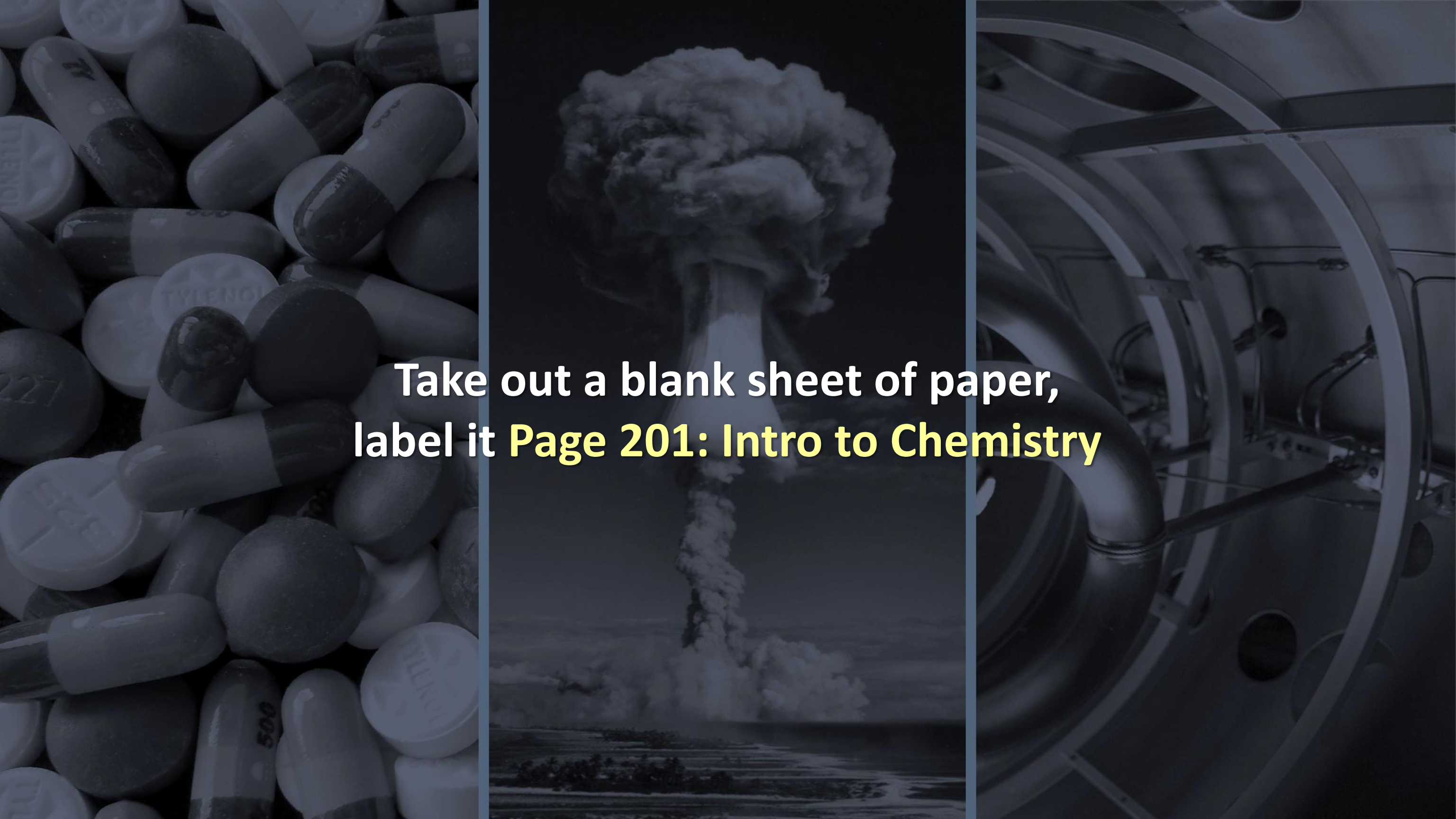




Unit 2: Basic Chemistry



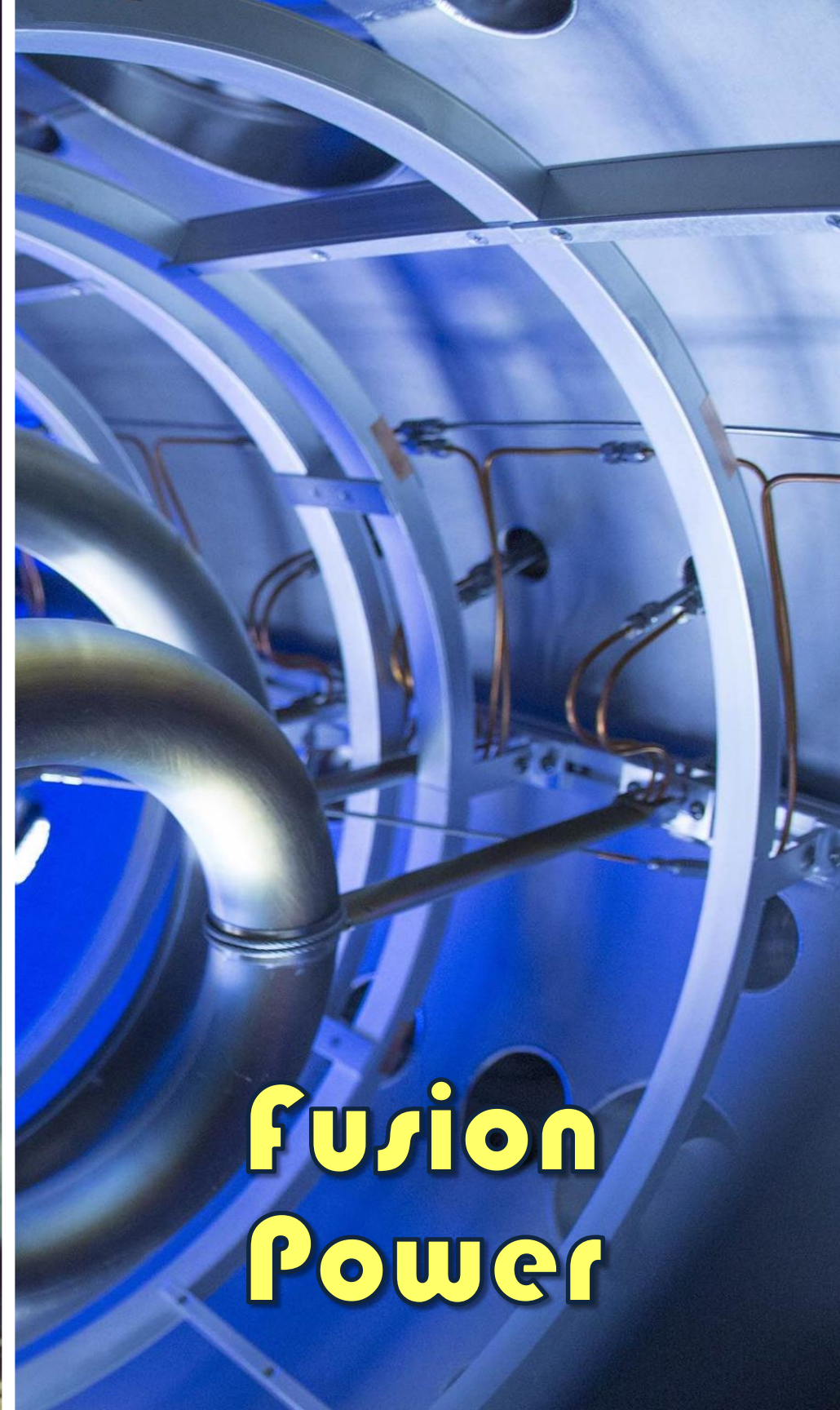
Take out a blank sheet of paper,
label it **Page 201: Intro to Chemistry**



**Modern
Medicine**



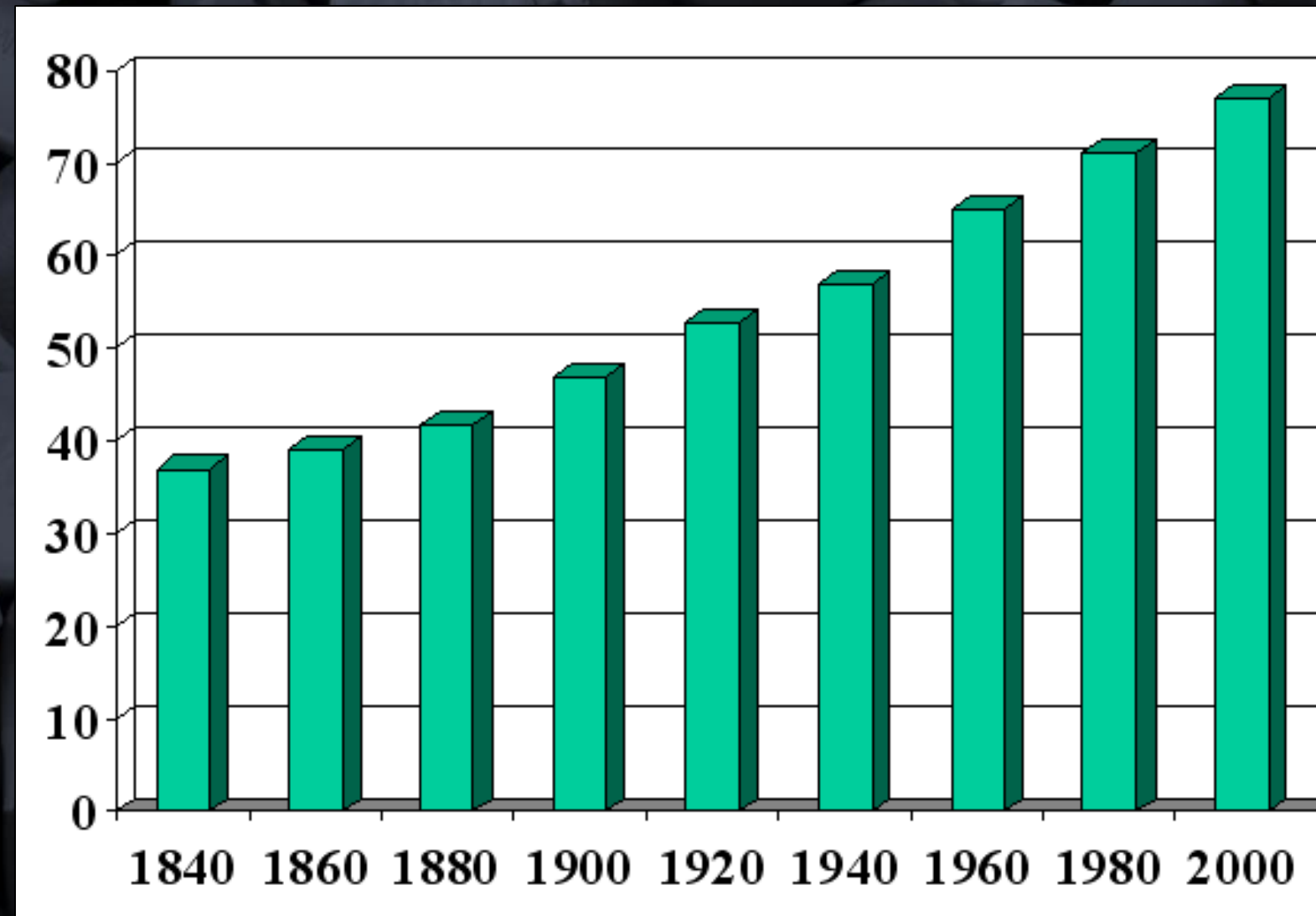
**Atomic
Bomb**



**Fusion
Power**

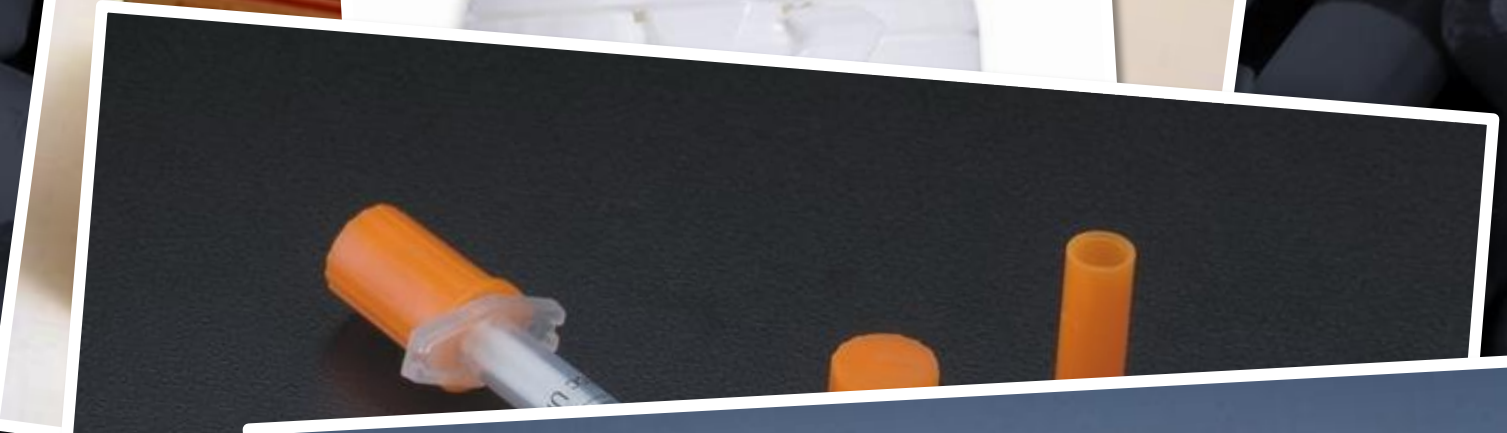
Modern Medicine

- In medieval times, the human life expectancy at birth was 30 years. Among those who made it to adulthood, the life expectancy was 43.
- 1846 – William Morton develops first anesthetic (ether) for surgery.
- 1854 – John Snow uses chlorine for the first time to purify water.
- 1923 – Insulin first isolated to be used as a cure for diabetes.
- 1928 – Alex Fleming discovers penicillin, the first antibiotic.



Modern m

- 1846 – William Morton develops first anesthetic (ether) for surgery.
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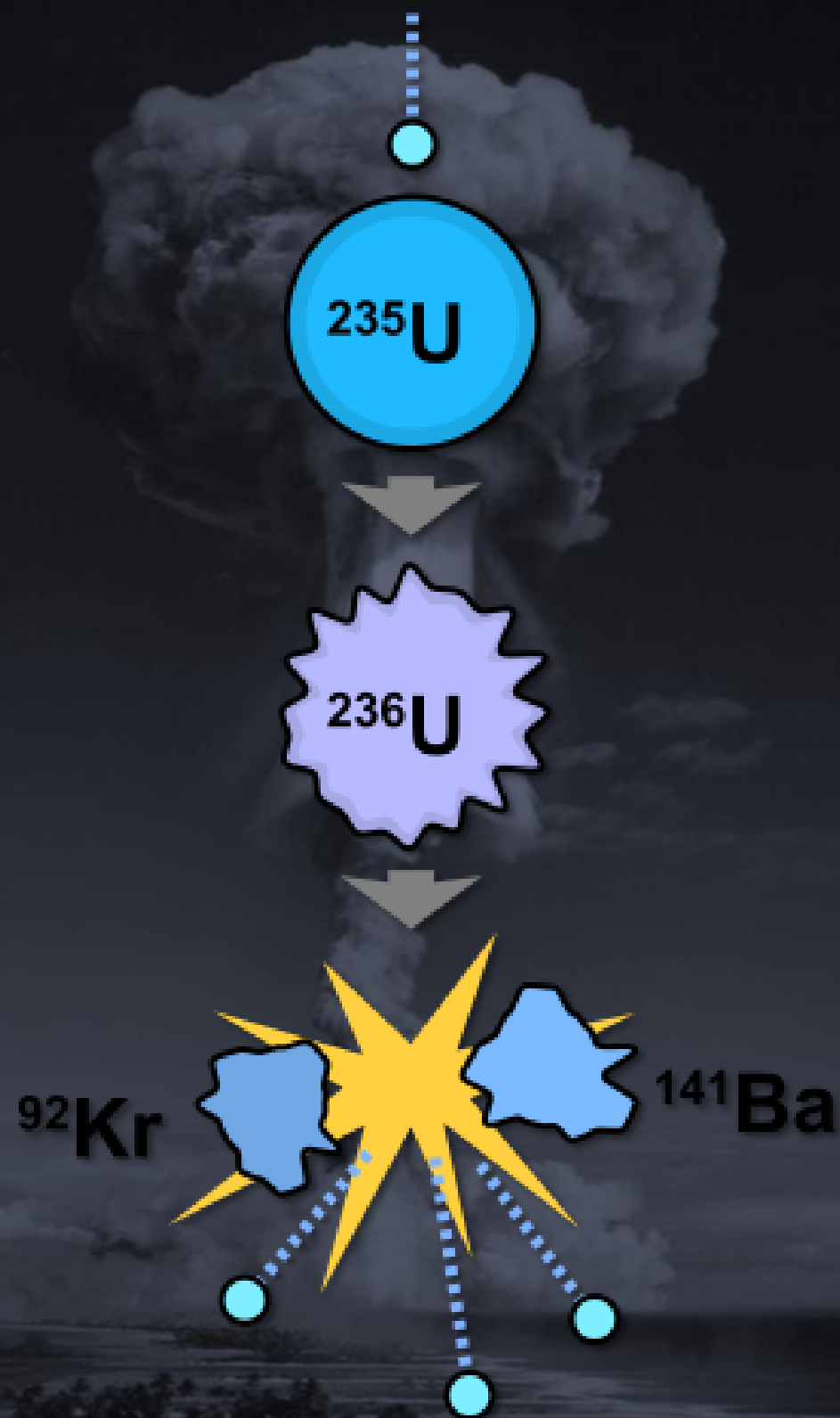
On **Page 201**, summarize how chemistry has changed modern medicine.



The History of the Atomic Bomb

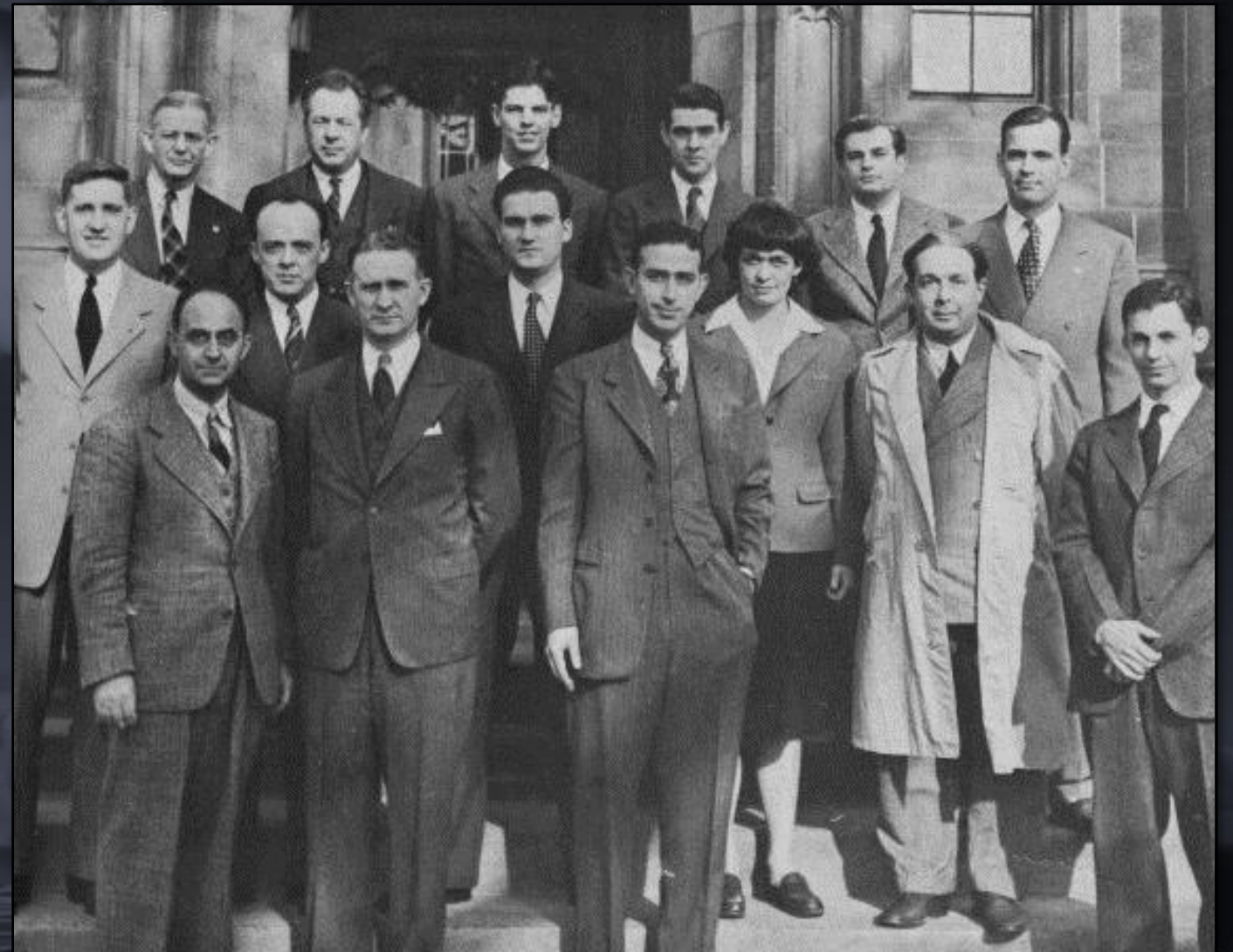
- In 1911, scientists began experimenting with the atom (exposing them to radiation, shooting protons and neutrons at them, etc.)
- By 1938, Hann and Strassman, two German scientists, discovered that by shooting neutrons at large atoms like Uranium, you could force them to break into pieces and release energy.
- Their discovery was published in 1938, just prior to the start of World War II.

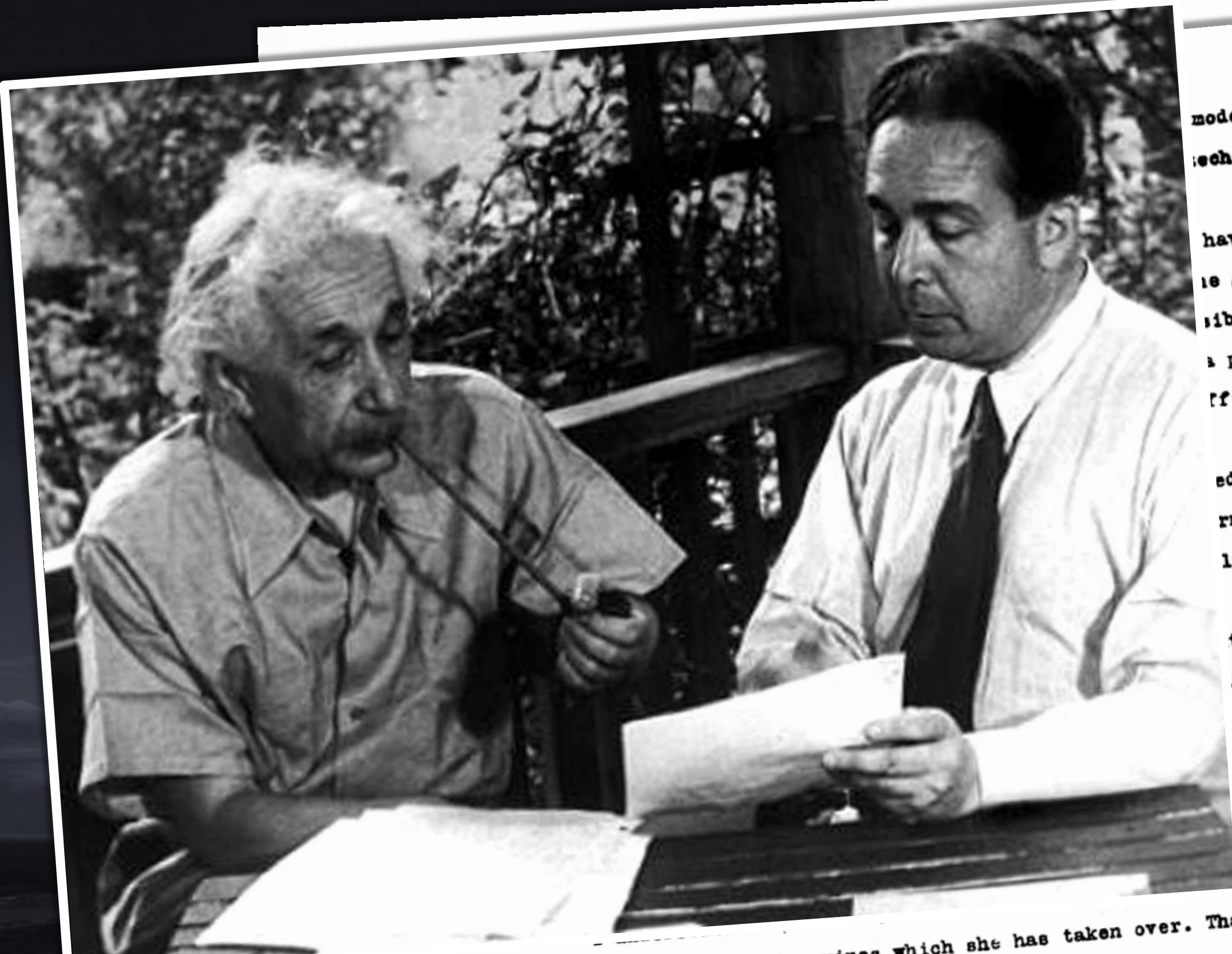




The History of the Atomic Bomb

- In 1939, American scientist Leo Szilárd thought of using nuclear fission as a weapon. A chain reaction of splitting atoms, he thought, could produce an unimaginable release of energy.
- With the Nazi Party gaining strength, on the brink of World War II, Szilárd urged his two friends (**Enrico Fermi and Frédéric Joliot-Curie**) not to publish their research into nuclear chain reactions.
- Enrico Fermi heeded his request, Frédéric Joliot-Curie did not.





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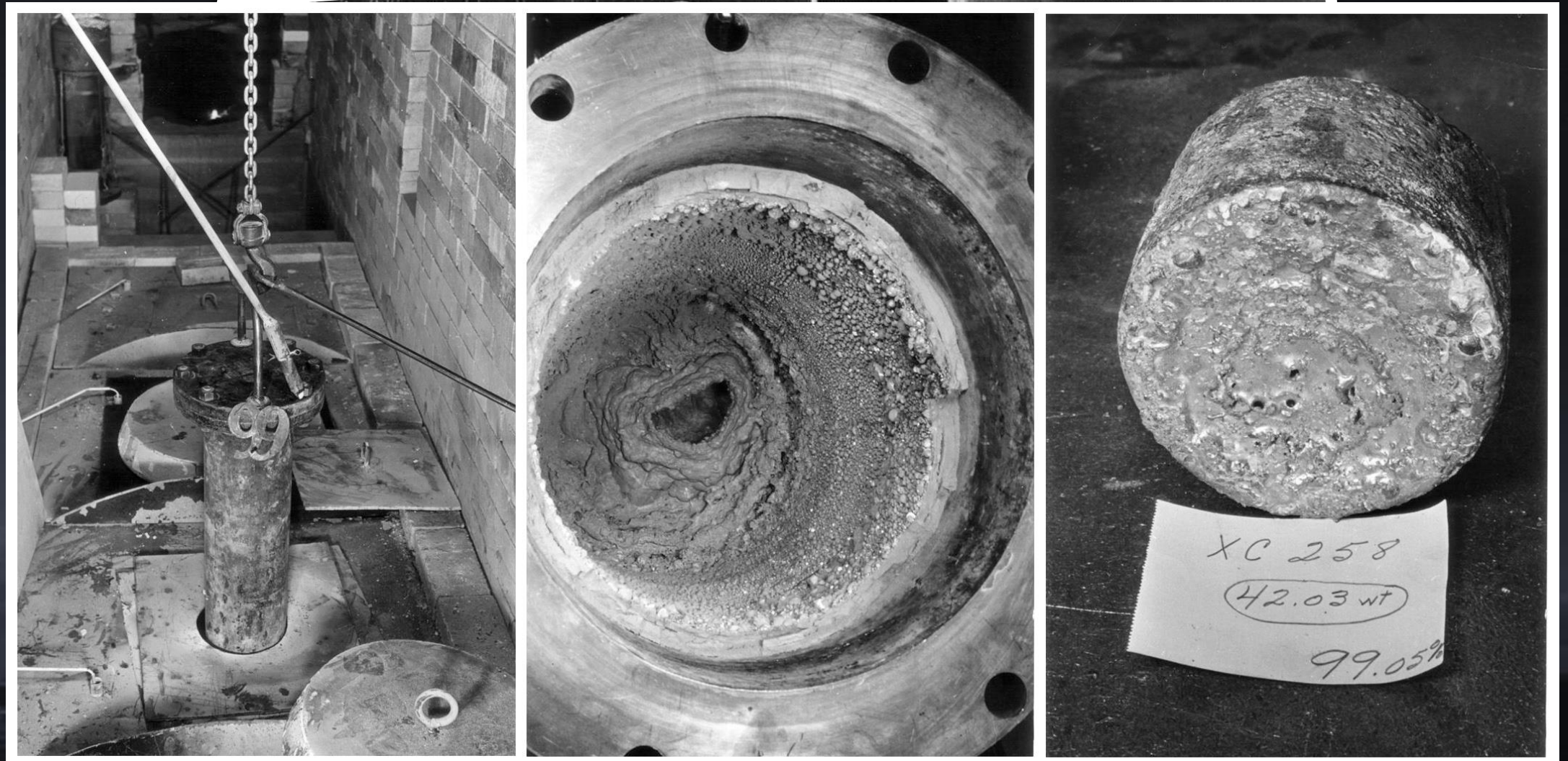
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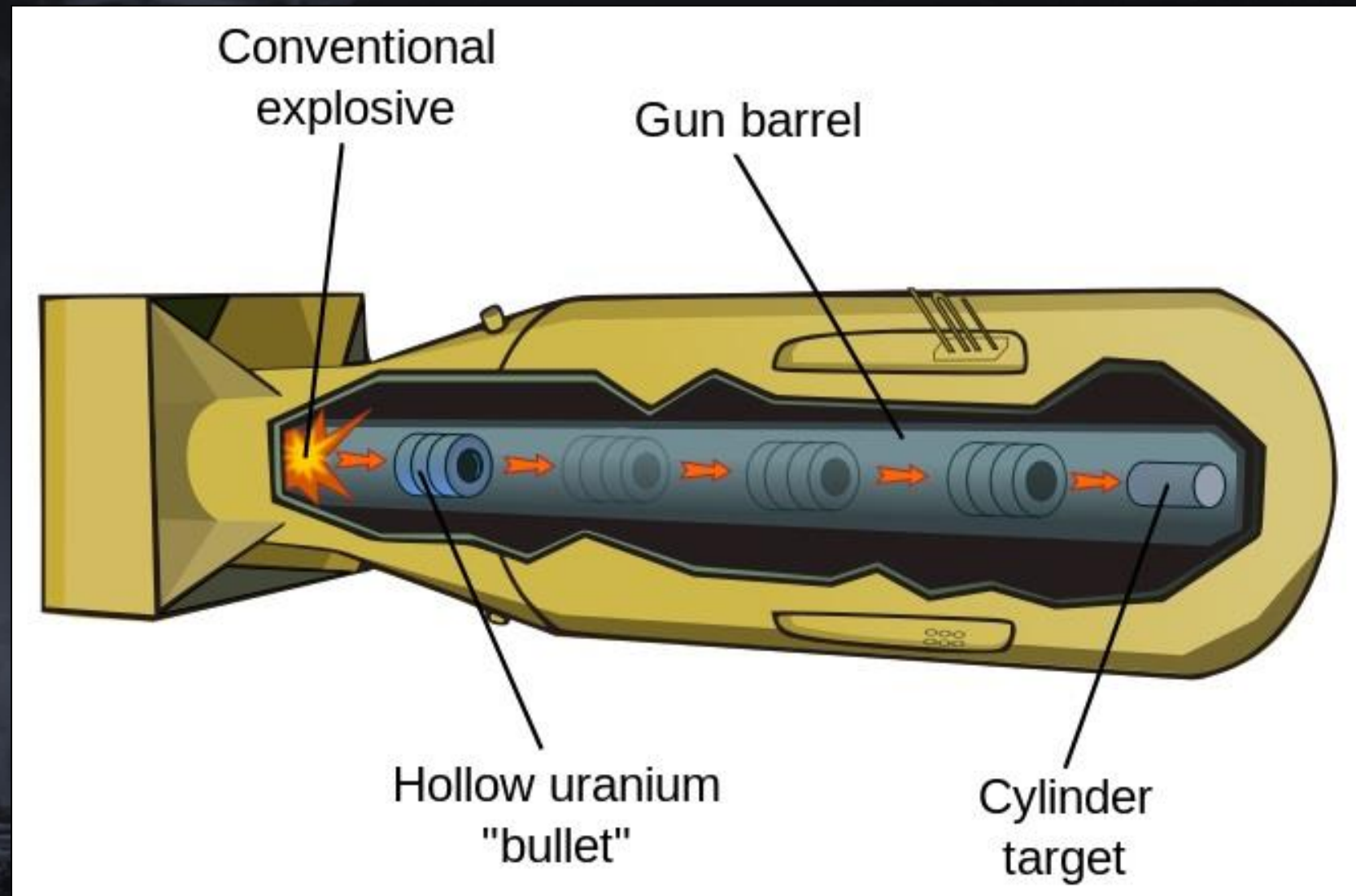
The Manhattan Project

- Roosevelt put together a team of the USA's best scientists. Their goal? Build an atomic bomb before the Germans do.
- Problem #1:
How do we get Uranium 235?
- Problem #2:
How do we make sure it doesn't blow up before we drop the atomic bomb?

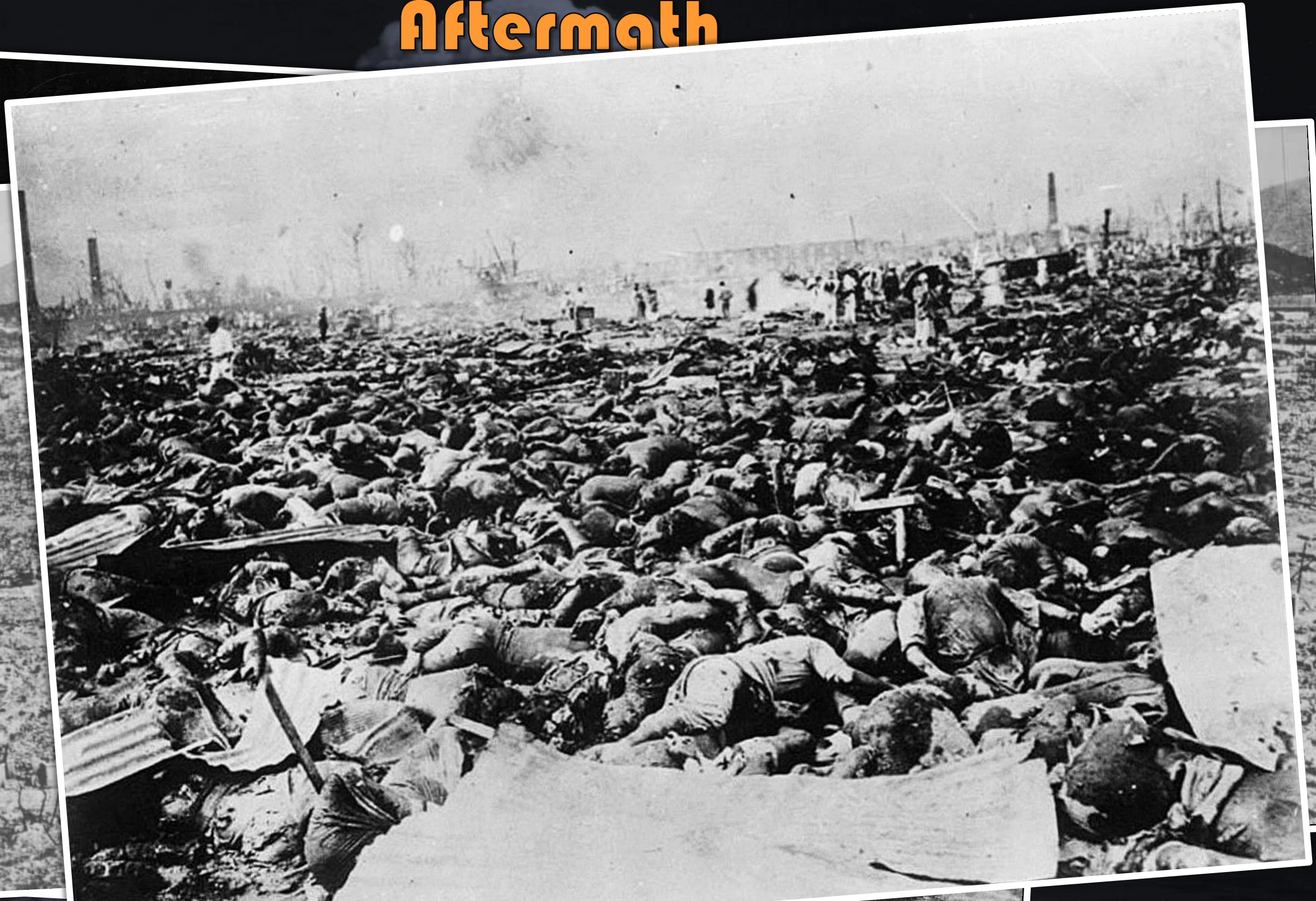


Bombing Japan

- Scientists chose the “gun type” method of detonation, in which two pieces of purified Uranium were mashed together using a gunpowder charge.
- Only two bombs were built by the USA, using slightly different designs.
- Bombs were dropped on Japan in August, 1945. The Japanese surrendered eight days later.



Aftermath




A black and white photograph of the atomic bombing of Nagasaki on August 9, 1945. A massive, billowing mushroom cloud rises from the city, its stem thick with smoke and debris. The cloud spreads out at a high altitude, creating a large, dark, and textured canopy. The surrounding landscape is visible at the base of the cloud, showing the city and the surrounding sea. The sky is filled with the smoke and the dark, ominous presence of the cloud.

On **Page 201**, summarize
the story of the atomic bomb.



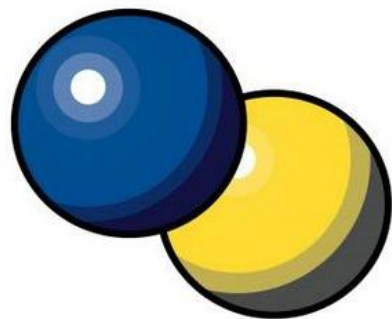
**fusion
Power**

A detailed view of the interior of a fusion reactor, showing a complex arrangement of toroidal magnetic coils and structural components. The scene is illuminated with a strong blue light, creating a futuristic and high-tech atmosphere. The coils are made of a dark, polished material, possibly copper or stainless steel, and are arranged in a series of concentric loops. Various cables, pipes, and structural supports are visible, adding to the complexity of the machinery.

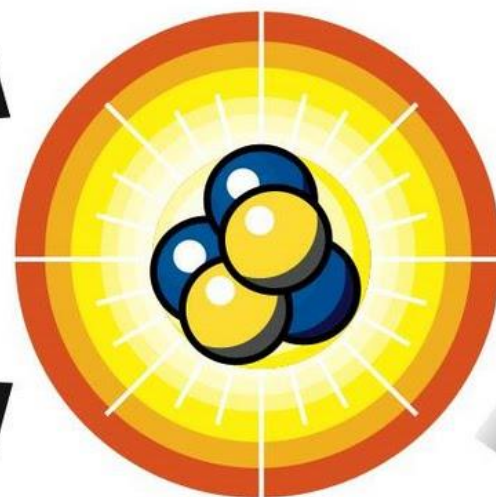
**fusion
Power**

Fusion Power

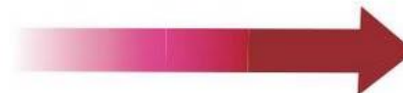
Hydrogen
(isotope)



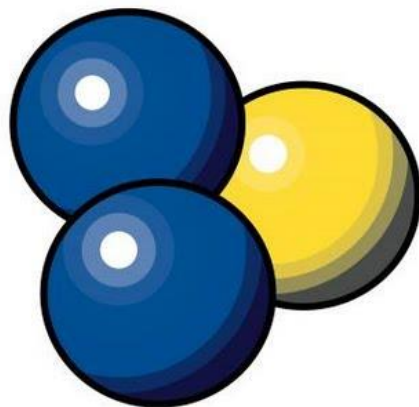
Extra Neutron



Energy



Hydrogen
(isotope)

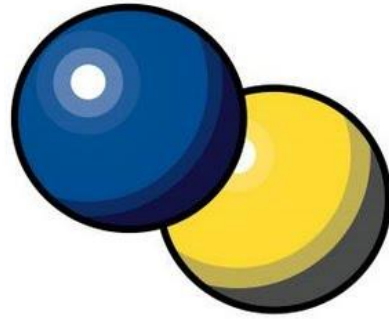


Helium

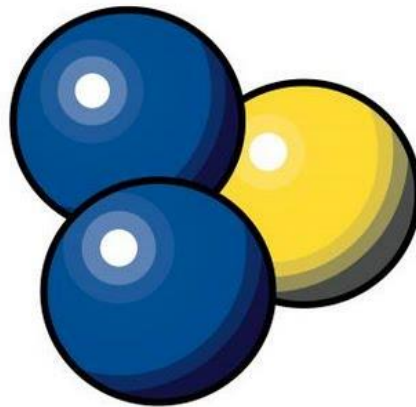


Fusion Power

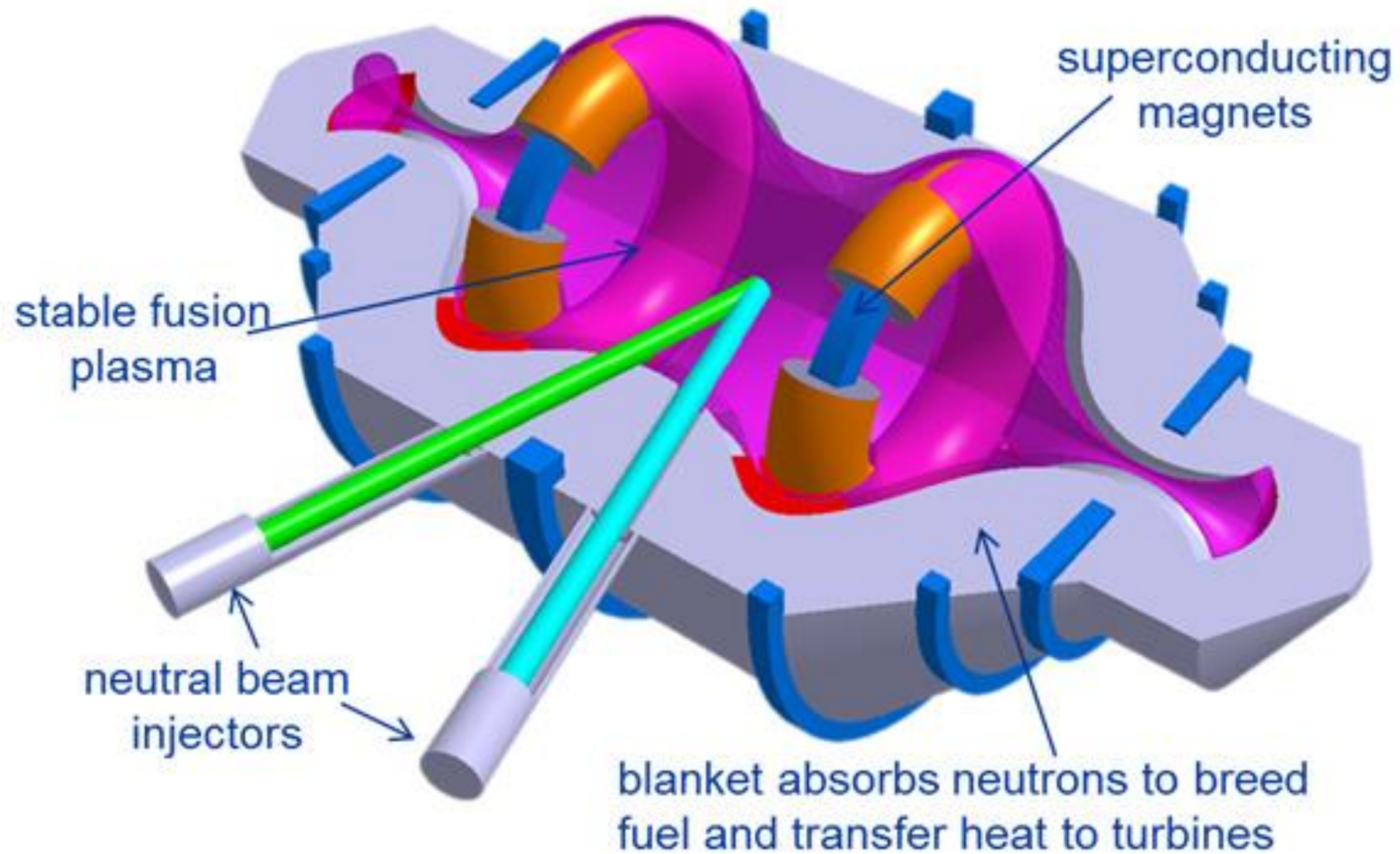
Hydrogen
(*isotope*)



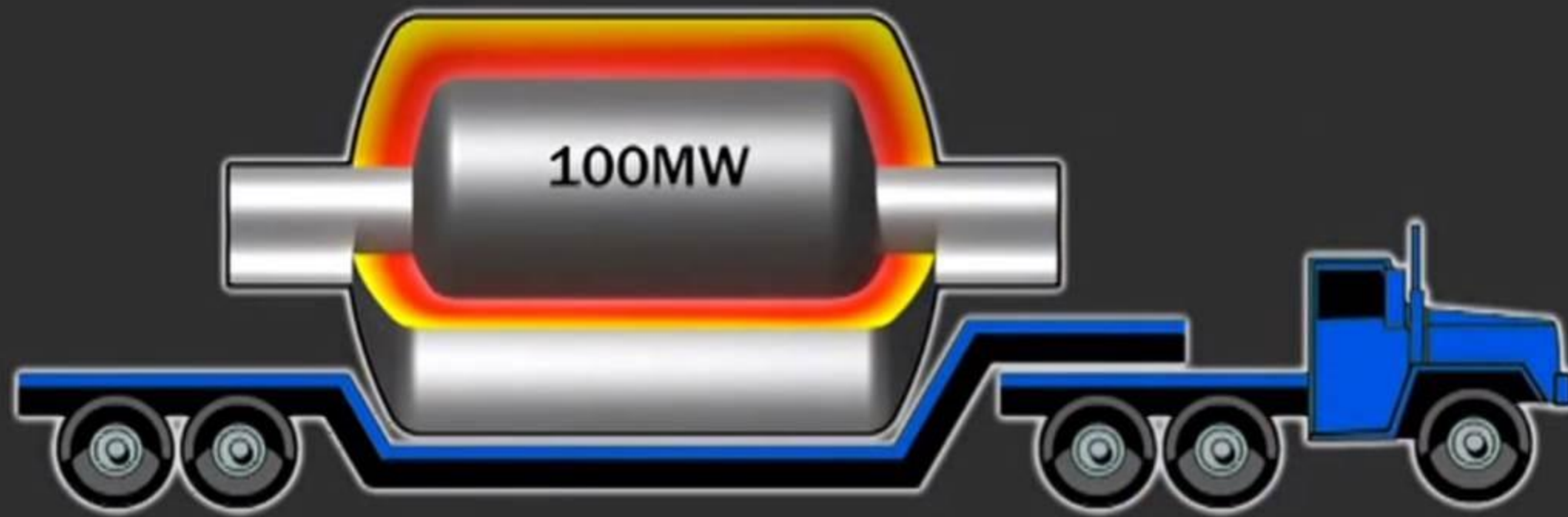
Hydrogen
(*isotope*)



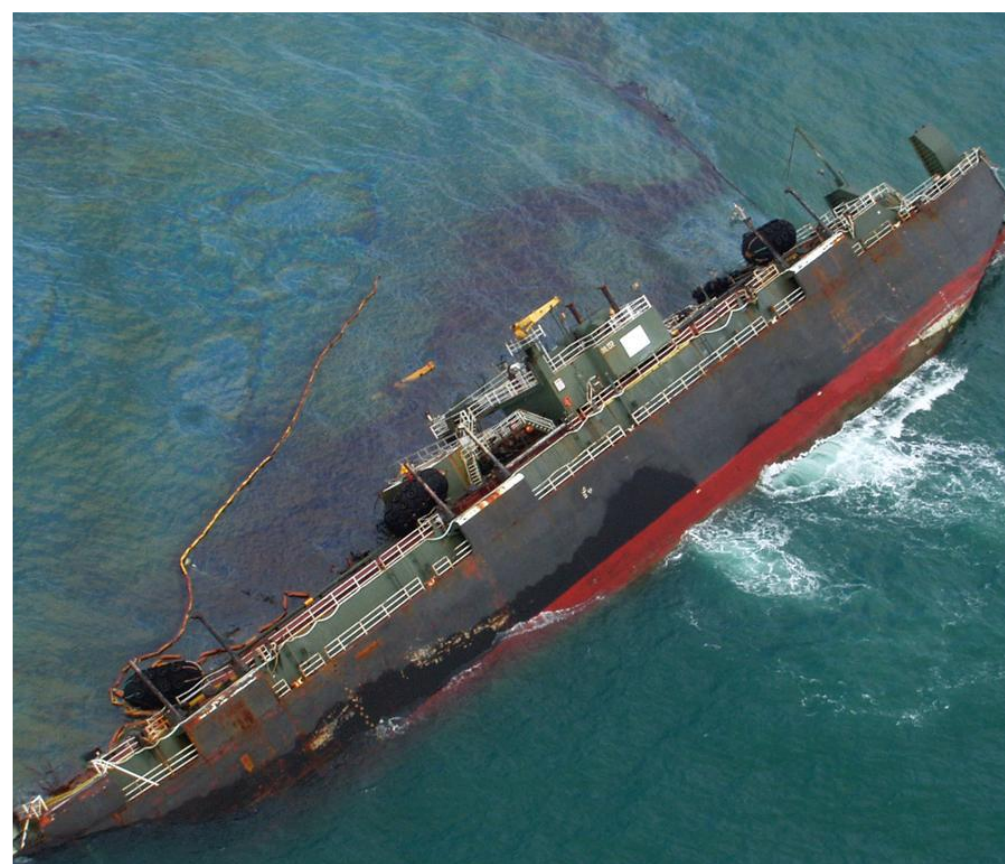
Fusion Power

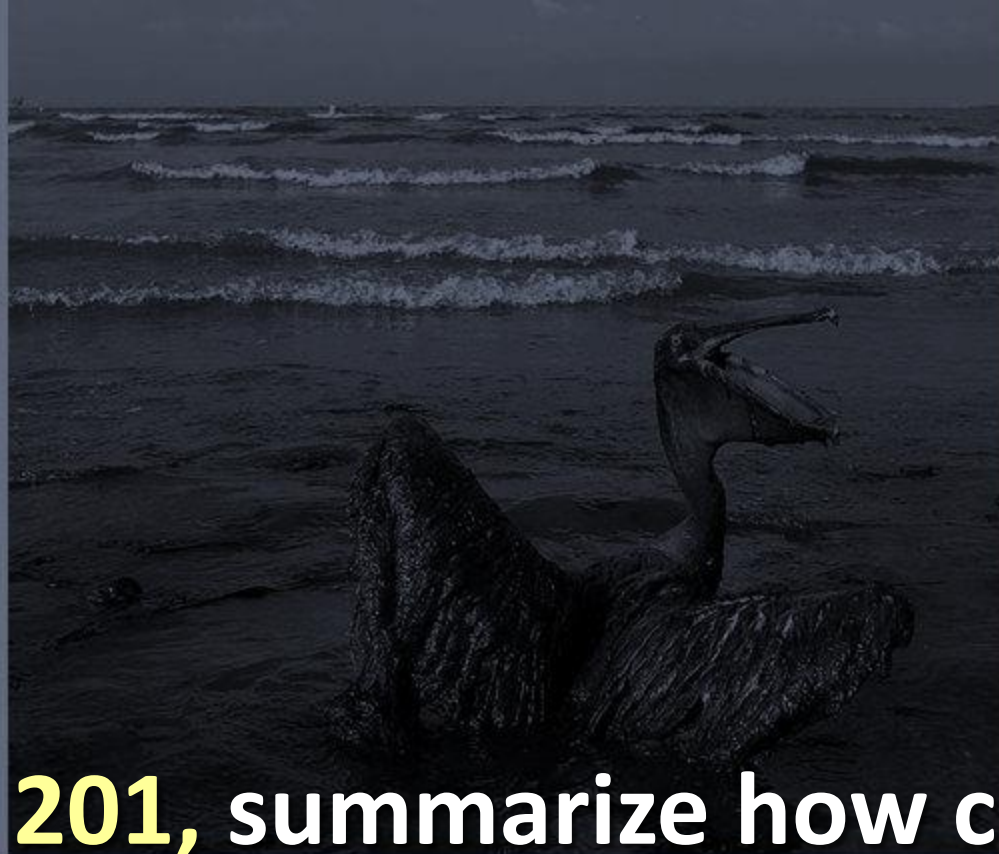


Compact Fusion



**Imagine all of Marshfield, Duxbury, and
Hingham being powered by one large truck.**





On **Page 201**, summarize how chemistry could impact the future of power production.

