Applications: Nuclear Weapons
What is a nuclear bomb?

- *fission* ("atomic") or *fission and fusion* ("hydrogen" / "thermonuclear") device

- Massive amounts of energy release (we’ll visualize later)
The origins of nuclear weapons

- Leo Szilard and Albert Einstein write a letter to Franklin D. Roosevelt in 1939
Yours very truly,

[Signature]  

[Albert Einstein]
The origins of nuclear weapons

- Leo Szilard and Albert Einstein write a letter to Franklin D. Roosevelt in 1939

- 1941 - start of Manhattan Project

- First use:
“Little Boy” detonated over Hiroshima.

Image courtesy of the National Archives and Records Administration. Source: Wikimedia Commons. This image is in the public domain.
“Fat Man” detonated over Nagasaki.

Image courtesy of the National Museum of the U.S. Navy. Source: Wikimedia Commons. This image is in the public domain.
Development and testing

▶ Desert Rock Tests, 1951-1957 (link)

▶ “downwinders”

▶ Castle Bravo Test, 1954 (link)

▶ End of (most) open air testing in 1963 (France 1974, China 1980)
  ▶ 1963 Partial Test-Ban Treaty
Proliferation

“A Chain Reaction of Proliferation,” New York Times, December 9, 2008. © The New York Times Company. All rights reserved. This content is excluded from our Creative Commons license. For more information, see https://ocw.mit.edu/help/faq-fair-use/.

Development of nuclear doctrine and strategy

- 1945-1949: Discussions about UN control of nuclear weapons
- 1949: USSR tests its first weapon in Kazakhstan
- 1950s: Many believed that nuclear weapons use in war would be relatively common.
- 1957: First ICBMs
- 1962: Cuban missile crisis
- 1960s: Mutually Assured Destruction (MAD)
- 1980s: development of Submarine launched ballistic missiles (SLBMs)
- 1991: Collapse of Soviet Union ends the Cold War
- Present: Strategy of potential nuclear powers is unclear.
Consequences of Nuclear War

Nuke map (link)
Consequences of Nuclear War

1990: FEMA-estimated primary counterforce targets for Soviet ICBMs.
Controversy: Is proliferation good or bad?
17.41 Introduction to International Relations
Spring 2023

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