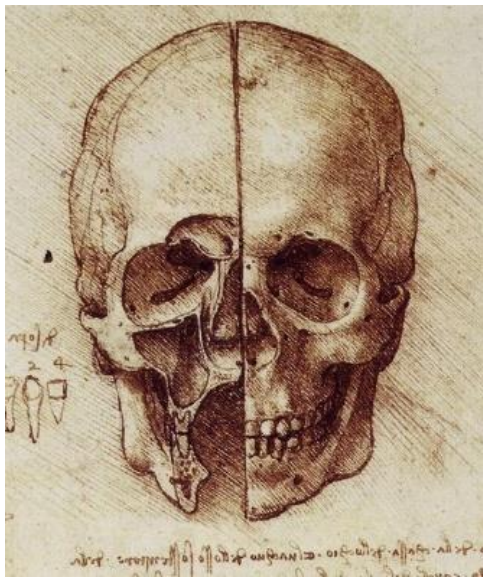


Medicine through Time

Revision Booklet.



1000 – 1400. Middle Ages.

1400 – 1750. Early Modern Britain (Renaissance)

1750 – 1900. Industrial Revolution.

1900 – 2000. Twentieth Century.

TASKS – Overview on the topic.

Time Period	MIDDLE AGES	RENAISSANCE	1800s	1900s – PRESENT DAY	
DATES	AD1000 – AD1400	AD1400 – AD1600	1800-99	1900 - NOW	
DISEASE + INFECTION WHAT caused disease?	Gods and Spirits Imbalance of 4 humours Miasma/bad air	A lot of people still believed in the theory of the 4 humours and that bad air caused disease	Germ Theory: Scientific advances led to the correct understanding of ... GERMS! Spontaneous generation	Genetic causes - DNA	
WHO healed it?	A lot of people up until the end of the renaissance would rely on priests or family members to help them recover from an illness, rather than see a doctor or go to a hospital		Fully trained doctors and nurses, improved hospitals		
HOW did they treat it?	Herbal remedies Leeches Bleeding, exercise and diet	More herbs available for herbal remedies	Vaccination discovered as a method for preventing disease	Chemical drugs, antibiotics, genetic medicine	
SURGERY + ANATOMY WHAT, if any, surgery was performed?	Battlefield surgeons made minor improvements Use of cauterisation to stop bleeding	Improved treatment of gunshot wounds Use of ligatures to stop bleeding	Chloroform – effective anaesthetic Carbolic acid – effective antiseptic	Discovery of blood groups – transfusions	
HOW MUCH did they know about the body and anatomy?	Galen	Vesalius pioneered human dissection and proved Galen's theories wrong. Harvey discovered how blood circulated around the body	Use of microscope to develop knowledge	X-rays Discovery of DNA	
PUBLIC HEALTH	Monasteries developed their own public health systems after the Romans left, but kings and mayors did little to help		Governments became increasingly more involved in improving public health Cholera epidemics forced government to act.	Help for poor, sick and unemployed NHS – 1948	
WHO were the key people in each time?	Al-Razi Ibn Sina	Vesalius Paré Harvey Paracelsus	Jenner Simpson Snow Nightingale Chadwick Pasteur	Koch Lister Blackwell Anderson Seacole	Booth and Rowntree Lloyd George Beveridge and Bevan Fleming, Florey and Chain Crick and Watson Barnard

TASK - Colour code each section in your booklet.

Causes and Treatment. 1000 – 1400. Middle Ages.

Roman Empire collapsed and Europe was split into warring tribes with no interest in education or science. Christianity and Islam preserved the medical writings.

- Christians often believed that illness was a **punishment from God** despite the fact that Hippocrates had suggested natural explanations.
- In the twelfth century Saint Bernard said, 'To buy drugs or consult with physicians doesn't fit with religion.'
- During the Black Death (1347-49) many people said God was punishing sinners. Mentally ill patients were thought to be possessed by demons and often flogged to drive out the evil spirits.

Treated the sick by setting up hospitals – some were small with space for 12 patients but some larger. They did not have doctors but chaplains

- Monasteries and convents would have their own **infirmaries** for the care of the sick. They offered care and rest over curing people. Prayer was the best medicine.
- Many monasteries also had their own herb gardens for the preparation of medicinal drugs.

Christian Church was the most powerful organisation in Europe. It was very traditional. **For example dissection to discover new knowledge was banned by the Pope.**

The Church taught that important knowledge came from ancient books such as those of Hippocrates or the Bible. Scholars worked to clarify not discover.

1200 **doctors were trained under Church approved universities.** Galen's works taught here. If people questioned Galen they may be imprisoned like Roger Bacon.

+ Cared for the sick

+ Preserved the work of Hippocrates and Galen.

TASK Using pages 3 and 4 give definitions for the following words:

Infirmaries	
Monasteries	
Alchemists	

Causes and Treatment. 1000 – 1400. Middle Ages.

Muslim doctors and scholars added to the knowledge of the Ancient Greeks

Roman Empire collapse brought wars but the Byzantine Empire in the East survived with a peaceful and stable government.

In the 7th century the Prophet Muhammad's followers established an enormous and new empire in the Arab world. Islam's golden age of scholarship was from 750AD to 1050AD

Islamic doctors included

Avicenna (Ibn Sina) – 'Galen of Islam', compiled a summary of all medical knowledge called '**The Canon of Medicine**', chapters on eating disorders and obesity, The Canon was used as a standard text in European schools and Universities

Rhazes (Al-Razi) – wrote 200 medical books, **identified the symptoms and developments of smallpox**, he also wrote *Doubts about Galen*

The first Islamic hospital was built in Baghdad in 805AD and by the 12th century every major town had one.

- These unlike the Christian versions were more concerned with the treatment of patients
- There were **teaching hospitals** that focussed on teaching doctors and nurses, the one in Baghdad had its own library
- Some **hospitals were specialised** for example mental illness.

Contribution to medical progress

- Government supported doctors in their search for knowledge.
- The Caliph ran the whole Islamic Empire. Caliph Harun al-Rachid (786AD-809) created a centre for the translation of Greek manuscripts into Arabic.
- Muslims were encouraged by the Prophet Muhammad himself to 'seek learning even as far as China.' **Prophet Muhammad also encouraged a scientific approach**; 'For every disease, Allah has given a cure.'
- Hippocrates and Galen's works were translated
- Islamic medicine improved the drugs and medicines provided with '**alchemists**' finding new chemicals.

+ Preserved the work of Galen and Hippocrates

+ Treating the sick in hospitals

+ Rhazes and Avicenna added to the knowledge of Hippocrates and Galen

+ Development of new drugs and medicines.

Surgery and anatomy. 1000 – 1400. Middle Ages.

Experience: medieval surgeons learned from experience by watching other surgeons

War: In **wartime** surgeons learned how to deal with different battlefields wounds. They were confident in dealing with these kinds of injuries but they did not perform complex, internal surgery.

Books: the 1st European book on surgery was written by Roger of Salerno in the late 12th century. In the 14th century Guy de Chauliac wrote a book called **Great Surgery**. These books contained hand-drawn illustrations of techniques such as cauterising.

Progress?

13th century Hugh of Lucca and his son Thoedroic (Italian surgeons) found that **wine** made a better job of cleaning a wound than water. But they did not know why!

14th century John of Arderne experimented **with henbane and hemlock as anaesthetics**. In controlled doses it worked but too much would kill the patient.

From 1340 an annual human dissection was performed at Montpeilier University in France.

There was also **professors of surgery** introduced which raised the status of medieval surgeons who had been looked down upon before.

Key Word:

Cauterising – using a red-hot iron to seal blood vessels.

- 1) Using the pages 1-5. Explain the difference between supernatural and natural methods of treatment for patients and give examples.

Supernatural	Natural

Public Health. 1000 – 1400. Middle Ages

In 500AD the Roman Empire was under attack from Barbarian tribes such as the Goths, Vandals and Huns. These tribes were illiterate and not interested in public health or engineering. As a result the public health facilities fell into disrepair.

Medieval towns became filthy, few public toilets and cesspits were near to wells. Did not improve till 1200 when for example cess pits were lined with stone.

Why so bad?

<ul style="list-style-type: none"> • No knowledge of prevention • Roman facilities destroyed • Towns full of animals 	<ul style="list-style-type: none"> • Unpaved streets were impossible to clean • Houses were tightly packed together • Paid officials found it hard to remove all rubbish and filth • Governments not strong enough to impose a regime. Kings were more interested in war than health.
---	---

Black Death 1347-49

Terrifying epidemic from China. Spread along trade routes. Estimates suggest at least **1/3** of the population of Europe.

<p>Causes</p> <ul style="list-style-type: none"> • Bubonic plague carried by rats and spread by fleas. Passed on when infected fleas bit other rats or humans. 	
<p>Explanations</p> <ul style="list-style-type: none"> • A punishment from God • Result of the planets being out of alignment • Work of Jews or other outsiders • Caused by bad air, dead bodies or stagnant water. 	<p>Treatments</p> <ul style="list-style-type: none"> • Prayer • Flagellants whipped themselves to show repentance • John of Burgundy in 1365 advised people to avoid baths as opening the pores of the skin allowed diseases into the body • Also suggested to follow Galen's 'Theory of Opposites' fever with cold foods like cucumbers.

TASK – Middle Ages.

Note down what the following individuals discovered:

Avicenna	
Rhazes	
Hippocrates	
Galen	
Roger of Salerno and Guy de Chauliac	

Causes and treatments. 1400 – 1750. Early Modern Britain (Renaissance).

Paracelsus

“My shoe-buckles contain more wisdom than both Galen and Avicenna!”

- Town doctor and professor of medicine in Basel, Switzerland in 1520s.
- Criticised the ideas of Hippocrates and Galen.
- **Illnesses caused by chemicals in the body**, and so treatments should be based on chemicals.
- God had sent clues about how to cure illnesses; he used plants that resembled the illness!
- **He gave his lectures in German**, rather than Latin and burnt the works of Galen and Avicenna.
- Not successful in winning support away from Galen; his work was not read or shared, and he was described as a crank.

Role of Women as Healers

- Still healers in the family, or local wise women used.
- Women still not allowed to go to university and train as doctors.
- Women did traditionally work as mid wives; but even that role was downgraded by the invention of the forceps (resembles a pair of tongs) in 1620; **only men knew how to use them because they'd gained the anatomical knowledge and training at university.**

Refer to Middle Ages pages 3-4. Time used those methods for causes and treatments as well.

TASK: Complete the table on Paracelsus.

Which individual did he criticise?	
What caused illness in the body?	
What should treatment be based on?	
Was he successful in convincing others of his ideas?	

Surgery and anatomy. 1400 – 1750. Early Modern Britain (Renaissance).

What happened?

- Classical knowledge of Rome and Greece rediscovered.
- They had a love of learning, experimenting and new discoveries; enquiry rather than acceptance!
- Church lost some of its powers; people began to ask questions
- **Printing press** invented (quicker communication of knowledge)
- Important developments in science and technology for example watches and pumps
- Developments in Art (Leonardo da Vinci) more lifelike drawings
- Humanist ideas developed – new belief and interest in the potential and achievements of mankind.

Ambroise Paré (1510-90)

Before Paré surgery was brutal (burning oil poured into wounds!)

Paré was a French barber surgeon. Worked in the French army and for the royalty. Wrote the book *Works on Surgery* in 1575.

Contribution

- Treated wounds with soothing ointment of egg yolks, **turpentine and rose oil for cauterising wounds**
- Used silk threads called ligatures to stop bleeding
- Designed **prosthetic** limbs for wounded soldiers.

Situation after

- Using ligatures was slow so many surgeons on the battlefield carried on cauterising
- If the **silk threads were dirty they could increase infection.**
- He had no formal education so he was looked down upon by others
- The problems of pain and infection remained unsolved for 300 years.

TASK

Rank and explain the importance of the following developments in medicine.

Use the writing frame:

This is the most important factor because...

This is the least important factor. However can be considered important because...

Printing press		
Prosthetics limbs		
Ligatures.		

Surgery and anatomy. 1400 – 1750. Early Modern Britain (Renaissance).

Andreas Vesalius (1514 – 64)

Vesalius came from an Italian medical family. He studied in France and Italy and was a professor of surgery at Padua University. He wrote *The Fabric of the Human Body* in 1543.

Galen had been unquestioned for 1500 years.

Contribution

- First anatomical textbook
- He proved Galen wrong e.g. Jawbone was one part, not two AND that human kidneys were not located one on top of the other.

Situation after

- Impact was limited because many doctors refused to accept Galen was wrong
- Vesalius' work did not cure anyone and had no practical uses.

William Harvey (1578 – 1657)

Galen said the heart was a machine.

Contribution

- Harvey dissected animals and humans, performed experiments and kept detailed notes
- Proved that the **heart pumps blood in 1 direction** around the body
- Showed that blood passes through the heart via the septum and that the arteries take blood away from the heart and the veins bring blood back in

Situation after

- Limited impact because doctors refused to accept these ideas
- His account of blood movement was limited as he could not explain how blood moved between the arteries and veins (capillaries – which were discovered in the 17th century with the microscope)
- Harvey's work had limited practical value at the time. Did not help people to get better till blood groups discovered.

Surgery and anatomy. 1400 – 1750. Early Modern Britain (Renaissance).

John Hunter. (1728 – 93)

Served as an army surgeon during the Seven Years War where he dealt with gunshot wounds and amputations. Edward Jenner was one of his students. Famous in his lifetime, he was known as the “father of scientific surgery.”

Contribution:

- After conducting numerous experiments on animals, Hunter advocated tooth transplantation for dentists of his time. His experiments allowed him to gain an insight into the need for **“freshness of transplanted tissue” as well as “matching for size” of transplanted organs.**
- He preferred to use **observation techniques** and then record his findings. This led to relentless desire to do research. Hunter was recognized as the leading teacher of surgery of his time. His passion and expertise attracted many students who would eventually become famous in their own right, such as Edward Jenner. He inspired Jenner to make thorough observations and test his theory about cowpox.

Significance:

- In Hunter’s book, **“A Treatise on Blood, Inflammation and Gun-shot Wounds,”** he noted the significance of inflammation and examined its causes as well as its effect on tissue damage in soldiers who sustained severe gunshot injuries. Hunter’s conclusions caused him to promote the view that surgery and amputation should be a last resort. Though his ideas were disputed at the time, Hunter was ultimately proven correct.
- His dissection of over a thousand bodies enable his to develop his understanding of the structure and function of the human body.
- His books and the Hunterian museum helped to make his ideas available for all other surgeons and anatomists to use to develop their ideas.

TASK – Note down what the following discovered that improved medicine.

Ambroise Paré	
Andreas Vesalius	
William Harvey	
John Hunter	

Public Health 1400 – 1750. Early Modern Britain (Renaissance).

- There were still regular outbreaks of plague.
- Towns were still dirty and overcrowded.
- Rulers still felt that their job was making decisions about war and religion and not improving living standards and health.

Great Plague 1665.

- When plague struck in 1665 the **Mayor of London** ordered watchmen to guard houses to make sure the sick and their families stayed shut up.
- When anyone died their bodies were checked by 'women searchers' to check plague was the cause and this was then confirmed by surgeons.
- Bedding had to be hung in smoke before it was used again.
- Fires were lit to cleanse the air of poisons.
- Bundles of straw were hung outside the homes of plague victims.
- People from infected houses should carry a white stick.
- House owners were ordered to sweep the streets outside their homes.
- Animals were not allowed to be kept in the city.
- Taverns and theatres and events such as animal fights were closed to stop plague spreading.
- When London was rebuilt after the great fire streets were wider and better paved and more buildings were made of stone and brick.
- As London became more crowded again the benefits of rebuilding began to fade.
- ***The plague died out due to the weather turning colder and the disease running its natural course and the Great Fire of London.***

TASKS.

Explain how the following areas have changed and stayed the same from Middle-Ages to Early Modern Period.

Factors	Continuity	Change
Causes and treatments.		
Anatomy and Surgery.		
Public Health.		

Causes and treatment. 1750 – 1900. Industrial Revolution.

Smallpox was a very infectious disease that killed 25% of those that caught it. Could be left blind if you survived.

- People often isolated – left to die or survive!
- In the Middle Ages they tried **inoculation** (giving a healthy person pus or scabs from an ill person). Giving a person a mild dose of the disease would build up resistance in the body.
- Inoculation became very popular in Britain – doctors became very wealthy!
- Inoculation was risky however and some people caught smallpox and died. The risks of inoculation were less than smallpox though!

Edward Jenner made a huge discovery.

He noticed that **milkmaids who caught cowpox** (a non-fatal version) from their cows did not catch smallpox. In 1796 he took pus from a cowpox scab on a girl named Sarah Nelmes and placed it into 2 small cuts on the arm of an 8 year old boy, James Phipps. 6 weeks later he did the same with smallpox but Phipps showed no reaction. The cowpox had prevented him from catching smallpox.

Opposition:

- Doctors carrying out inoculation were against it because they would lose money.
- Religious people said smallpox was a punishment from God and it was wrong to interfere with God's plan
- People feared that being vaccinated might turn them into cows
- Most doubted that a country doctor like Jenner could make such an important discovery
- Jenner could not explain why it worked.

In 1853 the **government made vaccination against smallpox compulsory for children.**

Jenner 'father of immunology'

2 other people had used cowpox to prevent smallpox before but Jenner's impact was because he proved his theories using scientific methods and experiments.

- Carefully recorded his work on Phipps
- 1799 he carried out a national survey to prove his findings.

TASK

Create a storyboard of Edward Jenner's discovery of the Smallpox vaccination.

Causes and treatment. 1750 – 1900. Industrial Revolution.

Before Louis Pasteur people still believed that sickness was a punishment from God or caused by miasma. But the invention of the **microscope** (1590s) meant that scientists now knew that germs existed.

The new theory was called '**spontaneous generation**' which meant that germs or bacteria were created when things rotted or decayed. Scientists had it the wrong way around!

Achievements:

- Shown that germs caused an animal disease in silkworms
- Many doctors and scientists accepted his ideas. For example Joseph Lister was so impressed he began to use **antiseptics** to kill germs during his operations.

Limitations:

- Despite public experiments other doctors refused to believe his ideas
- Pasteur had not been able to identify a germ that caused human disease.
- In 1868 Pasteur was forced to give up his work because of a stroke.

Pasteur's discovery:

1857 Pasteur was asked by local wine growers to investigate why wine often became sour. Using a microscope, Pasteur discovered that it was germs that caused the wine to go off. Further experiments showed:

- Germs made other liquids like milk go sour
- The souring was caused by germs in the air
- These germs could be killed by heating the liquid – a process called '**pasteurisation**'.

Many scientists refused to believe him. So he designed an experiment with a **swan-necked flask** to prove that germs in the air caused decay. He carried this out in public many times.

The next step was to show that germs could cause disease in animals and humans.

In 1865 while working in the silk industry, Pasteur proved that the disease which was killing silkworms was caused by germs. The link between germs and animal disease was made!

Causes and treatment. 1750 – 1900. Industrial Revolution.

Robert Koch (German) had a fierce rivalry with Pasteur (French).

So he employed a highly skilled team of researchers to help him.

Koch's methods made it easier to study germs by:

- Using new **industrial dyes** to stain individual germs so that they could be seen.
- Devising a way to grow a group of the same germs
- Developing a way of photographing germs to share information.

His achievements after 1872:

- able to identify the germ that caused tuberculosis
- Other scientists began using Koch's methods and soon the germs causing typhoid, diphtheria and pneumonia.

Louis Pasteur (again!):

- In 1877 he had recovered from his stroke, driven by personal rivalry but chance played a big part in his next discovery!
- He found weakened germs would protect chickens from strong germs by mistake.
- Achievements:
- Shown how vaccinations worked – weakened germs built up the body's defences.
- Developed a vaccine against the deadly animal disease anthrax.
- Early 1880s developed a vaccine for the deadly human disease of rabies. (Would not test it on a human until a small boy who had already been bitten came in. He survived.
- Other scientists used Pasteur's methods to develop vaccines for diphtheria and tuberculosis.

TASK

Who was responsible for what? Complete the table to make clear what Pasteur was responsible for discovering and what Koch was responsible for discovering.

Louis Pasteur	Robert Koch.

TASK.

Use the writing frame to complete the following tasks.

Pasteur was similar to Koch because they both...This made their contribution to developing medicine similar...

Pasteur was different to Koch because...This made their contribution to developing medicine different...

Explain what was similar about Louis Pasteur and Robert Koch in developing medicine.

Explain what was different about Louis Pasteur and Robert Koch in developing medicine.

Causes and treatment. 1750 – 1900. Industrial Revolution.

Difficulties for women:

- Middle Ages; the Christian Church only allowed men to train as physicians. Women were feared to be witches.
- **Women could not go to university** so could not be surgeons.
- 1700s it became popular for men to train as midwives.
- 1852 – Medical Registration Act. Had to be a member of one of the Colleges of Physicians, Surgeons or Apothecaries (all closed to women). Society considered a woman's role as a mother.

Situation in 1800

- Filthy, cramped and stuffy hospitals with inadequate toilets encouraged infections to spread.
- Most of the nurses who worked in them were untrained. They were often criticised for being dirty or drunk!

Improvements in the 1860s

- Situation steadily improved. Florence Nightingale improved basic hygiene in the military hospital during the Crimean War and saved lives. She used her fame to raise money and awareness to set up proper **training courses for nurses**.

Elizabeth Blackwell: Qualified as a doctor in America. In 1849 she returned to England. She was the only woman on the official list of doctors. Encouraged and inspired other women to become doctors.

Elizabeth Garrett Anderson: No University medical school would accept her. Tutored privately and worked as a nurse at Middlesex University. In 1865 she passed the Apothecaries exam and received her license to dispense medicines. She went to the University of Paris and gained her degree in 1869 but would not be accepted in Britain because it was French!

Florence Nightingale: Born in 1820. Trained as a nurse in Germany and ran a hospital for rich women in London. In 1854 Nightingale was asked to take control of a military hospital in Scutari (Crimean War). She took 38 nurses. When they arrived they thoroughly cleaned the hospital and improved the death rate (40% to 2%). When she returned in 1856 she set about improving hospitals in Britain. 1860 set up the **Nightingale Training School** for nurses at St Thomas' Hospital in London. She published *Notes on Nursing* which was a bestseller. Known famously as 'the Lady with the Lamp'

Mary Seacole: born in Jamaica she was a skilled healer and midwife. She paid for her own journey to the Crimea. She set up a hotel near Balaclava to give food and drinks to soldiers. Also treated men on the battlefield. After the war she was in ill health and no money so had little impact back in Britain.

Surgery and anatomy. 1750 – 1900. Industrial Revolution.

Anaesthetics– a substance that removes pain.

Before – no anaesthetics, no hope in reducing pain, no attempt to control infection, no knowledge of germs, no way to replace blood.

No anaesthetics meant that operations had to be done as quickly as possible and only on the surface of the body.

Humphrey Davy did experiments to discover the property of gases. He experimented and found that nitrous oxide was a natural painkiller. He called it '**laughing gas.**' He said he could see it being used in surgical operations. 40 years later some surgeons used it successfully for the first time.

Doctors now looked for other gases with similar qualities. The 2nd gas was ether. Demonstrated successfully by John Warren in Boston in 1846 but was flammable, unpleasant and irritated the lungs.

Breakthrough in 1847 when the Scottish doctor James Simpson discovered the effectiveness of **Chloroform**.

Opposition to anaesthetics:

Religious groups felt that pain, particularly in childbirth, was sent by God and should therefore be suffered.

Doctors and dentists were worried about the **correct dose of chloroform** because they did not realise that men, women and children needed different quantities, and as a result some patients had died.

Some doctors felt that anaesthetics made little difference to the outcome of the operation.

Most of the initial opposition to anaesthetics disappeared after Queen Victoria chose to give birth to her son in 1853 under anaesthetic!

Surgery and anatomy. 1750 – 1900. Industrial Revolution.

Problem of infection: surgeons would use dirty, unsterilized equipment. Many patients died after surgery from infected wounds.

Ignaz Semmelweis:

First doctor to stop infection. He was Hungarian, working in Vienna in the 1840s. Horrified that so many women died after childbirth from puerperal fever.

Semmelweis believed that doctors who had first examined corpses and then pregnant women were spreading the disease on their unwashed hands.

He cut the death rate by ordering doctors to wash their hands in a solution of **chloride of lime**, an effective antiseptic which killed the bacteria.

Although Semmelweis was correct he could not prove it because Pasteur's **germ theory** was another 20 years in the future. His ideas were dropped when he left Vienna in 1848. Death rates rose again!

Joseph Lister

1867 he read through Pasteur's work he developed the use of carbolic acid to kill germs. He soaked his instruments in it and used a carbolic spray to kill germs in the operating theatre.

Lister cut the death rate from 46% to 15% in 3 years. He promoted the idea of **sterile surgery**.

Opposition:

Some doctors thought the sign of a skilled surgeon was the speed with which he worked.

Carbolic acid was unpleasant to use. Dried out doctors skin, made their eyes water and irritated the throat.

Many doctors still refused to accept Pasteur's germ theory and therefore thought them unnecessary.

Aseptic surgery – stop germs getting into the operating theatre.

Professors Neuber and Bergman insisted that all surgeons' clothes, hands and instruments were sterilised before use.

The American William Halstead developed **rubber gloves** for all doctors and nurses to avoid the spread of germs.

TASK

What is the difference between anaesthetics and antiseptics?

Anaesthetics	Antiseptics.
---------------------	---------------------

Explain what the following individuals discovered during the Industrial Period.

Humphrey Davy	
John Warren	
James Simpson	
Ignaz Semmelweis	
Joseph Lister	
Professors Neuber and Bergman	
William Halstead	

Public Health. 1750 – 1900. Industrial Revolution.

Living conditions: Unscrupulous landowners built cheap, low-quality slum houses. No laws forcing local councils to provide sewers or clean water. Human waste and rubbish on the streets. Disease spread rapidly.

- Cholera new and deadly disease that spread from India to Britain in 1831. Boards of Health were set up but were not compulsory and disbanded after the epidemic died down.

Further cholera **epidemics** were recorded in 1848 and 1854. These made the wealthy realise that they could neither ignore nor dismiss the causes or effects of the disease.

Little understanding of the causes of disease. Some still believed **God was punishing sinners and some in miasma.**

William Farr: recorded data about the population. From 1837 all births, marriages and deaths had to be recorded by law.

Farr used the statistics to map areas with high death rates and looked up causes of death. He proved that unhealthy living conditions and high death rates were related. He shamed many local councils into action.

Edwin Chadwick: 1842 published 'Report on the Sanitary Conditions of the Labouring Population.' proving that poor people in towns lived in overcrowded and unhygienic conditions. This led to: illness, low life expectancy, absence from work, no wages, and rich having to pay higher taxes.

Chadwick's solution was for the government to provide public health facilities such as sewers and clean streets and to appoint Medical Officers.

Opposition

- Many rich taxpayers objected to paying for improvements to facilities they would not use.
- Local councils resented orders from the central government.
- Many people in government believed in the 'laissez-faire' approach.

1848 Public Health Act was the first of its kind.

Effects of the 1848 Act include;

Setting up a National Board of Health

Local councils had powers to improve the water supply and the sewers

Councils appointed Medical Officers of Health as well as local Boards of Health to supervise improvements.

It was not compulsory and only suggested improvements. When the threat of cholera faded the National Board of Health was abolished in 1854.

Public Health. 1750 – 1900. Industrial Revolution.

John Snow; London doctor. First to use chloroform and ether as anaesthetics. Helped Queen Victoria give birth. Believed cholera was caused by the water.

Seen as the father of modern epidemiology.

He mapped where the cholera victims lived and saw that cases were clustered around a water pump in **Broad Street in 1854**. 500 people had died in 10 days. He persuaded the council to remove the handle.

It was later discovered there was a leaking cesspool nearby.

Many refused to accept his findings because they did not know why there was a link. Consequently many scientists and doctors held onto theories like **miasma and spontaneous generation**.

Government:

Unwilling to make reforms compulsory because:

Wealthy landowners had the vote

Only people who would pay taxes for sewers etc.

In 1867 working men given the vote, new pressure on the govt.

Led to new laws designed to help people.

Individual Genius:

1861 Pasteur published his '**germ theory**'. By 1865 scientists accepted this and gave proof to Snow, Chadwick, and Farr etc.

More people willing to pay to help.

1875 Public Health Act:

Forced local councils to provide clean water, public toilets, effective drains and sewers

Forced councils to appoint Medical Officer of Health and other inspectors to examine and report on local public health facilities.

Octavia Hill: pushed for fair rent and access to open spaces for poor tenants.

In 1865 she started to buy slum houses and make them into healthy homes. Led to the **Artisan's Dwelling Act (1875)** which empowered local councils to clear away slums for public health reasons.

Public Health. 1750 – 1900. Industrial Revolution.

Joseph Bazalgette and the 'Great Stink' (1858):

The level of the water in the River Thames dropped dramatically and the smell from the river became known as the '**Great stink**' – (upset MPs as the Houses of Parliament are on the riverbank!)

Bazalgette was the engineer who designed and supervised the building of the new sewer system. 1000 miles of sewer.

He used an oval tunnel which made it self-cleaning.

Connected the sewers to pumping stations so sewage could be carried out to sea at high tide.

Ambitious project and took 10 years. His original design and construction is still part of **London's sewage** system today.

Technology:

Engineering, methods of building and constructions and these were essential in the construction of public toilets and sewer networks.

Key Words:

Cholera – deadly water-borne disease causing death through diarrhoea and dehydration.

Miasma – the belief that disease was caused by bad or poisoned air.

Spontaneous generation – the theory that decaying matter turns into germs.

TASKS.

1750 – 1900. Industrial Revolution.

Explain how the following individuals influenced the development of medicine:

Edward Jenner	
Louis Pasteur	
Robert Koch	
William Farr	
Edward Chadwick	
John Snow	
Octavia Hill	
Joseph Bazalgette	

Causes and treatment. Twentieth Century.

1909 – Paul Ehrlich:

He found a chemical cure for syphilis. Ehrlich described it as a '**magic bullet**' because it went straight to the harmful germ and destroyed it but without harming the rest of the body.

1928 Alexander Fleming discovered penicillin:

He had seen first-hand how soldiers in WW1 died, not from wounds but from simple infections caused by germs getting into those wounds. (**Factor = war**)

While tidying his laboratory he made an accidental discovery. Fleming saw a mysterious mould growing in one of his old culture dishes that seemed to have killed all the harmful bacteria around it (**factor = chance**)

He realised that the mould should be studied and found it was penicillin, the properties had been known for over 100 years. (**Factor = personal qualities**)

He had to turn it into a **pure drug to be effective. Unable to do this.**

1938-41 Producing pure penicillin:

Howard Florey working with Ernst Chain decided to see if they could produce and experiment with pure penicillin (**factor – science**)

By 1940 they had produced small amounts – tested successfully on mice. October 1940 tried on a human. It was working on a policeman but they ran out of the drug. (**Factor – science**)

WW2 meant big companies could not provide resources to produce the drug (**factor – government and industry**)

1941-44 Mass production:

1941 Florey flew to **America** to ask for research funds but US about to enter WW2 (**factor – war**)

The US government saw potential of using penicillin to treat wounded soldiers. Gave \$80 million. (**Factor – government**)

US government made companies share research data

By 1944 it was being mass produced and used on **D-Day**. After the war **penicillin** being used for civilian use and became known as an antibiotic.

TASK

Fill-in the timeline of events of the impact penicillin.

DATE	Event – What happened?	How did this develop medicine?
1928		
1938-1941		
1941-44		
1944 D- Day		

Causes and treatment. Twentieth Century.

Challenges in 21st century

- New Diseases – AIDS the 4th biggest killer worldwide and, at present, there is no effective cure or vaccine.
- ‘Superbugs’ – Bacteria such as **MRSA** – difficult to kill as resistant to normal antibiotics. They thrive in hospitals and nursing homes
- ‘Old’ diseases returning – number of people in Britain catching diseases like mumps, tuberculosis and malaria even though there are vaccines is growing. **Due to vaccination campaigns not being effective or because of more foreign travel.**
- The cost of medical progress and care – new drugs and medical technology are very expensive. **Ageing population** means more money needed for social and medical care for this age group. Alzheimer’s is a problem.
- Illnesses caused by lifestyle choices – these give health services the dilemma as to whether scarce resources should be given to people who choose to smoke, eat unhealthily or abuse drugs and alcohol.

Alternative therapies:

Aromatherapy or homeopathy - alternatives to drug based scientific methods and become increasingly popular with supporters, claiming that they are more effective than conventional treatments.

Opportunities in 21st century

- DNA research – DNA contains the instructions that operate every cell in the body. The double helix shape of the DNA was discovered by Francis Crick and James Watson in 1953. Between 1986 and 2001 the Human Genome Project identified the purpose of every gene in the body. Further research could lead to; **gene therapy, genetic screening, customised drugs and ‘designer babies.’**
- International co-operation through the World Health Organisation - led to the eradication of smallpox by 1980. It is also now working on combating AIDS/HIV and tuberculosis worldwide.

TASK.

Rank the challenges facing the 21st Century in medicine. Explain your choice.

Rank these challenges 1 the most serious 5 being the least serious.

Challenge	1 to 5	Explanation of your choice.
New Diseases		
Superbugs		
'Old' diseases returning		
Ageing Population		
Lifestyle choices.		

Surgery and anatomy. Twentieth Century.

The discovery of blood groups in 1900:

During surgery the body can lose a lot of blood, and patients can die from losing too much blood even if the surgery is successful.

Blood transfusions were tried in the 19th century. They often failed because a patient's body would reject blood from a **different blood group**, and usually died from a reaction to it.

In 1901 a German doctor, Karl Landsteiner discovered blood groups.

However there was no method of storing blood. The donor had to be in the same room as the patient. The replacement of a patient's blood could not be anticipated and prepared for; this came later with the **use of sodium citrate to stop blood clotting**.

By 1920 surgeons were able to overcome the main problems they had faced in 1800.

- Effective anaesthetics meant they could take time and care over operations.
- Carry out procedures inside the body too.
- Keep patients safe from infection.

How did war help surgery develop?

WW1 soldiers needed blood transfusions. British doctors discovered sodium citrate would stop blood from clotting.

Gunshot wounds carried dirt deeply into the wound. Surgeons had to cut away infected tissue.

WW1 needed X-rays developing to help surgeons locate bullets and shrapnel. Governments ordered more of William Rontgen's X ray machines including portable versions.

Development of penicillin during WW2.

Plastic surgery and skin grafting was pioneered by New Zealand surgeon, Sir Harold Gillies. End of WW1 surgeons carried out 11,000 skin grafts.

Afghanistan war (2001) has produced many injuries that have **led to new medical techniques to rebuild limbs shattered by explosions and advances in replacement limbs**.

Wars are disruptive and cause governments to reassess priorities.

Surgery and anatomy. Twentieth Century.

How did science and technology help surgery to develop?

William Rontgen **discovered X-rays** in 1895. Could see inside a patient without cutting them open.

Marie and Pierre Curie in the 1890s noticed that their hands were being burnt by the material they were handling when working with X-rays. This was the beginning of modern cancer diagnosis, treatment and radiotherapy.

Helmuth Wesse in the 1930s pioneered the use of **anaesthetics injected into the veins**.

Tissue typing was first used in 1962 to help match a kidney to a patient to reduce the risk of infection and rejection. Cyclosporine (drug to stop the body rejecting (1980s))

Kidney transplant (1954) and liver transplants (1963). Christian Barnard performed the first heart transplant in South Africa in 1967.

Micro-surgery in the 1980s.

Keyhole surgery developed since 1990s. Can insert small cameras.

Modern surgery – what problems remain?

Relatively little is still known about how the brain controls the functions of the body, so neurosurgery is still in its infancy.

Transplant surgery has advanced to the point where a whole face can be replaced, although patients still struggle with finer motor movements such as speech and facial expression.

Hospitals have seen the growth in infections and ‘superbugs’ such as MRSA over the last 10 years. These are highly resistant to even the strongest antibiotic and more research is needed into their cause and treatment.

Modern, high-tech surgery is very expensive and hospital trusts have to manage their resources carefully. They have to make difficult choices about who is in most need of an operation.

TASK

Explain how each individual developed surgery.

Karl Landsteiner	
William Rontgen	
Marie and Pierre Curie	
Sir Harold Gillies	
Helmuth Wesse	
Christian Barnard	

Public Health. Twentieth Century.

The Liberal party argued that social reform would make Britain's workers more efficient.

The following social reformers were instrumental:

Charles Booth: set out to investigate the East end of London. Discovered 35% of people were living in poverty. Published 'Labour and the Life of the People' in 1889. **He proposed Old Age Pensions.**

Benjamin Rowntree: Inspired by Booth. **Carried out own survey about York** ('Poverty, a Study of Town Life' (1901). Found that 29% of people in York were living in poverty. Close friend of Lloyd-George and so influenced Liberal reforms.

William Beveridge: wrote the report 'Social Insurance and Allied Services' to the government proposed that **workers should pay national insurance each week, so that poor and unemployed people could receive benefits.** Formed the basis of the welfare state including the NHS.

Group	Act	Effect
Children	Provision of School Meals Act, 1906	Local council had to provide school meals
	School Medical Services Act	Ordered the medical inspections of schoolchildren. By 1911 it showed that 1/3 of schoolchildren needed medical treatment
Old People	Old Age Pensions Act, 1908	Helped people over 70 who earned less than £21 a year by giving them a pension of 5 shillings (25p) a week. Pensions were introduced in 1909 and by 1912 1 million people were claiming them.
Workers	Workmen's Compensation Act, 1906	Forced employers to compensate employees in dangerous jobs for accidents in work
	National Insurance Act, 1911 (part 1)	Everyone between 16 and 70 paid 4p into a national fund to which the state and employer added another 5p. This money would then pay for medical care of the sick
Unemployed	Labour Exchanges Act, 1909	Unemployed people were helped to find work
	National Insurance Act, 1911 (part 2)	Introduced compulsory unemployment insurance. Workers paid a regular contribution into the fund. The unemployed received 35p of benefit for the first 15 weeks in any one year.

Public Health. Twentieth Century.

In 1944 Beveridge recommended a National Health Service, providing health care that was free for everyone and funded through taxation.

Reactions: many enthusiastic but opposition included;

- Doctors thought they might become government employees and lose the freedom to choose treatments and their right to charge fees for seeing patients
- Some councils objected to the **government taking over the management of their hospitals.**
- Some people thought that poverty and sickness was the result of idleness and therefore a person's fault. Scared poor people would take advantage of it.

Benefits:

Minister of Health Aneurin Bevan (Labour) brought the NHS in in July 1948

- Free treatments for patients
- National ownership of hospitals
- Doctors were paid by the government

Life expectancy in Britain improved.

Limitations:

Increased pressure to provide services due to the population rising. **The range of treatments has increased due to scientific and technological discoveries, costs have risen and people expect more. People are also living longer.**

Therefore there are now some limitations to the original principals of free health care for all people;

- Some services are paid for; adults now pay for dental, eye tests and prescriptions
- Some services are so oversubscribed it takes time to get them e.g. Cancer treatment
- Other services are prioritised, whereby each NHS trust decides which treatments should be readily offered based on evidence of effectiveness and good use of taxpayers' money.
- Some services are not offered universally, e.g. Fertility treatment may not be funded by the NHS in some areas of Britain.

TASK.

Explain how the following individuals improved public Health.

Charles Booth	
Benjamin Rowntree	
William Beveridge	
Anuerin Bevan	

TASK.

Explain the change and continuity from Industrial period to twentieth century.

Factors	Continuity	Change
Causes and treatments.		
Anatomy and Surgery.		
Public Health.		

Middle Ages – Go through the period and find examples for each factor.

Factor	Explanation	Example of <u>helping</u> change	Example <u>hindering</u> change
<i>Religion</i>	Anything to do with gods or spirits. Organised religion becomes a real factor.		
<i>War</i>	When countries are fighting each other, war causes and prevents change.		
<i>Government</i>	The influence of laws and other rules on people's health		
<i>Individual Genius.</i>	An individual and their story, where they made the effort or had the expertise to change things.		
<i>Chance</i>	Luck, something that happens by accident!		
<i>Communication</i>	This is about people communicating their ideas and sharing them so that they can build on each other's ideas.		
<i>Science and Technology</i>	Science is anything involving experiments or careful observations. Technology is the use of equipment.		

Early Modern Britain (Renaissance) – Go through the period and find examples for each factor.

Factor	Explanation	Example of <u>helping</u> change	Example <u>hindering</u> change
<i>Religion</i>	Anything to do with gods or spirits. Organised religion becomes a real factor.		
<i>War</i>	When countries are fighting each other, war causes and prevents change.		
<i>Government</i>	The influence of laws and other rules on people's health		
<i>Individual Genius.</i>	An individual and their story, where they made the effort or had the expertise to change things.		
<i>Chance</i>	Luck, something that happens by accident!		
<i>Communication</i>	This is about people communicating their ideas and sharing them so that they can build on each other's ideas.		
<i>Science and Technology</i>	Science is anything involving experiments or careful observations. Technology is the use of equipment.		

Industrial Revolution – Go through the period and find examples for each factor.

Factor	Explanation	Example of <u>helping</u> change	Example <u>hindering</u> change
<i>Religion</i>	Anything to do with gods or spirits. Organised religion becomes a real factor.		
<i>War</i>	When countries are fighting each other, war causes and prevents change.		
<i>Government</i>	The influence of laws and other rules on people's health		
<i>Individual Genius.</i>	An individual and their story, where they made the effort or had the expertise to change things.		
<i>Chance</i>	Luck, something that happens by accident!		
<i>Communication</i>	This is about people communicating their ideas and sharing them so that they can build on each other's ideas.		
<i>Science and Technology</i>	Science is anything involving experiments or careful observations. Technology is the use of equipment.		

Twentieth Century - Go through the period and find examples for each factor.

Factor	Explanation	Example of <u>helping</u> change	Example <u>hindering</u> change
<i>Religion</i>	Anything to do with gods or spirits. Organised religion becomes a real factor.		
<i>War</i>	When countries are fighting each other, war causes and prevents change.		
<i>Government</i>	The influence of laws and other rules on people's health		
<i>Individual Genius.</i>	An individual and their story, where they made the effort or had the expertise to change things.		
<i>Chance</i>	Luck, something that happens by accident!		
<i>Communication</i>	This is about people communicating their ideas and sharing them so that they can build on each other's ideas.		
<i>Science and Technology</i>	Science is anything involving experiments or careful observations. Technology is the use of equipment.		

Draw an image based on what you have found difficult to understand on medicine through time. Then write explanation of that image in how it helped or hindered the development of medicine.

1. Use simple drawings with matching simple descriptions
2. The drawing should represent your understanding of the topic
3. Try to draw links between images.