The Medical Renaissance

1400 to 1750
What was the Renaissance?

Renaissance means ‘rebirth’. The Renaissance period in Europe witnessed a widespread rebirth of the learning and knowledge lost from the Classical period (Greek and Roman civilizations). Scholars sought answers in science and the arts.

Medicine benefited considerably from this thirst for knowledge. This was a time when many new discoveries were made about the human body, some of which overturned ideas that had been around for more than a thousand years.
Medical progress had always been hampered by the refusal to allow dissection, and therefore the lack of knowledge about human anatomy.

By the time of the Renaissance, however, dissection was allowed in some places, such as Italy, which gave doctors the ability to find out more.

Dissection alone would not have been of huge assistance, though, if artists had continued to draw in the flat, childlike way they had done in the Middle Ages. What happened in this period was that artists tried to learn the life-like skills used by the ancient Greeks.

In Padua and Venice, student artists were allowed to cut up bodies to learn how to draw humans more accurately.
Andreas Vesalius

Andreas Vesalius was born in 1514 in Brussels. He studied medicine in Paris and then at Padua University in Italy. He became a professor of surgery, and employed artists to draw every part of human anatomy from all angles. He put the drawings together as a book called *The Fabric of the Human Body* (1543). He died in 1564.

For the first time doctors had life-like, accurate drawings to help them understand the body. Old medieval drawings were replaced by Vesalius’s incredibly detailed ones.
Earlier drawings were childlike and inaccurate, such as this one of a foetus in the womb from a medieval textbook on midwifery.

Vesalius showed how the parts of the body fitted together, as well as the make up of each organ.

By showing these details, he enabled doctors to work out the way the body worked.

What were the main benefits of Vesalius’s book?
Why Vesalius became famous

Vesalius’s book was a major breakthrough for doctors, but he also became known for challenging Galen. Vesalius found that Galen had been wrong about the human jaw. Galen wrote that it was made of two bones whereas Vesalius found only one.

Vesalius also found that the septum in the heart was too thick and had no holes for the blood to flow through, as Galen had said.

Copy the diagram of the heart and explain briefly the two ways in which Vesalius showed Galen was wrong.
Did Vesalius make a difference?

**Short term:** In the first edition of *The Fabric of the Human Body* Vesalius did not show Galen’s mistakes, even though he had made those discoveries. It was not until a later edition that he showed where Galen was wrong. Vesalius, like all doctors, held Galen in such high esteem that he didn’t want to question him, but he did encourage doctors to test out the ancient ideas rather than just accepting them. Trying to overturn ideas that had been embedded for more than a thousand years was difficult, however, and most doctors continued to believe Galen and denounce Vesalius.

**Long term:** Vesalius’s work on anatomy was of huge importance and helped doctors make new discoveries.

Give two reasons why Vesalius did not publish Galen’s mistakes at first. Now answer the question “Did Vesalius make a difference?”
Our second Renaissance man is Ambrose Paré, a French army surgeon between 1537 and 1566. During those years he became an expert in treating sword and gunshot wounds.

He recorded his expertise and discoveries in several books published between the 1540s and the 1570s. The newly-invented printing press enabled many copies of his books to reach doctors all over Europe.
During his first few days as an army surgeon Paré made the first of two discoveries which were to make him famous.

Never having treated gunshot wounds before, he listened to, and copied, the other experienced surgeons treating the injured soldiers. They used the age-old process of **cauterization** to seal wounds and stop the bleeding.

As you go through the next few slides, note down how the factors of war, chance, technology and individual genius brought about Paré’s discoveries, and helped the progress of medicine.
Cauterization

In cauterizing a wound, a doctor would apply one of two methods. 1) He would stop the bleeding by searing the edges of the wound with a red-hot iron. 2) He would stop infection by pouring boiling oil on the wound.

Soldiers injured in the field at this time stood little chance of survival, but these were the only methods available to the doctors trying to save them.

Paré used boiling oil on the gunshot wounds of the soldiers being brought into the field hospital. He worked continuously all day as there were so many wounded. The hospital resounded with the screams of the soldiers.

Towards the evening, Paré ran out of oil. There were still many soldiers with terrible wounds to be treated.
Paré felt helpless but was determined to help them. He thought back to ideas he had learnt as a medical student. One of them was an ointment the Romans had used on wounds. In desperation he used it on his patients:

“[I applied] a healing salve (ointment) of egg-white, rose-oil and turpentine. The next night I slept badly, plagued by the thought that I would find the men dead whose wounds I had failed to burn, so I got up early to visit them. To my great surprise, those treated with salve felt little pain, showed no inflammation or swelling, and had passed the night rather calmly – while the ones on which seething oil had been used lay in high fever with aches, swelling and inflammation around the wound. At this, I resolved never again cruelly to burn poor people who had suffered shot wounds.” Paré, ‘Treatise on Gunshot Wounds’, 1545.
Paré’s second innovation was that of **ligatures**.

When amputating a limb, surgeons used cauterization to stop the bleeding. Following his success with the boiling oil, Paré looked for a kinder way of sealing the blood vessels in the stump than using a red-hot iron.

In his book of 1564, Paré describes his idea for tying off the arteries and veins to stop the patient bleeding to death. Other surgeons were against this risky procedure and continued using cautery.
Paré was prepared to try new ideas, however, and successfully used ligatures on a number of patients. There were many problems with them, though. In some amputations there were too many vessels to tie off – the patient would lose too much blood before the surgeon could finish. (In a thigh amputation 53 ligatures were needed.)

Ligatures for such amputations were not really practical until the invention of the **tourniquet** two centuries later. Moreover, without antiseptics or knowledge of germs, the silk thread used as ligatures easily carried bacteria into the body and caused infection.
Describe Paré’s discoveries.

Using the notes you have been taking, explain how the factors of war, chance, technology and individual genius brought about his discoveries or helped medical progress.

Did his discoveries improve health and treatments during the medical renaissance?
William Harvey

Our third Renaissance character is William Harvey. Born in England in 1578, he studied medicine at Cambridge and Padua. He became a physician at St Bartholomew’s in London and lectured at the College of Physicians, before becoming court physician to James I and Charles I. He is important in our study because he discovered how the heart worked and how blood circulated around the body.

Before Harvey, doctors learned from Galen that the body used blood like a fuel. He had written that the liver continually produced blood to replace that which the body had burnt up.

Some doctors had been doubtful about this theory, but no one had yet come up with a better one.
What did Harvey prove?

Harvey showed that blood returns to the heart from the body via veins. 1

It is then pumped to the lungs. 2

Blood carrying oxygen flows from the lungs to the heart. 3

Blood leaves the heart to circulate round the body via arteries. 4

Harvey proved that the heart is like a **pump**.
What else did he prove?

He proved that veins contained one-way valves.

He worked out accurately how much blood was in the body.

He proved that the blood is recirculated and does not need replacing.

What benefits do you think Harvey’s discoveries had in (a) the short-term and (B) the long-term?

The blood only flowed in one direction around the body. 

Copy this diagram into your book.
How did he do it?

Harvey’s methods:

He dissected live, cold-blooded animals. Their very slow heartbeat allowed him to observe the actions of the heart.

He acquired a good knowledge of the human body through dissection.

He carried out hundreds of painstaking experiments.

He calculated the total volume of blood by measuring the amount of blood pumped by each heartbeat.

He experimented with rods in the veins. He found he could only push them through the valves one way.

He carefully recorded all his findings so that he could prove why he was right.

Looking at this slide and the next one, what were the effects on the development of medicine here of individual genius, technology and chance?
What could Harvey not prove?
Without microscopes he could not see the tiny capillaries which carry blood, though he knew they must exist. With the invention of the microscope in the late 17th century, Harvey was proved right.

How did other doctors react to Harvey’s findings?
Like Vesalius three-quarters of a century before him, Harvey had dared to challenge Galen and the other ancient writers. Many doctors once again regarded new ideas as dangerous and a waste of space and carried on with their own methods. In their defence, however, it can be argued that even if they had all believed Harvey, his findings would not have been able to improve people’s health at that time.
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<thead>
<tr>
<th>Doctor</th>
<th>Specialism</th>
<th>Discovery</th>
<th>Factors involved</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Short-term</td>
</tr>
<tr>
<td>Vesalius</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paré</td>
<td></td>
<td></td>
<td></td>
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<td>Harvey</td>
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Using your notes and diagrams copy and complete the above chart in your book.
The Great Plague of 1665

Following the Black Death in the mid-14th century there were several further outbreaks of the plague, but with lesser effects.

In 1665, however, another epidemic looked set to wreak havoc again. 65,000 people died in London alone.

By comparing the way people reacted to the Great Plague of 1665 and the Black Death of more than 300 years earlier, we can gauge how much medicine had developed.

Read the sources on the next three slides and write down what they believed caused the plague and how they tried to prevent it or treat it.

How far medicine had advanced during those three centuries?
“7 June: I did in Drury Lane see two or three houses marked with a red cross upon the doors and ‘Lord have mercy upon us’ writ there … I was forced to buy some roll-tobacco to smell and chew.”

Extract from the Diary of Samuel Pepys, 1666.
“The government appointed public prayers and days of fasting, to make public confession of sin and implore the mercy of God to avert the dreadful judgement that hung over their heads.”

“… a blazing star or comet appeared for several months before the plague. [They] passed directly over the city and imparted something peculiar.”

“[Some] talk of infection being carried on by the air, carrying with it vast numbers of insects and invisible creatures, who enter into the body with the breath…”

From Daniel Defoe’s ‘Journal of the Plague Year 1665’.
Lord Mayor of London

By Order

Examiners: to shut up a house if they find any person with the infection

Women searchers: to search and report whether the person die of the infection or other disease.

Any man found to be sick of the Plague to be shut up in the house and the house shut up for a month.

Burials to be before sunrise or after sunset in graves at least 6 feet deep.

Every house to keep the street clean before its door.

No hogs, dogs, cats, pigeons or rabbits to be kept in the city.
Girls from rich families often treated their servants and village people using self-learnt methods from medical textbooks.

The village wise woman used ancient herbal knowledge to cure illnesses.

Midwives were available to deliver babies. A physician might be called in if there were difficulties.

Apothecaries (chemists) made and sold medicines prescribed by doctors. Some treated the sick although they were not allowed to.

Wives and mothers treated their families in the first instance.

‘Quack’ healers usually set up stalls in markets and fairs to sell potions to cure all illnesses.

Note down the people you could go to for medical treatment on this and the next slide. Who do you think would be the most use to you?
Doctors and surgeons

Only the wealthy could afford to visit a physician (doctor) or to use a surgeon. They could charge very high fees and many became quite rich.

Physicians had to study medicine for seven out of fourteen years spent at university. They studied the old Greek ideas, the works of Hippocrates and Galen, and the specialists of their own time such as Vesalius, Paré or Harvey. Only men could become physicians.

Surgeons did not have to train as doctors first, as they do today and did not have to go to university. They trained under an experienced surgeon. They did not command the same level of respect as physicians. Like physicians, though, they had to have a licence from the church to practise.
Women could not become doctors because they could not go to university. Since the Middle Ages, however, they had been allowed to be surgeons. This was to change towards the end of the Renaissance, though, because of the emphasis placed on education. Many male surgeons now went to university to extend their knowledge, and customers preferred to use a highly educated surgeon than one with only practical experience. Gradually the number of women surgeons dwindled. Female midwives also lost their supremacy when forceps were invented in 1620. To use these safely, a detailed knowledge of anatomy was needed, which only trained physicians had. By the end of this period many men were delivering babies, which would have been unheard of before.

**Did more men or women treat the sick? How did the role of women change during the Medical Renaissance?**
Using your notes you can now write your own summary of this period. You will need to include the discoveries which were made about anatomy, physiology and surgery and the way people were treated. Don’t forget to include why the improved knowledge had little effect on health or life expectancy.