- 40% of France and her colonies would be controlled by Pétain's puppet government with its capital at Vichy
- the French army would be reduced to 100 000 men
- French prisoners of war, over 1.5 million men, would be kept in captivity with no guarantee of their release
- the French would have to pay "occupation costs"
- the French navy was to be turned over to Germany.

Technology and war: Enigma and codebreaking

Enigma was an encoding machine used by the German military throughout the war. Enigma had a keyboard attached to three rotors. Each keystroke turned the rotors encrypting the message. An associated code key was required to decipher the message at the receiving end. By 1939 with the help of Polish mathematicians, the Allies were beginning to decipher German military code keys. The British mathematician Alan Turing developed a mechanized deciphering machine, which accelerated the process considerably. When the Germans created a four-rotor Enigma machine, the British modified their machine to decipher these codes as well. There were, however, hundreds of Axis code systems that were used and changed with varying degrees of regularity, making the task of the codebreakers vastly more complicated.

The program which deciphered and analysed the intelligence derived from Turing's machines was known as Ultra and at its height was deciphering over 2,000 messages a day. In a way the success of the program posed its own problems. Ensuring that the 2,000 decoded messages were analysed for their military importance and sent to the units to which the information was the most use in a timely fashion was an enormously complex undertaking. Allied leaders had to be careful which intelligence they acted on and how they did so for fear of tipping off the enemy who could then change the encryption system. The Allied militaries each had their own cryptographic systems and shared intelligence regularly. It was Ultra intelligence on Japanese intentions in northern China, released to the Soviets on Churchill's orders, which persuaded Stalin to allow his Siberian divisions to be transferred to the west. These divisions played a major role in the counteroffensive of December 1941 that threw the Germans back from the outskirts of Moscow.

▲ The Enigma machine. What were the challenges presented by this technology for both sides?

Barbarossa to Stalingrad

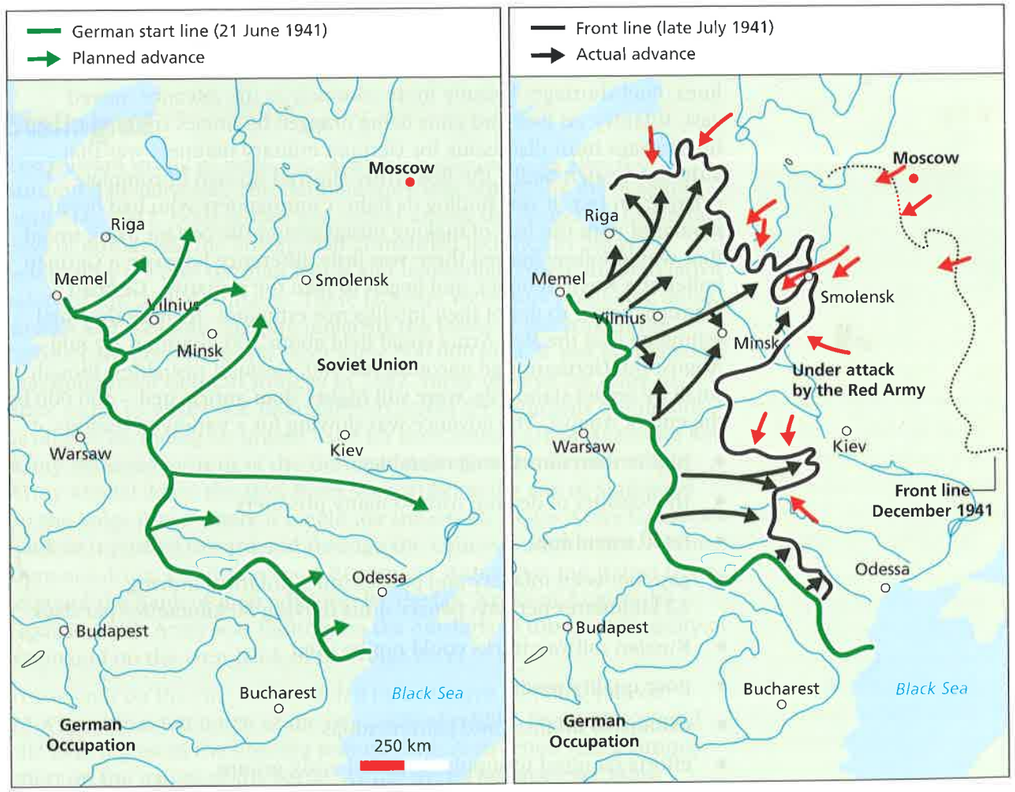
While the autumn of 1940 was seemingly consumed with the vicious fighting in the skies, Hitler's attention was increasingly focused on the east – Germany's invasion of the Soviet Union. To an extent unknown in modern history, this was to be an ideological war, not simply a war of territorial conquest. Hitler had long envisioned the destruction of the communist edifice and the enslavement of the people who lived under it. It was to be a massive undertaking even by the standards of the Second World War. Three million men were to attack in three army groups along a 3,200-kilometre front supported by close to 1 million men from her allies. This force which included 3,350 tanks would be supported by

7,000 artillery pieces and 2,000 aircraft. To outfit such a formidable invasion the Germans were forced to use tanks and equipment from all over Europe including tanks from Czechoslovakia, artillery from Norway and trucks from France.

Opposing the Germans was a Red Army still reeling from the comprehensive purge of its officers in 1937–1938 and its humiliating performance against the Finns in 1940. Nevertheless, the Red Army numbered some 3.2 million infantry, 50 tank divisions (about 24 000 tanks in total) and 25 mechanized divisions.

Stalin's purge of the Red Army	
Rank	Executed or imprisoned
Marshall	60%
Army Commander	87%
Divisional Commander	56%
Brigadier	46%
Deputy Commissar of Defence	100%
Total officers purged	36 671

▲ German dispatch riders take a break during Operation Barbarossa. What role did communications play in *Blitzkrieg* tactics?



▲ Operation Barbarossa

Army Group Centre
The German army group tasked with advancing toward Moscow during Operation Barbarossa.

More than Stalin's purge handicapped the Red Army. The Soviet leader's willful blindness to the coming invasion ensured that no proper military preparation had been made. Not wanting to offend Hitler or to violate the spirit of the Molotov-Ribbentrop Pact, Stalin forbade any "provocative" mobilization. Field commanders had no access to intelligence that very clearly showed that the Germany army was mobilizing along the frontier. As late as a few hours before the onslaught, Stalin refused to believe that anything was amiss, despite all telephone wires between Germany and Russia having been cut.

The German plan was to send its three army groups toward Leningrad, Moscow and Kiev. En route the Germans were to wash over Minsk, Smolensk, Riga and Tallin.

The *Blitzkrieg* blueprint was to be used again. Shortly after 3 am, the German artillery opened up along the entire front. The Luftwaffe began sorties against the Red Army air force almost immediately, destroying 3,000 aircraft in the first four days of the operation, many of these while they were still on the ground. Bridges and river crossings were secured quickly and the panzer divisions began to pour across the frontier. The opening weeks of the campaign were marked by massive battles of encirclement, "cauldrons". Within four days of the attack, **Army Group Centre** had encircled and captured 300 000 Soviet troops, destroying some 2,500 tanks. Such battles were to be repeated throughout the first months of the war.

By midsummer cracks had begun to show in the German army. As her panzers raced into Russia, they quickly outstripped their supply lines. Fuel shortages became more common as the advance moved east. Infantry on foot and guns being dragged by horses could not keep up. Perhaps most distressing for German military planners was that, although beaten badly, the Red Army showed no sign of complete collapse. In fact, it was finding its fight. Commanders who had been paralysed with the fear of making mistakes and the certain firing squad that would follow figured there was little difference between a German bullet or a Russian bullet, and began to take the initiative. German planners began to doubt their intelligence estimates. In June they had estimated that the Red Army could field about 200 divisions. By mid-August the Germans had encountered 360. German casualties, though small by Soviet standards, were still higher than anticipated – 400 000 by the end of August. The advance was slowing for a variety of reasons:

- higher than anticipated casualties
- the logistics of dealing with so many prisoners
- rapid use of fuel
- gaps between infantry and panzer units (infantry moving 32 kilometres per day; panzer units moving 80 kilometres per day)
- Russian railway tracks could not be used
- poor quality roads
- exhausted infantry and panzer troops
- efforts required to supply three full army groups.

At this point Hitler interceded and changed the course of the campaign. Convinced that the capture of Leningrad would secure trade routes with Sweden, he diverted part of Army Group Centre to assist with the advance in the north. Equally concerned with the grain that the Ukraine could provide, he further weakened the centre by sending panzer units toward Kiev. By the time these units could return for Operation Typhoon, the advance on Moscow, valuable time had been lost – the mud of the autumn and snow of the winter approached.

While Typhoon went smoothly at first, after 6 October wet snow began to fall, turning all roads into quagmires. Meanwhile, the citizens of Moscow had been mobilized to its defence. Women dug tank traps while the men formed militia units. As November wore on and the weather deteriorated, the Red Army's defences stiffened. When winter arrived in force, German tank engines froze for lack of anti-freeze and German soldiers froze for lack of winter clothes.

What the Germans did not know was that the Red Army had assembled a massive force behind Moscow. This was partially composed of Siberian divisions trained in winter warfare that had been guarding against a Japanese attack in the east and were equipped with new aircraft and the T-34 tank. Zhukov, the Red Army Chief of Staff, unleashed this force as the temperature dipped to –25° C. The Soviet plan was to do to the Germans what had happened to the Red Army repeatedly in the summer – encirclement. After two weeks of vicious fighting, the Red Army had recaptured the territory lost since the beginning of Operation Typhoon. Both armies then dug in to endure the winter.

Stalingrad

The Russian spring brought the same mud and quagmire that the autumn had delivered. The German army was not on the move again until May 1942. Both armies had rebuilt during the winter. In the frantic days of Barbarossa the Soviets had dismantled factories in the west before they fell into German hands and reassembled them in the relative safety of the Ural Mountains. These factories were now producing tanks, aircraft and weapons. Despite replacing the losses of the winter, the German divisions were still short some 500 000 men. It was production that dominated German strategy in 1942. Hitler ordered his army to drive south to secure the Baku oilfields across the Caucasus Mountains as oil was becoming an urgent issue for the German army. Again the Red Army withered in front of the German onslaught. The German Sixth Army moved down the Don River, its goal being the city of Stalingrad on the Volga River where it would use the city to secure Army Group A's flank as it pushed toward and through the Caucasus Mountains. As the Germans drove south they used Romanian, Hungarian and Italian troops to guard the flank of their advance. By the last weeks of August the German Sixth Army was fighting on the outskirts of the sprawling city of Stalingrad on the west bank of the Volga River.

The assault on the city was heralded by a massive bombing raid on 23 August that left much of the city a pile of rubble. The rubble would pile ever higher in the ensuing months. This destruction had a curious effect on the nature of the battle. As the streets became ever more

impassable, the Germans found it hard to use its great advantage in armour. It essentially turned the Battle of Stalingrad into a series of small unit actions in which the tenacity and growing expertise of the Red Army would tell, evening the odds somewhat. The Soviet strategy was to fight for every house, factory, sewer or ditch, all of which were filled with rubble. The Germans referred to it as *Rattenkrieg* – War of the Rats.

▲ A Red Army soldier fights in the ruins of Stalingrad. How did the German success in destroying the city work against them?

The Soviets mobilized every aspect of Stalingrad society in defence of the city that bore their leader's name. Two hundred thousand citizens of the city were organized to dig entrenchments and fortify defences. A potent mixture of patriotism, survival and fear motivated all who defended the city. Stalin had issued his famous "Not One Step Backward" order in August in which he ordered anyone who retreated without orders to be arrested. It also provided for the creation of units whose job it was to form a line behind advancing troops to gun down those who turned around to flee. The Red Army would cling to the west bank of the river while trying to resupply these forces from staging areas on the east bank of the river. Such resupply was treacherous under constant attack from the Luftwaffe and from 21 September with artillery fire.

Initially the Red Army defended the city itself with three divisions and less than 70 tanks. The perimeter steadily shrank from the repeated thrusts by the German infantry and tanks. The effort, however, was exhausting the Germans as well and the Sixth Army commander von Paulus called a halt to bring up fresh troops and supplies for another

push. This push came on 4 October and took them within 300 metres of the river. With over half its fighting strength gone, the Sixth Army tried one last time to dislodge the Russians, but this too failed.

The city of Stalingrad itself had only been a part of the Soviet strategy. Stalin's inclination had been to use absolutely all his available troops to defend the city. Zhukov, however, persuaded "The Boss" as he was known, to defend the city with the smallest force possible. Meanwhile they would gather a huge force north of Stalingrad where the German line bowed west and was defended by inferior Romanian and Italian troops. By September 1942 the Russians were producing 2,200 tanks a month, while the Germans were building 500 a month, which then had to be divided among the various theatres in which the Germans were fighting. This massive Red Army force would drive south and east, while a smaller force south of Stalingrad would drive north and west in a bid to encircle the German Sixth Army. Operation Uranus began on 19 November and within a few days the encirclement was complete.

Had Hitler allowed him, von Paulus and the Sixth Army could have fought their way out at that point, but the Führer had his own version of the "Not One Step Backwards Order". His scheme involved an outside force fighting its way to von Paulus's position, which would meanwhile be supplied by air with 300 tonnes of supplies a day landing at three airfields within the German perimeter. About 280 000 Germans were caught in the cauldron. As the weather deteriorated and the temperature fell, so too did the amount of supplies that reached the surrounded Germans, averaging only 70 tonnes per day. Unable to evacuate the wounded or maintain ammunition supplies, the perimeter gradually shrank and von Paulus surrendered on 30 January 1943. Ninety-one thousand Germans were captured. Between 1945 and 1955 the Russians released 5,000 prisoners. The final 2,000 were released in 1955 – the rest had perished in captivity. Since the beginning of the Stalingrad operation in August it is estimated that Germany and her allies suffered 500 000 casualties. The Red Army suffered 1.1 million casualties of which some 485 000 were dead. Stalingrad was the furthest point to the east the German army would reach during the war.

Class discussion

To what extent did tanks affect the nature of the Second World War compared to the First World War?

Technology and war: tanks

Tanks had originated in Britain during the First World War. Initially small numbers of tanks were assigned to infantry units. Later, the Germans and British pioneered the idea of massing tanks in their own divisions with supporting infantry. Coordination between large formations of tanks was made more practical with advances in wireless radio technology.

Tanks were generally classified according to size and armament – light, medium and heavy. Medium tanks such as the US Sherman with a 108 mm gun and the German Panzer Mark IV were excellent machines and the workhorse of their armies. The Soviet T-34 was perhaps the best all-round medium tank of the war. Sloped armour made it difficult to pierce with anti-tank shells. Its diesel engine could power it to over 50 kmh. Wide treads made it more versatile in snow and its 76 mm gun, though not as big as some medium tanks, was more than sufficient. Perhaps one of the greatest attributes of the T-34 was that it could be readily produced in huge quantities. More T-34s were manufactured than any other model of tank in the war – over 57 000.

While the T-34 and Sherman were both relatively simple tanks to produce, the German heavy tanks were more complicated. The Tiger I and Tiger II were fearsome weapons designed to outmatch the T-34. The intricate mechanics, however, made for cumbersome manufacturing and difficult repair. By the end of the war the Germans had only produced about 1,350 Tiger Is and less than 500 Tiger IIs.

North Africa

The war in North Africa from 1940 to 1943 was a running battle between three combatants. As in Russia and the Pacific, geographic location, topography, climate and vegetation – or lack thereof – in North Africa determined much of the nature of combat there. The absence of obstacles, except for impassible features such as the Qattara Depression, on the surface seems a perfect environment for the mechanization of the Second World War. The lack of roads, harsh climate and interminable sand and dust, however, made waging war here its own particular hell. What obstacles there were – the sea, highland or depression – would limit mobility to a narrow strip along the coast. Despite this, the war in North Africa would prove to be one of extreme mobility, albeit a confined mobility. As a theatre it also would depend on control of the Mediterranean Sea as the only feasible supply route.

Initially the North African war would see some 200 000 Italian troops in Libya facing 63 000 British soldiers in western Egypt. In September 1940 Italy launched an attack on Egypt after which it tried to consolidate its gains. The expedition into Egypt was short-lived and a British counter-attack in December 1940 sent the Italians retreating 650 kilometres along the coast roads. When the advancing British managed to get ahead of the retreating Italian army the victory seemed complete. It could not, however, get as far as Tripoli for reasons that would become commonplace. The advancing force could not maintain supplies and manpower to sustain such a rapid advance and the German army was coming to the aid of its beleaguered Italian ally. In this case the Germans sent a panzer division and infantry division that would become an elite fighting force known as the Afrika Corps under a confident and supremely competent general, Erwin Rommel.

Rommel wasted no time in throwing the British back to where they had started, which he had done by 3 April, where he too outstripped his food, fuel and water and came to a halt, where his troops dug in. A British effort to dislodge them came to nothing. Another attempt, Operation Crusader, eventually succeeded in pushing the German-Italian force back to where they had started, relieving the siege of Tobruk in the process. By May, Rommel was ready to try again and hurled his largely recovered force at the British, forcing them to again retire to the east. This time the fortress at Tobruk could not hold out and the Germans captured the city. Rommel would try again to break through the British defences at the Battle of Alam Halfa. It was his turn to dig in as the British Eighth Army amassed new men and material under its new commander, General Bernard Montgomery.

El Alamein

The resulting battle would be pivotal in the North African campaign. Rather than the fight and dash nature of the war in the desert up to this point, Montgomery would rely on his numeric superiority to fight a more plodding battle of attrition. Montgomery's plan was a massed infantry attack supported by massive bombardment. Once his troops had punched a hole in the German defences his massed armour would exploit the breach – a strategy more similar to 1916 than to 1942.

He wanted to inflict such losses on Rommel that he was compelled to withdraw and would thus be too weak to establish a strong position in the rear. The British plan worked. Forbidden by Hitler to retreat, Rommel committed to defend his northern position, weakening his southern position, where the British eventually broke through. Retreat became the only option and the German-Italian forces would not stop until they reached Tripoli in late January 1943.

▲ German soldiers advance toward El Alamein in 1942. What challenges did fighting in the desert pose for the combatants?

ATL Research and thinking skills

1942 is often viewed as the turning point in the war for the Allies. The years and months up to mid-1942 had been marked by Axis success – the conquest of Poland, France and western Europe, western Russia, Hong Kong, Singapore, the 1942 and its consequences

1942 is often viewed as the turning point in the war for the Allies. The years and months up to mid-1942 had been marked by Axis success – the conquest of Poland, France and western Europe, western Russia, Hong Kong, Singapore, the Philippines. Three important battles in 1942, Midway, Stalingrad and El Alamein, stopped Axis progress. From that point the Allies began to push them back.

Complete the following table to explore the consequences of Stalingrad and El Alamein in more detail.

Battle	Effect on Axis troop strength	Effect on Axis material strength	Other short-term consequences	Long-term consequences
El Alamein				
Stalingrad				

Over the course of the next few months, the German-Italian forces would be driven against the anvil of the US army that had landed in Algeria and Morocco, and although they had some successes at places like Kasserine Pass, their acute supply shortages and dwindling manpower meant that it was only a matter of time before they surrendered. The Royal Navy's dominance in the Mediterranean sunk two-thirds of the material needed to sustain the Germans at fighting strength. The last 275 000 of the Axis forces in North Africa surrendered in May 1943.

Sicily and Italy

The invasion of Sicily was aimed at what the British viewed as the "soft underbelly of Europe". It was designed to divert German forces from the eastern front and to foment a revolt against Mussolini's increasingly unpopular regime. Setting off from Tunisia, US and British airborne and amphibious troops, 10 divisions in all, landed in Sicily in July 1943. They faced ineffectual Italian divisions buttressed by two German divisions. The capture of Sicily was the preliminary stroke in the invasion of the Italian peninsula in September. Peninsulas are difficult for attacking forces. Their narrowness makes outflanking manoeuvres difficult and interlocking defence easier. In Italy the peninsula was split by a mountain range that offered obstacles to attacking forces and cover to defending forces. The mountains further forced the Allies moving up the peninsula to divide and advance up the coasts, allowing the Germans to concentrate their forces on their flanks and leave the centre lightly defended. The US command was hesitant about the Sicilian and Italian operations, viewing them as a distraction from the invasion of western Europe into which they would have to commit valuable men and resources. In any event, the Germans would conduct that defence as the Italians signed an armistice with the Allies on 3 September. Allied troops landed on the peninsula on 9 September.

After landing at Salerno, the Allies raced north to capture Naples, but ran into a strong defensive line running the breadth of the peninsula south of Rome, the Gustav Line, where the advance was bogged down. Some of the bitterest fighting of the war took place around the western anchor of the Gustav Line, a strongpoint around the abbey of Monte Cassino. On the eastern flank, British and Canadian forces encountered heavy fighting in places such as Ortona and Sangro. Unable to outflank a line that stretched from shore to shore, the Allies opted to do so through another amphibious landing, this time south of Rome at Anzio in January 1944. Although it achieved strategic surprise, the US commander failed to exploit this success and another Allied advance became bogged down. It would take another five months for the Allies to enter Rome, two days before the landings at Normandy. The German forces retreated to a second prepared defensive line 300 kilometres north of Rome, the Gothic Line, from which they would conduct their defence for the remainder of the war.

Normandy

The grand Allied strategy had, since the entry of the United States, been in one way or another to involve German in a two-front war. The hard-pressed Soviet Union became ever more insistent on this and Stalin complained bitterly when the date for the establishment of this second front was postponed. The invasion of Sicily and Italy was partially designed to force the Germans to divert divisions from the eastern front thereby relieving some pressure on the Red Army. Although the Allied operations in Italy did divert troops and material from the force pressing the Soviets, it was not enough to satisfy Stalin or to make a difference on the battlefield. Regardless, the main second front was not to be Italy, but rather in France – Operation Overlord.

The obstacles to landing in force in France were formidable. A number of these were highlighted by the Dieppe Raid of August 1942. A force of 5,000 Canadians landed at the port city of Dieppe to probe its defences. On the surface it was a disaster. Of the 5,000 Canadians and 1,000 British soldiers that landed, less than half returned. Nevertheless, the raid did teach some hard won lessons that would be employed in the planning of Overlord:

- attack open beaches rather than established ports
- attack sand beaches – tanks could not get traction on the shale beaches at Dieppe
- land the bulk of tanks after the beaches are secure
- absolute air superiority is necessary during amphibious operations
- landing craft had to be improved and operated by the navy.

An operation the size of Overlord would take unprecedented logistical planning and material build-up. The plan seemed simple enough. The United States, British and Canadian armies would attack five beaches – Omaha, Utah, Gold, Sword and Juno respectively – on the coast of France supported by paratroop drops behind German lines, and establish a beachhead into which men and material would flow in the days after the landings. From this beachhead the invasion force would break out and drive north and east, securing the coast and advance on Paris. Such an undertaking would take a level of cooperation and coordination between all three branches of three national armies. The civilian population of Britain would have to be mobilized to support the build-up that would happen there. Contact and coordination with the French resistance was necessary as was the inclusion of the **Free French** leadership. Intelligence including troop dispositions and maps of the objectives would have to be gathered. Huge amounts of material would have to be produced and stored. All of this would have to be kept secret from German intelligence. Any commander overseeing such an operation needed to be adept at logistics, diplomacy and strategy. US General Dwight Eisenhower was chosen as Supreme Commander. The British General Bernard Montgomery was given tactical command during the landings.

Free French
French soldiers and citizens who escaped occupied France and organized themselves into military formations under the leadership of Charles de Gaulle. These formations fought with the Allies against the Axis Powers.

The defences were formidable, but troubled. Rommel had been placed in command of the Atlantic Wall (as the German positions were known). He disagreed with his superior, Field Marshall von Rundstedt, on how