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**Nuclear Weapons**

The term weapon of mass destruction (WMD) is used to characterize a variety of weapons that share two key features: their potential for large-scale destruction and the indiscriminate nature of their effects, notably against civilians. One of the three major types of weapons of mass destruction is nuclear weapons. There are approximately 30,000 nuclear weapons in national stockpiles of the eight nuclear weapons states: Britain, China, France, India, Israel (assumed), North Korea (claimed), Pakistan, Russia, and the United States. . It is believed that China does not keep its nuclear force on alert status and that Britain and France maintain their nuclear forces on lower levels of alert. There is incomplete and contradictory information available on the nuclear stockpiles of India, Pakistan and Israel. Most experts believe that the nuclear weapons in these countries are only partially deployed. Even greater uncertainty surrounds the status of North Korea's nuclear program, but some analysts estimate that North Korea may have already built as many as 13 nuclear weapons. Also, it is impossible to give an exact figure on the makeup and yield of government arsenals because of government secrecy. According to the 2005 edition of the SIPI yearbook, the estimated figure of nuclear weapons deployed worldwide by eight countries is 13,470 with another 14,000 held in reserve.

Depending upon the yield and atmospheric conditions, a large thermonuclear weapon dropped on a densely populated city could kill millions of people in an instant. Today, a handful of nations possess an inventory of nuclear weapons, roughly half the number that existed at the height of the Cold War.

Overall, the total number of nuclear weapons has decreased in the past few years, yet all eight nuclear weapon states continue to maintain and modernize their arsenals and assert (either publicly or covertly) that nuclear weapons play a crucial role in their national security. Meanwhile, though, because nuclear weapons have been a part of state arsenals for more than half a century, there is a tendency among policymakers toward tacit acceptance about these weapons that can, in itself, be dangerous.

Nuclear weapons, like conventional bombs, are designed to cause damage through an explosion that releases a large amount of energy in a short period of time. In fission weapons, atoms are split. The core of a fission bomb is made of either plutonium or highly enriched uranium. Plutonium and uranium atoms are both heavy, meaning they have a large number of protons and neutrons in the nucleus. During fission, when the heavy nucleus splits into two smaller nuclei, extra neutrons are released. If these neutrons are absorbed by other nuclei, they can, in turn, split, also releasing neutrons and setting off what is known as a chain reaction. In fusion weapons often known colloquially as hydrogen bombs deuterium and tritium, two isotopes of hydrogen, are fused together to create heavier atoms. This is the same reaction that occurs in the center of the sun. Fusion can only happen at extremely high temperatures and pressure. In a fusion weapon, such a state is created by using a fission explosion (i.e. an atom bomb) to trigger the fusion reaction.

**Effects of Nuclear Weapons**

**Blast**: The rapid release of energy in an explosion creates a shock wave equivalent to several thousand pounds of pressure per square inch (psi), enough many times over to crush most objects on earth. By way of comparison, brick houses and human lungs can be crushed at about 30 psi pressure or less.

**Thermal radiation**: Thermal radiation includes heat and light. The heat from a nuclear explosion is so intense that nearly all materials at the center of the explosion (epicenter) are immediately vaporized. The thermal radiation also creates a fireball which rapidly expands outward, consuming oxygen and, combined with the blast effect, creating near total destruction for some distance from the epicenter.

**Electromagnetic pulse**: In addition to its other effects, a nuclear explosion sends out an electromagnetic pulse, similar to the thermal pulse. Although the electromagnetic pulse does not directly harm humans, it can increase the devastation at the site of a nuclear explosion because it disables all electrical devices in its path, including computers, communication and medical devices.
**Direct nuclear radiation**: A nuclear explosion releases several forms of radiation. Both gamma rays and neutrons easily penetrate solid objects and can be deadly. Beta and alpha particles are generally less dangerous, having much shorter ranges - several meters and several centimeters, respectively. Alpha particles cannot penetrate human skin. If ingested, however, alpha particles will cause the most damage to the human body.

Fallout consists of large numbers of particles, from the earth, buildings and other ground objects, which are propelled upward in the blast and irradiated, mixing with the radioactive products of the explosion. Some of this material will fall back to earth within a few minutes, and radioactive fallout may continue its descent for about 24 hours. It may be the most insidious effect of a nuclear explosion because the area of exposure to fallout is much wider and more unpredictable than that of direct nuclear radiation

Radiation affects those cells in the human body that actively divide, such as those found in hair, in the intestinal tract, in bone marrow, and in the reproductive organs. A large, rapid dose of radiation causes cell death, and effects are apparent within hours, days, or weeks. The most serious delayed, long-term effect of radiation exposure is a significantly increased incidence of leukemia and thyroid, lung, breast, and bone cancers. The incidence of a particular type of cancer depends on how the radiation exposure occurs.