The Smithsonian and the *Enola Gay*
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The Atomic Bomb

The Manhattan Project
Spurred on by German success in splitting the atom and fearing the Germans would develop a nuclear bomb first, US scientists had been working toward an atomic weapon since 1939. They pursued two approaches to creating fissionable material, one to extract U-235 nuclear fuel from natural uranium (U-238) and the other to produce plutonium. Both approaches would be successful.

In 1942, the program was transferred to the Army Corps of Engineers and designated the "Manhattan Project," taking its name from the Corps's Manhattan Engineer District. Col. Leslie R. Groves—later a major general—was appointed as director.

Plants at Oak Ridge, Tenn., and Hanford, Wash., produced the U-235 and the plutonium. At the University of Chicago, Enrico Fermi and his team succeeded in generating the world's first controlled nuclear chain reaction. Scientists and engineers at Los Alamos, N.M., headed by physicist J. Robert Oppenheimer, worked on designing and building an atomic bomb.

Los Alamos tried two possible designs, a bulbous 10-foot bomb called "Fat Man" and a long, skinny 17-foot bomb called "Thin Man." Eventually, Thin Man was canceled in favor of a shorter design dubbed "Little Boy."

The program was ready for testing by 1945, but there was only enough U-235 for one bomb, so the test bomb—known as "the gadget"—was a plutonium device, similar to "Fat Man," the bomb that would be dropped on Nagasaki. The "gadget" was tested successfully at the "Trinity" site in the New Mexico desert, July 16, 1945.

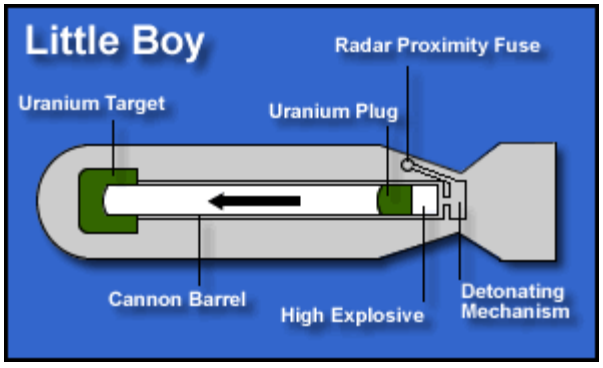
Los Alamos produced two operational bombs: "Little Boy," the uranium bomb dropped on Hiroshima, and the "Fat Man" plutonium bomb used at Nagasaki.

	Little Boy	Fat Man
Weight	9,700 lb.	10,800 lb.
Length	10 ft.	10 ft. 8 in.
Diameter	28 in.	60 in.
Fuel	enriched uranium	enriched plutonium
Detonation	gun type	implosion
Explosive Force	15,000 tons TNT	21,000 tons TNT

Although the explosive power of Fat Man was greater than that of Little Boy, the damage was less extensive because of the hilly terrain around Nagasaki.

Sources: The Manhattan Project Heritage Preservation Association; National Museum of the US Air Force

Little Boy
Little Boy was anything but "little." It weighed almost 10,000 pounds. On Tinian, the B-29 was pulled astraddle a loading pit and the bomb was hoisted into the bomb bay of the aircraft with a hydraulic lift.

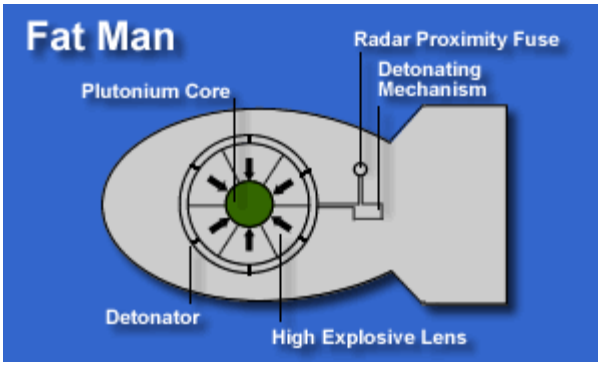


Little Boy was the only nuclear weapon to use uranium as the fissionable material. It was simpler, but also less efficient, than implosion bombs, like Fat Man.

It was detonated by a mechanism that resembled a cannon. At the muzzle was the "target," a hollowed-out subcritical mass of uranium. The "cannon ball" was another subcritical mass of uranium, a perfect fit to plug the hollow of the target. The plug was propelled down the cannon barrel by several thousand pounds of high explosive. When it hit, the combination of compression and increased mass pushed the uranium to the supercritical level and the bomb went off.

The *Enola Gay* weaponeer, Navy Capt. Deak Parsons, was concerned about taking off with Little Boy fully assembled and live. Some heavily loaded B-29s had crashed on takeoff from Tinian. If that happened to the *Enola Gay,* the bomb might explode and wipe out half the island. Thus, Parsons, assisted by Lt. Morris Jeppson, finished the assembly and armed the bomb in the bomb bay after takeoff.

Fat Man
The Nagasaki bomb worked on the basis of implosion, as did the "gadget" test device at Trinity. Fat Man had a core of plutonium at subcritical mass in the center of a sphere, surrounded by 64 precisely-timed high explosive charges. Upon detonation, the high explosive compressed the plutonium core from the size of a grapefruit to the size of tennis ball, achieving supercritical mass and inducing the nuclear explosion.



Fat Man was too complex to arm in flight. *Bockscar* took off with the bomb fully armed.

Further Reading

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WHEELER, Keith. *The Fall of Japan.* Time-Life Books, 1983.