

What Will Happen if a Nuclear Bomb Falls on Lahore?

Karen Haydock
haydock@gmail.com

Grade level: Classes VIII-XI

Introduction

Suppose a nuclear bomb exploded on Lahore – what would happen? What would happen to the people of Pakistan? What would happen to the people of India? What would happen to the environment? What are the economics of a nuclear weapons development program? Can nuclear weapons be good? Should we build nuclear weapons? In today's world these questions need to be considered as part of science and technology literacy.

Science concepts

- What are nuclear weapons and how are they different from conventional weapons?
- Assessing the death and destruction caused by nuclear weapons

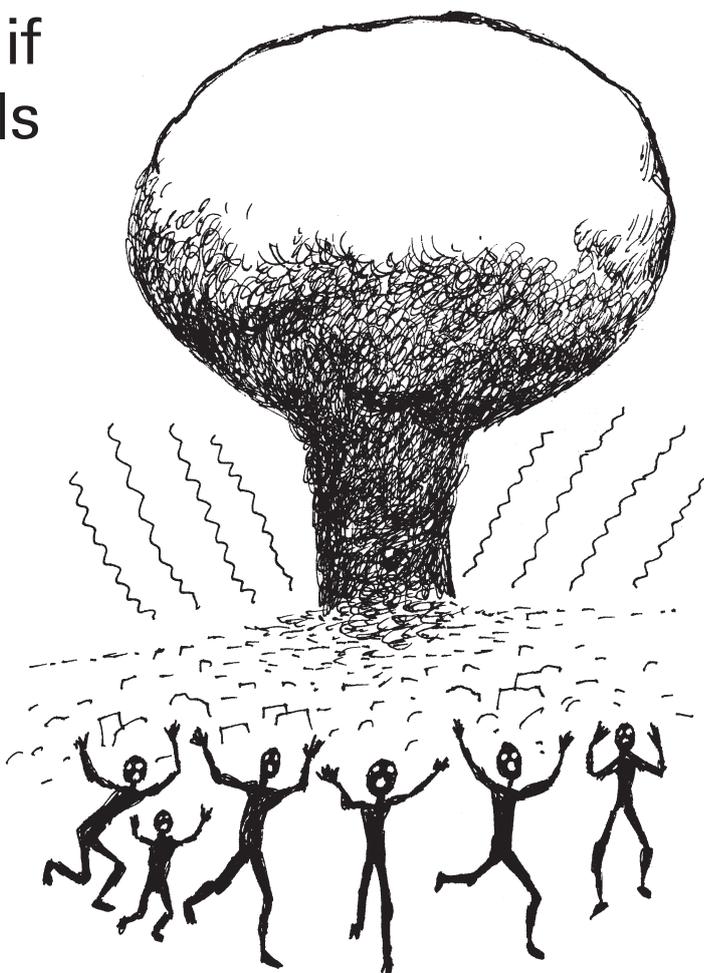
Previous knowledge

The students should have heard of molecules and atoms

Teaching/learning materials

Slides showing the effects of nuclear war

Access to libraries, newspapers, and the internet



Students' Guide

Scenario: Sadako by Eleanor Coerr

One morning in August 1954, Sadako Sasaki looked up at the blue sky over Hiroshima and saw not a cloud in the sky. It was a good sign. Sadako was always looking for good-luck signs.

Back in the house, her sister and brothers were still sleeping on their bed quilts. She poked her big brother, Masahiro. "Get up, lazybones!" she said. "It's Peace Day!"

Masahiro groaned, but when he sniffed the good smell of bean soup, he got up. Soon Mitsue and Eiji were awake, too.

Rushing like a whirlwind into the kitchen, Sadako cried, "Mother, can we please hurry with breakfast? I can hardly wait for the carnival!" "You must not call it a carnival," her mother said. "It is a memorial day for those who died when the atom bomb was dropped on our city. Your own grand mother was killed, and you must show respect."

"But I do respect Obasan," Sadako said. "It's just that I feel so happy today."

At breakfast, Sadako fidgeted and wriggled her bare toes. Her thoughts were dancing around the Peace Day of last year - the crowds, the music, and the fireworks. She could almost taste the spun cotton candy. She jumped up when there was a knock at the door. It was Chizuko, her best friend. The two were as close as two pine needles on the same twig.

"Mother, may we go ahead to the Peace Park?" Sadako asked.

"Yes, Sadako chan," her mother answered. "Go slowly in this heat!" But the two girls were already racing up the dusty street.

Mr. Sasaki laughed. "Did you ever see Sadako walk when she could run, hop, or jump?"

At the entrance to the Peace Park, people filed through the memorial building in silence. On the walls were photographs of the ruined city after the atom bomb-the Thunderbolt- had instantly turned Hiroshima into a desert.

"I remember the Thunderbolt," Sadako whispered. "There was the flash of a million suns. Then the heat prickled my eyes like needles."

"How could you possibly remember anything?" Chizuko exclaimed. "You were only a baby then."

"Well, I do!" Sadako said stubbornly.

After a speech by the mayor, hundreds of white doves were freed from their cages. Then, when the sun went down, a dazzling display of fireworks lit up the dark sky.

Afterward, everyone carried rice-paper lanterns to the banks of the Ohta River. Written on the rice-paper were the names of relatives and friends who had died because of the Thunderbolt. Sadako had Obasan's name on hers.

Candles were lit inside the lanterns. Then they were launched on the river, floating out to sea like a swarm of fireflies.

It was the beginning of autumn when Sadako rushed into the house with the good news.

"The most wonderful thing has happened!" she said breathlessly. "The big race on Field Day! I've been chosen to be on the relay team!" She danced around the room. "If we win, I'll be sure to get on the team next year!"

That was what Sadako wanted more than anything else.

From then on, Sadako thought of only one thing - the relay race. She practiced every day at school and often ran all the way home. Masahiro timed her with their father's big watch. Sadako dreamed of running faster. Maybe, she thought, I will be the best runner in the whole world.

At last the big day arrived. Parents, relatives, and friends gathered at the school to watch the sports events. Sadako was so nervous she was afraid her legs wouldn't work at all.

"Don't worry," Mrs. Sasaki said. "When you get out there, you will run as fast as you can."

At the signal to start, Sadako forgot everything but the race. When it was her turn, she ran with all the strength she had. Her heart thumped painfully against her ribs when the race was over.

It was then that a strange, dizzy feeling came over her. She scarcely heard when someone cried, "Sadako! Your team won!" The class surrounded Sadako, cheering and shouting. She shook her head a few times and the dizziness went away.

All winter long, Sadako practiced to improve her speed. But every now and then the dizziness returned. She



didn't tell anyone about it, not even Chizuko. Frightened, Sadako kept the secret inside her. On New Year's Eve, Mrs. Sasaki hung good-luck symbols above the door to protect her family all through the year.

"As soon as we can afford it, I'll buy a kimono for you," she promised Sadako. "A girl your age should have one."

Sadako politely thanked her mother, but she didn't care about a kimono. She only cared about racing with the team next year.

For several weeks it seems that the good luck symbols were working. Sadako felt strong and healthy, and she ran faster and faster.

But all that ended one crisp, cold winter day in February when Sadako was running in the school yard. Suddenly everything seemed to whirl around her, and she sank to the ground.

Soon Sadako was in an examining room in the hospital, where a nurse took some of her blood. Dr. Numata tapped her back and asked a lot of questions.

Sadako heard the doctor say the word "leukaemia." That was the sickness caused by the atom bomb! She put her hands over her ears, not wanting to hear any more.

Mrs. Sasaki put her arms around Sadako. "You must stay here for a little while," she said. "But I'll come every evening." "The doctors want to take some tests, that's all," her father told her.

"They might keep you here a few weeks."

A few weeks ! To Sadako it seemed like years. What about the relay team?

When her family had left for the night, Sadako buried her face in the pillow and cried for a long time. She had never felt so lonely.

The next day, Chizuko came to visit, smiling mysteriously.

"Close your eyes," she said. Sadako held her eyes tightly shut, "Now you can look!"

Sadako stared at the paper and scissors on the bed. "What's that for?" I've figured out a way for you to get well," Chizuko said proudly. "Watch!"

She cut a piece of gold paper into a large square and folded it over and over, until it became a beautiful crane.

Sadako was puzzled "But how can that paper bird make me well?"

"Don't you remember that old story about the crane?" Chizuko asked. "It's supposed to live for a thousand years. If a sick person folds one thousand paper cranes, the gods will grant her wish and make her well again." She handed the golden crane to Sadako. "Here's your first one."

"Thank you, Chizuko chan," Sadako whispered. "I'll never part with it."

That night, Sadako felt safe and lucky. She set to work folding cranes, and Masahiro hung them from the ceiling. Why, in a few weeks she would be able to finish the thousand cranes and go home - all well again.

Eleven... I wish I'd get better...

Twelve... I wish I'd get better...

One day Nurse Yasunaga wheeled Sadako out onto the porch for some sunshine. There Sadako met Kenji. He was nine and small for his age, with a thin face and shining dark eyes.

Soon the two were talking like old friends. Kenji had been in the hospital a long time, but his parents were dead and he had few visitors. "It doesn't really matter," Kenji said with a sigh, "because I'll die soon. I have leukaemia from the bomb." Sadako didn't know what to say. She wanted so much to comfort him. Then she remembered. "You can make paper cranes like I do," she said, "so that a miracle can happen!" "I know about the cranes," Kenji said quietly. "But it's too late. Even the gods can't help me now."

That night, Sadako folded a big crane out of her prettiest paper and sent it across the hall to Kenji's room. Perhaps it would bring him luck. Then she made more birds for her own flock.

One hundred ninety-eight...I wish I'd get better...

One hundred ninety-nine...I wish I'd get better...

One day Kenji didn't appear on the porch, and Sadako knew that Kenji had died.

Late that night, Sadako sat at the window, letting the tears come. After a while, she felt the nurse's gentle hand on her shoulder. "Do you think Kenji is out there on a star island?" Sadako asked.

"Wherever he is, I'm sure he is happy now," the nurse replied. "He has shed that tired, sick body, and his spirit is free." "I'm going to die next, aren't I?" "Of course not!" Nurse Yasunaga answered with a firm shake of her head. "Come, let me see you fold another crane before you go to sleep. After you finish one thousand, you'll live to be an old, old lady." Sadako tried hard to believe that. She folded birds and made the same wish. Now there were more than three hundred cranes.

In July it was warm and sunny, and Sadako seemed to be getting better. "I'm over halfway to a thousand cranes," she told Masahiro, "so something good is going to happen." And it did.

Her appetite came back and much of the pain went away. She was going to get to go home for O Bon, the biggest holiday of the year. O Bon was a special celebration for the spirits of the dead who returned to visit their loved ones on earth.

Mrs. Sasaki and Mitsue had scrubbed and swept the house, and the air was filled with smells of delicious

holiday food. Dishes of bean cakes and rice balls had been placed on the altar. After they had eaten, Eiji handed Sadako a big box tied with a red ribbon. Slowly Sadako opened it. Inside was a silk kimono with cherry blossoms on it. Sadako felt hot tears blur her eyes. "Why did you do it?" she asked, stroking the soft cloth. "Silk costs so much money." "Sadako chan," her father said gently, "your mother stayed up late last night to finish sewing it. Try it on for her."

Mrs. Sasaki helped her put on the kimono and tie the sash. Everyone agreed that she looked like a princess. Sadako let out a happy sigh. Perhaps - just perhaps - she was home to stay.

But by the end of the week Sadako was weak again and had to return to the hospital. The class sent her a Kokeshi doll to cheer her up. Sadako placed it on the bedside table next to the golden crane.

For the next few days, Sadako drifted in and out of a strange kind of half- sleep. Her parents sat beside the bed. "When I die," she said dreamily, "will you put my favourite bean cake on the altar of my spirit? And put a lantern on the Ohta River for me on Peace Day?" Mrs. Sasaki could not speak. She took her daughter's hand and held it tightly. "Hush!" Mr. Sasaki said. "That will not happen for many, many more years. Don't give up now, Sadako chan. You have to make only a few hundred more cranes."

As Sadako grew weaker, she wondered, Did it hurt to die? Or was it like falling asleep? Would she live on a heavenly mountain or star? She fumbled with a piece of paper and clumsily folded one more bird.

Six hundred and forty four...

Her mother came in and felt her forehead. She gently

took the paper away. As Sadako closed her eyes, she heard her mother whisper, "O flock of heavenly cranes, Cover my child with your wings."

When she opened her eyes again, Sadako saw her family there beside the bed. She looked around at their faces and smiled. She knew that she would always be a part of that warm, loving circle.

Sadako looked up at the flock of paper cranes hanging from the ceiling. As she watched, a light autumn breeze made the birds rustle and sway. They seemed to be alive, and flying out through the open window.

Sadako sighed and closed her eyes. How beautiful and free they were.

Sadako Sasaki died on October 25, 1955.

Her friends and classmates worked together to fold 356 paper cranes, so that she would be buried with one thousand. In a way, she got her wish. She will live on in the hearts of all the people who hear her story.

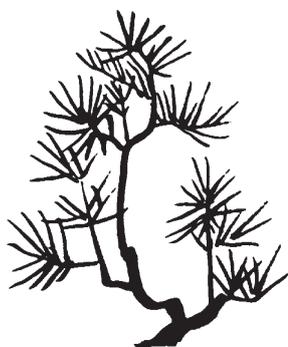
The class collected Sadako's letters and writings and published them in a book called Kokeshi, after the doll they had given her. A Folded Crane Club was organised in her honour.

Sadako's friends began to dream of a monument to her and all the children who were killed by the bomb. Young people throughout the country helped collect money. They wrote letters and shared Sadako's story. Finally, in 1958, their dream came true.

Now there is a statue of Sadako in Hiroshima Peace Park. She is standing on the Mountain of Paradise, holding a golden crane in out-stretched hands.

Every year, on Peace Day, children hang garlands of paper cranes under the statue. Their wish is engraved at its base:

This is our cry,
this is our prayer:
Peace in the world.

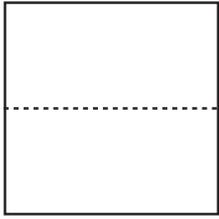


Your Tasks:

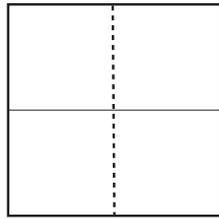
1. Read the story of Sadako.
2. Make paper cranes [see Handout].
3. Listen to the slide show, "It Could Happen To Us".
4. Work in groups, using the library and the internet to find out:
 - a. What are the differences (in terms of both design and effect) between conventional and nuclear weapons?
 - b. What is the size of the nuclear bomb that was dropped on Hiroshima, and what are the sizes of nuclear weapons available these days?
 - c. If a medium-size nuclear bomb was to fall on Lahore what would happen? (First decide on exactly what is meant by 'medium sized'.)
 - i. On a map of South Asia, draw circles to show the size of the area in which all people would die immediately, the area in which most buildings would be destroyed and most people would be hurt, and the area in which radiation would have a substantial effect. (Also consider the effects of wind and different weather conditions.)
 - ii. Estimate how many people would die immediately and after some time due to the bomb.
 - iii. Discuss and estimate what the effect on Chandigarh would be.
 - d. Find out how much India has spent on developing nuclear weapons. Suppose the same amount had instead been spent on schools or hospitals – how many schools or hospitals could be built and kept running?
 - e. Which countries spend the most money on nuclear weapons?
5. Each group will then present their findings to the rest of the class.
6. The whole class should brainstorm on the good and bad things about nuclear weapons, and then discuss whether nuclear weapons should be built.
7. Discuss in small groups how we could stop nuclear war. Then discuss in the whole class.

MAKE A PAPER CRANE

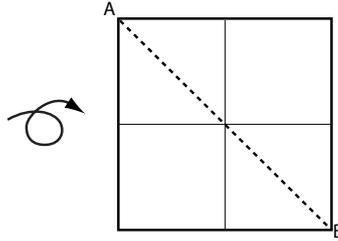
Use a square piece of a thin paper (a 20 cm square of old newspaper works fine).



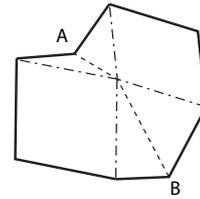
1. Fold in half and unfold, to get a crease.



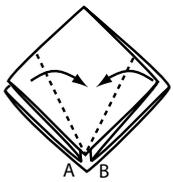
2. Fold in half the other way, and unfold.



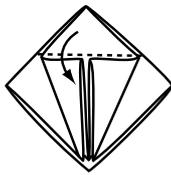
3. Turn the paper over and fold on the diagonal.



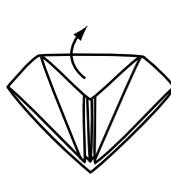
4. Push the centre up while bringing all four corners together, with A and B in between.



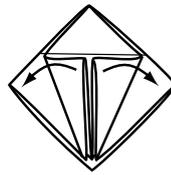
5. With A and B at the bottom, fold the top layer on each side in to the centre.



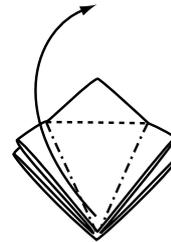
6. Fold the top triangle down.



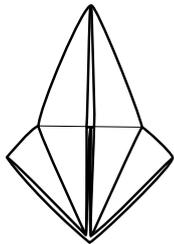
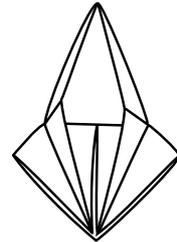
7. Unfold the top triangle.



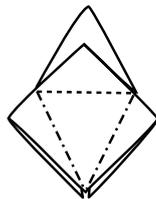
8. Unfold the two side flaps.



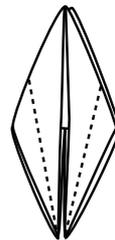
9. Raise the bottom point (top layer only), making a valley fold along the horizontal line, and allowing the sides to come together.



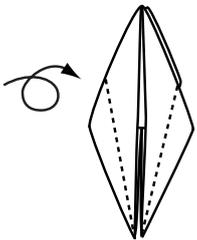
10. Flatten the trapezoid



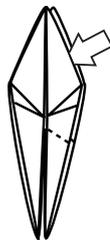
11. Turn over and repeat steps 5 - 10 on the other side.



12. Notice that the bottom of the resulting trapezoid is split. Fold the sides to the centre (top layer only).



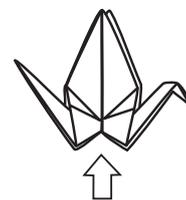
14. Turn over and fold the sides to the centre.



15. While opening slightly at the arrow, inside-reverse fold to bring the neck up from inside.



16. Now, inside-reverse fold to bring the tail up. Also, inside-reverse fold to bring the beak down.



17. Pull the wings slightly apart while gently blowing to inflate the body.

Teachers' Guide

Suggested Teaching Strategy

1. Read the story and/or present the slide show, "It Could Happen To Us" (available on CD). For younger children, we suggest you read the story but do not present the slide show, since some material in the slide show may be too disturbing.
2. Ask the students to work in groups, using the library and the internet to find out answers to the questions given above in Your Tasks. You may give the students the following hints:
 - a. The sizes of bombs are measured by comparing their explosive power to the explosive power of TNT.
 - b. You need to estimate the current population in different parts of Lahore, Pakistan, and India based on published census data.
 - c. When considering the effect of a nuclear bomb, consider all kinds of effects: deaths injuries and resulting sicknesses of people and other animals, destruction of buildings, railroads, bridges, roads, forests, farms, long term effects of radiation, congenital birth defects, and other economic, political, social, psychological, religious effects.
3. Each group will then present their findings to the rest of the class.
4. The whole class should brainstorm on the good and bad things about nuclear weapons, and then discuss whether nuclear weapons should be built. While brainstorming, try to get the students to think of all possibilities, even outlandish ones. Later, in the discussion, the validity of points brought up during the brainstorming can be debated. The teacher can at times play the 'devil's advocate' in order to get the students to think deeper.
5. Discuss in small groups how we can prevent nuclear war. Then discuss in the whole class. Should the ideas be followed by action?

Additional Activity

If desired, after reading the story of Sadako, you can teach the children how to fold paper cranes (the method can be found in many books on Japanese paper folding, or origami).

About the Script:

I read the story of Sadako to a group of about 30 boys from Classes 6, 7 and 8 in an elite convent school in Chandigarh. Then I guided through the process of folding paper cranes.

Then we had a discussion. I asked the children why we read the story and why we folded the cranes. They said that we have to remember what happened, and we have to know how bad atom bombs are, so that we can have world peace.

Then, after some more similar discussion, I asked them, "So, after hearing the story of Sadako, how many of you think that India should drop an Atom Bomb on Pakistan?"

Immediately, more than half of the boys raised their hands, waving proudly, and shouting out, "Yes! Yes! Bomb them!"

So I asked, "Don't any of you have any cousins there?....Don't you think there are also children in Pakistan who are just like you?.....Don't you think there might be any Sadako's in Pakistan?"

But even then, the boys answered, "But if Pakistan had done something bad, then it would be alright to kill their Sadako's."

One boy was laughing with a real mean glint in his eyes, saying gleefully, "Smash them!!!" [Should we be thankful that at least this child is honest in communicating his feelings? An educated adult scientist/politician from the US may think similarly about 'the enemies', but may instead phrase his or her response in terms like, "It is unfortunate that there may be some collateral damage but we must fight a war on terrorism the peacekeeping force and nuclear deterrence a terrorwar on peace force the civilized world and democratic nuclear shield...." – spoken while stuffing their pockets with the profits of the arms business and continuing to train and fund Osama's in Asia.]

Another boy said, with (false) authority, "It is not true that if we attack Pakistan with a nuclear bomb, we will also feel the affects in India." Interestingly, no one in our discussion had yet brought up this possibility. Are his parents the ones who have misguided him? Or his teachers?

Certainly there is a need to continue with the activities suggested in the Script, but we were not able to do so at that school because of limited time.

I wonder if 'uneducated' children would respond in the same way. What about children in schools that are not so elite? We will try this in other places.

The slide show has been presented to other groups of students but the full script has not yet been tried out.