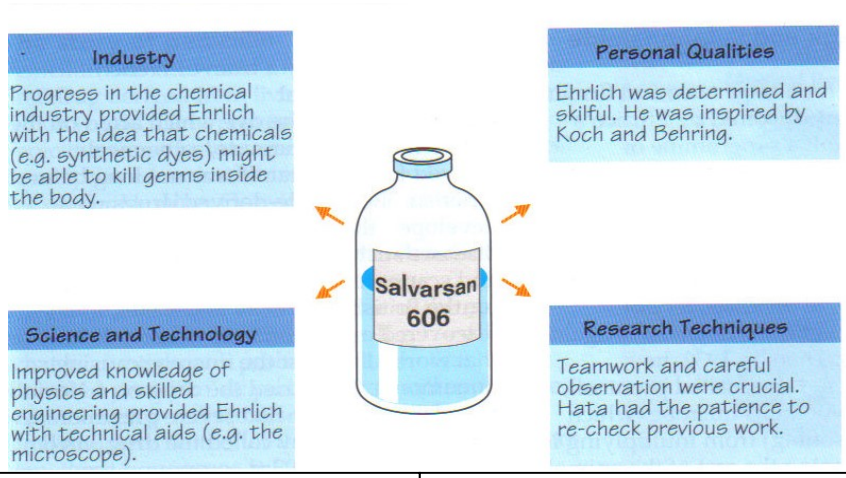
DISEASE AND INFECTION

Following the discovery of Germ Theory in 1861 many doctors raced to find the next vaccine to prevent illnesses. However, some doctors began to look for a chemical that would go into the human body and kill infections. They called this the search for the 'Magic Bullet'. Two scientists would go onto discover the Magic Bullet for some individual illnesses. However it would be Alexander Fleming's discovery of Penicillin that save most lives and cure most infections.

Ehrlich and the first 'Magic Bullet'

The fight against Disease and Infection by 1900

The work of Paul Ehrlich and the magic bullet theory



Read pages 90-1 and make notes in this mindmap

The Syphilis Microbe

Why was there opposition to his discovery?

Domagk and the second 'Magic Bullet'

A painting from the 1860's called An Anxious Hour. Before Sulphonamide drugs many children dies of common illnesses such as 'flu'.

Gerhard Domagk worked for a large chemical firm in Germany. Inspired by Ehrlich he carried out systematic research looking for chemical dyes which might destroy infecting microbes within the body. Like Ehrlich he was conscientious and determined. Read page 92 and make notes

Germanin and Prontosil

Discovery of Sulphonamides

Disadvantages

PENECILLIN!

Penicillin was the worlds first anti-biotic – that means the first drug derived (made) from living organisms such as fungi which can kill or prevent bacteria from growing, Penicillin is effective against a variety of germs. The name Alexander Fleming is one of the most famous in history and is linked with inventing Penicillin. The problem we need to investigate is – how much credit does he really deserve? As you will find out – he is often actually called – 'the man who didn't invent penicillin!' Read 93-4

Fleming's Motives

During his time working in a military hospital Fleming had been appalled to see that antiseptics such as carbolic acid did not prevent infection in deep wounds. He returned from war determined to find a substance that would kill germs effectively. In 1922 he discovered lysozyme, it killed some germs but not those that caused disease and infection.

The 'Discovery'

Fleming was carrying out research into staphylococci (germs which turn wounds septic'. He grew germs on 'agar' in culture dishes. When he came to clean a discarded culture dish he noticed a mould spore had landed on one. All around the mould the bacteria had stopped growing. Could this mould kill bacteria? Due to his individual genius he investigated further and produced a bacteria killing juice called Penecillin.

SOURCE 5 A. Maurois, *The Life of Sir Alexander Fleming*, 1963

"Fleming was in his little laboratory as usual, surrounded by innumerable dishes. The cautious Scot disliked being separated from his CULTURES before he was quite certain that there was no longer anything to be learned from them … Fleming took up several old cultures and removed the lids. Several of the cultures had been contaminated with mould … 'As soon as you uncover a culture dish,' he said to Pryce, 'something tiresome is sure to happen. Things fall out of the air.'

Suddenly he stopped talking, then, after a moment's observation, said … 'That's funny …' On the cultures at which he was looking there was a growth of mould, as on several of the others, but on this particular one, all around the mould, the colonies of STAPHYLOCOCCI had been dissolved …"

Stage 1: growing the penicillin

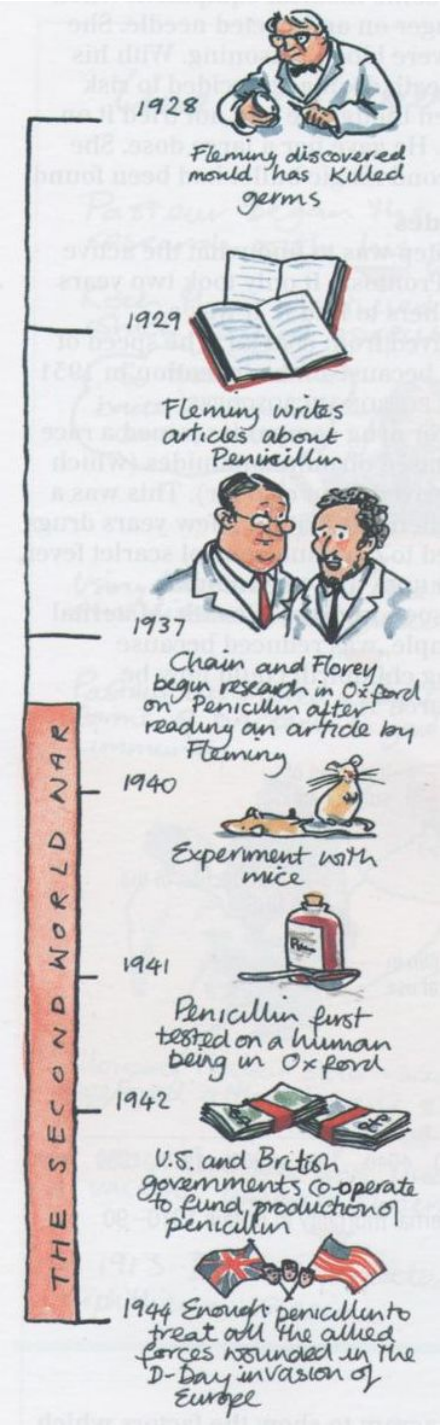
The process devised by Chain to make penicillin was a combination of the latest freeze-drying technology and some much more traditional equipment: thousands of milk bottles (in which to grow the bacteria), milk churns, a dog bath and a hand pump! Slowly the team gathered a few grams of pure penicillin.

Stage 2: testing the penicillin on animals

There was just enough penicillin to try an experiment on eight mice. They were all injected with dangerous microbes. Four mice were then given penicillin. Four were not. Twenty-four hours later the mice who had not been injected with penicillin were dead. Those who had been given penicillin were fine.

Stage 3: the first human trial of penicillin

The team needed more penicillin for a human trial than they had for the mice. It was not until early 1941 that they had enough to test it on a human patient.



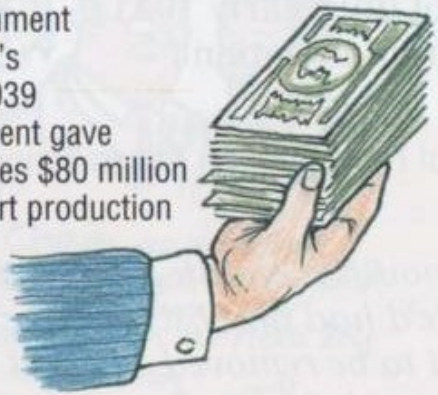
Explain – What did Fleming do after his discovery? (Page 94)

What is the significance of Florey and Chain's role in Penicillin? (Page 95)

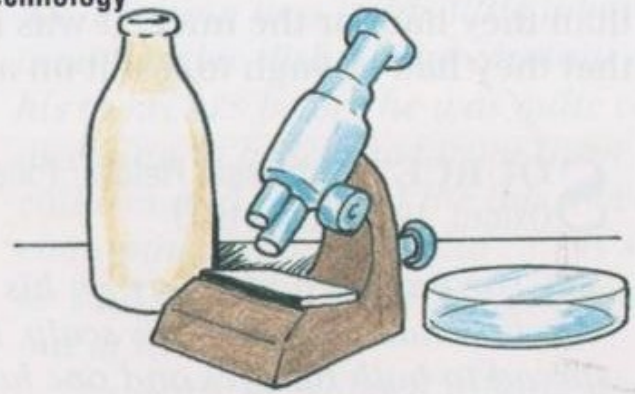
Watch - https://www.youtube.com/watch?v=N2-7UQWrYPY

In your opinion – how much credit should go to Fleming for providing the world with Penicillin (you may wish to look at the diagram on the next page to help you!)?

Government
- British government funded Florey's research in 1939
- U.S. government gave drug companies $80 million in 1942 to start production of penicillin



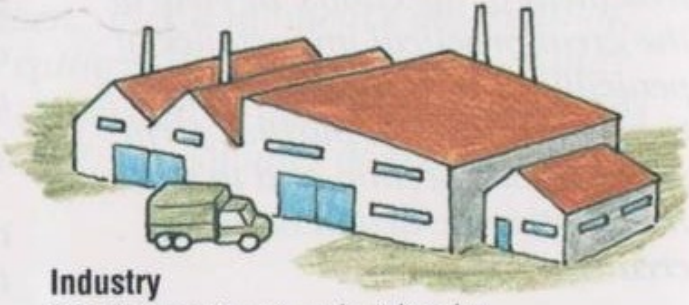
Technology



Scientific experiment

Chance

PENICILLIN: WHY THEN?



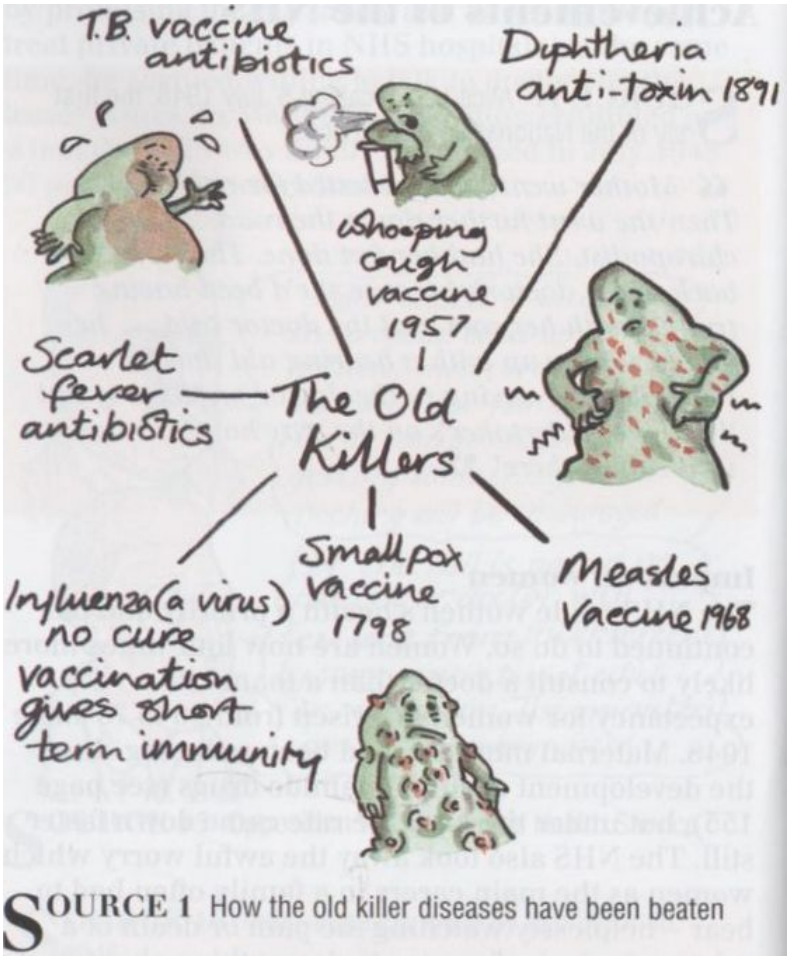
Industry
Development was undertaken by four major drug companies pooling their experts

War

Communications

Individuals
Florey and Chain were skilled scientists supported by a skilled and committed team of researchers

So – is the fight against infection and disease over?



SOURCE 1 How the old killer diseases have been beaten

Are any of these old 'killers' still a problem today?

Read page 98-100 of your textbook – What are the current challenges we face with disease and infection?

Read pages 76-77. Makes notes under these two headings:

Areas where medicine has progressed	New threats and challenges that remain

Who were Crick and Watson? Why is there discovery so important?

SURGERY AND ANATOMY

The impact of war on surgery in the 20th Century.

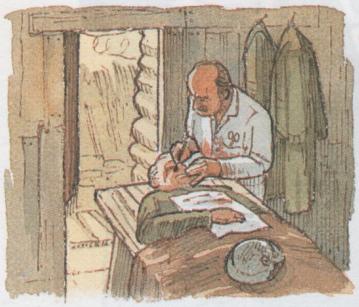
By the 20th Century surgery was far more common and the two world wars meant that new techniques and technology made further advances. The image below shows what impact the First World War had on surgery.

Millions were wounded giving surgeons the opportunity to experiment with new techniques.

The powerful guns used in the First World War caused more severe wounds.

Broken bones were commonplace. Surgeons developed new techniques to repair broken bones, and to perform skin grafts – which formed the basis for plastic surgery.

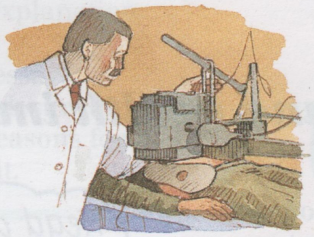
Head wounds were particularly common. Surgery of the eye, ear, nose and throat all improved rapidly. Brain surgery also advanced.



Many of the surgeons who learned their skills quickly in battlefield hospitals set up as specialist surgeons after the war.

Bullet wounds carried infection deep into the body. Surgeons had to search for better ways to prevent the infections. They never fully succeeded, but the suffering of the First World War inspired some doctors to search harder for an effective way to fight infection.

X-rays were invented before the war. During the war their use became routine to find bullets and shrapnel lodged in the body.



Blood transfusion was used effectively for the first time. Methods of storing blood and transporting it to where it was needed were improved.

The low standard of health among recruits to the army made the government very worried about the health of the population generally. It made them more eager to improve health care at home.

The soldiers who fought in the war were promised good housing when they returned – 'homes for heroes'. This speeded up the process of getting rid of unhealthy slum housing in Britain.

During today's lesson you will research the impact of the two world wars on surgery in the 20th Century. On the next page are a number of boxes for you to fill in which show how surgery advanced through war.

Read

- Textbook pages 152-153 and pages109-111

Remember read each section one at a time then put it in your own words- DON'T COPY!

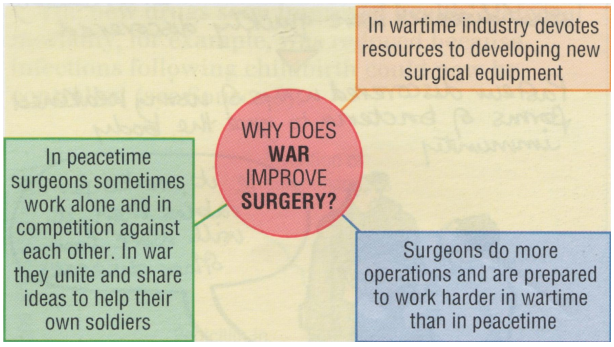
Developing X-Rays

Blood Transfusions

WWI

Fighting Infection

Other developments



Plastic Surgery

Heart Surgery

WWII

Overcoming the problems of Heart Transplant.

By the 1950s surgery had changed radically. Thousands of operations were taking place each month in the NHS and most obstacles to advancing surgery had been removed. One last major area remained unconquerable- transplanting a Heart. The whole world was watching on as news of the first Heart transplant was completed, only to find it failed. Was it just too difficult for surgeons? Read pages 110-113 and make notes on how did heart transplants become successful in the late 20th Century.

High technology surgery

Problems with heart surgery

How did Heart Transplants become successful operations?

Christiaan Barnard

Cyclosporin

With a combination of skill, patient care, technology and drugs operations which people would not have dreamed of attempting were now possible and many are now routine. Over 160 years surgery has gone from being the medicine of last resort to being at the for front of caring for the patient.

The impact of High Technology Surgery?

Read page 114 and make notes:

PUBLIC HEALTH

During the 1900s the government moved away from being Laissez Faire and instead moved towards taking responsibility for our health (we call this idea the Welfare State). Two laws were introduced to allow this to happen:

- The Liberal Social Health Reforms
- The NHS

The Liberal Social Health Reforms

(Rowntree and Booth + Boer war + Changes to Government + Lloyd George = Liberal Social Health Reforms 1906-1914)

Rowntree and Booth

Read page 131 and make notes (Additionally you can watch https://www.bbc.co.uk/programmes/p00w6xn8 and https://www.youtube.com/watch?v=-rN3WG1SMss)

Boer War

Read page 131 and make notes

David Lloyd George

He was Chancellor of the Exchequer (in charge of the governments money) and responsible for introducing new health laws. He was a brilliant and persuasive speaker. He wanted to improve the lives of ordinary people and was a friend of Rowntree. He increased taxes for the rich to help pay for some the new health laws to help the poor

Changing Government

The Labour party were new. They represented the working classes. The Liberal party had been around for longer and were worried they would lose votes as many working classes might now vote for the new Labour party. The Liberal party were therefore keen to please the everyday working man.

What were the Liberal Social Health Reforms?

Copy the green diagram on page 131

What was the impact of the Liberal Social Health Reforms?

Read page 132 and make notes

Public Health between World War One and World War Two

Read pages 132-133 and write a paragraph explaining the changes and problems in public health between the two World Wars.

The NHS (National Health Service

(Beveridge + World War Two + Bevan = NHS 1948)

Watch - https://www.youtube.com/watch?v=0pnEMBgEG24

Beveridge

Read page 135 and make notes

World War Two

Read page 134 and make notes (Additionally you can watch)

Bevan

Read page 136 and make notes

What is the NHS?

Read page 135 and make notes

Reactions to the NHS?

Read page 136 and make notes

Problems with the NHS?

Read page 137 and make notes

Alternative Treatments

Recently people have begun to turn back to 'alternative' treatments. Read page 138 and make a mind map of what these are.

Retrieval Practice – the 1800s

Look at this code

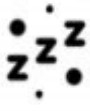
3.				

- Highlighter Icons -

- For each question can you circle the answer (it may be more than one person)
- On the bottom make 3 of your own questions to ask the person next to you.
- Then from memory write three bullet points under each person at the bottom to test your kn

	Pasteur	Koch	Ehrlich	Snow	Chadwick	Simps
His report on the living conditions of the poor shocked Britain in 1842.						
In 1909, he discovered that the chemical Salvarsan 606 cured syphilis.						
Was professor of Midwifery at Edinburgh University						
Proved that germs did not come alive on their own, that they could be found in places they could reach easily, and they infected things and turned them bad.						
Idea was helped by the work of Lister and antiseptics.						
Who reduced the number of deaths during surgery to 15%						
Helped Jamie Greenless who had been run over by a cart and						

A famous surgeon who worked in Broad Street, Soho, London						
Developed the technique of growing microbes on a plate of solidified agar which encouraged microbes to grow						
A student of Robert Koch who reasoned that, if certain dyes could stain bacteria, perhaps certain chemicals could kill them.						
One objection to their discovery was that pain in childbirth was God's will and a punishment for sin.						
1.						
2.						
3.						

Pasteur	Koch	Snow	Chadwick	Simpson
				

Exam Practice – Question Four

Factors question – 16 Marks + SPAG - Medicine

Examples

Has the role of the individual been the main factor in the development of medicine in Britain since medieval times? Explain your answer with reference to the role of the individual and other factors

Technique

Consider using a brief intro, 3 factors paragraphs and a conclusion;

- Iceberg question- the examiner has given one factor that you must discuss, you have to come up with two other factors to compare it to.
- PEEI paragraphs (point, specific evidence, developed explanation, state importance of the factor)
- Compare importance of factors in the conclusion
- SPAG- this isn't just about spelling, the examiner would like to see clear, sophisticated paragraphs with correct use of key terms.
- 20 minutes

Student mark scheme

- Fails to address the question – ***0 marks***
- **Level 1:**Basic explanation of one or more factors– ***1 – 4 marks***
- **Level 2:** Simple explanation of the stated or other factors – ***5-8 marks***

  Level 3: Developed explanation, range of accurate knowledge of stated factor plus another factor(s) – ***9-12 marks***

  As above + use specific evidence and explain the consequences of changes mentioned. Suggest that one factor is more important.
- **Level 4:** Uses specific own knowledge to explain several factors and contains a sustained argument – ***13-16 marks***

  Complex explanation of factors leading to a sustained judgement.

SPAG

- Candidate spells, punctuates and uses grammar with reasonable accuracy. Limited range of specialist terms. ***1 mark***
- Candidate spells, punctuates and uses grammar with considerable accuracy. Good range of specialist terms but used appropriately. ***2-3 marks***
- Candidate spells, punctuates and uses grammar with consistent accuracy and uses them effectively. Wide range of specialist terms as appropriate ***(4 marks)***

Top Tips

- *Read question carefully.*
- *Highlight the given factor*
- *Check if it is talking about all of medicine or just one area e.g. surgery and anatomy*
- *SPAG marks mean you need clear paragraphs and an introduction*

Plan your answer on the next page

Introduction (Outline the factor and two others you will talk about)	
Use the given factor	***I agree that the factor of…… has been important in the progress of……***
Use another factor	***On the other hand, the factor of…… has been important because…***
Use another factor	***The factor of…… has also been significant because…***
Conclude. Is the given factor the most important or not? Can you link factors together?	***Overall I think….***

Other example *:Has the role of the technology been the main factor in the development of surgery in Britain since the Renaissance times? Explain your answer with reference to the role of the technology and other factors.*

Example question and answer:

How far has communication been the main factor in the development of surgery and anatomy? 16 marks + 4 SPAG

Communication has been a relatively significant factor in the development of surgery and anatomy, as has war however in my opinion, science and technology has contributed much more.

Firstly, communication has contributed to the spreading of new ideas on anatomy and new surgical methods. For example, Vesalius published The Fabric of the Human Body in 1543 in which he displayed accurate technical drawings of the body including the muscles and bones. This had never been done accurately before Vesalius, which meant that medical students had access to incorrect information on anatomy and surgery from other doctors such as Galen. Due to the invention of the printing press in the 15th century, Vesalius' books were able to reach medical students and doctors all around Europe and therefore improved their ability to perform surgery well and understand anatomy. However, the contribution of communication is somewhat limited the Renaissance as people were reluctant to follow the new ideas being presented to them because of the Church's disagreement with these, therefore communication only becomes very useful to the development of medicine during the 19th century onwards when religion had much less influence.

War had an equally important impact on the development of surgery and anatomy. During the 16th century Pare discovered new ointments for gunshot wounds and new ways of tying ligatures that are still used today. This was thanks to his work as a battlefield surgeon. The crusades in the Middle Ages gave Europeans the opportunity to learn from Arab medicine, which was more advanced than European medicine, which still heavily relied on Galen. However, it was in the 20th century that war helped develop surgery and anatomy the most. X ray machines were developed and used widely because of World War One, and these allowed doctors and surgeons to see bones without opening up the body, meaning injuries could be operated on effectively. Blood transfusions also started to be understood (thanks to the base work done earlier by Harvey) and these were used on soldiers who had lost lots of blood in battles.

However, in my opinion science and technology has been the main factor in the development of surgery and anatomy as most of the communication and warfare developments involved some science and technology, for example the technology used to build the X ray machines. Also, the surgical revolution of the 19th century was driven mainly by science and technology. James Simpson's invention of a new type of anaesthetic called chloroform allowed surgeons to perform operations more carefully and slowly because it stopped one of the main problems of surgery- pain. Joseph Lister's carbolic acid antiseptic spray helped reduce the risk of infections that this led to, despite how unpopular it initially was with surgeons.

Overall, although communication and war were important factors in the development of surgery and anatomy, these wouldn't have had as much impact without science and technology.

How many marks would you give this and why?

This sort of question demands that you can explain what factors have been important in each area of medicine. Use all of your work on medicine to give examples of how each factor has contributed to medicine in each of the three areas.

Disease and Infection

Individuals	
War	
Government	
Sci and Tech	
Chance	

Religion	

Surgery and Anatomy

Individuals	
War	
Government	
Sci and Tech	
Chance	

Religion	

Public Health

Individuals	
War	
Government	
Sci and Tech	
Chance	

Religion	

EXTENSION TASK

Create revision cards on the following people
Ehrlich, Domagk, Fleming, Rowntree and Booth, Lloyd George, Beveridge, Bevan, Gillies, McIndoe. These should be laid out in this way…

Name:
Date:
Area of medicine:

Background:

What they are famous for:

Factors that helped:

Importance: ?/10