Summary
In the years after World War II, the United States and its former ally, the Soviet Union, became involved in a bitter rivalry on a world stage. This struggle became known as the Cold War. Stakes were high in the post-WWII world, especially in Third World countries that might side with one power or the other according to which side had the perceived upper-hand. American prospects in this global tussle grew darker with the advent of the Space Race of the 1950’s, which saw the Soviets pull ahead in the conquest of space. This lesson addresses this race as well as the impact of this Space Race on Florida.

Objectives
Students will:
1. learn how the Space Race developed out of Cold War tensions between the United States and the Soviet Union;
2. discuss the reasons why Cape Canaveral was chosen as the base for the US missile and rocket development;
3. recount how the Soviet Union took the lead in space technology and the reaction of the United States; and
4. understand how the growth of Cape Canaveral equated to a strain on local resources.

U.S. History Event
This lesson can be used for any unit covering the Cold War and the 1950’s.

Grade Level
Middle school or high school

Materials
Transparencies of the timeline ("Worksheet #1"), pictures, and notes.

Lesson Time
One class period, or one-half block period.
Lesson

Procedures
1) As students enter the classroom, show a transparency of one of the following pictures and ask the corresponding questions:
      • What do you see in this picture? From where was this picture taken? Do you think a person or a satellite took this picture? How did that person/satellite get into space?
   b. Forest fires from space: http://www.sff.net/people/jack.haldeman/fires2.jpg
      • What do you see in this picture? From where do you think this picture was taken? What do you think this picture is showing? Besides tracking forest fires, what other useful things do you think satellites can provide for us? (TV, pictures of the universe, etc.)
      • What do you see in this picture? From where do you think this picture was taken? Was this picture taken by a person, or by a satellite? Do you think that it was a difficult thing to send people to the moon? Should we still explore outer space?

2) After a brief 5-7 minute discussion about the picture, explain to the students that in this lesson they are going to see several pictures dealing with: the dawn of the American space program and its subsequent “race” with the Soviet Union; how this Space Race was part of the larger Cold War and the sense of mistrust and competition between the USSR and the US; the reasons why Cape Canaveral, Florida, was chosen as the launching point for all American space missions; and the effects that the US space program had on the Brevard County area. Your students will receive Part One of a two-page Timeline, in which they are to keep track of the important events in the American space program through 1960.

3) Have students update their timelines with pertinent information while taking careful notes on your presentation (Note: lecture notes have been provided for you. They are not meant to be used as a script, but rather for you to look over and decide the most salient points for your students). If needed, make a transparency of the timeline and model for your students the information that needs to be included.

4) While lecturing through the topics of the lesson, display transparencies or projections of the pictures and describe the pictures for the students (websites of the pictures have been provided). Answer any questions that they may have.

5) Before giving any information on the end of WWII, show the projection of Churchill, Truman, and Stalin. Ask your students who these men are in the foreground, and why they look so happy. Next, ask them who the serious-looking men are in the background of the picture, and why they look so serious. Then, ask them if they think if these good feelings will continue to exist between the Allies after the defeat of Germany.

6) After the picture and notes have been presented on the choosing of Cape Canaveral as the US military’s launching ground in the late 1940’s, allow a few students to stand in front of the projection and perform an “Act-It-Out.” Play the role of an on-the-spot reporter interviewing the people in the picture. Ask them questions pertaining to the reasons why they are watching the launch, what they hope their country can accomplish by launching rockets, and whether they feel any pressing concerns about how rockets could be used militarily.

7) As you finish the lesson, inform the students that they will finish Part Two tomorrow.
The End of World War II and the Beginnings of the Cold War

In the years leading up to and during World War II, German scientists were ordered to develop the first large, long-range military rockets. The first weapons of this type were the V-1 rockets, introduced in combat in June 1944. These “buzz bombs” were launched against London and other cities in Europe, terrorizing the population but limited in their accuracy and military effectiveness. They could also be intercepted or shot down.

New rockets, the “Vengeance Weapon #2,” or V-2, were used in a last-ditch effort to stave off defeat in World War II; Hitler ordered his military to launch over 3,700 V-2s in attacks against the Allies. Many of these V-2 rockets hit Great Britain, to no avail. Germany was soon defeated, and the Allies and the Russians quickly moved in to confiscate the Nazis’ missile technology.

The Americans captured an underground test laboratory, 100 partially-assembled V-2 rockets, and 125 top rocket specialists and brought them back to the United States in “Project Paperclip.” The Soviets only captured a handful of top engineers, but they also found other secret laboratories, hundreds of regular engineers and technicians, and lists of suppliers for rocket parts, many of which were located in the Soviet-controlled sectors of East Germany after the war. The Soviets transported these people back to the USSR and took as much information about rocket science as they could.

When the fighting ended in Europe in May 1945, it still raged in the Pacific, but not for long. By September of that same year, World War II was over. American president Harry S Truman had ordered two atomic bombs to be dropped on Japan, destroying two cities and hundreds of thousands of lives. The war was finally over. But a new struggle was just beginning.

The governments of the United States and the Soviet Union had become allies to defeat Hitler’s Nazi Germany, but there was still a mutual distrust. With the war over, the Soviets quickly reneged on their pledge to withdraw their troops from Eastern Europe. Instead, they continued to occupy Eastern Europe and installed governments that would be friendly to the Soviet Union hoping to set up a Communist bloc that would buffer the Soviet Union from Western Europe and the Americans. Thus, the Cold War began (war in which two enemies do not actually fight each other; instead, each builds up military forces and arms to intimidate the other). Later, President (and WWII general) Dwight D. Eisenhower put the Cold War in simple terms when he stated, “What makes the Soviet threat unique in history is its all-inclusiveness. Every human activity is pressed into service as a weapon of expansion. Trade, economic development, military power, arts, science, education, the whole world of ideas... The Soviets are, in short, waging total cold war.”

Both nations began to arm themselves for the possibility of another, larger conflict. Both sides quickly began to build arsenals of weapons that were much more destructive than the atomic bombs dropped on Japan. Each nation hoped to prevent the other from striking first through a policy known as “MAD,” or “mutually-assured destruction.” In other words, whichever nation launched a first strike against the other would be assured of also being destroyed.

Picture F-3-2
An atomic blast, similar to the one at Hiroshima and Nagasaki
photo courtesy of Atomic Veterans History Project
(http://www.aracnet.com/~pdxavets/xx43.jpg)
The Soviets quickly turned to the development of large liquid-propellant rockets. Lacking an armada of intercontinental bombers carrying atomic warheads, such as the United States possessed, they envisioned "trans-Atlantic rockets" as "an effective straightjacket for that noisy shopkeeper Harry Truman," to use Stalin's words.

The U.S.S.R. began exploration of the upper atmosphere with captured V-2s in the fall of 1947. Within two years, however, Soviet production was underway on a single-stage rocket called the T-1, an improved version of the V-2. The first rocket divisions of the Soviet Armed Forces were instituted in 1950 or 1951. Probably in 1954, development work began on a multistage rocket to be used both as a weapon and as a vehicle for space exploration. And in the spring of 1956 Communist Party Chairman Nikita Khrushchev warned that "soon" Russian rockets carrying thermonuclear warheads would be able to hit any target on Earth.

Meanwhile the United States, convinced of the long-term superiority of her intercontinental bombers, pursued national security by means of airpower. The extremely heavy weight of atomic warheads meant that they would have to be delivered by large bombers, or by a much bigger rocket than anyone in the military was willing to ask Congress to fund. The V-2s captured in Germany and put together by the United States Army from captured components were used for upper-atmosphere scientific research in the early postwar years. From April 1946 to October 1951, 66 V-2s were fired at the Army's White Sands Proving Grounds, New Mexico, in the most extensive rocket and upper-atmospheric research program to that time. The Army Ordnance Department, the Air Force, the Air Force Cambridge Research Center, the General Electric Company, various scientific institutions, universities, and government agencies, and the Naval Research Laboratory participated in the White Sands V-2 program. Virtually all the rockets were heavily instrumented, and many of them carried plant life and animals. V-2s carried monkeys aloft on four occasions; telemetry data transmitted from the rockets showed no ill effects on the primates until each was killed in the crash back to Earth.

A new chapter in space flight began on 1950 July with the launch of the first rocket from Cape Canaveral, Florida: the Bumper 2. The Bumper 2 was an ambitious two-stage rocket program that topped a V-2 missile base with another rocket. The upper stage was able to reach then-record altitudes of almost 400 kilometers, higher than even modern space shuttles fly today. The Bumper 2 was used primarily for testing rocket systems and for research on the upper atmosphere. Bumper 2 rockets carried small payloads that allowed them to measure attributes including air temperature and cosmic ray impacts.

Cape Canaveral

Spanish explorer Ponce de Leon was the first European to "discover" Cape Canaveral in 1513. He initially called the area "Cabo de los Corrientes," a Spanish phrase that meant "tip of the currents" and described the strong currents his crew of sailors experienced off its coast. At that time, the Ais Indians inhabited the area. De Leon and other Spaniards soon found themselves in a deadly skirmish with the natives. Many of de Leon's men were killed by the razor-sharp cane arrows used by the Ais. As a result of the battle, the name "Canaveral" began appearing on maps of the area. The name meant "cane bearer."
V-2 rocket testing had begun at the White Sands Proving Ground in New Mexico, in 1945, but a more adequate base was needed. The first choice was in California, near the border with Mexico, but because of objections from the Mexican government, a second choice was soon found: the Banana River in Florida.

The Banana River location was the best choice, anyway, for several reasons:

1) Already in place were a line of observation sites on islands stretching throughout the Caribbean Sea and South Atlantic Ocean;

2) There was already an existing naval air station in the vicinity that could be used as a support base for launches (the Banana River Naval Air Station had been home to patrol bombers protecting Allied shipping along the east coast of Florida during WWII; since the war had ended, only a forty-man maintenance crew remained);

3) There was an ideal launching site, the relatively unpopulated Cape Canaveral, which jutted eastward into the Atlantic Ocean only fifteen miles north of the air base;

4) There were no major centers of population anywhere nearby, so the danger to civilians was minimal;

5) Rockets launched from the Cape could take advantage of the rotational speed of the Earth, which is greatest at the Equator. Therefore, the relative position of Cape Canaveral required less rocket engine thrust than would have been necessary elsewhere.

6) The climate was mild year-round and provided a great deal of launching opportunities.

The United States Air Force acquired the land at Cape Canaveral, and in late 1950, it opened a missile testing station there. On July 24, 1950, a small rocket was launched from “the Cape,” marking the true beginning of the United States space program. Rockets were launched throughout the next decade in an effort to keep up with the Soviet Union’s own space program.

Rockets served as the most dazzling technological symbol of postwar Florida. An adoring and grateful public idolized scientists who helped win the war of technology. World War II marked the first time scientific breakthroughs developed during a war actually helped win the war. In August 1945, as Floridians cheered victory and worried about hurricanes, the Lee County Commission offered the U.S. government 7,500 acres “as a base for the atomic bombing of hurricanes.” As late as 1947, Floridians still hoped that a well-placed atomic bomb would deflect an approaching hurricane.

Picture F-3-4

*Sputnik*, pronounced “Spoot-nik”

(photo courtesy of NASA-
http://www.hq.nasa.gov/office/pao/History/sputnik/sputnik1.jpg)

for an “exploded” view of Sputnik, go to:
http://www.hq.nasa.gov/office/pao/History/sputnik/sputexp.jpg

The Soviets Surge Ahead

Meanwhile, the Soviet Union exploded her first atomic device in 1949, ending the United States’ postwar monopoly on nuclear weapons. After a few more years of secret testing of German V-2 rockets, the Soviets shocked the world. On August 26, 1957, *Tass*, the official Soviet news agency, announced that the U.S.S.R. had successfully launched over its full design range a "super long-distance intercontinental multistage ballistic rocket,” an R-7, probably a vehicle employing an improved V-2, a Soviet-made T-1 as an upper stage, and a booster rocket with a thrust of over 400,000
pounds called the T-3. This "ICBM" could be launched from one continent, pass through the atmosphere into space, and then re-enter the atmosphere over its target on another continent. No longer were the Americans safe, half a world away, separated from the Soviets by two oceans. Soviet missiles could be produced with the ability to destroy American cities in a matter of minutes. In the furor in the West following the Russian announcement an American general allegedly exclaimed, "We captured the wrong Germans."


![Picture F-3-5](http://www.videocosmos.com/images/laika.jpg)

**Picture F-3-5**

Laika, the first animal in space

Photo courtesy of videocosmos.com


- Less than a month later, on November 3rd, Soviet engineers and rocket scientists sent a second capsule, *Sputnik II*, into orbit. *Sputnik II* was much heavier than the first one, weighing 1,120 pounds, and contained a Siberian husky-mix dog named Laika, which meant “Barker” in English. The American press quickly nicknamed the dog “Muttnik.” With this launch, the Soviets had achieved another remarkable first: the first animal in space. Unfortunately, no arrangements were made for Laika’s safe return to Earth. Though supplied with plenty of food and water, the batteries for her life support system eventually ran out, as did the air supply in her capsule. Months later, *Sputnik II* disintegrated as it reentered Earth’s atmosphere.

- The ICBM launch in August was difficult enough for the Americans to accept. They had always been confident in their technological superiority over other nations, especially the Soviet Union. According to John Simpson, who was then a nuclear scientist at the University of Chicago, “It was thought that the Soviet technology was behind the U.S...[the Sputnik launch] was a demonstration to show them—the world—that they weren’t...we had a false sense of superiority, superiority in technology and the way to do things in an organized fashion.” The Russian ICBM shot in August had given new urgency to the missile competition and had prompted journalists to begin talking about the “missile gap.” Now, with the *Sputnik* launches there was a "space race" in addition to an "arms race," and it was manifest that at least for the time being there was a "space lag" to add to the missile gap.

**The American Response**

- After the first Sputnik went into orbit, President Dwight D. Eisenhower reminded the critics of his administration that, unlike ballistic missile development, “our satellite program has never been conducted as a race with other nations.” However, the United States was losing face, at home and abroad.

![Picture F-3-6](http://www.hq.nasa.gov/office/pao/History/monograph10/hasabrth.html)

**Picture F-3-6**

The first Vanguard launch-Dec. 6, 1957

Photo courtesy of NASA

National attention soon turned to Cape Canaveral when it was announced by the White House that scientists and engineers from the Naval Research Laboratory and its industrial contractors would attempt to put in orbit a grapefruit-sized package of instruments as part of Project Vanguard, the American satellite effort. In reality the Vanguard group was planning only to use a test satellite in the first launch of all three active stages of the research rocket. To their dismay swarms of newsmen descended on Cape Canaveral to watch what the public regarded as this country's effort to get into the space race. On December 6, before a national television audience, the Vanguard rose little more than three feet off of its launching pad before it fell back. The first stage exploded and the rest of the rocket collapsed into the wet sand surrounding the launch stand.

In the face of the fact that "they" orbited satellites before "we" did, together with the apparent complacency of official Washington, the Vanguard blowup took on disastrous proportions. America had seemingly fallen far behind their Soviet rivals in the Space Race and, more importantly, in the Cold War. At the federal level, a consensus formed: the nation needed a more concerted effort to nurture the sciences and develop new technologies. Two major legislative actions followed: the National Defense Education Act, signed into law by President Dwight D. Eisenhower on September 2, 1958; and the establishment of National Aeronautics and Space Administration on October 1st of the same year.

The National Defense Education Act, or NDEA, was passed because Sputnik had jolted the American education system. The United States felt Soviet students must have been getting a better science and math education than were American students. The NDEA approved $887 million spread across primary, secondary, vocational, and higher education programs with an emphasis on identifying students gifted in science, mathematics, and modern foreign languages. The establishment of the National Aeronautics and Space Administration, or NASA, was equally important. Now, a federal agency was chartered to conduct space operations, while the military continued its weapons research.

After the failed Vanguard launch, the United States space program began to achieve some of its objectives, though not on a par with the Soviets. On January 31, 1958, a Jupiter C carrying satellite instruments developed for Project Vanguard by University of Iowa physicist James A. Van Allen boosted into orbit Explorer I, the first American satellite. The total weight of the pencil-shaped payload was about 31 pounds, 18 pounds of which consisted of instruments. Following a high elliptical orbit, Explorer I transmitted data revealing the existence of a deep zone of radiation girdling Earth, dubbed the "Van Allen belt." The following March 17, the much maligned Vanguard finally accomplished its purpose, lifting a scientific payload weighing a little over 3 pounds into an orbit that was expected to keep the satellite up from 200 to 1,000 years. Vanguard I proved what geophysicists had long suspected, that Earth is not a perfect sphere but is slightly pear-shaped, bulging in the aqueous southern hemisphere. Explorer III, with an instrumented weight of 18½ pounds, was fired into orbit by a Jupiter C nine days later. But in May a mammoth Soviet rocket launched a satellite with the then staggering weight of nearly 3,000 pounds, some 56 times as heavy as the combined weight of the three American satellite payloads.

To counter the launching of the first animals in space by the Soviets, the Americans soon began a program of launching primates into space. Although at first unsuccessful, American success culminated with a rhesus monkey named Sam. Launched aboard a Little Joe rocket on December 4, 1959, Sam experienced three minutes of
weightlessness as he traveled 55 miles into space. Sam was later recovered alive by the U.S.S. 
Borie off the coast of North Carolina.

Cape Canaveral’s Growing Pains
- The growth in population of the “Space Coast” was mind-boggling after the formation of NASA. In 1940, before American involvement in World War II, Brevard County numbered just over 16,000 residents, with less than 150 people in Melbourne and Cocoa Beach combined. The major industries in the area were agriculture (cattle, citrus, and vegetables) and commercial fishing. Alarming numbers of mosquitoes had checked the area’s population growth up to that time. With the addition of the federal space program, businesses flocked to the area, bringing jobs and opportunities for the area’s residents. Pan American World Airways, the Radio Corporation of America, TransWorld Airlines, General Electric, and the Martin-Marietta Company all opened branches near the Cape.
- Between 1950 and 1960, Brevard County’s population grew by 371%, making it America’s fastest growing county. Meanwhile, Florida’s population as a whole was increasing at a rate of almost 79%, the six-county area around the Cape at 128%, and the national average was almost 19%. In 1950, Brevard County claimed 434 manufacturing jobs; by 1970, it exceeded 17,000. Income rose dramatically. The Cape Canaveral annual payroll, $2-million in 1950, soared to $136-million by 1962. “On almost every hand,” noted U.S. News and World Report in 1962, “from the launching pads of ‘the cape’ to Orlando, 60 miles inland, this once-quiet countryside is in upheaval. New factories, new subdivisions, new shopping centers are going up with startling speed.”
- This avalanche of new people required that new facilities and services be developed almost overnight. Brevard County scrambled to build schools, part of the costly invasion of engineers’ sons and daughters to “Missile Land.” In 1950-1951, Brevard County had only 117 classrooms and an average daily attendance of 4,163 students. By 1963-1964, these numbers had grown to 39,873 in 1,473 classrooms, an increase of almost 852%!
- The influence of the space industry on education was obvious to everyone. The number of schoolchildren whose parents were federally employed rose from a little over 10% in 1950 to just under one-half by 1963. New schools were built at a rapid pace. And Melbourne High and Cocoa’s Satellite High led the state in National Merit Scholars. In 1958, scientists launched Brevard Engineering College, better known by its later name, Florida Institute of Technology.
Activities

Timeline of the United States Space Program-Part I (see next page)

Assignments
Have your students answer the following question: at this point of the Space Race, who, in your opinion, is winning? Cite evidence in your notes and timeline to strengthen your opinion. (1-2 pages)
1945 - end of WWII, Soviets and US confiscate German rockets
Assessment

1. In the post-WWII years of the Space Race, the __________ ________ had the clear advantage.
   a) United States b) Soviet Union c) Nazi Germany

2. At the end of WWII, both the Soviets and the Americans captured ____________ ____________ from Nazi Germany.
   a) V-2 rockets   b) rocket scientists   c) all of the above

3. The launching of ____________ brought the Soviet Union into the Space Age.
   a) Sputnik  b) Laika  c) Vanguard  d) Crazy Ivan

4. The American response to the Soviets’ ventures into space was:
   a) the formation of NASA and the passing of the National Defense Education Act
   b) the atomic bombing of several large cities in the USSR
   c) the launching of a cat into space
   d) none of the above

5. Which one of the following reasons WAS NOT a reason why Cape Canaveral was chosen as the base for the US space and missile research site?
   a) it was relatively unpopulated
   b) there were no major population centers anywhere close by
   c) the climate was advantageous for year-round launches
   d) the nearby beaches provided excellent recreational opportunities for the families of NASA scientists
Resources

The following resources were used in writing this lesson:

Lesson from http://fcit.usf.edu/florida/ (FL History/1950-Present: “Cape Canaveral: Launchpad to the Stars”)
Russian Space Industry Firsts from http://www.videocosmos.com/first.shtm
Smithsonian National Air and Space Museum Exhibit- “Space Race” http://www.nasm.si.edu/galleries/gal114/gal114.htm