

Name:

Date:

Class:

Block #:

WWI Military Technologies

Objective: What was the impact of new types of Warfare and new technologies on WWI and today's world?

	Prediction How do you think this technology changed the war experience for combatants?	Primary Source Match the excerpt to the placard. (Write the primary source #)	Extra Information Add 2 to 3 pieces of new information based on the information sheet.
Flamethrower			
Machine Guns			
Artillery			
Tanks			
Trench Warfare			

Primary Source Excerpts

Excerpt 1

The enemy battle-cruisers came up very rapidly, and must have made a speed of at least 26 knots . . . The enemy had separated and formed two groups, the leading one having three, and the other two ships. They were trying to keep at the farthest firing distance . . . The enemy battlecruisers then turned at once to a northerly course to . . . turn on the *Blücher* . . . Very soon after her engines were damaged another shot caused an explosion and a fire . . . the *Blücher* was sunk.

—Manfred von Richthofen, *Der Rote Kampfflieger (The Red Fighter Pilot)*, 1917

Excerpt 2

We heard strange throbbing noises, and lumbering [moving] slowly towards us came three huge mechanical monsters such as we had never seen before . . . Big metal things they were, with two sets of caterpillar wheels that went right round the body. There was a bulge on each side with a door in the bulging part, and machine-guns on swivels poked out from either side . . . There they sat, squat [thick] monstrous things . . . crushing the sides of our trench . . . [and] with their machine-guns swiveling around and firing like mad.

—Bert Cheney, *An Account of the First Tanks in Action*, 1916

Excerpt 3

I was awakened by a terrific crash . . . I could hardly breathe . . . I was put into an ambulance and taken to the base . . . I suppose I resembled a kind of fish with my mouth open gasping for air. It seems as if my lungs were gradually shutting up and my heart pounded away in my ears like the beat of a drum. On looking at the chap next to me I felt sick, for green stuff was oozing from the side of his mouth . . . I dozed off for short periods . . . I was always surprised when I found myself awake, for I felt sure that I would die in my sleep. So little was known about treatment for various gases.

—William Pressey, *Gassed at Messines Ridge*, 1917

Excerpt 4

There's a zone
 Wild and lone
 None claim, none own,
 That goes by the name of No-Man's Land;
 Its frontiers are bastioned [defended], and wired, and mined,
 The rank [foul] grass shudders and shakes in the wind,
 And never a roof nor a tree you find
 In No-Man's Land.

—Major "H. D.'A. B.," *No-Man's Land*, exact date unknown

Excerpt 5

I had taken the position of the three [enemy] ships before submerging, and I succeeded in getting another flash [look] through my periscope before I began action. I soon reached what I regarded as a good shooting point. Then I loosed one of my torpedoes at the middle ship. I was then about twelve feet under water, and got the shot off in good shape . . . I climbed to the surface to get a sight through my tube of the effect, and discovered that the shot had gone straight and true, striking the [enemy] ship . . . There were a fountain of water, a burst of smoke, a flash of fire . . . Then I heard a roar and felt reverberations [a boom] sent through the water by the detonation [explosion]. [The enemy ship] had been broken apart, and sank in a few minutes.

—Otto Weddigen, *A Memoir of the Sinking of the Aboukir, Cressy, and Hogue by U-boat U-9*,
 1914

Excerpt 6

Our gun's crew was busy mounting the . . . gun on the parapet [walls] and bringing up extra ammunition from the dugout . . . I trained my . . . gun on their [the enemy] trench and its bullets were raking the parapet [scraping the wall]. Then over they [the Germans] came, bayonets glistening . . . they looked like some horrible nightmare. All along our trench . . . guns spoke . . . They went down in heaps, but new ones took the place of the fallen. Nothing could stop that mad rush.

—Arthur Guy Empey, *Over the Top*, 1917

Excerpt 7

It was yesterday evening, just as night fell, that it happened. The day had been fairly calm . . . and nothing forewarned us of a German attack. Suddenly one of my comrades shouted, "Hallo! what is this coming down on us? Any one would think it was petroleum [fuel]." At that time we could not believe the truth, but the liquid which began to spray on us was certainly some kind of petroleum. The Germans were pumping it from hoses . . . A few seconds later incendiary [fire-starting] bombs began to rain down on us and the whole trench burst into flame . . . the men began to scream terribly, tearing off their clothes, trying to beat out the flames . . . We had our eyebrows and eyelashes burned off, and clothes were burned in great patches and our flesh was sizzling like roasting meat.

—Philip Gibbs, "Story of the Evening of Liquid Flames," in *Soul of the War*, 1915

Excerpt 8

Last night Fritz [the Germans] put on a whale of a bombardment [attack], and I don't see how any of us escaped to tell the story. In the thick of it our communications were knocked out and I was detailed to repair the telephone line . . . Well, I thought of all the mean things I'd done in my life, breathed a little prayer, climbed out of my foxhole, and darted out . . . Flashes of exploding artillery at intervals lighted up the blackness of the night. Explosions of enemy shells on every hand and the scream of big ones going overhead to back areas added to the thunderous uproar so that I could not have heard my own voice had I dared to speak . . . I was splicing [joining] the wire when—Shriek! Bang! A ton of steel came over me.

—Corporal Elmer Sherwood, diary entry, October 30, 1918

Excerpt 9

I turned from this extraordinary spectacle in midair to witness another which in all my life at the front I have never seen equaled in horror and awfulness. The picture of it has haunted my dreams during many nights since . . . I saw that a general fight was on between the remaining ten Fokkers and the eight Spads . . . Like a flash [Lieutenant] White zoomed up . . . and made a direct plunge for the enemy machine . . . without firing a shot the heroic White rammed the Fokker head on while the two machines were approaching each other at the rate of 230 miles per hour! It was a horrible yet thrilling sight . . . Wings went through wings and at first glance both the Fokker and the Spad seemed to disintegrate. Fragments filled the air for a moment, then the two broken fusilages, bound together by the terrific collision fell swiftly down and landed in one heap on the bank of the Meuse [River]!

—Eddie Rickenbacker, *Fighting the Flying Circus*, 1919

Aviation and Aircraft of WWI

World War I was the first major war where airplanes were used as a significant part of the military. The airplane was invented by the Wright Brothers in 1903, just 11 years before the start of World War I. When the war first began, aircraft played a small role in warfare, but, by the end of the war, the air force had become an important branch of the armed forces.

The first use of airplanes in World War I was for reconnaissance. The airplanes would fly above the battlefield and determine the enemy's movements and position. One of the first major contributions of airplanes in the war was at the First Battle of the Marne where Allied reconnaissance planes spotted a gap in the German lines. The Allies attacked this gap and were able to split the German armies and drive them back.

As the war progressed, both sides began to use aircraft to drop bombs on strategic enemy locations. The first planes used for bombings could only carry small bombs and were very vulnerable to attack from the ground. By the end of the war, faster long-range bombers were built that could carry a much larger weight of bombs.

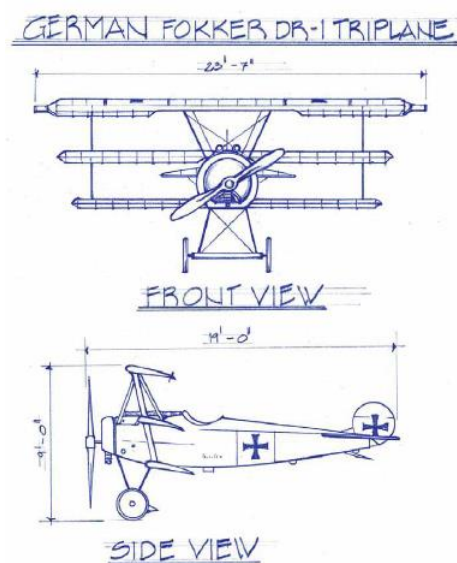
With more planes taking to the skies, enemy pilots began to fight each other in the air. At first, they tried throwing grenades at each other or shooting with rifles and pistols. This did not work very well. With the invention of mounted machine guns, pilots engaged in dogfights or air fights

When the war first started, the planes were just regular planes without any military markings. Unfortunately, ground troops would try to shoot down any plane they saw and sometimes shot down their own plane. Eventually, countries began to mark their planes under the wing so that they could be identified from the ground.

Citation:

Nelson, Ken. " World War I for Kids: Aviation and Aircraft of WWI ." Ducksters. Technological Solutions, Inc. (TSI), Nov. 2018. Web. 13 Nov. 2018.

<https://www.ducksters.com/history/world_war_i/aviation_and_aircraft_of_ww1.php >.



Artillery

Artillery consisted of the military's heavy firearms. As a branch of the armed forces, its purpose was to fire explosive-filled projectiles across relatively large distances. In contrast to the infantry and the cavalry, the artillery could not enter into combat on its own. By the same token, other weapons required artillery support in order to be effective in battle.

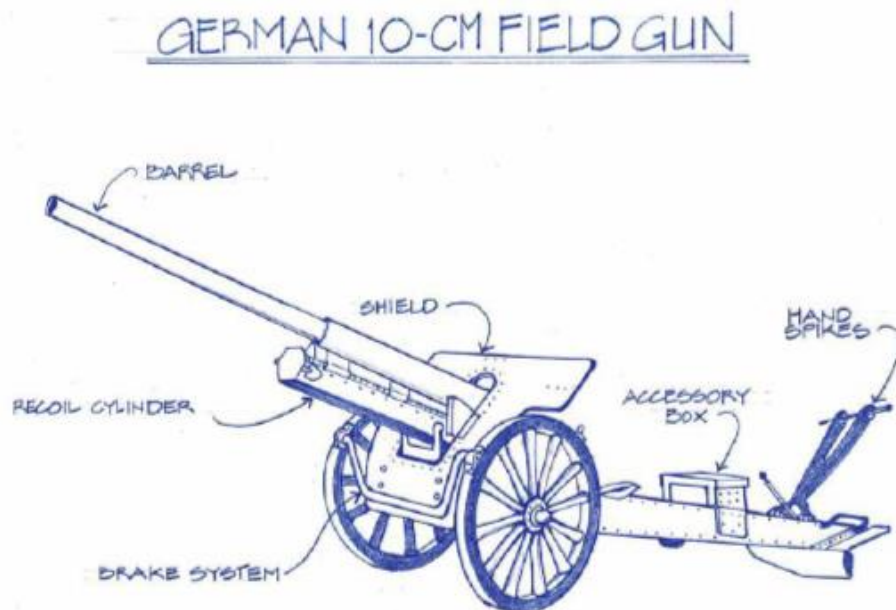
Artillery is divided, technologically and tactically, into light and heavy artillery. Light artillery was generally referred to as "field artillery" and intended for mobile warfare, which was the norm until 1914. The artillery's weaponry needed to be transportable. This required that it be able to bear up under long marches and cope with difficult terrain. Heavy artillery included heavy mortar fire. This encompassed special guns with calibers of over thirty centimeters that were utilized for fighting against modern armored turret fortifications.

In 1914, mobile warfare largely came to a standstill within several weeks and transformed into trench warfare. As a result, siege warfare became the norm. The importance of heavy artillery increased to the degree that field fortifications were driven deeper into the ground vertically and structured with greater complexity horizontally. Light artillery was supplemented - not replaced - by heavy artillery. Small guns with rapid rates of fire continued to be indispensable for many artillery-related tasks. In the First World War, the German field artillery is said to have fired 222 million rounds.

Besides the actions of small, raiding patrols, every military operation in the First World War required massive artillery support if there was to be any hope of success. In mobile warfare, most soldiers were killed or wounded by infantry fire. By contrast, in trench warfare, the artillery was responsible for 75 percent of the known casualties. During the war, the artillery not only experienced considerable growth in absolute numbers, but also in terms of its relative share of the entire army. This is demonstrated by the example of the French military: In 1914, artillery-men made up 20 percent of the army; in 1918, it was 38 percent.

Citation

Storz, Dieter: Artillery , in: 1914-1918-online. International Encyclopedia of the First World War, ed. by Ute Daniel, Peter Gatrell, Oliver Janz, Heather Jones, Jennifer Keene, Alan Kramer, and Bill Nasson, issued by Freie Universität Berlin, Berlin 2014-12-16. DOI: 10.15463/ie1418.10510. Translated by: Reid, Christopher



Battleships

The naval arms race between Britain and Germany (along with smaller naval arms races between other European powers) was precipitated by a new ship, the HMS Dreadnought, which revolutionized naval weaponry. Her size, armor, and firepower essentially made every other ship in the world obsolete when she entered service in 1906. In fact, “dreadnought” soon became shorthand for any battleship built along similar specifications, as well as a unit of measure for comparing naval strength and building programs -- with endless attention paid to how many dreadnoughts each navy would boast by a certain point in the future.

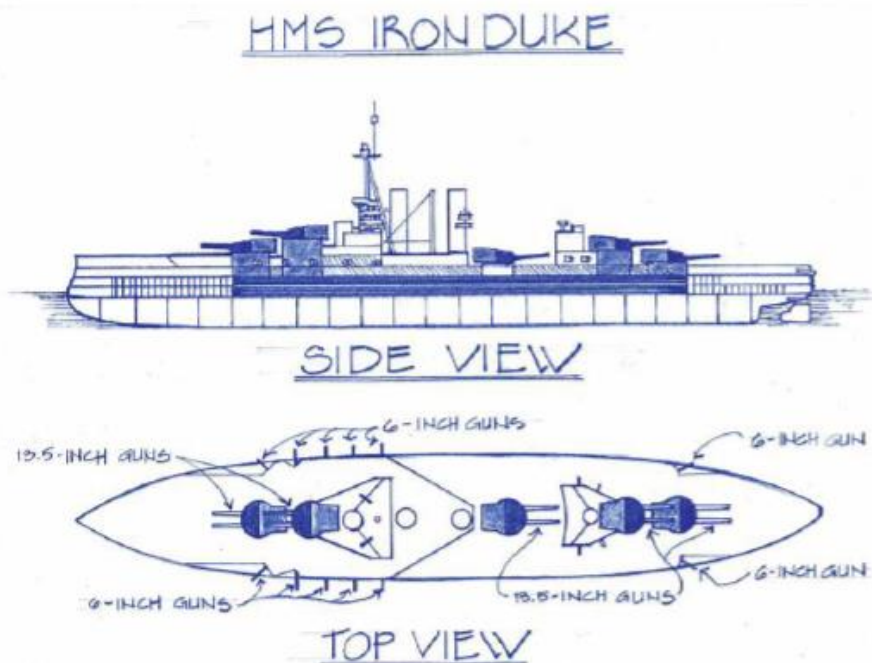
Of course, none of this meant that dreadnoughts represented a final, definitive stage in naval design; as in any kind of arms race, you could always go bigger and better. Thus when Britain found its naval dominance challenged by Germany’s own naval construction program (which envisioned, by 1916, a High Seas Fleet composed of three active battle squadrons, including 25 dreadnoughts and eight battle cruisers, versus 28 dreadnoughts and nine battle cruisers for the Royal Navy), the Brits took the competition to the next level.

On June 19, 1912, the Royal Navy Admiralty, headed by First Lord Winston Churchill, approved the design for a new, even bigger battleship, called the “Queen Elizabeth” class after the HMS Queen Elizabeth, the first ship in the series. These “super-dreadnoughts” boasted guns capable of lobbing a 1,920-pound explosive shell, measuring 15 inches in diameter, to a range of 18.5 miles; by comparison, the 13.5-inch guns carried by the previous intermediate (“Iron Duke”) class of dreadnoughts could send a 1,400-pound shell to a distance of 13.5 miles. The Admiralty initially planned to build four of these monsters, with the first scheduled to launch in 1913.

Thanks to the influence of a key Churchill advisor, the (temporarily) retired Admiral Jackie Fisher, the new Queen Elizabeth class battleships would also be powered by oil rather than coal, allowing them to go faster than their coal-powered predecessors and rivals, with a maximum speed of 24 knots (27.6 miles per hour) versus 21.25 knots (24.4 mph) for the Iron Dukes.

Citation:

“World War I Centennial: Even Bigger Battleships.” *Mental Floss*, 19 June 2012, mentalfloss.com/article/30963/world-war-i-centennial-even-bigger-battleships.



Flamethrower

The flamethrower, which brought terror to French and British soldiers when used by the German army in the early phases of the First World War in 1914 and 1915 (and which was quickly adopted by both) was by no means a particularly innovative weapon.

The basic idea of a flamethrower is to spread fire by launching burning fuel. The earliest flamethrowers date as far back as the 5th century B.C. The flamethrower was inevitably refined over the intervening centuries, although the models seen in the early days of World War One were developed at the turn of the 20th century. The smaller and lighter flamethrower was designed for portable use, carried by a single man. Using pressurised air and carbon dioxide or nitrogen it belched forth a stream of burning oil for as much as 18 metres. The second, larger model worked along the same lines but was not suitable for transport by a single person, but whose maximum range was twice that of the smaller model; it could also sustain flames for a (then) impressive forty seconds, although it was decidedly expensive in its use of fuel.

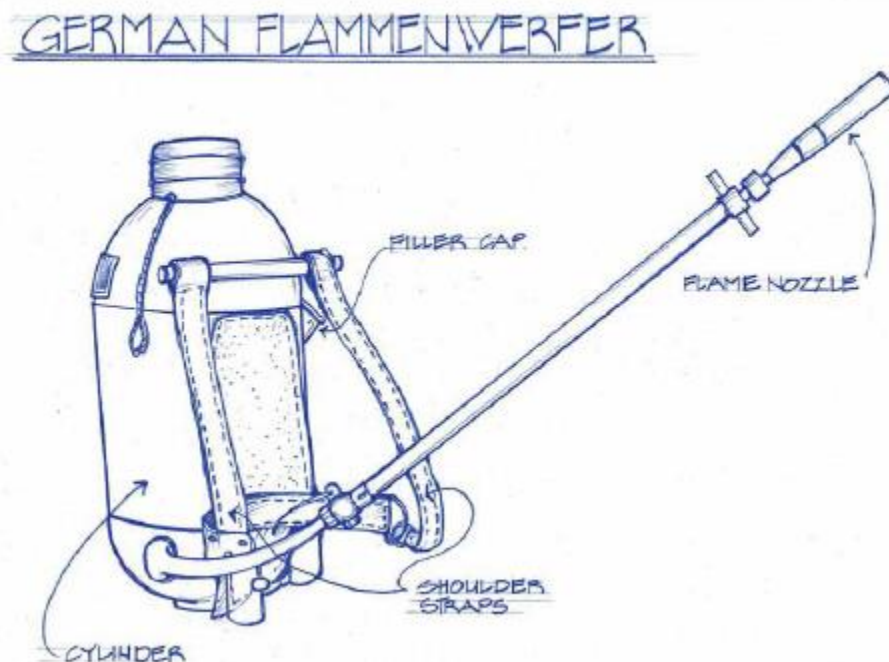
It was put to initial wartime use against the French in the south-eastern sector of the Western Front from October 1914, although its use was sporadic and went largely unreported. They were undeniably useful when used at short-range, but were of limited wider effectiveness, especially once the British and French had overcome their initial alarm at their use.

The operators of flamethrower equipment also lived a most dangerous existence. It was entirely feasible that the cylinder carrying the fuel might unexpectedly explode. They were marked men; the British and French poured rifle-fire into the area of attack where flamethrowers were used, and their operators could expect no mercy should they be taken prisoner. Their life expectancy was therefore short.

By the close of the war flamethrower use had been extended to use on tanks, a policy carried forward to World War Two. Flame-throwing equipment, albeit somewhat refined, continues in use to the present day.

Citation

Duffy, Micheal. "Weapons of War - Flamethrowers." First World War.com - Weapons of War: Machine Guns, 22 Aug. 2009, www.firstworldwar.com/weaponry/flamethrowers.htm.



Machine Guns

On July 1, 1916, whistles blew in the British trenches near the Somme River on the Western Front. It was the sign for men in the trenches to “go over the top.” Soldiers climbed up and over the makeshift walls, kicking soccer balls and carrying walking sticks, confident their artillery had drummed the German lines into submission. German machine-gun posts lay in wait.

At the end of the first hour, some 50% of the “first wave” of the British attack were dead or injured. By day’s end, more than 20,000 British soldiers were dead on the battlefield. One German machine-gunner was recorded as saying there hadn’t even been a need to aim.

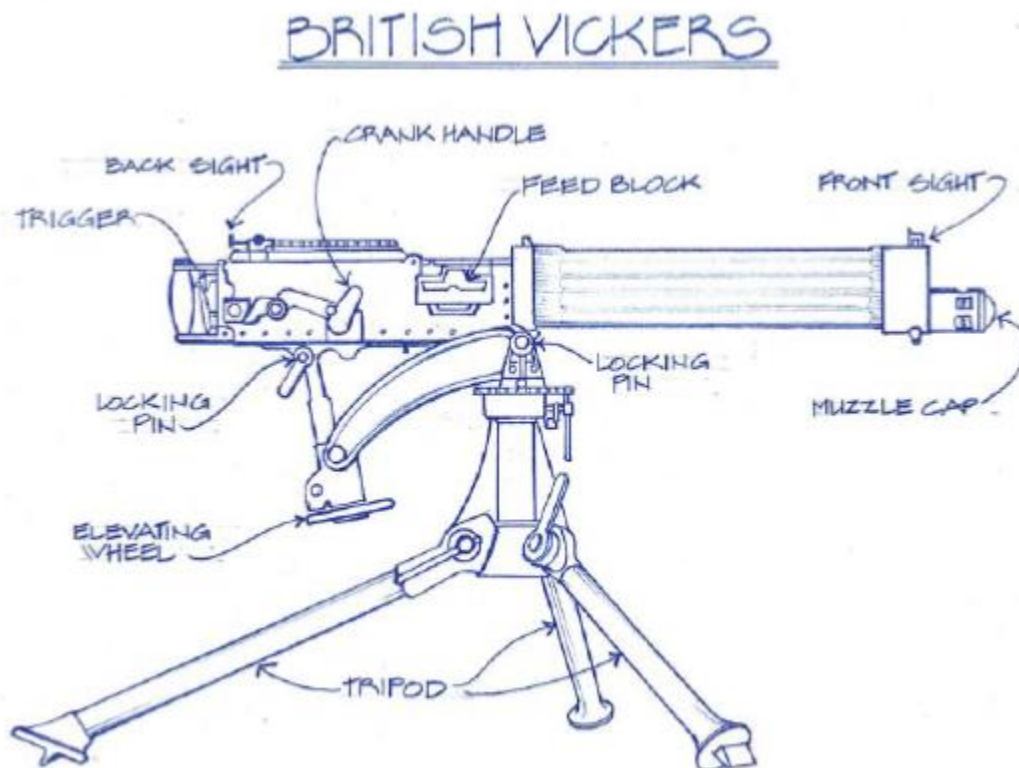
The machine gun’s ability to mow down enemies quickly and in great numbers forever changed the face of modern warfare. The weapon was invented in the 1800s, and early versions were used in the U.S. Civil War. But it wasn’t until World War I that the weapon came into its own, as mechanized slaughter took place on a scale scarcely imagined before.

Early machine guns were hand-powered, not automatic, but they provided a gateway for what was to dominate 20th-century battlegrounds. By World War I, machine guns were fully automatic weapons that fired bullets rapidly, up to 450 to 600 rounds a minute. By 1914, German forces had 12,000 machine guns, compared with a few hundred between the French and British.

Over the next century, new designs made machine guns an ever-present part of war. In the form of lightweight portable versions carried by infantry, or of heavy guns mounted on ships and planes, the machine gun has become a commonplace battlefield weapon.

Citation:

Patnaude, Art. “World War I Centenary: Machine Guns.” *The Wall Street Journal*, Dow Jones & Company, 28 June 2014, graphics.wsj.com/100-legacies-from-world-war-1/machine-guns.



Poison Gas

On April 22, 1915, German forces shock Allied soldiers along the western front by firing more than 150 tons of lethal chlorine gas against two French colonial divisions at Ypres, Belgium. This was the first major gas attack by the Germans, and it devastated the Allied line.

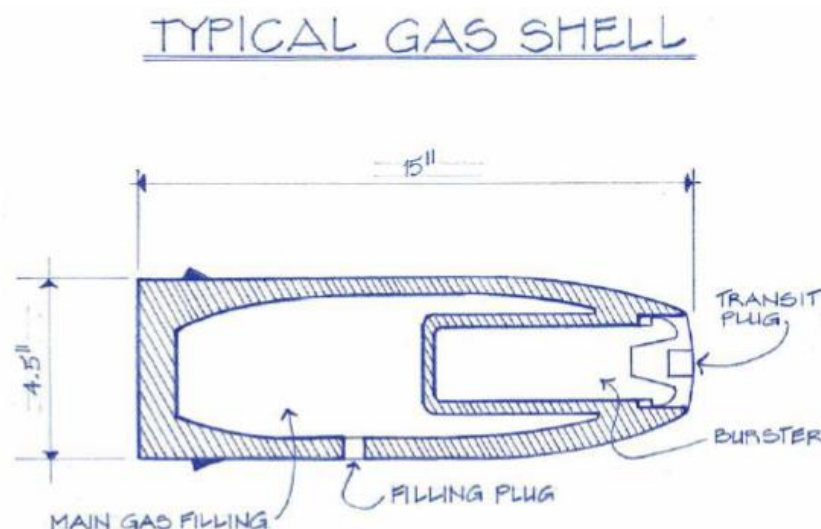
Toxic smoke has been used occasionally in warfare since ancient times, and in 1912 the French used small amounts of tear gas in police operations. At the outbreak of World War I, the Germans began actively to develop chemical weapons. On April 22, 1915, the Germans launched their first and only offensive of the year. Known as the Second Battle of Ypres, the offensive began with the usual artillery bombardment of the enemy's line. When the shelling died down, the Allied defenders waited for the first wave of German attack troops but instead were thrown into panic when chlorine gas wafted across no-man's land and down into their trenches. The Germans targeted four miles of the front with the wind-blown poison gas and decimated two divisions of French and Algerian colonial troops. The Allied line was breached, but the Germans, perhaps as shocked as the Allies by the devastating effects of the poison gas, failed to take full advantage, and the Allies held most of their positions. The introduction of poison gas, however, would have great significance in World War I.

Immediately after the German gas attack at Ypres, France and Britain began developing their own chemical weapons and gas masks. With the Germans taking the lead, an extensive number of projectiles filled with deadly substances polluted the trenches of World War I. Mustard gas, introduced by the Germans in 1917, blistered the skin, eyes, and lungs, and killed thousands. Military strategists defended the use of poison gas by saying it reduced the enemy's ability to respond and thus saved lives in offensives. In reality, defenses against poison gas usually kept pace with offensive developments, and both sides employed sophisticated gas masks and protective clothing that essentially negated the strategic importance of chemical weapons.

In all, more than 100,000 tons of chemical weapons agents were used in World War I, some 500,000 troops were injured, and almost 30,000 died, including 2,000 Americans. In the years following World War I, Britain, France, and Spain used chemical weapons in various colonial struggles, despite mounting international criticism of chemical warfare. In the 1930s, Italy employed chemical weapons against Ethiopia, and Japan used them against China. In World War II, Germany did use poison gas to murder millions in its extermination camps.

Citation:

"Germans Introduce Poison Gas." Edited by History.com Editors, *History.com*, A&E Television Networks, 21 Aug. 2018, www.history.com/this-day-in-history/germans-introduce-poison-gas.



Submarine and Submarine Warfare

During the First World War the German government made extensive use of submarines, initially against warships and then, as the war progressed, most heavily against merchant shipping. However, the sinking of neutral merchantmen eventually led to diplomatic crises with neutral nations and to war between Germany and the United States.

Ironically the nation that would become synonymous with submarine warfare put comparatively little effort into building their submarine arm in the years before the First World War. The Germans did develop submarines in the years before the war but they only possessed twenty-eight of them when war broke out in 1914.

The German government gave its submariners permission to attack enemy, and neutral shipping without adhering to rules. In particular, they were encouraged to attack their targets without warning. This came to be known as unrestricted submarine warfare, and a campaign was launched on 4 February 1915.

The foreign reaction to the German campaign was resoundingly negative. The most significant neutral was the United States. The sinking of the British passenger liner *Lusitania* happened in April 1915, just three months into the campaign. That sinking led to strong American protests against the submarine campaign.

Unrestricted submarine warfare resumed on 1 February 1917. Now, with roughly thirty submarines at sea at a time, the Germans enjoyed enormous success. The submarines had reached their goal but the British had not surrendered; indeed, the campaign added the United States to Germany's list of enemies.

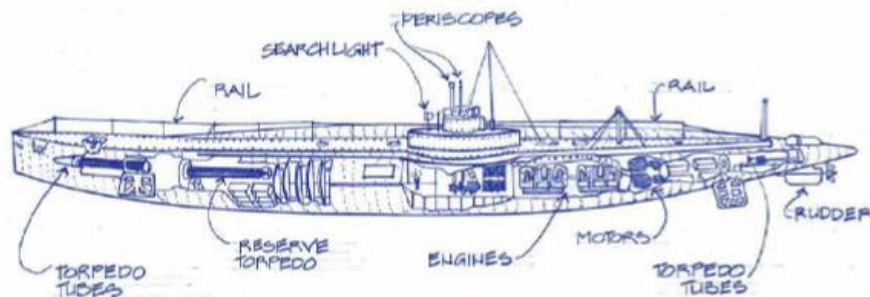
The Germans used primarily three types of submarines during the war, the U-boat, large fleet boats, and two smaller classes, the UB and UC boats. All of these craft developed over the course of the war as experience led to changes in design.

In the end the German submarines had an enormous impact on the war. Over the course of the war German submarines sank 6,394 ships. In exchange they lost 229 submarines. Despite that enormous level of damage and the hopes invested in them by the German government, the submarines of World War One lacked the ability to win the war.

Citation

Karau, Mark D.: Submarines and Submarine Warfare , in: 1914-1918-online. International Encyclopedia of the First World War, ed. by Ute Daniel, Peter Gatrell, Oliver Janz, Heather Jones, Jennifer Keene, Alan Kramer, and Bill Nasson, issued by Freie Universität Berlin, Berlin 2017-07-24. DOI: 10.15463/ie1418.11131.

GERMAN SUBMARINE U9



Tanks

World War I introduced new technologies and doctrine in a quest to overcome the tactical stalemate of the trenches. The first tanks had great potential that would be capitalized upon during the next world war, but early models suffered from design flaws and lack of doctrine for their use on the battlefield.

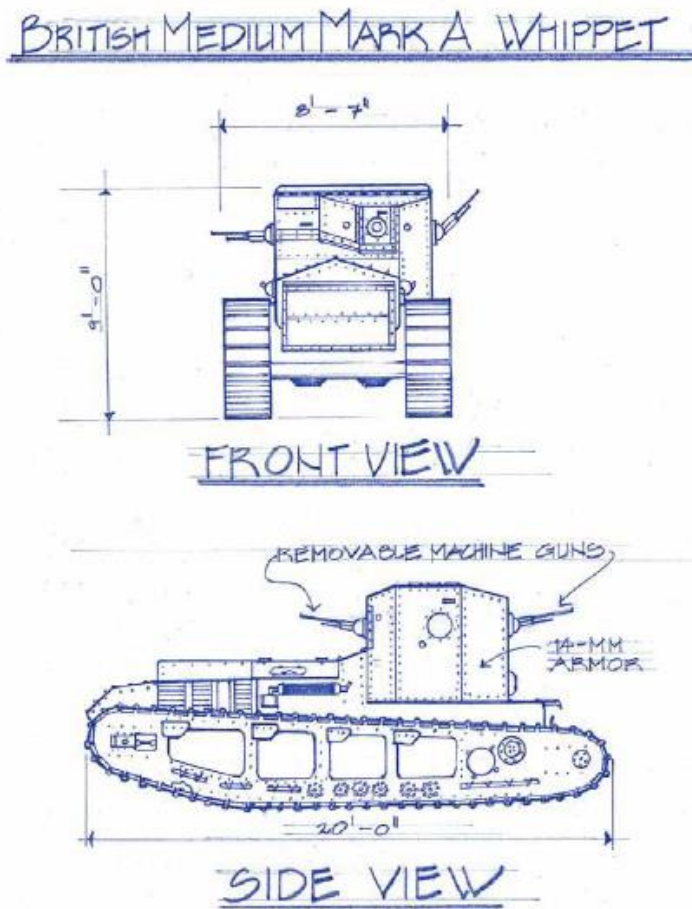
Tanks are armored vehicles designed to combine the military factors of fire, maneuver and protection. Although the concept of armored vehicles preceded the Great War, the tank was specifically developed to overcome the stalemate of trench warfare on the Western Front.

The first tanks introduced in 1916 were generally slow and hard to maneuver, and they performed poorly in rugged terrain. The early models were heavily influenced by commercial tractors. While impervious to barbed wire, small arms, and shrapnel, their primitive armor was still susceptible to heavy machine gun fire and direct hits from high explosive artillery rounds. Most tanks typically had two versions: “male” tanks designed with artillery to attack fortified positions and “female” models armed with machine guns to target enemy infantry.

Although the Allies maintained a significant numerical advantage in tanks over Germany, the new weapon was not the decisive factor in the outcome of the war. It is true that tanks achieved small tactical gains in some instances, but limited capabilities and a lack of doctrine prevented the tank from becoming the key to Allied victory on the World War I battlefield.

Citation

Kennedy, Michael David: Tanks and Tank Warfare , in: 1914-1918-online. International Encyclopedia of the First World War, ed. by Ute Daniel, Peter Gatrell, Oliver Janz, Heather Jones, Jennifer Keene, Alan Kramer, and Bill Nasson, issued by Freie Universität Berlin, Berlin 2016-05-17. DOI: [10.15463/ie1418.10905](https://doi.org/10.15463/ie1418.10905).



Trench Warfare

Trench warfare is a type of fighting where both sides build deep trenches as a defense against the enemy. These trenches can stretch for many miles and make it nearly impossible for one side to advance. During World War I, the western front in France was fought using trench warfare. By the end of 1914, both sides had built a series of trenches that went from the North Sea and through Belgium and France. As a result, neither side gained much ground for three and a half years from October 1914 to March of 1918.

The trenches were dug around twelve feet deep into the ground by soldiers. The trenches weren't dug in one long straight line, but were built as more of a system of trenches. They were dug in a zigzag pattern and there were many levels of trenches along the lines with paths dug so soldiers could travel between the levels.

The trenches were not nice, clean places. They were actually quite disgusting. There were all sorts of pests living in the trenches including rats, lice, and frogs. The rats were everywhere and got into the soldiers' food and ate just about everything, including sleeping soldiers. The lice were also a major problem. They made the soldiers' itch horribly and caused a disease called Trench Fever.

The weather also contributed to rough conditions in the trenches. Rain caused the trenches to flood and get muddy. Mud could clog up weapons and make it hard to move in battle. Also, the constant moisture could cause an infection called Trench Foot that, if untreated, could become so bad that a soldier's feet would have to be amputated. Cold weather was dangerous, too. Soldiers often lost fingers or toes to frostbite and some died from exposure in the cold.

The land between the two enemy trench lines was called "No Man's Land." This land was sometimes covered with barbed wire and land mines. The enemy trenches were generally around 50 to 250 yards apart.

Citation

Nelson, Ken. " World War I for Kids: Trench Warfare ." Ducksters. Technological Solutions, Inc. (TSI), Nov. 2018. Web. 13 Nov. 2018. < https://www.ducksters.com/history/world_war_i/trench_warfare.php >.

