

HOMEWORK: COLD WAR SCIENTIFIC ADVANCEMENTS

Directions: Please answer the questions in complete sentences on sheet provided.

1. Describe *one* similarity and *one* difference between fission weapons and thermonuclear weapons.
2. Using the internet, find out which countries possess nuclear weapons today.
3. What does “arms race” mean?
4. What was the policy of brinkmanship? Do you think this policy was wise or unwise? Did it make the world safer or less safe? Explain your answer.
5. Why did it look like the Soviet Union was winning the Space Race in the late 1950s?
6. Why did tensions between the U.S. and U.S.S.R. increase further in May 1960?
7. Describe some of the features of the Lockheed SR-71 Blackbird. What made it so special?
8. (Optional Extra Credit!) On a separate sheet of paper, draw a picture of the SR-71 Blackbird!

What Are Nuclear Weapons?

A nuclear weapon is any weapon that gets its power from the transformation of matter in atoms into energy. Nuclear weapons can be fission weapons, also called atomic weapons, or they can be thermonuclear weapons, also known as hydrogen weapons or fusion weapons. In fission weapons, matter converts to energy when the nuclei of uranium or plutonium atoms are split. Thermonuclear weapons convert matter to energy by combining pairs of certain kinds of hydrogen nuclei to form single nuclei. Thermonuclear weapons are generally far more powerful than fission weapons. Most nuclear weapons are thermonuclear. (Source: World Book Online)

The Nuclear Arms Race

After World War II ended, the United States possessed a monopoly on atomic weapons, while Soviet scientists were working frantically on an atomic bomb. After the Soviet Union exploded its own atomic weapon in 1949, President Truman authorized work on a hydrogen or H-bomb which was thousands of times more powerful than the atomic bomb. Its power came from the fusion of atoms, rather than from the fission of atoms. In November 1952, the United States successfully tested the first H-bomb. In August 1953, the Soviets exploded one of their own.



In 1953, Secretary of State John Foster Dulles threatened that if the Soviet Union or its supporters attacked U.S. interests, the United States would “retaliate instantly, by means and at places of our own choosing.” This willingness to go to the brink, or edge, of war became known as **brinkmanship**. Brinkmanship required a reliable source of nuclear weapons and airplanes to deliver them. So the U.S. strengthened its air force and began producing stockpiles of nuclear weapons. In response, the Soviet Union made its own collection of nuclear bombs. This arms race would go on for decades.



The Space Race

In August 1957, the Soviets announced the development of an intercontinental ballistic missile (ICBM), a rocket that could be used to strike enemy targets from long distances. They would soon use an **ICBM** to launch the first satellite. The **Sputnik** launch made Americans feel as if they had fallen behind. In response, the U.S. poured huge amounts of money into education, especially in science and math. Soon the United States had successfully launched its own satellite.

A Showdown in the Skies

A serious showdown between the superpowers occurred in 1960. President Eisenhower had proposed an “open skies” policy which would allow the two powers to fly freely over each other’s territory to guard against surprise nuclear attacks. The Soviets rejected his proposal. In response, the CIA sent secret spy flights over Soviet territory in planes called U-2s. In May 1960, a Soviet pilot brought down a U-2 plane and captured the pilot. The Soviets sentenced him to ten years in prison but released him after 19 months. This **U-2 incident** brought tensions to a new height.



Super Spy Plane

By the early 1960s, the American U-2 spy planes were becoming vulnerable to surface-to-air missiles. As a result, the United States Air Force asked the Lockheed Corporation to develop a reconnaissance plane that could fly faster than the speed of sound. At the super-secret “Skunk Works” in Palmdale, California, Lockheed engineers developed the world’s fastest airplane. Originally codenamed Project Oxcart, the SR-71 Blackbird entered active service in 1966 and became one of the most amazing aircraft ever to fly.

This plane is 161 feet long and is covered with special black paint that makes it nearly invisible to radar. The Blackbird holds the world speed record for an airplane, which stands at 2,193 miles per hour—more than three times the speed of sound. It normally flies at altitudes above 85,000 feet. By comparison, a passenger jet flies around 500 miles per hour at altitudes of about 33,000 feet.



The shell of the SR-71 is made of titanium. A large amount of heat from air friction causes the skin of the plane to expand during flight. Captain Thomas L. Peterson, a Blackbird pilot, said “The [windshield] gets so hot that a pilot can’t keep his hand on it for more than 20 seconds even with flame-retardant gloves.” A fast landing speed requires the use of a parachute to help the plane stop. The wheels are filled with nitrogen, instead of normal air, to keep the tires from burning up when they touch the runway. Special fuel, called JP-7, was developed to keep the engines running at high altitudes.

Blackbird crews start getting ready for a flight three days before takeoff. Navigation preparation is especially important since the plane covers more than 30 miles every minute. The pilot, navigator, and radar officer wear pressure suits similar to an astronaut’s and use oxygen tanks to help their breathing. Special engines are used to start the aircraft. During photographic spying missions, the Blackbird’s cameras can take pictures of 100,000 square miles every hour.

The SR-71 was used extensively for spying and reconnaissance missions during the Vietnam War and the several years that followed. Improved technology of space-based spy satellites, combined with high maintenance and operating costs of the SR-71, made it difficult to justify the continued operation of the plane. The last operational flight of an SR-71 was made in 1989, and the remainder of the Blackbird squadrons have since been deactivated. It flew for almost 25 years, set many still-standing speed records, and made an immeasurable contribution to national security during a difficult time in the history of the United States.