

## The Fever of '57

### EXPLORATION 5: What Was the Radioactive Fallout Legacy of the Sputnik Year?

**Disciplines:** Earth Science, Meteorology, and Chemistry

**Suggested Age:** 14 and up

**Background:** During the year 1957 to 1958, just after the launch of Sputnik, the two superpowers of the day, America and the Soviet Union, began a dangerous game of nuclear brinkmanship. If the Soviets could launch a satellite into space, we figured they could land a nuclear bomb at our doorstep. So we became very fearful and the arms race began in earnest. During this year, as the Cold War between the superpowers heated up, *above ground nuclear bomb tests* (with their associated radioactive nuclear fallout) happened somewhere in the world every three days!

The 15 megaton (Mt) Castle Bravo test on the bikini atoll was the largest hydrogen bomb detonated by the United States. This paled in comparison to the 50 Mt Tsar Bomba explosion initiated by the Soviet Union. This device—the King of all Bombs—was scaled down from its original design of 100 megatons to reduce the resulting nuclear fallout. Significantly, due to meteorological conditions and unusual winds, Castle Bravo developed into the worst radiological (fallout) accident caused by the United States.

To get some perspective it should be noted that the atomic bombs dropped on Japan in 1945 were only 15 kilotons (Little Boy--Hiroshima) and 20 kilotons (Fat Man—Nagasaki). Hence, Tsar Bomba was about 3000 times more powerful than these World War II giants.

In terms of fallout, 1957's *above ground* Operation Pumbbob (29 explosions) at the Nevada Test Site 65 miles northwest of Las Vegas produced the most radioactive dust and accompanying Iodine-131 in history. In addition to civilian exposure, troop exercises conducted on the ground near the 19<sup>th</sup> shot code-named Smoky exposed over three thousand servicemen to relatively high levels of radiation. A survey of these servicemen in 1980 found significantly elevated rates (2.5X) of leukemia.

#### Exploration 5 Activity Ideas for Students

Have students conduct research online and write up a report including answers to one of the following questions:

1. What kind of environmental impact did this have on the Earth's atmosphere, land, water, and air?
2. Why is there a ban on above-ground tests today?
3. Is the world safer now than it was then?
4. What are the physical effects of nuclear bombs and their fallout on humans and other life forms?
5. For radiological emergencies all households within the emergency protective zone (i.e., 10 mile radius) of nuclear power plants in America are eligible to receive potassium iodide (KI) pills free-of-charge. Why would anyone go to the trouble of procuring these tablets? Should the US government stockpile enough KI for every person in the country?
6. Nuclear fallout primarily emits dangerous beta particles and gamma rays, hence the spate of personal bomb shelters built in the 1950's. Essentially, these shelters were designed to allow a family to avoid exposure to harmful fallout until the radioactivity decays to a safe level. Given the half-lives of the most radioactive isotopes how long would a group of people have to stay in a fallout shelter after a nuclear attack?

7. Given today's threat of a so called conventional "dirty bomb" being detonated in one of major cities do you feel that fallout shelters should come back into vogue?

**Related Media:**

- Part 1 - 3 – The Fever of '57 (DVD)

**Student Handouts and Helpers:**

- Exploration 5 Student Activity
- Online Homework Helper for Exploration 5 at [www.thefeverof57.com](http://www.thefeverof57.com)

**Online Homework Helper for Exploration 5**

Links are available for students from the website [www.thefeverof57.com](http://www.thefeverof57.com) under “Homework Helper”.

Radioactive Fallout

<http://library.thinkquest.org/C004218/RadiationFallout.htm>  
<http://hyperphysics.phy-astr.gsu.edu/hbase/nucene/bomb2.html>  
<http://www.history.navy.mil/faqs/faq76-1.htm>  
<http://physics.bu.edu/py106/notes/RadioactiveDecay.html>

Above Ground Nuclear Testing

[http://www.epa.gov/rpdweb00/rert/nuclear\\_blast.html](http://www.epa.gov/rpdweb00/rert/nuclear_blast.html)  
<http://archive.greenpeace.org/comms/nukes/ctbt/read9.html>

Potassium Iodide Tablets

<http://www.ki4u.com/>  
<http://www.fda.gov/cder/guidance/4825fnl.htm>  
<http://www.areyouprepared.com/potassium-iodide-information.html>

Fallout/Bomb Shelters

<http://www.radshelters4u.com/>  
[http://www.alpinesurvival.com/nuclear\\_bomb\\_shelters.html](http://www.alpinesurvival.com/nuclear_bomb_shelters.html)  
<http://wardomatic.blogspot.com/2006/11/fallout-shelter-handbook-1962.html>

Related and Appropriate YouTube Videos

<http://youtube.com/watch?v=fd1IFjBNNVo>  
[http://www.youtube.com/watch?v=C0K\\_LZDXp0I](http://www.youtube.com/watch?v=C0K_LZDXp0I)  
<http://www.youtube.com/watch?v=16cewjeqNdw&mode=related&search=>  
<http://www.youtube.com/watch?v=Dobys9s9f2w>

## Exploration 5

### Student Activity Sheet

#### The Fever of '57

#### YOUR EXPLORATION: What Was the Radioactive Fallout Legacy of the Sputnik Year?

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### Here's What to Do

Conduct research online and write up a report that contains answers to one of the following questions:

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[http://www.archives.gov/digital\\_classroom/lessons/nuclear\\_fallout\\_documents/nuclear\\_fallout.html](http://www.archives.gov/digital_classroom/lessons/nuclear_fallout_documents/nuclear_fallout.html)

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**Visit The Fever of '57 Homework Helper for videos and links to help you with Exploration 5.**

**[www.thefeverof57.com](http://www.thefeverof57.com)**