

NAVAL HISTORY STEM-H LESSON PLAN

TEACHER HELP GUIDE

LESSON PLAN: On the Brink of Nuclear War: Projectile Motion and the Cuban Missile Crisis

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INSTRUCTIONAL GOAL:

Skip the sports analogies and offer an integrated, standards based lesson combining Cold War history and the physics of projectile motion to land a missile on target in defense of our nation. With the included activities your students will learn about projectile motion and the importance of precision and accuracy, and also the historical facts surrounding the Cuban Missile Crisis.

Students will learn that, with projectile motion, the movement along the x and y axes are independent of each other with only the force of gravity acting on the projectile once launched, then work problems related to determining the range of a missile given certain parameters. They will also learn that good problem solving prevents projectile launches.

BACKGROUND: The Cuban Missile Crisis, October 1962.

Often referred to as the “height of the Cold War” the Cuban missile crisis came about in October 1962 when the Soviet Union was discovered installing missile launch sites in the country of Cuba, just 90 miles from the United States. From that proximity a Soviet nuclear missile could quickly reach and destroy a city anywhere along the eastern seaboard causing extensive loss of life and property— a vulnerability to attack that the U.S. Government could not tolerate. As we saw with the events of 9/11, an attack on the United States would bring public cries for immediate retaliation and World War III could begin. It was a war both sides knew they could not really “win” as each had enough nuclear warheads to wipe out every major city in the other's country. Life as Americans and Soviets currently lived would cease to exist, with each side dealing with loss of life in the millions and the complete destruction of the infrastructure of each country. Both sides also knew that the pride of each country might cause them to face total destruction rather than capitulate to the actions of the other side.

An American spy plane (called the U-2) on patrol over Cuba collected intelligence photos of the launch site construction. The information quickly made its way to the top military commanders and the President of the United States at the time, John F. Kennedy. U.S. leaders were faced with a choice: allow the installations to continue and live with the threat or confront the Soviet government and demand their removal. For 13 tense days negotiations and military readiness for war between the two countries ebbed and flowed. Both sides understood the ramifications of a nuclear attack but diplomatic negotiations had not produced a scenario where each side could save face.

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The U.S. navy played a key role during this crisis. On the surface, the Navy carried out the President's order to quarantine missiles and associated supplies from reaching Cuba, essentially a blockade, preventing the components for completion of the missile sites from reaching the island nation. Under the sea, Navy submarines patrolled the oceans ready to launch nuclear missiles at the Soviet Union if a war broke out. Their unknown locations insured that attacks from the Soviet Union would not likely stop the submarine threat before a retaliatory strike could be carried out in defense of the United States.

While there was a recurring belief that we were right on the brink of nuclear destruction the crisis came to a peaceful outcome. When the Soviet ships faced the U.S. Naval blockade they turned back. As the press reported at the time, the Soviet Union and its leader, Nikita Khrushchev, "**blinked**". Shortly after that point, the missile based were taken apart and shipped back to the Soviet Union. U.S. Airborne photography confirmed the presents of the missiles and the missile launchers on ships sailing from Cuba. In return for removal of the missiles the United States agreed not to invade Cuba.

The release of classified documents released many years later revealed that the two nations were much closer to nuclear war than was even reported in the press. Direct communication had been carried out between President Kennedy and Premier Khrushchev, a level of negotiations unheard of, in an effort to avert war. It was also revealed that the United States had agreed to remove missile bases located in Turkey which were a threat to the Soviet Union, but at a later time so that the events would not appear to be connected. It was a negotiating concession that allowed both sides to report "victory."

RESOURCES:

The Cuban Missile Crisis:

<http://www.jfklibrary.org/JFK/JFK-in-History/Cuban-Missile-Crisis.aspx> and [*Cordon of Steel The U.S. Navy and the Cuban Missile Crisis*](#) by Curtis Utz. No. 1 in the series *The U.S. Navy in the Modern World*

Projectile motion explanation, formulas, and practice problems:

<http://www.physics247.com/physics-homework-help/projectile-motion.php>

Image of the 6 ballistic missiles used by the Navy during the Cold War:



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STANDARDS:

Florida History Standards – Cold War:

» [SS.912.A.6.1: Examine causes, course, and consequences of World War II on the United States and the world.](#)
Cognitive Complexity: N/A | Date Adopted or Revised: 12/08

Belongs to: [Understand the causes and course of World War II, the character of the war at home and abroad, and its reshaping of the United States role in the post-war world.](#)

» [SS.912.A.6.10: Examine causes, course, and consequences of the early years of the Cold War \(Truman Doctrine, Marshall Plan, NATO, Warsaw Pact\).](#)
Cognitive Complexity: N/A | Date Adopted or Revised: 12/08

Belongs to: [Understand the causes and course of World War II, the character of the war at home and abroad, and its reshaping of the United States role in the post-war world.](#)

» [SS.912.A.6.11: Examine the controversy surrounding the proliferation of nuclear technology in the United States and the world.](#)
Cognitive Complexity: N/A | Date Adopted or Revised: 12/08

Belongs to: [Understand the causes and course of World War II, the character of the war at home and abroad, and its reshaping of the United States role in the post-war world.](#)

Florida Science Standards:

SC.912.P.12.1: Distinguish between scalar and vector quantities and assess which should be used to describe an event.

SC.912.P.12.2: Analyze the motion of an object in terms of its position, velocity, and acceleration (with

SC.912.P.12.3: Interpret and apply Newton's three laws of motion.

SC.912.N.4.1: Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

SC.912.N.4.2: Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.

SC.912.N.1.6: Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7: Recognize the role of creativity in constructing scientific questions, methods and explanations.

SC.912.P.12.1: Distinguish between scalar and vector quantities and assess which should be used to describe an event.

SC.912.P.12.2: Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.

SC.912.P.12.3: Interpret and apply Newton's three laws of motion.

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INSTRUCTIONAL PROCEDURES FOR LESSON:

Activity One is for a basic physics class with simplified math. All launches take place at the optimum launch angle of 45 degrees where the distance initially travelled along the “x” and “y” axis are the same and can be solved using the Pythagorean Theorem ($a^2 + b^2 = c^2$) instead of basic trig.

Activity Two integrates Common Core English Language Art and Social Studies Standards into a discussion and literacy activity to introduce students to the ramification of historical events associated with the Cuban Missile Crisis during the Cold War.

INSTRUCTIONAL PROCEDURES FOR ACTIVITIES: Each is self-explanatory.