



# Contents

Key features of Smarter History

vi

## **PART 1: Introduction: Setting up your enquiry**

**2**

Why do enquiry?

2

Why study surgery?

3

The big picture: surgery through time

4

How had surgeons tried to solve their three big problems?

6

Exam Busters: How this book helps you prepare for your Source Enquiry exam

7

Your hypothesis: Which surgical breakthrough was the most significant?

8

Meet the Examiner: The Source Enquiry

10

## **Part 2: How did surgery change by 1918?**

**14**

What was surgery like in the early 1800s?

14

Why were the problems of surgery overcome?

17

Breakthrough 1: Anaesthetics

18

Breakthrough 2: Antiseptics

26

Breakthrough 3: Blood transfusions

32

Which factors played the biggest parts in the transformation of surgery?

34

Judgement time! Which do you think was the most important breakthrough?

36

# Part 1

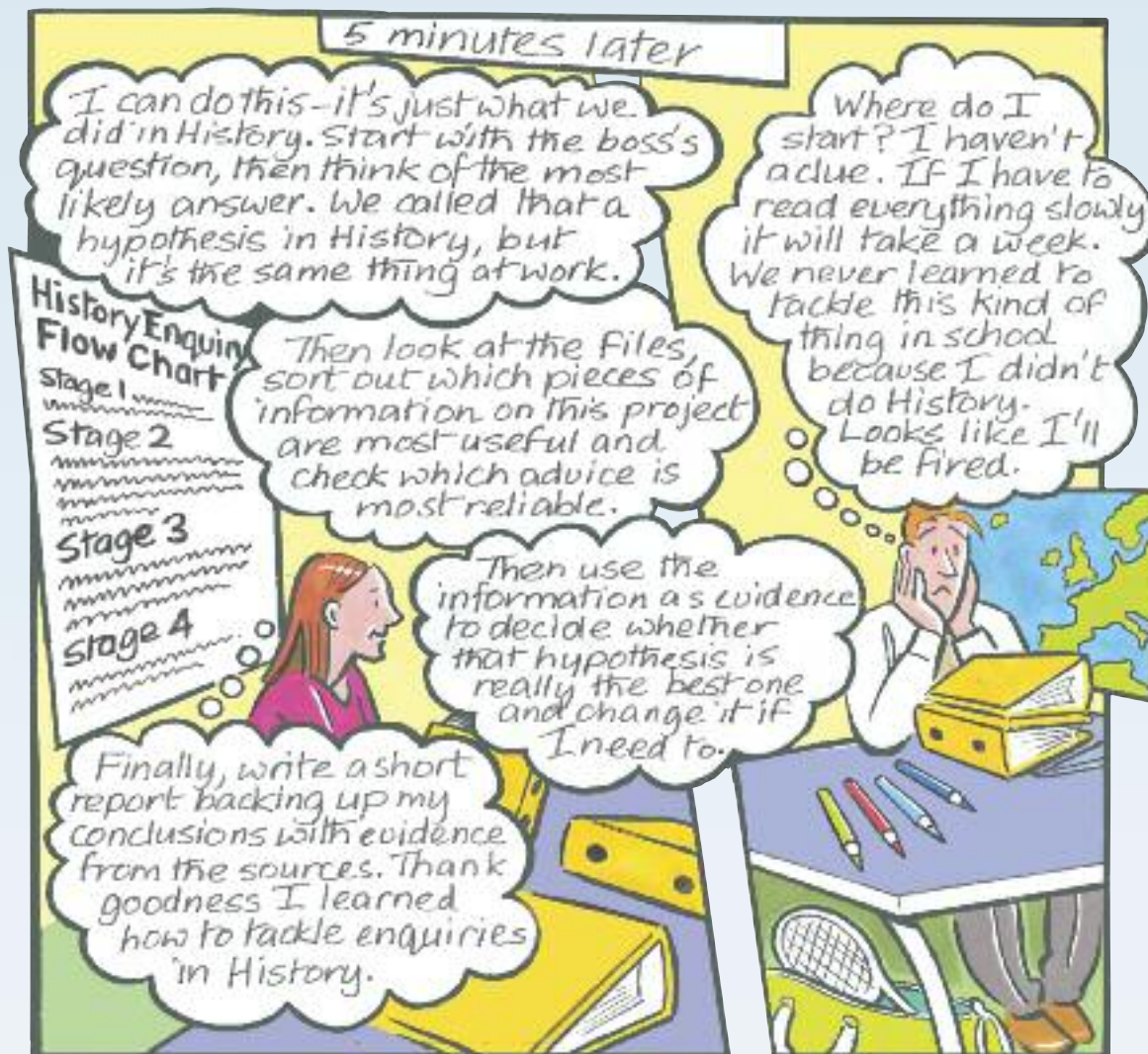
## Introduction: Setting up your enquiry

**Enquiry – the skill that makes history really useful!**



### Activity

- 1 Think back over your work in History at Key Stage 3 or GCSE. Identify one enquiry you have carried out. In what ways was it similar to the approach being used by the ex-History student in this picture?





## Why study surgery?

Nowadays we think of surgeons as respected, skilled and clever people who save lives. They are the stars of hospital dramas on TV and everyone looks up to them. Two hundred years ago the story was very different.

### How did we get from this ...



▲ A drawing published in 1793 of surgery taking place.

Some people would say that the really big changes happened in the period 1845–1918 when surgery was transformed from a painful, bloody experience for the patient into something professional and scientific and much more likely to save a patient's life. In this enquiry you will investigate the developments that made this transformation possible.



◀ A surgical operation taking place in the early twenty-first century.

### Activity

- 2 Make a list of the differences between the two operations in these pictures.
  - a Start by identifying differences you can see.
  - b Then add to your list any differences you can infer from the pictures or which you think took place between 1793 and the present.

### ... to this?





# The big picture: surgery through time







In this book you are only going to study a short period of 70 years but here is the big picture of 2000 years of surgery.

## Activities

Read the news headlines opposite about developments in surgery.

- 1 Which of them do you think happened between 1845 and 1918 (the unshaded area of the timeline)?
- 2 Check your answers by going on an information hunt through this book. Note down the dates of the developments that did happen between 1845 and 1918.
- 3 On your own copy of this timeline summarise the main changes in surgery between 1845 and 1918.
- 4 You have **one minute**. Explain out loud the ways in which surgery was transformed. Your teacher will tell you how long you have to prepare your explanation.



	Ancient World	500	Middle Ages	1500	Re
How did they deal with <b>pain</b> ? (anaesthetics)	 <p>Herbal drinks e.g. opium, mandrake, hemlock, alcohol</p>		Speed of surgery/tying or holding down the patient		
How did they deal with <b>infection</b> ? (antiseptics)	 <p>Honey, wine, spices and vinegar</p>		Boiling oil for gunshot wounds		
How did they deal with <b>blood loss</b> ?	 <p>Stitches to close wounds</p>		Red hot cauteries closed wounds		 <p>Liga Failed transfusio</p>
What <b>equipment</b> did they use for surgery?	 <p>Saws, probes, drills and fine scalpels</p>				
What <b>kinds</b> of surgery were possible?	<p>Surface surgery Amputations Setting broken bones Trephining</p>				

Note: timeline not to scale



**1. First heart transplant**  
 Dr Christiaan Barnard performs revolutionary heart surgery in South Africa.

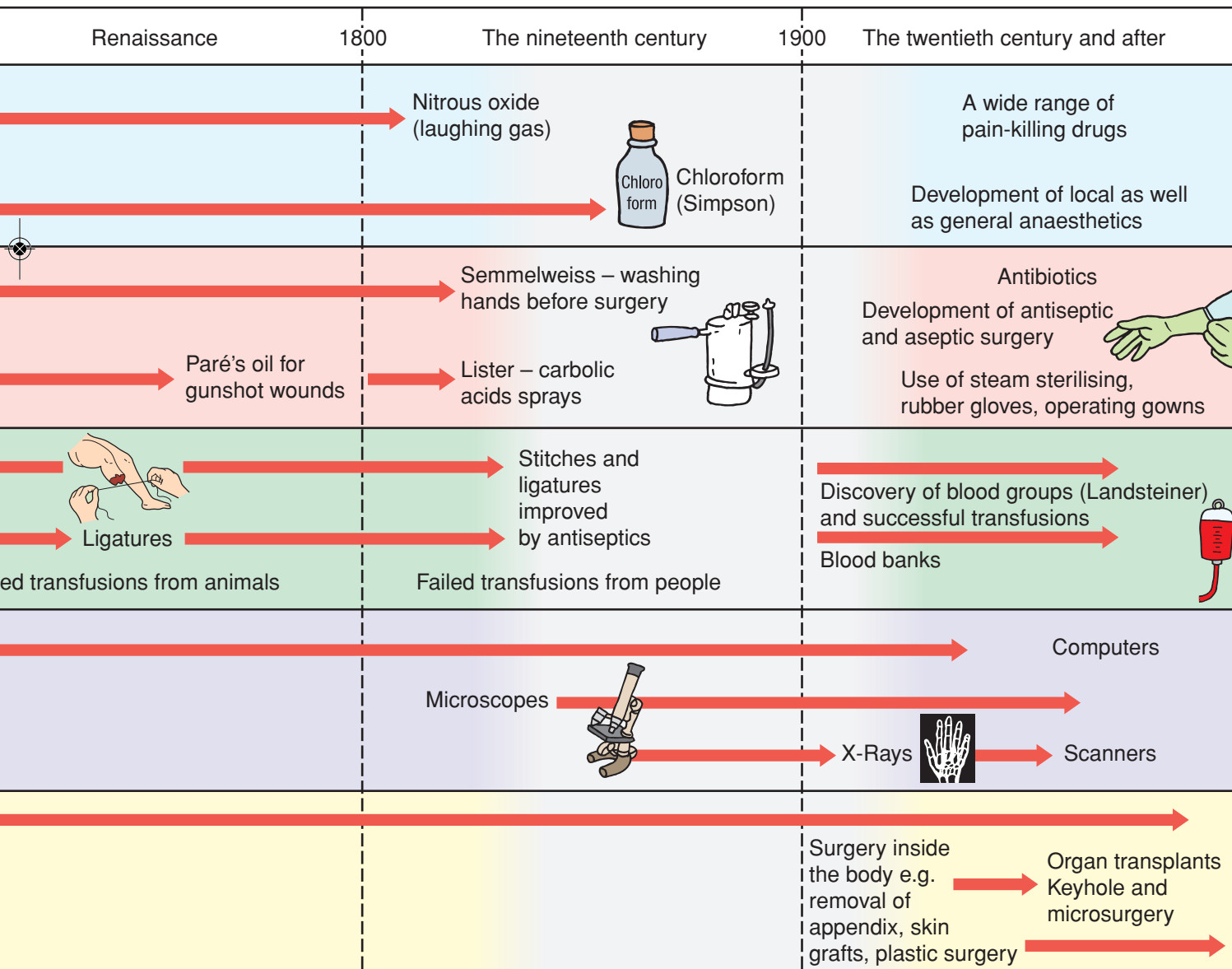
**2. Blood comes in different groups**  
 Karl Landsteiner discovers three different blood groups. Safe blood transfusions now possible.

**3. Chloroform – the first effective anaesthetic**  
 James Simpson pioneers use of chloroform to save patients from pain. Chloroform used world-wide within a year.

**4. X-ray machines help surgeons**  
 First X-ray machines used in hospitals. Helps surgeons identify problems.

**5. Skull surgery**  
 Healers drill holes in the skull to let out evil spirits.

**6. Antiseptics cut deaths from infection**  
 Joseph Lister uses carbolic acid to kill bacteria in wounds and operating theatres. Big reduction in deaths from infection after surgery.





## How had surgeons tried to solve their three big problems?

The drawings below show the three major problems facing surgeons – and patients – in the early 1800s. These were not new problems. They had always existed and surgeons had tried to find solutions before but had never succeeded.

### Activities

- 1 Look at Methods A–D. Which of the three surgical problems 1–3 was each method trying to solve?
- 2 Why did each attempted solution fail? (You may need to look back to page 5 for ideas.)

#### Problem 1: Pain



#### Problem 2: Infection



#### Problem 3: Blood Loss



### Method

#### A



▲ This picture shows an experiment in 1665.

#### B

A fourteenth-century medical book contains this recipe:

‘To make a drink that men call dwale, to make a man sleep during an operation.

‘Take the gall of a boar, three spoonfuls of the juice of hemlock and three spoonfuls of wild briony, lettuce, opium poppy, henbane and vinegar. Mix them well together and then let the man sit by a good fire and make him drink of the potion until he falls asleep. Then he may safely be operated upon.’

#### C

In the 1500s, gunpowder in gunshot wounds was thought to be poisonous so boiling oil was poured onto wounds to kill the poison. The great French surgeon Ambroise Paré replaced the use of boiling oil with his own mixture of egg yolks, oil of roses and turpentine. This was much less painful, but did not deal with the problems caused by surgery on open wounds or bullets carrying fragments of uniform deep into the body.

#### D

Paré also used ligatures (silk threads tied around individual blood vessels) to stop bleeding, but the thread could carry infection deep into a wound, causing death.



## How this book helps you prepare for your Source Enquiry exam



Through this book we will be helping you in various ways.



### smarter revision

These features will help you think through the issues and prepare your revision notes thoroughly.

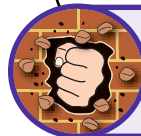
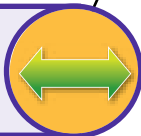
**Factors chart** – helps you record how different factors affected surgery. See page 17.



**Hypothesis triangle** – helps you draw and revise your hypothesis. See page 8.

### SMARTER REVISION TOOLKIT

**Timeline** – helps you see the order in which things happened and how each breakthrough related to the others. See page 18.



**Breakthrough chart** – helps you record the key features of each breakthrough. See page 25.



### meet the examiner



These features will show you how to answer source-based questions in the exam.



**Examine that question** – analyses each kind of question you will face. See page 11.



**Improve that answer** – gives you sample answers and asks you to mark them or improve them. See page 22.

**How to** – takes you step by step through the process of answering each kind of question. See page 14.



**Warning** – helps you avoid the most common mistakes. See page 15.



## Your hypothesis: Which surgical breakthrough was the most significant?

This enquiry asks you to decide which of three surgical breakthroughs – anaesthetics, antiseptics or blood transfusions – was the most important. The sources on the opposite page help you create your hypothesis, your first thoughts on what the answer might be. As you work on the sources on later pages you can amend it. This way you won't lose track of the main focus of the enquiry.

### Activities

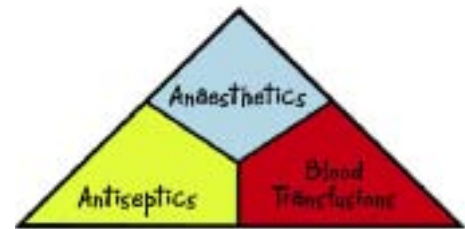
1 Read Sources 1–6. Are they likely to be useful for your enquiry or can any be discarded because they aren't helpful?

2 a



**Hypothesis triangle:** Record your hypothesis by placing a cross on your own copy of the triangle above to show which breakthrough you think is most important. If you're certain, place your cross in one corner. If you're uncertain, place it between the corners. (It's OK to be uncertain at this stage!)

b Write some sentences to explain your hypothesis. Think carefully about which words to use to show how certain or uncertain you are at this stage.



### Stages in an enquiry

**Stage 1**  
Our question is which surgical breakthrough was the most significant.

**Stage 2**  
First we need to look at some evidence and come up with a hypothesis. It's only a rough answer at this stage and not very certain but it helps focus the enquiry.

**Stage 3**  
Next we need to investigate in detail by examining each of the three breakthroughs.

**Stage 4**  
Then we look again at our hypothesis and improve it. With all that knowledge we've gained in Stage 3 we should be more certain about our answer.



## Your hypothesis: Which surgical breakthrough was the most significant?

**Source 1**

An account of a blood transfusion (blood given to a person who has suffered severe blood loss) between a calf and a man, Antoine Mauray, in 1668:

'As soon as the blood entered his veins, he felt the heat along his arm and under his armpits. His pulse rose and soon after we observed a plentiful sweat over all his face. His pulse varied extremely at this instant and he complained of great pains in his kidneys, and that he was not well in his stomach, and that he was ready to choke. He was made to lie down and fell asleep, and slept all night without awakening until morning. When he awakened he made a great glass full of urine, of a colour as black as if it had been mixed with the soot of chimneys.'\*

\* This describes what happens when a patient receives blood which reacts badly with their own blood group.

**Source 2**

The verdict of Sir Clifford Albutt (1836–1925), Professor of Medicine, quoted by David Zuck, president of the History of Anaesthesia Society, 2007:

'When I was a boy ... the best surgeon was he who broke the three-minute record for amputation. What place could there be in record-breaking operations for the fiddle-faddle of antiseptic (hygienically clean) precautions? The obvious benefit of freedom from pain was the benefit of time. With anaesthesia (drug-induced unconsciousness) ended slapdash surgery; anaesthesia gave the necessary time for the theories of Pasteur and Lister to be adopted in practice.'

**Source 3**

A description of surgery in St Thomas's Hospital, London in 1871, written by John Leeson, a medical student:

'Ovariectomy (removing the womb) was becoming common and one of our surgeons was keen on it. His mortality was round about 80 per cent. I used to dread seeing a notice of the operation, as I knew that in a few days the patient would probably be lying on the post-mortem table.

'I remember the house-surgeon in the operating theatre with his threaded needles dangling from the front flap of his coat. One of our surgeons lectured on anatomy in an old frock-coat buttoned up to the chin. I see him now, pawing the dissection as he lectured on it. When the coat was past even this work, he took it up to the operating theatre. An operation was a dirty job and an outworn old coat was a suitable garment! I see it now, faded with age, stained with blood and spotted with pus.'

**Source 4**

Professor David Leaper, writing in the *European Wound Management Journal*, 2007:

'[Lister's use of carbolic meant that] the operating theatre in Glasgow was witnessing the introduction of carbolic hand washing, skin preparation and of course the famous carbolic spray. The success of these measures was spectacular. Between 1864–1866 there had been 16 deaths after 35 amputations (a 46 per cent mortality) and between 1867–1870, after the introduction of antiseptic surgery, there were 6 deaths after 40 operations (a 15 per cent mortality). Lord Lister also left us with the memorable surgical statement that "success depends on attention to detail".'

**Source 6**

The novelist Fanny Burney wrote this account of her mastectomy operation in 1811:

'... when the dreadful steel was plunged into the breast – cutting through veins, arteries, flesh, nerves – I began a scream that lasted during the whole time of the incision (cut) – I almost marvel that it does not ring in my ears still! So excruciating was the agony. When the wound was made, and the knife was withdrawn, the pain seemed undiminished, for the air that suddenly rushed into those delicate parts felt like a mass of small but sharp and forked poignards [daggers], that were tearing at the edges of the wound.'

**Source 5**

An extract from *A Short History of Blood Transfusion* by Phil Learoyd, 2006:

'By the end of the 19th century, the practical use of blood transfusion was only slightly less primitive than it had been two and a half centuries earlier. The principle accomplishment during this period was the recognition, by the majority of people in the field of transfusion, of the inappropriateness of the use of animal blood for human transfusion. The discovery (in 1900) of the human ABO blood groups by Dr Karl Landsteiner in Vienna was the major step (forward).'

**Activities**

- 3 What else do you want to find out to continue your investigation?
- 4 Which skills have you used so far in this enquiry?

## Meet the Examiner: The Source Enquiry



Now that you have a hypothesis, it's almost time to begin your enquiry in detail – and develop the skills you need to do well in your Source Enquiry exam at the same time. As you'll see below, the exam tests the skills you'd need if you really were sifting through files of evidence and reaching a conclusion, which is a really useful skill for many jobs (see page 2).

The Source Enquiry is an important exam, worth 25 per cent of your final mark – the same percentage as the Development Study. The Source Enquiry exam consists of six to eight sources and five questions testing your skills in using sources as evidence. This exam paper and the sources booklet on pages 12–13 show you what the 'real thing' will look like.

### Unit 3: Schools History Project Source Enquiry Option 3A: The transformation of surgery, c.1845–c.1918

1

Time: 1 hour 15 minutes  
The total mark for this paper is 50.

2

#### Background information

When anaesthetics, antiseptics and blood transfusions began to be used between 1845 and 1918, they led to huge changes in the way operations were carried out.

Many people thought that these were important advances in surgery but some people opposed these developments.

The sources in this paper give you a range of views about these developments and provide the opportunity for you to decide which of these breakthroughs played the biggest part in transforming surgery.

1

#### TIMING

The marks for **each** question are shown in brackets. Use this as a guide to how much time to spend on each question.

It is important to time yourself carefully. Some students run out of time because they spend too long on the first two questions and don't have time for the higher mark questions that come later. So stick to a time plan like this:

- Approx. 5 minutes: Read all the questions, the background information and scan the sources so that you pick up the theme of the paper and how the questions and the sources relate to each other.
- No more than 20 minutes: Questions 1 and 2 (14 marks)
- Approx. 25 minutes: Questions 3 and 4 (20 marks)
- Approx. 20 minutes: Question 5 (16 marks)
- Approx. 5 minutes: Check your answers. If time is really short check your answer to Question 5 first. This is where the examiner will be looking particularly closely at your spelling, punctuation and grammar.



2

#### THE BACKGROUND INFORMATION

This is an important part of the exam paper and shouldn't be overlooked. Study it carefully, even if you know the topic really well, because you can use it to put the sources on the paper into context. Highlight important points and identify the theme of the paper. Here the theme is an investigation into which surgical breakthrough was most significant.

**Answer all questions.**

Look carefully at the background information and Sources A to H in the sources booklet (see pages 12–13) and then answer Questions 1 to 5 which follow.

**1** Study Source A.

What can you learn from Source A about surgery in the late eighteenth and early nineteenth century?

**[6 marks]**

**2** Study Source B.

What impression of the impact of anaesthetics is portrayed by the artist who drew Source B?

**[8 marks]**

**3** Study Sources C and D.

To what extent does Source D challenge the view of anaesthetics given in Source C?

**[10 marks]**

**4** Study Sources E and F.

Which is more useful to the historian who is investigating how surgery changed when antiseptics were introduced, Source E or F? Explain your answer using Sources E and F.

**[10 marks]**

**5** Study Sources C, G and H and use your own knowledge.

'Anaesthetics were the most significant surgical breakthrough of the period 1845–1918.' How far do you agree with this statement? Use your own knowledge, Sources C, G and H, and any other sources you find helpful.

**[16 marks]**

**3**

### DEVELOPING INFERENCES FROM A SOURCE

The first question will usually be an inference question. You need to go beyond the obvious clues in the source and explain what you can learn from the source. The advice on pages 14–16 helps you tackle 'inference questions' effectively.

**4**

### ANALYSING THE WAY AN EVENT OR PERSON IS PORTRAYED IN A SOURCE

The emphasis in these questions is on how an impression has been deliberately created by the person who produced the source. Advice on how to tackle 'portrayal questions' can be found on pages 20–22.

**5**

### CROSS-REFERENCING SOURCES

This question is asking you to compare what is being said in two sources and to reach a judgement on how far they are saying the same thing. The advice on pages 23–24 helps you tackle 'cross-referencing' questions effectively.

**6**

### EVALUATING THE USEFULNESS OF SOURCES

There is usually a question asking you to evaluate how useful two sources are for a particular historical enquiry. You need to explore the strengths and weaknesses of each source before reaching an overall judgement on which source is the most useful. The advice on pages 30–31 helps you tackle this type of question effectively.

**7**

### USING SOURCES TO REACH A JUDGEMENT

The final question asks you to use the sources and your own knowledge to evaluate an interpretation or point of view. In this case, you must decide the extent to which you agree or disagree with this statement. The advice on pages 38–45 helps you tackle this type of question effectively. Although the question directs you to use sources C, G and H, you can use any source on the paper to support your answer. Before you answer this question, a good tip is to go through the sources and place a tick or cross in the margin when you find evidence that either supports or contradicts the statement.



## 1 Introduction: Setting up your enquiry

## SOURCES BOOKLET

### Source A



▲ A drawing published in 1793 of a surgical operation at that time.

### Source B



▲ A cartoon called 'Operation madness' published in 1870.

### Source C

An extract from an anonymous letter to Sir James Simpson, written by someone who had had an operation without anaesthetic:

'Several years ago I was required to prepare for the loss of a limb by amputation. Suffering so great as I underwent cannot be expressed in words.

Before the days of anaesthetics a patient preparing for an operation was like a condemned criminal preparing for execution.

I still recall the spreading out of the instruments, the first incision, and the bloody limb lying on the floor. From all of this I should have been saved by chloroform [a liquid whose vapour produces unconsciousness].

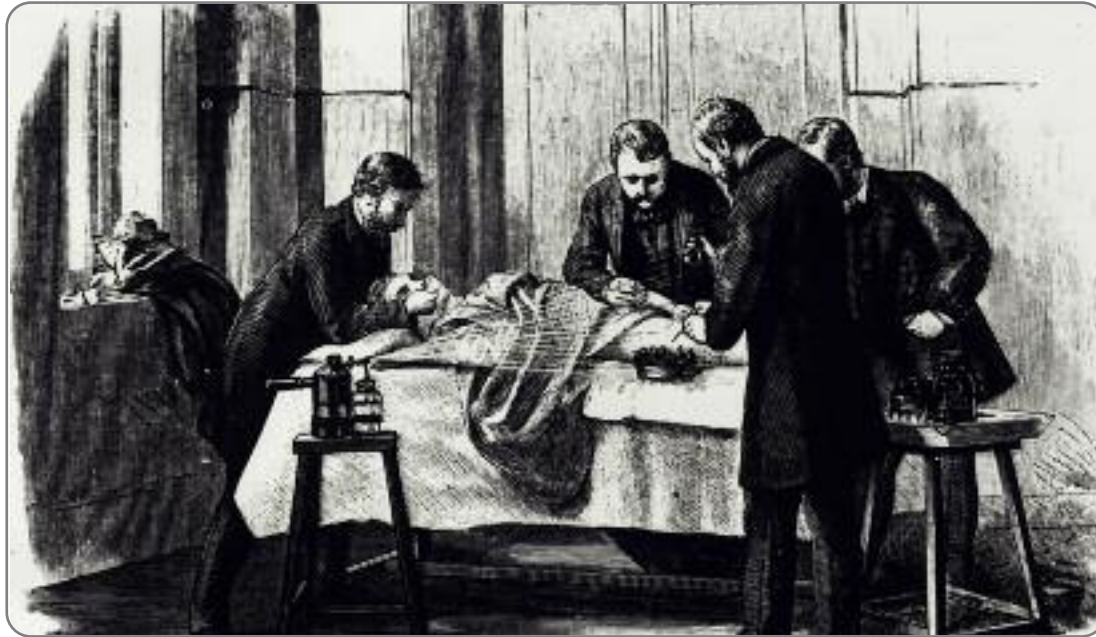
When I first heard that anaesthetics had been discovered I could not believe it. I have since thanked God that he has put into our heart to devise so simple and safe a way of lessening pain.'

### Source D

From the *London Medical Gazette*, 1848, describing Hannah Greener's operation to remove a toenail:

'The inhalation was done from a handkerchief on which a teaspoonful of chloroform had been poured. In about half a minute I requested Mr Lloyd to begin the operation. She gave a kick which caused me to think that the chloroform had not had sufficient effect. I started to apply more when her lips became suddenly balanced and she spluttered at the mouth. I threw down the handkerchief, dashed cold water in her face but this had no effect. The whole process of inhalation, operation and death could not have occupied more than two minutes.'



**Source E**

▲ An operation taking place while a carbolic spray disinfects the area. One assistant is using chloroform to anaesthetise the patient, another is mopping up blood with a sponge.

**Source F**

From Lister's own record of amputations:

	Total amputations	Died	% who died
1864–66 (without antiseptics)	35	16	45.7
1867–70 (with antiseptic)	40	6	15.0

**Source G**

Professor David Leaper, writing in the *European Wound Management Journal*, 2007:

[Lister's use of carbolic meant that] the operating theatre in Glasgow was witnessing the introduction of carbolic hand washing, skin preparation and of course the famous carbolic spray. The success of these measures was spectacular. Between 1864–1866 there had been 16 deaths after 35 amputations (a 46 per cent mortality) and between 1867–1870, after the introduction of antiseptic surgery, there were 6 deaths after 40 operations (a 15 per cent mortality). Lord Lister also left us with the memorable surgical statement that "success depends on attention to detail".'

**Source H**

An extract from *A Short History of Blood Transfusion* by Phil Learoyd, 2006:

'By the end of the 19th century, the practical use of blood transfusion was only slightly less primitive that it had been two and a half centuries earlier. The principle accomplishment during this period was the recognition, by the majority of people in the field of transfusion, of the inappropriateness of the use of animal blood for human transfusion. The discovery (in 1900) of the human ABO blood groups by Dr Karl Landsteiner in Vienna was the major step (forward).'