(from the textbook Module 2 Part 3 "Fermi Creates Controlled Nuclear Reaction")

**Read the text paying attention to the words in bold. Get ready to answer the following comprehension questions in class:**

1) What project did Fermi work on?

2) How does the process of fission work?

3) How was he able to achieve the control over the chain reaction?

4) What event proved Fermi’s idea?

5) Can you give examples of the applications of his discovery?

**Fermi Creates Controlled Nuclear Reaction**

Enrico Fermi (1901-1954) left Italy in 1938 to receive the Nobel Prize for physics in Sweden. He never went back. He and his wife moved to the USA to **escape**Italy’s fascism and anti-Semitism.

Fermi realized that nuclear **fission** was accompanied by release of colossal amounts of energy from the **conversion**of mass into energy. When scientists convinced President Roosevelt of this, Fermi was **appointed**to head a research team as part of a secret project to develop an atomic bomb. Fermi’s task, however, was to create a controlled nuclear reaction; that is, to **split**the atom without creating a deadly **explosion**.

Theoretically, it was possible. During fission a neutron is fired at the atom’s nucleus, which splits and ejects a neutron. This ejected neutron could split another nucleus, **releasing** another free neutron to split yet another, and so on: a**self-sustaining** chain reaction. If this chain reaction went too fast, it became an atomic explosion, but under control it could produce a steady flow of energy.

At the University of Chicago, Fermi worked with a team to find a way to control the chain reaction. He did this by setting up the equipment - atomic pile - so that he could **insert** a neutron-absorbing material into the midst of the fission process to slow it down or stop it altogether. He found that **rods** made of cadmium would absorb neutrons. If the chain reaction speeded up, the cadmium rods could be inserted to slow it down and could be removed to accelerate it again.

By the end of 1942, the team was ready for its first test. The equipment was set up in a squash court at the University of Chicago. It was December 2. The moment was tense: if their theories and experiments until now proved wrong, they could blow up half of Chicago. A few of the rods were pulled out, and the reaction began. More rods came out. The reaction was self-sustaining. The team could increase or decrease the energy **output** by **adjusting** the rods. Fermi’s idea worked, and the first controlled flow of energy from a source other than the Sun was achieved. A coded message told the government of this success: “The Italian navigator has just landed in the new world.”

Since then, Fermi’s theory has been **expanded** and **refined**. Nuclear reactors have been built in many countries to supply energy for military uses such as nuclear submarines and civilian uses such as ordinary electricity. But incidents through the years showed the dangers of the process and of its **waste products**, and nuclear power lost much of its original popularity.

**Now get ready to answer the comprehension questions above.**