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C&I 539 Methods

Ethical Reasoning Lesson Plan

**U.S. Nuclear Testing in the Marshall Islands**

This two-day lesson fits into a larger unit of the Cold War in a freshmen U.S. History class. Specifically it falls into a section on the nuclear arms race, nuclear deterrence, and U.S. domestic and foreign policy.

**Day One:**

Hand out guided notes to students that have spaces for the ‘where, when, and why’ and a map of the Marshall Islands on the other side. Then give the students a brief lecture on the basic information about the Marshall Islands and the U.S. nuclear testing there, to cover the

Where: Marshall Islands (show on map) discuss the pros and cons of this location…

When: from June 30, 1946, to August 18, 1958, the United States conducted [67 atmospheric nuclear tests in the Marshall Islands](http://www.nuclearclaimstribunal.com/testing.htm#testlist)…

Why: to test our nuclear technology, conduct research…

* Connect to the Cold War arms race and US policy of nuclear deterrence and related topics which students will have covered in previous lessons

After introducing the topic and making sure the students have taken notes, read the students the central question and write it on the board. Tell the students to keep it in mind as they watch the following Youtube video clips.

**Central Question:**

 Was it justified for the U.S. to conduct nuclear testing on the Marshall Islands, considering the consequences for the people who live there, but also considering the scientific and national security benefits for the U.S.

**Youtube video clips:**

Collateral Damage: Atomic Testing in the Marshall Islands (3:53)

Between 1946 and 1958, the U.S. detonated 67 nuclear devices in and around the Marshall Islands. The impact of these tests on the Marshallese people was profound - in terms of both actual radioactive exposure and the displacement of people from their home islands due to contamination and to accommodate the U.S. military.

This clip is excerpted from Episode 6 of "UNNATURAL CAUSES: Is Inequality Making Us Sick?", a ground-breaking documentary series that looks at how the social, economic and physical environments in which we are born, live, and work profoundly affect our longevity and health. The series broadcast nationally on PBS in spring 2008, and can be bought on DVD from California Newsreel, www.newsreel.org

<http://www.youtube.com/user/unnaturalcausesdoc#p/u/25/Tvj7MscvSrg>

Marshallese Displaced from Homes After U.S. Nuclear Testing (5:14)

Dise Langrus is one of many Marshallese who were relocated from their home islands 40 years ago after U.S. nuclear testing rendered it uninhabitable. Others were moved to make room for the construction of the U.S. military base on Kwajalein Island. Today, the Marshallese confront the worst of the "developing" and urbanized worlds: infectious disease running rampant because of poverty and squalid conditions and chronic illnesses resulting in part from the stress of dislocation and cultural loss.

This clip is excerpted from "Collateral Damage," Episode 6 of "UNNATURAL CAUSES: Is Inequality Making Us Sick?" This ground-breaking documentary series looks at how the social, economic and physical environments in which we are born, live, and work profoundly affect our longevity and health. The series broadcast nationally on PBS in spring 2008, and can be bought on DVD from California Newsreel, www.newsreel.org

<http://www.youtube.com/user/unnaturalcausesdoc#p/u/9/_7Ef6hsf3sA>

After watching the clips, answer any questions that might have come up and have a brief discussion on the different benefits and consequences of nuclear testing, who is benefitting and who is harmed? What are other possible consequences and benefits from nuclear testing? Do the benefits outweigh the consequences? Revisit the guiding question and ask students to write down on the guided note sheet their initial thoughts.

Hand out a packet with information on specific tests done in the Marshall Islands, the Nuclear Weapons Test Map, the Marshall Islands Nuclear Claims Tribunal… and tell the students to read through it for the next class. Explain that this information will help them form their answer to the guiding question, which they will have to take a stance on in the following class. Also, let the students know that they are not limited to this information packet as evidence to justify their positions: outside research is encouraged but not necessary. Any student can find out more and share during the next class period what they found.

**Day Two:**

See if any student has any extra research they would like to share with the class, and reread the guiding question (which should still be on the board). Take any questions about the reading in the packet, see what the students thought about it…

Ask students to make a preliminary judgment on the guiding question, and then separate the two opinion groups to opposite sides of the room. Then pair the students up in mixed-opinion groups and explain how to do the Written Dialogue Exercise.

**Written Dialogue Exercise:**

Have students complete the Written Dialogue Exercise in pairs and then talk with one other group about the exercise and if they were persuaded at all by their partner’s arguments, if they felt their own argument had weaknesses…

Then have a large-group discussion about the exercise and the different opinions on the guiding question. Any persuading arguments that made the students change their mind? Any new questions raised?

End class with a summary of the activity and topics discussed in the last class period as related to the rest of the unit on the Cold War. Ask students to hand in their recorded dialogue that they did in pairs, this will be used as a form of formal assessment, with students getting credit for participation as well.

**Nuclear Testing in the Marshall Islands**

**Information Packet**

**Nuclear Weapons Test Map**

Since 1945 there have been a total of 2,057 known nuclear tests worldwide. The United States and the former Soviet Union conducted the majority of these with the U.S. performing 1,030 tests from 1945 - 1992 and the Soviet Union carrying out 715 between 1949 and 1990. In 1963 both the Soviet Union and the United States signed the Limited Test Ban Treaty which prohibited nuclear weapons tests in the atmosphere, in outer space, and underwater. Additionally, the treaty banned underground tests that would cause "radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control" the explosions were conducted.





<http://www.pbs.org/teachers/connect/resources/1091/preview/>

1. Alaska (US) -- 3 Tests
2. Johnston Island (US) -- 12 tests
3. Christmas Island (UK & US) -- 30 tests
4. Malden Island (UK) -- 3 tests
5. Fangataufa Atoll (France) -- 12 tests
6. Mururoa Atoll (France) -- 175 tests
7. Nevada (US) -- 935 tests
8. Colorado (US) -- 2 tests
9. New Mexico (US) -- 2 tests
10. Mississippi (US) -- 2 tests
11. South Atlantic Ocean (US) -- 12 tests
12. Algeria (France) -- 17 tests
13. Russia (USSR) -- 214 tests (many at Novaya and Zemlya)
14. Ukraine (USSR) -- 2 tests
15. Kazakhstan (USSR) -- 496 tests
16. Uzbekistan (USSR) -- 2 tests
17. Turkmenistan (USSR) -- 1 test
18. Pakistan (Pakistan) -- 2 tests
19. India (India) -- 4 tests
20. Lop Nur (China) -- 41 tests
21. Marshall Islands (US) -- 66 tests
22. Australia (UK) -- 12 tests

In September, 1996 the United Nations General Assembly voted to adopt the Comprehensive Nuclear Test Ban Treaty, which prohibits all "nuclear weapons test explosions and all other nuclear explosions." As of September 1998, 150 nations had signed the treaty, and 21 nations had ratified it. Notable exceptions are India and Pakistan, both of which conducted nuclear tests in May, 1998.

**Bikini Atoll**


Bikini Atoll, located in the central Pacific, is one of the 29 atolls and five islands that make up the Marshall Islands. Bikini itself is perhaps best known in the West for the role it played in the U.S. nuclear test program. A number of atomic tests took place on Bikini, the first of which called Operation Crossroads, was scheduled for March of 1946. The 167 islanders, who were living on Bikini at the time were evacuated by U.S. officials. In 1969 after U.S. agencies declared that it was safe to return to Bikini, President Johnson ordered the atoll to be resettled "with all possible dispatch." Bikini Islanders began returning home in the early '70s. But subsequent monitoring of the islands revealed higher levels of radioactivity than originally thought. In September 1978, the Islanders were once again evacuated. They have not returned.

**The "Bravo" Test**


On March 1, 1954 the United States tested an H-bomb design on Bikini Atoll that unexpectedly turned out to be the largest U.S. nuclear test ever exploded. By missing an important fusion reaction, the Los Alamos scientists had grossly underestimated the size of the explosion. They thought it would yield the equivalent of 5 million tons of TNT, but, in fact, "Bravo" yielded 15 megatons -- making it more than a thousand times bigger than the bomb dropped on Hiroshima.

The blast gouged a crater about a mile wide in the reef. Within seconds the fireball was nearly three miles in diameter. The illumination from the blast was visible for almost one minute on Rongerik, an island 135 miles east of the burst. It trapped personnel in experiment bunkers and engulfed the 7,500 foot diagnostic pipe array. Physicist Marshall Rosenbluth was on a ship about 30 miles away. He remembers that the fireball, "just kept rising and rising, and spreading... It looked to me like what you might imagine a diseased brain, or a brain of some mad man would look like on the surface... And the air started getting filled with this gray stuff, which I guess was somewhat radioactive coral."

An hour-and-a-half later a similar gritty, snow-like substance began raining down on a Japanese fishing vessel called the Lucky Dragon that was about 80 miles east of Bikini. The 23 fishermen aboard had no idea the ash was fallout from a hydrogen bomb test. When they returned to port two weeks later they were all suffering severe radiation sickness. The radio operator later died. One Tokyo newspaper headline demanded that the U.S. authorities "Tell us the truth about the ashes of death."

Marshall Islanders were also exposed to the fallout. One islander on Rongelap about 100 miles east of Bikini remembers hearing, "a loud explosion and within minutes the ground began to shake. A few hours later the radioactive fallout began to drop on the people, into the drinking water, and on the food. The children played in the colorful ash-like powder. They did not know what it was."

On Rongerik (about 135 miles east of Bikini), 28 U.S. service personnel operating a weather station grew alarmed when the meter reading on their fallout monitoring equipment went off the scale. They radioed the communications center and took cover inside a tightly closed building. The service personnel were evacuated within 34 hours. The Marshall Islanders, who had been closer to the blast, weren't rescued for another day, by which time many of them had severe burns and were beginning to lose their hair.

In a press conference, shortly after the blast, Atomic Energy Commissioner Lewis Strauss claimed that, "meteorologists had predicted a wind condition which should have carried the fallout to the north of a group of small atolls lying to the east of Bikini... The wind failed to follow the predictions but shifted south of that line and the little islands of Rongelap, Rongerik and Utirik were in the edge of the path of the fallout." But in fact a weather report just seven hours before the shot predicted "less favorable winds at 10,000 - 25,000 foot levels" with winds at 20,000 feet "headed for Rongelap to the east."

In 1955, the United States paid two million dollars as restitution for damage to the Lucky Dragon, its 23 crew members and its cargo. And in 1988, the Marshall Islands Nuclear Claims Tribunal was established to grant compensation to Marshall Islanders for personal injury deemed to have been caused by nuclear testing. As of December 31, 1997, $63,127,000 had been awarded to or on behalf of 1,549 people. With more personal injury claims and several class action suits for property damage still pending, the Tribunal claims that the original terms of the settlement with the Marshall Islanders are grossly inadequate.

**"Mike" Test**


On November 1, 1952 the United States detonated a hydrogen device in the Pacific that vaporized an entire island, leaving behind a crater more than a mile wide. The test, code-named "Mike" was the first successful implementation of the concept for a superbomb that physicist Edward Teller and mathematician Stanislaw Ulam had outlined in a report a year and a half earlier. A team of scientists assigned the task of turning the Ulam-Teller concept into an experimental device, met for the first time in October 1951. They achieved the designated goal, one that required a tremendous engineering effort, in little more than a year.

The design process was complicated by the sort of hydrogen fuel the team decided to use. One option would have been lithium deuteride, which has the advantage of being a solid at room temperature. But the scientists had limited information on how well it would work. They chose instead to use liquid deuterium, which needed to be kept below it's boiling point of -417.37 fahrenheit. That meant the device would require a very complex insulation and cooling system.

"Mike" was also incredibly large. In 1952, the smallest atomic bomb with enough explosive force to set off a fusion reaction, was almost four feet in diameter. The actual casing for the "Mike" gadget would end up being 20 feet long. According to one of the scientists who worked on the project, a full-scale drawing of the device became essential for everyone on the team to communicate effectively with each other. The drawing was so big, that a balcony had to be built from which to view it.

As the date for the test approached, a number of prominent scientists not involved with the project pushed to have it postponed. The reasons they gave were political. "Mike" was scheduled to be detonated just three days before a general election. Many scientists felt that it was wrong to burden a new president with the responsibility for a nuclear test that he had not authorized. They also argued that by testing "Mike" the U.S. would effectively eliminate any opportunity it had for reaching an agreement with the Soviet Union for a moratorium on thermonuclear weapons. But after listening to the arguments, President Truman decided to proceed as planned.

The test was to take place on Eniwetok Atoll, which is in the Marshall Islands about 3,000 miles west of Hawaii. It was an enormous operation. Staging began in March and by October more than 11,000 civilians and military personnel were in the vicinity of Eniwetok working on the project. A six-story cab was built on the island of Elugelab to house "Mike." And a two-mile long tunnel that extended from the device to another island was filled with helium balloons that would provide data on the progress of the fusion reaction.

"Mike" was detonated remotely from the control ship Estes, which was stationed 30 miles away from ground zero. Even those who had witnessed atomic tests were stunned by the blast. Within 90 seconds the fire ball had reached 57,000 feet. The cloud, when it had reached its furthest extent, was about 100 miles wide. The explosion wiped Elugelab off the face of the planet, and destroyed life on the surrounding islands. In their report, the survey team that went to Engebi three miles from ground zero wrote, "The body of a bird was seen, but no living animals and only the stumps of vegetation. Among the specimens collected were fish which seemed to have been burned. On each of these fish, the skin was missing from one side, as if, the field notes said at the time, the animal 'had been dropped in[to] a hot pan.' "

Physicist Herbert York summed up the implications of the first test of a thermonuclear device: "the world suddenly shifted from the path it had been on to a more dangerous one. Fission bombs, destructive as they might have been, were thought of [as] being limited in power. Now, it seemed we had learned how to brush even these limits aside and to build bombs whose power was boundless."

**Report from the Marshall Islands Nuclear Claims Tribunal for the Calendar Year 1997 Showing the Number of Claims for Various Medical Conditions**


In June 1983, the United States and the Marshall Islands entered into a formal agreement in which the U.S. recognized the contributions and sacrifices made by the Marshallese as a result of the Nuclear Testing Program. The Marshall Islands Nuclear Claims Tribunal was established in 1988 to grant compensation for personal injury deemed to have been caused by the testing.

As of December 31, 1997 $63,127,000 had been awarded to or on behalf of 1,549 people.

Marshall Islands Nuclear Claims Tribunal
Summary Of Presumed Medical Conditions Regulations

ATTACHMENT 1

Pursuant to 23(13) of the Marshall Islands Nuclear Claims Tribunal Act 1987, as amended, the Tribunal adopted regulations in August 1991 establishing a list of 25 medical conditions which are irrebuttably presumed to be the result of the Nuclear Testing Program. Those regulations were amended by the Tribunal and approved by the Cabinet of the Republic of the Marshall Islands in January 1944 to add two additional conditions (numbers 26 and 27 below) to the presumed list. Effective October 1, 1996, the regulations were again amended by the Tribunal and approved by the Cabinet to include seven additional conditions (number 28-34 below).

For eligible claimants, the administratively presumed medical conditions and the amounts of compensation for each that will be paid in pro rata annual payments are as follows:

1. Leukemia (other than chronic lymphocytic leukemia).....$125,000
2. Cancer of the thyroid
a. if recurrent or requires multiple surgical and/or ablation............................................$75,000
b. if non-recurrent or does not require multiple treatment...........................................$50,000
3. Cancer of the breast
a. if recurrent or requires mastectomy................$100,000
b. if not recurrent or requires lumpectomy............ $75,000
4. Cancer of the pharynx.................................$100,000
5. Cancer of the esophagus...............................$125,000
6. Cancer of the stomach.................................$125,000
7. Cancer of the small intestine.........................$125,000
8. Cancer of the pancreas................................$125,000
9. Multiple myeloma......................................$125,000
10. Lymphomas (except Hodgkins's disease).................$100,000
11. Cancer of the bile ducts..............................$125,000
12. Cancer of the gall bladder............................$125,000
13. Cancer of the liver (except cirrhosis or hepatitis B is indicated).......................................$125,000
14. Cancer of the colon....................................$75,000
15. Cancer of the urinary bladder..........................$75,000
16. Tumors of the salivary gland
a. if malignant........................................$50,000
b. if benign and requiring surgery.....................$37,500
c. if benign and not requiring surgery.................$12,500
17. Non-malignant thyroid nodular disease (unless limited to occult nodules)
a.if requiring total thyroidectomy.....................$50,000
b.if requiring partial thyroidectomy...................$37,500
c.if not requiring thyroidectomy.......................$12,500
18.Cancer of the ovary....................................$125,000
19.Unexplained hypothyroidism (unless thyroiditis indicated
.......................................................$37,500
20.Severe growth retardation due to thyroid damage........$100,000
21.Unexplained bone marrow failure........................$125,000
22.Meningioma.............................................$100,000
23. Radiation sickness diagnosed between June 30, 1946 and August 18, 1958, inclusive.....................$12,500
24. Beta burns diagnosed between June 20, 1946 and August 18, 1958, inclusive..........................$12,500
25.Severe mental retardation (provided born between May and September 1954, inclusive,and mother was present on Rongelap or Utirik Atolls at any time in March 1954)..........$100,000
26.Unexplained hyperparathyroidism.........................$12,500
27. Tumors of the parathyroid gland
a. ifmalignant.........................................$50,000
b.if benign and requiring surgery......................$37,500
c.if benign and not requiring surgery..................$12,500
28. Bronchial cancer (including cancer of the lung and pulmonarysystem)...................................$37,500
29.Cancer of the brain....................................$125,000
30.Cancer of the central nervous system...................$125,000
31.Cancer of the kidney....................................$75,000
32.Cancer of the rectum....................................$75,000
33.Cancer of the cecum.....................................$75,000
34. Non-melanoma skin cancer in individuals who were diagnosed as having suffered beta burns under number 24 above..................................$37,000

The regulations adopted by the Tribunal also provide a mechanism and set out applicable standards for (1) the consideration of non-presumed conditions for compensation in individual cases; (2) the periodic standards for (1) the consideration of non-presumed conditions for compensation in individual cases; (2) the periodic evaluation of possible modifications to the list of presumed conditions; (3) the assignment of compensation levels to non-presumed or future presumed medical conditions; and (4) adjustments to the amounts of compensation based on a claimant's age and prognosis.

Source: Nuclear Claims Tribunal, Republic of the Marshall Islands.

To review or obtain copies of the regulations, contact Cathlina J. deBrum, Clerk of the Tribunal, P.O. Box 702, Majuro, MH 96960; telephone (692)625-3396; facsimile (692)625-3389; e-mail nctmaj@ntamar.com.

To find out more about the Nuclear Claims Tribunal visit their Web site at www.tribunal-mh.org.

<http://www.pbs.org/teachers/connect/resources/1091/preview/>

**Welcome to the Marshall Islands Nuclear Claims Tribunal**

*site last updated: June 11, 2007*

During the period from June 30, 1946, to August 18, 1958, the United States conducted [67 atmospheric nuclear tests in the Marshall Islands](http://www.nuclearclaimstribunal.com/testing.htm#testlist), 43 at Enewetak Atoll, 23 at Bikini Atoll, and one approximately 85 miles from Enewetak. The most powerful of those tests was the "Bravo" shot, a 15 megaton device detonated on March 1, 1954, at Bikini atoll. That test alone was equivalent to 1,000 Hiroshima bombs.

While the Bravo test is well known, it should be acknowledged that 17 other tests in the Marshall Islands were in the megaton range and the total yield of the 67 tests was 108 megatons, the equivalent of more than 7,000 Hiroshima bombs.

For the sake of comparison, it may be noted that from 1945 to 1988, the U.S. conducted a total of 930 known nuclear tests with a combined yield estimated to be 174 megatons. Approximately 137 megatons of that total was detonated in the atmosphere. In other words, while the number of tests conducted in the Marshall Islands represents only about 14% of all U.S. tests, the yield of the tests in the Marshalls comprised nearly 80% of the atmospheric total detonated by the U.S.

In June 1983, a formal Agreement Between the Government of the United States and the Government of the Marshall Islands for the Implementation of Section 177 of the Compact of Free Association was entered into ([Section 177 Agreement](http://www.nuclearclaimstribunal.com/177text.htm)). In that agreement, the U.S. recognized the contributions and sacrifices made by the people of the Marshall Islands in regard to the Nuclear Testing Program and accepted the responsibility for compensation owing to citizens of the Marshall Islands for loss or damage to property and person resulting from that testing.

Under the 177 Agreement, the United States provided to the Marshall Islands the sum of $150 million as a financial settlement for the damages caused by the nuclear testing program. That money was used to create a fund intended to generate $270 million for distribution over a 15 year period with average annual proceeds of  approximately $18 million per year through the year 2001. These funds were distributed among the peoples of Bikini, Enewetak, Rongelap, Utrik, for medical and radiological monitoring, and the payment of claims.

The 177 Agreement also provided for the establishment of a Claims Tribunal with jurisdiction to "render final determination upon all claims past, present and future, of the Government, citizens and nationals of the Marshall Islands which are based on, arise out of, or are in any way related to the Nuclear Testing Program."

The Marshall Islands Nuclear Claims Tribunal was established in 1988.  In 1991, the Tribunal first implemented a compensation program for personal injuries deemed to have resulted from the nuclear testing program.  By the end of 2003, the Tribunal had awarded more than $83 million in compensation for such injuries with additional compensable claims being filed on a regular basis.  In addition, the Tribunal has awarded over $1 billion in property damage awards in the class actions of the people of Enewetak Atoll and the people of Bikini Atoll. The pending property claims from the peoples of Rongelap and Utrik Atolls near completion, while the people of Ailuk Atoll have recently filed a class action claim for compensation.

With only $45.75 million made available for actual payment of awards made by the Tribunal during the first fifteen years of the Compact and less than $6 million of the initial $150 million now remaining in the Nuclear Claims Fund, it has become clear that the original terms of the settlement agreement are manifestly inadequate.

<http://www.nuclearclaimstribunal.com/>



[http://commons.wikimedia.org/wiki/File:Bravo\_fallout2.png](http://commons.wikimedia.org/wiki/File%3ABravo_fallout2.png)

 Path of [nuclear fallout](http://en.wikipedia.org/wiki/Nuclear_fallout) plume after U.S. nuclear weapons test Bravo (yield 15 Mt) on [Bikini Atoll](http://en.wikipedia.org/wiki/Bikini_Atoll). It is the single worst contamination accident in U.S. nuclear history. The test was part of the [Operation Castle](http://en.wikipedia.org/wiki/Operation_Castle). The Bravo event was an experimental thermonuclear device surface event.