Theme: ANATOMY AND SURGERY			
1. Why was Medieval knowledge of human anatomy limited? Impact of Christianity on Medieval medicine – no dissection allowed, illness as a punishment for sin, God determines the fate of each person			
2. How good was Medieval surgery? • **Problems linked to surgery** – no knowledge of dirt carrying disease, belief pus in wounds was good, no pain killers, surgeons could not operate on deep wounds • **Who practiced surgery?** – no 'surgeons' by modern standards = barber surgeons – lower class medical tradesmen – cutting of flesh seen as beneath physicians. Surgeons also practiced their trade on battlefield. • **Surgical procedures** – bloodletting was most common, some amputations but dangerous, cutting off painful parts of body – some tumours, bladder stones, haemorrhoids, breast cancer and trepanning (drilling hole in skull) • **Problem of pain –** attempts to put patient to sleep, alcohol but increased heart rate and therefore bleeding, held down or tied down. Some anaesthetics used – natural substances = hemlock, opium of mandrake root BUT too much could kill • **Problem of blood loss –** cauterisation – burning wound to stop the bleeding – very painful and led to infection. • **Problem of infection** – belief that pus in wounds was good – often pus was put onto wounds deliberately			
3. Who were the significant individuals developing surgery in the Medieval period? Surgical pioneers tried new methods, their ideas were read in Latin by educated and religious men in Europe and eventually translated into English. • **Abulcasis** – Islamic doctor wrote ***Al Tasrif*** - invented 26 new surgical tools, described new procedures e.g. ligatures, popularised cauterisation, known as 'father of modern surgery' • **Frugardi** – Italian wrote ***Practice of Surgery*** – warned against trepanning, tried ambitious chest operations and removed bladder stones • **Hugh of Lucca and his son Theodric** – Italian criticised view pus needed for wounds to heal, recommended wine on wound to reduce infection but ideas against Hippocratic advice so unpopular • **Mondino** – famous professor in Italy – allowed to complete a dissection wrote a manual which became standard text for next 200 years, dissection allowed in universities for training (to prove Galen despite errors in his work) • **De Chauliac** – French, very famous Medieval surgeon, wrote ***Great Surgery (1363***) dominated English and French surgical knowledge for 200 years – references Avicenna and quoted Galen – opponent of Hugh of Lucca • **John of Arderne** – most famous English surgeon – wrote surgical manual ***Practica (1376)*** based on Ancient writing and his own experience in the Hundred Years War, used opium and henbane to dull pain, removed anal abscesses from knights, formed Guild of Surgeons in London to separate his work from that of barber surgeons			
4. Was there any progress in surgery during the Medieval peiod? • **Progress** – some anaesthetics used, development of tools, communication of knowledge, success of John of Arderne, a distinct profession etc. • **No progress** – pus in wounds, old ideas e.g. Galen not questioned, dissection still not widely allowed, cauterisation painful, Christin beliefs holding back progress			

5. How did anatomical knowledge develop during the Renaissance? • **Impact of Andreas Vesalius** – dissection used to question Galen, ***The Fabric of the Human Body*** – systems within the body e.g. muscles, nervous system • **Ideas to Britain** – Vesalius' drawings added to medical text called ***Compendiosa*** (text by French surgeon Henri de Mondeville) studied by barber surgeons • **Significance** – no direct cure / treatment but foundation for future study			

Acceptance of surgery as regulated medical practice – Henry VIII gave barber surgeons a charter 1540 for Company of Barber Surgeons – charter granted 4 corpses of criminals per year for dissection.			
6. How important were Ambroise Pare's discoveries? • **Experience on battlefield** – led to discoveries, invention of gunpowder and gunshot wounds as new injuries to treat, use ***Of Wounds in General*** by Jean de Vigo to treat wounds – use of boiling oil, improvised when oil ran out – new mixture / cream which worked to soothe patients injuries more effectively • **Method** – challenge held views with experimentation and observation of patients, promoted use of ligatures as preferable to cauterisation ('too cruel a way of healing) • **Inventions** – crow's beak clamp – to help with ligatures (but ligatures proved slow when speed essential in early surgery), designed and made false limbs • **Significance** – inspired by Vesalius' work on anatomy – translated his work into French, Pare's book ***Works on Surgery*** was translated into English and used by barber surgeons and others, other surgeons followed Pare's renaissance approach e.g. William Clowes surgeon to Elizabeth I – treatment of burn with onions.			
7. How did William Harvey's work on blood circulation improve surgery? • **Further evidence to question Galen** – mathematically disproved Galen's theory that blood was burned as fuel in body and blood produced in the liver • **Significance** – no direct cure / treatment but idea eventually accepted and taught to medical students. Basis for further study e.g. blood transfusions, blood tests, heart transplants etc.			
8. Why should we remember John Hunter? • **Background** – worked for brother, talent for dissection and anatomical research, battlefield surgeon, Surgeon to George III (1776) and Surgeon-General to Army (1790) • **Scientific method** – careful observation, self-experimentation, radical approaches e.g. man with aneurysm successfully saved his leg by restricting blood flow to area • **Books** – theoretical knowledge of anatomy, ***Natural History of Teeth (1771***), ***Blood Inflammation and Gunshot Wounds***, ***On Venereal Disease (1786)*** – discoveries made about nature of disease, infections, cancer and circulation of the blood • **Teaching –** admitted to Company of Surgeons, trained many other surgeons – many of whom went on to set up famous teaching hospitals in Britain and America, taught Edward Jenner • **Specimens –** collected thousands of anatomical specimens, publicity for surgery and his experimental approach			

9. How was pain conquered?

- **Problem of pain** – despite improvement in status of surgeons and surgery the reality of surgery was terrifying and painful
- **Previous methods of pain relief** – natural substances used in medieval period e.g. mandrake, hashish, opium BUT difficult to judge effective dose so overdose, alcohol led to increased blood loss, religious objections to pain relief so singing hymns – IMPACT = surgery done quickly – NO complicated, internal surgery
- **New chemical anaesthetics** – Nitrous Oxide (laughing gas), Ether and Chloroform
- **Opposition to anaesthetics –** skill of surgery altered (no longer quick and on conscious patient), duty of pain (soldiers and religion – childbirth) and death due to overdose
- **Overcoming opposition –** royal example – Queen Victoria gave birth using chloroform
- **Significance** – immediate impact e.g. childbirth, surgery could become more complicated and procedures developed HOWEVER rick of death still existed due to infection and lack of knowledge of germs

10. How did Germ Theory impact on surgery: how important was Joseph Lister?

- **Germ theory** – Pasteur's idea not initially accepted in Britain but adopted by some doctors e.g. Lister (told to read Pasteur by Thomas Anderson –Professor of Chemistry)
- **Antiseptic approach** – Lister believed infection only occurred if skin was broken – use of chemical barrier would prevent infection – Anderson suggested Carbolic Acid, experiment on boy with broken leg – worked no infection but irritated by chemical
- **Surgery** – antiseptic sprayed during surgery to cover surgeons hands, instruments and wound – soaked bandages and ligatures to ensure no infection
- **Controversial / opposition** – some surgeons dislike the procedure -unpleasant to use, against view that infection 'spontaneously generated' within wound – Charles Bastian influential writer claimed this idea and heavily criticised 'Listerism'
- **Significance** – use of Pasteur's ideas to advance medical progress and surgical progress, impact during lifetime and proven results = evidence, idea not fully accepted at time and Lister not involved in public debate, lack of complete understanding of germs –not washing hands– staying in outside wear whilst operating. Lister later introduced French serum for diphtheria to Britain and was widely used after 1895 (continuing to build on practice to save patients)

11. How was aseptic surgery developed in Britain?

- **Antiseptic vs. Aseptic** – aseptic excludes germs from the start = sterile operating environment, by 1890s surgeons moved towards this practice – although still not fully understanding infections and how they developed
- **Aseptic practices**– operating theatres not soaked in carbolic acid but kept sterile – surgeons well-scrubbed, wearing surgical gowns, face masks, wearing thin, flexible gloves and with sterilised equipment. No longer huge public operating theatres – smaller rooms reduced infections

12. How has surgery developed since 1945?

Changes made since WW2 to surgical practices:

- **Surgical developments:** open heart surgery (Canada 1950), first kidney transplant outside of UK (1952), first kidney transplant in UK (1960), first pacemaker fitted, surgeins re-attach arm of 12 year old boy (USA), first heart transplant – South African doctor (1967), first British heart transplant (1968), skin grafts to burns victims (1984), implant electrodes to miniature computer to give 'sight' to blind man (2002), first partial face transplant (2006), first full face transplant (2008) and breakthrough with prosthetic eyes (2007).
- **Factors influencing the development of surgery:** Government and Finance, War, Communications, Individuals, Change in attitudes and ideas

13. What was the impact of WW1 on surgery and health?

- **WW1 hindrance to progress** – surgeons drafted to fight and therefore taken away from medical service, medical research halted as focus on wartime economy, warfare destructive to towns / cities and places of learning – destroying knowledge and research
- **WW1 help to progress:**
  Blood transfusions – method of preventing blood from clotting so blood transfusions could be carried out and blood transported to where it was needed
  X-rays – mobile x-ray machines to see bullets and shrapnel in soldiers bodies
  Plastic surgery – Harold Gillies - skin grafts and treat severe facial wounds
  Infection – prevent gangrene cut away infected flesh and soak wound in saline **Broken bones** – Army Leg Splint – elevated and extended broken leg – helped bones knit together more securely
  Shell shock – psychological damage – eventually recognised as medical condition

WW1 sped up developments that would probably have happened anyway – scientists had already been working on blood transfusions but amount of blood needed in war mean scientists worked even harder – same with x-rays which were discovered in 1895.

14. What was the impact of WW2 on surgery and health?

- **WW2 help to progress:**
  Blood transfusions – British National Blood Transfusion service (1938) – blood banks developed in USA and Britain for WW2

Heart surgery – US army surgeon Dwight Harken stationed in London cut into beating hearts and removed bullets and shrapnel – his findings helped further developments after the war
Plastic surgery – penicillin used to prevent infection when treating horrific facial injuries – Archibald McIndoe (New Zealand) reconstructed damaged hands and faces
Drug development – penicillin, first antibiotic, developed prior to WW2
Poverty – evacuation led British people/ governments to realise poverty in cities
Diet – shortages of food led people to grow own vegetables – improved diets
National Health Service – Britain re-organised medical care on national basis

15. What impact has technology had on the development of surgery?

- **Improved anaesthetics** – patients unconscious for longer so more complicated operations carried out
- **Improved antiseptics** – ensured success rate of difficult surgery
- **New drugs** – transplants – drugs prevent body rejecting new organs
- **New equipment** – keyhole surgery, microsurgery and laser surgery
- **Radiotherapy** – treatment of cancer and other diseases = high level radiation to shrink tumours and kill cancerous cells via machine outside the body or by material placed inside the body