THE BATTLE OF BRITAIN

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INTRODUCTION

The Battle of Britain was one of the most important Allied victories of the Second World War.

The German air force (Luftwaffe) had been at the front of every attack the Nazis had made on their neighbouring countries, starting with the military attack on Poland in September 1939. The Luftwaffe would attack all the key defences of a country, including the airfields, clearing the way for the ground troops (the army) to invade. The idea was that the country being attacked would not be able to stop the invasion, as its air force would have been destroyed and its military bases damaged. The battle plan had been successful for the Nazis when they attacked Poland, but was also very effective when they attacked Luxemburg, Belgium, the Netherlands and France in May to June1940. It took the Germans just six weeks to take the four countries.

By late June 1940, it was obvious that the last country the Germans needed to defeat to achieve their conquest of Western Europe was Britain. For the Germans, it was essential that they destroyed Britain's defences on its southern and eastern coasts before an attack was mounted across the English Channel. At the end of June 1940, German aircraft began flying across to Britain, carrying out reconnaissance and limited attacks. This was all in preparation for the main attack to begin.

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THE BATTLE ITSELF

The attack on Britain by the Germans from the air started on 10 July 1940. While aerial attacks on Britain would continue throughout the Second World War, the Battle of Britain is regarded as lasting from 10 July to 31 October 1940. Most historians break the battle up into roughly four stages (although some use five by splitting the first or last stages up even further):

STAGE ONE: 10 JULY–12 AUGUST 1940

The German Luftwaffe attacked sites along the British coast and ships in the English Channel by dropping bombs.

In July, the Germans began preparations for Operation Sea Lion, the planned invasion of Britain. A central part of the plan was that there should be no air defences or aircraft capable of attacking the German troops as they approached from the sea and on reaching Britain.

STAGE TWO: 13–18 AUGUST 1940

The Germans started to focus the bombing raids on British airfields and radar stations. The German bombers were accompanied by fighter planes, which the British pilots and ground defences (anti-aircraft guns) needed to stop in addition to the bombers.

The main German air-intensive assault was planned for 13 August, known to the Luftwaffe as Adlertag – Eagle Day. That day was planned as the start of the final stages of the air attack. In harbours in occupied Europe, German ships were prepared for the sea attack.

One of the hardest days of fighting between the RAF and the Luftwaffe was 18 August. Both sides took the highest number of casualties in one day's fighting of the battle. The Germans managed to destroy British aircraft and airfields, but they did not stop the RAF from fighting back, and no sea invasion could be launched.

STAGE THREE: 19 AUGUST–6 SEPTEMBER 1940

The Luftwaffe began to bomb more non-military and industrial sites, and started to bomb towns and cities as well. The attacks went beyond the south-east coast and up into the South West, the Midlands, the North East of England and into Scotland.

The British Prime Minister, Winston Churchill, made a speech on 20 August that paid tribute to the courageous and important work and fighting of the RAF personnel: *'Never in the field of human conflict has so much been owed by so many to so few.'*

After attacks on British cities, the RAF sent its first planes to bomb Berlin on 25 August.

STAGE FOUR: 7 SEPTEMBER–31 OCTOBER 1940

The Germans decided to target more cities with mass bombing raids – the Blitz had started. On 15 September, one of the heaviest bombing raids was launched against London. However, the RAF Fighter Command continued to attack the Luftwaffe, and the Germans suffered huge losses. The day became known as **Battle of Britain Day**, and forced Hitler to postpone his invasion.

The Germans had damaged airfields and factories, but not enough to stop Bomber Command responding or aircraft being built. The radar stations suffered little damage, which meant that the early warning system was not stopped for any length of time during the battle.

Instead, night raids on British cities were increased, to try to exhaust the British public and to reduce German casualties. By the end of October, the Battle of Britain was over; the British air force was the first air force to defeat the Nazis. The Blitz would continue for years, as would aerial attacks, but the Germans would never mount a full-scale attack on Britain again.

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THE TECHNOLOGY THAT MADE THE VICTORY POSSIBLE – RADAR

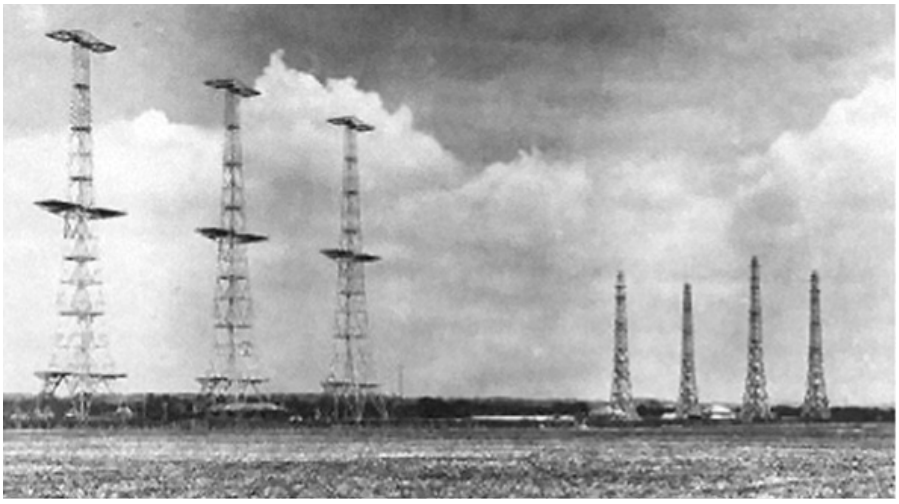
RADAR TECHNOLOGY

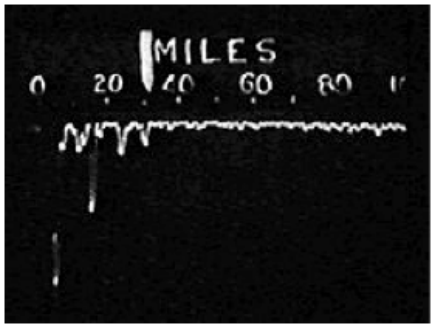
During the1920s and 1930s, scientists worked on ways of detecting aircraft from far away, long before they could be seen by people on the ground. The First World War – or Great War as it was then known – had used aircraft for light bombing raids and, with the advancements that had been made to aircraft, it was felt that a serious air attack was a real possibility in the future.

The Air Ministry set up the Committee for the Scientific Survey of Air Defence in 1934, and scientists including Robert Watson Watt, Arnold F Wilkins and Edward George Bowen tried out ways to create a detection system for incoming aircraft. One of the favoured methods was using radio waves and, on 17 June 1935, radio waves as a way of spotting aircraft was first successfully demonstrated by the British scientists.

HOW IT WORKED

A radio wave was sent out. If it hit something, the signal or wave 'bounced' back, and so detection of a radio 'echo' indicated that something was coming towards the place where the wave was first sent. Waves were sent out a few times a second, and measurements were plotted on a screen to produce a display that looked like a straight line, rather than the circular image we associate with radar now.

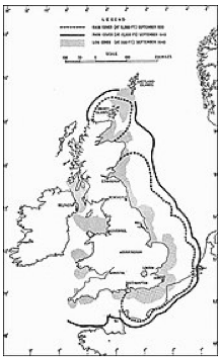




The radio waves were sent out by towers like the ones top right, and were set up all along the southern and eastern coasts of Britain.

The signal would be monitored by someone at a radar station, who would be able to work out how far away the flying object was and its speed. They might also very roughly be able to work out how many things were flying. Sometimes mistakes were made, and flocks of birds would be detected; however, their speed usually indicated what they were. Throughout the war, and during the Battle of Britain, many of those working in the radar receiver room on the RAF stations were women – part of the WRAF.

Towards the end of 1936, a linked early radar warning system was built along the British coast, known as Chain Home (CH). From 1939, there was also Chain Home Low (CHL), which was able to detect low-flying aircraft. Combined with spotter stations (people on the coast with binoculars), this provided the British with an important early warning technique for an air attack.



Although the technology was revolutionary at the time, the system could only look out to sea. Once the German aircraft crossed over the British coast and on to land, it was up to the spotters and other RAF stations belonging to the Observer Corps to monitor and plot the attackers' journeys.

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FROM RADAR TO SCRAMBLE!

Air Chief Marshal Sir Hugh Dowding, Commander-in-Chief of RAF Fighter Command, created a reporting and responding system that ensured that the radar early warning system was as effective as possible. The Dowding system divided the UK into groups and sectors, organising a reporting structure for all the information collected that could be acted on with sufficient speed, so that any attack could be met with a British fighter response.

All information collected at the radar stations was checked and then sent through to the headquarters of Fighter Command at Bentley Priory (near Harrow, North London), where Dowding had his own HQ.

A central part of the system was that the whole country was divided into four groups (10 to 13).

- **10 Group**, covering South West England and Wales under Air Vice-Marshal Sir Quintin Brand. Operational headquarters were located at RAF Rudloe Manor near Corsham in Wiltshire.
- **11 Group**, covering London and the South East under Air Vice-Marshal Keith Park. Operational headquarters were located in Uxbridge, West London (now the Battle of Britain Bunker and shown in the film).
- **12 Group**, covering the Midlands, East Anglia and parts of northern England under Air Vice-Marshal Trafford Leigh-Mallory. Operational headquarters were located at RAF Hucknall in Nottinghamshire during the Battle of Britain, and then moved to RAF Watnall, also in Nottinghamshire.
- **13 Group**, covering the rest of northern England, the south of Scotland and Northern Ireland under Air Vice-Marshal Richard Saul. Operational headquarters were located in Kenton near Newcastle upon Tyne.

Bentley Priory would send the radar information to the appropriate group's operational headquarters.

Each group was divided into sectors located across the area. The sectors contained the airfields, anti-aircraft guns and other defences such as barrage balloons. It was the responsibility of the operational headquarters of each group to organise the response to the enemy aircraft coming over their area, using the relevant sectors. During the Battle of Britain, 11 Group was the busiest, as the German attack came across the English Channel and on to the south-east coast.

As this was the time before computers, each of the decisions was made and passed on through the telephone systems, and every action was plotted on a large map in the Operations Rooms.

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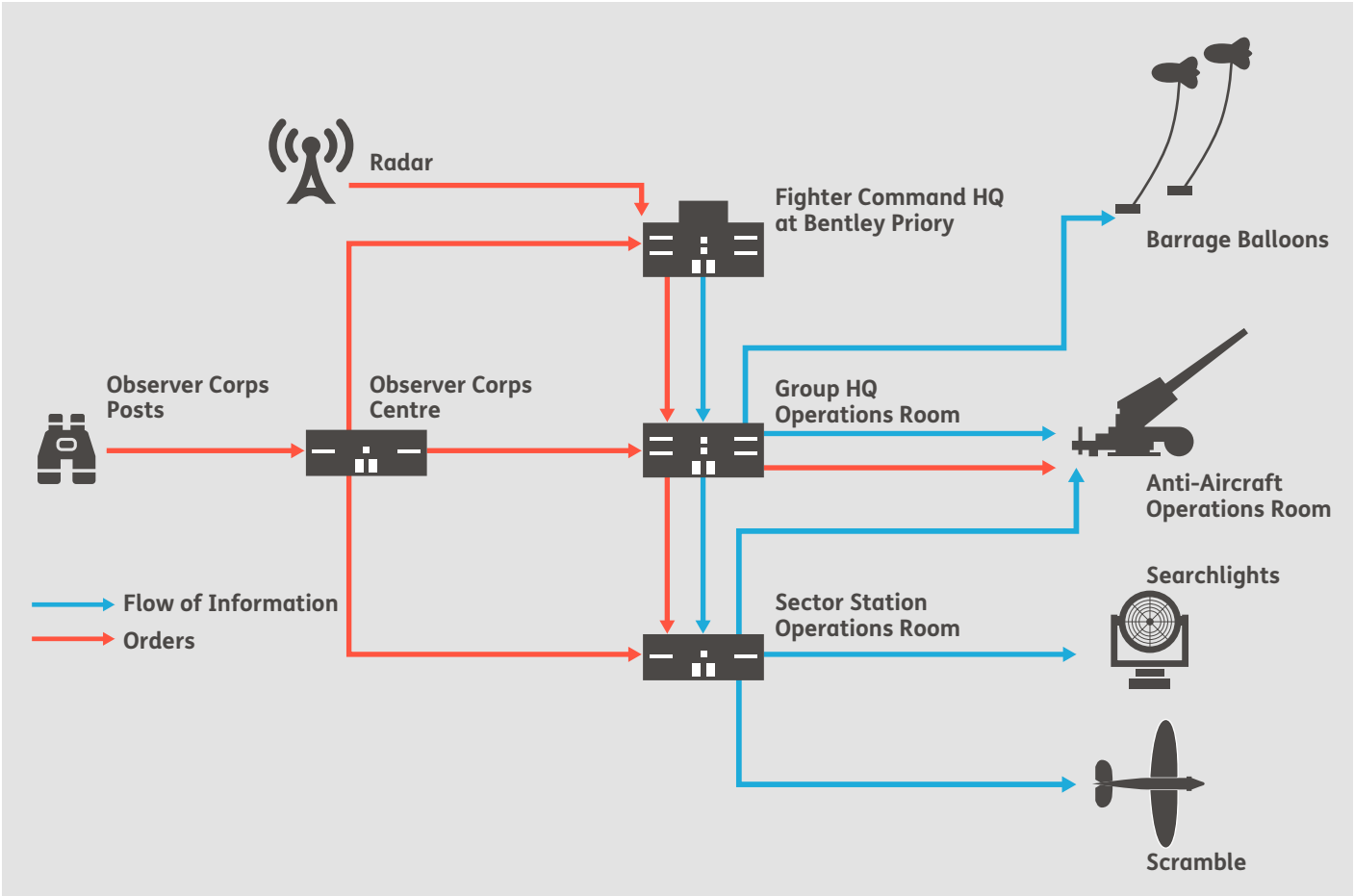
The whole process, from a radar operator detecting aircraft and telephoning the findings through to Bentley Priory, who checked the information against other sources, passing the information on to the correct group, to a duty Commanding Officer deciding how each of the sectors should respond, and Operations team and Sector team co-ordinating the response, had to be done in approximately four minutes!

This speed was crucial, as it took the German aircraft approximately 20 minutes after being detected crossing the English Channel to reach British targets in the South East. It took 14–16 minutes once a telephone call reached the airfield in the sectors to get the pilots into the British fighter aircraft, start the engines, take off (all called scramble) and fly towards the British coast to meet the German aircraft. This meant that at no stage was there a second to spare if the Luftwaffe were going to be stopped from destroying British sites.

The system worked very effectively, and all of the different people knew how to carry out their roles with the greatest efficiency. The combination of technological development and human planning and co-operation created a successful, modern system.



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DIVERSITY IN THE AIR

One of the strengths of the RAF in 1940 was its diversity. The victories of the Germans across Europe had encouraged men from across the British Empire to travel to Britain to join the RAF. In Europe itself, airmen from the countries that the Germans took over or attacked travelled to the UK to try to carry on the fight against the Nazis.

According to the RAF Museum and other sources (https://www.rafmuseum.org.uk/research/online-exhibitions/history-of-the-battle-of-britain/battle-of-the-nations.aspx):

During the Battle of Britain one fifth of Fighter Command's aircrew came from overseas and 16 nations were represented in its squadrons. A total of 126 New Zealanders, 98 Canadians, 33 Australians and 25 South Africans participated. They were joined by three Rhodesians, a Jamaican, a Barbadian and a Newfoundlander.

The Commonwealth countries produced some of the best fighter pilots, including the Australian Flying Officer Paterson Hughes and Flight Lieutenant Adolph 'Sailor' Malan from South Africa.

After the fall of France, the RAF welcomed into its ranks exiles from German-occupied Europe. In all, 145 Poles, 88 Czechoslovaks, 29 Belgians, 13 Frenchmen and an Austrian flew in the Battle and many of these proved to be excellent pilots. Though only operational for six weeks, the Polish No. 303 Squadron claimed 126 victories to become the top scoring RAF unit. The most successful RAF pilot, with 17 kills, was Sergeant Josef Frantisek, a Czech national who also flew with '303'.

In addition to the different nationalities, there were also different religions in the RAF. Christian, Jewish, Muslims, Sikhs and Hindus all served as part of the RAF.

THE POLISH CONTRIBUTION - 302 AND 303 SQUADRON

The Polish air force was no match for the technically superior Luftwaffe in terms of aircraft. However, the Polish pilots and crews were very good and fought as best they could when Germany invaded Poland in September 1939. Many of the Polish airmen flew to France once Poland was defeated, so that they could continue to fight the Germans. After France also fell in June 1940, approximately 8,400 Polish airmen travelled to Britain, which they now called *Wyspa Ostatniej Nadziei* or 'The Island of Last Hope'.

Initially, the British authorities were unsure about how to use the Polish pilots, especially as many of them did not speak any English. Then, in August 1940, it was agreed to form them into two squadrons, 302 and 303 Squadron. (A squadron is a way of organising pilots, ground crew and aircraft into groups – a squadron will contain 12–24 aircraft plus the number of pilots, crew, etc. that are needed to support the activities.)

The Polish pilots had fought the Germans before; they understood some of their tactics in the air and were able to counter them. After the Battle of Britain, the Poles continued to serve in the RAF as part of the PAF (Polish Air Force), including large numbers of ground crew (engineers, etc). They were all offered English lessons, and technical manuals were translated into Polish. By the end of the war in 1945, there were approximately 15 squadrons in the PAF, covering fighter planes, bombers and coastal and special duties, with approximately 14,000 men and women serving in them.

http://www.polishsquadronsremembered.com/303/

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THE PILOTS, THE GROUND CREW AND THE OPERATORS

WHO WERE THE FEW?

There were approximately 3,000 pilots who took part in the Battle of Britain as part of the RAF. However, there were thousands more working as mechanics, fitters, engineers or on home defences, such as anti-aircraft guns and barrage balloons (barrage balloons are very large balloons attached to metal cables that were used to distract and confuse pilots and could bring aircraft down if flown into). There were also the staff who worked at the Operations Rooms and on radar stations, along with their support staff.

In addition to the pilots fighting the Germans in the air, there were other pilots whose job it was to transport the aircraft from the factories to the bases and around bases. These pilots were the ATA – Air Transport Auxiliary. Approximately one in eight ATA pilots was a woman. Although these pilots didn't fight, they still risked their lives with the sometimes-temperamental aircraft, and were targeted by German fighters.

Lord Balfour, Under Secretary of State of Air, commented that 'the Air Transport Auxiliary were civilians in uniforms who played a soldier's part in the Battle for Britain'.

Women, as part of the WRAF, also carried out the majority of roles in the Operations Rooms and in radar stations. They served the Observer Corps as spotters, as well as carrying out support roles with the ground crew. Women were not allowed in combat (fighting roles); however, there were women as part of the crew for anti-aircraft guns.

The pilots came from many different walks of life. Flying had been an expensive hobby before the war, so only those who were well-off tended to be pilots, but this was not always the case. Those who worked on aircraft as mechanics and fitters often learnt how to fly as well. Once the war started, the RAF was interested in recruiting anyone who showed an ability to fly, especially under pressure. This meant that there was a real mixture of people that became pilots.

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SOME STATISTICS

There were **2,000** Luftwaffe aircraft.

There were **640** RAF aircraft at Fighter Command, and this was supported further by Bomber Command and Coastal Command.

Approximately **3,000** pilots served in Fighter Command and the average age was **20** (although some were **18** and others were over **30**).

The RAF lost **1,023** aircraft during the Battle of Britain and the Luftwaffe lost **1,887**.

Of the **3,000** aircrew who fought in the Battle of Britain, **544** lost their lives, and of the remainder, a further **814** died before the end of the War.

The most famous fighter aircraft used in the Battle of Britain were the British **Hawker Hurricane** and **Supermarine Spitfire Mk I** and the German **Messerschmitt Bf 109**, although other aircraft were also involved.

There were **35** Hurricane squadrons, compared to **19** Spitfire.

While the Spitfire was newer, slightly smaller and faster, the Hurricane was reliable and much easier to repair.

OUTCOME OF THE BATTLE OF BRITAIN

The RAF was outnumbered about five to one by the Germans.

The cost of the Battle was high for pilots and aircraft.

In the end, the British won the Battle of Britain due to the advance warning that radar gave them, working with the Dowding system. It can also be suggested that, for many of those flying, the need to stop an invasion was more important than that for attacking, and they were prepared to risk more than the things that motivated the Luftwaffe.

By defeating the Luftwaffe, the RAF had stopped an invasion, and they had also prevented the resources of Britain and its Empire and Commonwealth from falling under Nazi control.

Ultimately, the success of the Battle of Britain meant that the Nazis could be defeated, and this was an important message to the people of Europe and the rest of the world.

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USING THIS INFORMATION

This historical information can be combined with the introductory film and resources from the resource section for exploring some creative ideas in a school club/informal club, or for a more curriculum-based lesson.

Below are the ideas and questions that these materials could support.

In addition to the historical information above, case studies and extra information is available in the resource section. These include biographies and aircraft technology case studies.

QUESTIONS FOR EXPLORATION IN ANY SETTING:

Why did radar play a role in the British strategy for defeating the Germans during the Battle of Britain?

Why was the Battle of Britain so important to the UK in 1940?

HOW TO USE THIS MATERIAL IN A HISTORY CLUB OR LUNCHTIME/AFTER-SCHOOL / INFORMAL CLUB

These ideas are suitable for a mixture of age groups and abilities.
They can also be used with the interactive map to begin a local history investigation.

SHOW THE FILM – THE RADAR AND THE BATTLE OF BRITAIN

Provide the historical information or read it to students, and select one or both of the questions from the list above that you think the group might find interesting. (You may want to use the additional questions in the box at the end of this section to stimulate ideas.)

Select some of the case studies/biographies from the resource section. Ask the young people to answer the question(s) and present their discoveries as:

- An information poster on why winning the Battle of Britain was important
- A newspaper story for their school/group newsletter on why radar stations needed to be protected and supported during the Battle of Britain
- A display for the school/class/group noticeboard about the different people and groups that contributed to the Battle of Britain victory
- A comic script or graphic showing all the stages of the Dowding system and how long each stage was allowed
- An assembly presentation or talk for other members of your group about how radar worked and why it made a difference

Extension: Find out how radar is used today – is it just by the military?

Now use this information to start investigating the local history of an airbase near you – this can begin by using the interactive map. Over the course of the last century, there have been over 1,500 air bases or places used by the RAF; even if you don't live near to one now, there will have been one at some time.

Find out about the base. Identify what other information or understanding of an historical period is needed to tell the story of that base.

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LESSONS IN SUPPORT OF THE CURRICULUM AND/OR EXAMINATIONS

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GUIDANCE ON HOW THIS MATERIAL COULD BE USED IN A LESSON ABOUT:

1. The First World War
2. The Technology of Warfare

1. THE SECOND WORLD WAR

Ages 11–14

The questions in the box can also be used to explore this theme and the materials.

Example key enquiry question:

Was there a key factor that helped the British win the Battle of Britain?

SHOW THE FILM – THE RADAR AND THE BATTLE OF BRITAIN

Allow them access to the historical information and to the biographies and case studies in the resources section.

Working in groups, ask the students to create their own Operations Room map, like the one shown in the film.

Include the roles and skills for those in the room around the side of the map, e.g.:

- Operations controller
- Telephonist
- Map plotters
- Enemy trackers
- Squadron contacts
- Communication operators
- Sector plotters

On the map, they need to put all the locations where key events or incidents happened, where decisions were being made and what activity was happening, e.g.:

- Radar stations
- Barrage balloon crews
- Anti-aircraft guns
- Air bases
- Enemy aircraft
- Spotters
- Aircraft factories
- Key towns
- Operations Rooms

Using a point system of 1–10, ask the pupils to evaluate the importance of each activity or role, e.g.:

Spotter – 7

Radar operator – 10

Operations Room commander – 10

Telephonist – 8

From this activity, ask the students to discuss *Was there a key **factor** that helped the RAF to win the Battle of Britain?*

Ask the students why the combination of technology and human organisation was essential to the result of the Battle of Britain.

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2. THE TECHNOLOGY OF WARFARE

Ages 11–16

Example key enquiry question:

What technologies were important during the Second World War for defence?

Show the film.

Using the historical information, create a time-line of radar and the Dowding system, from when the system first detects the enemy aircraft to when the two sides meet in the air.

At each of the stages of the time-line, indicate what needs to be done, by whom and what will happen if that action is not done.

Extend the time-line to include the other technologies/tactics being used to defend Britain during a Luftwaffe attack.

Using the information in the time-line and elsewhere on the site, ask the students to create a skills list for each of the people involved at the different stages of an attack and defence response during the Battle of Britain.

Now ask the students what, in their view, was the most important part of the process.

Was it the skills of the pilots, the operators or the technology that mattered most during the Battle of Britain?

Conclude: How important was the technology of radar to the Battle of Britain?

Extension: Find out how radar is used today – is it just by the military?

ADDITIONAL QUESTIONS TO SUPPORT LEARNING FOR ALL GROUPS

- Why did the partnership of radar technology and human judgement make such a difference to the Allies in the victory of the Battle of Britain?
- Why was the Battle of Britain significant to the rest of Europe in 1940?
- How did the people in the Operations Rooms help to win the Battle of Britain?
- What were the aircraft used during the Battle of Britain – why were different ones used (use the information in the resource section)?
- What roles did women carry out during the Battle of Britain?
- Why did it matter that the pilots of the Battle of Britain came from different nationalities?
- Why was it important that everyone knew their role as part of the Dowding system?
- Douglas Bader was disabled when he flew during the Battle of Britain – did this affect his flying?
- How did radar in 1940 work?
- How did the RAF use radar to respond to German attacks?
- What were the different stages, from detection of the enemy to the British planes returning to the ground?
- Why did Nazi Germany attack Britain in 1940?
- Why was the Battle of Britain so important for the British to win?

USING THE PHYSICS/STEM SUPPORT MATERIALS:

The activity is designed to show an aspect of technology that demonstrates some of the thinking in the past. The STEM activity here – try it to understand how radar could be compromised (not always accurate) and how the information that it provides could be used in settings today.