



## LESSON PLAN: *National Geographic Magazine Archive 1995-present*

**Title:** Hiroshima and Nagasaki: Science that Would Change History

**Grade Level(s):** 9-12 (High School)

**Subject/Content:** Physics or Chemistry

**Overview & Purpose:** This lesson serves as a supplement to teaching about nuclear fission. Students should have already learned what nuclear fission and fusion are. The article, "Living with the Bomb," should serve to help students understand the effects of fission and fusion on the world and give students a better understanding of how science applies to the world.

**Focus Question:** How did the discovery of nuclear weapons change how the world viewed science and the threat of science on the world?

### Materials and Resources Needed:

- Database: National Geographic Virtual Library, National Geographic Magazine Archive 1995-present. [Rhodes, Richard. "Living With the Bomb." National Geographic Aug. 2005: \[99\]+. National Geographic Virtual Library. Web. 13 June 2013.](#)
- Questions about reading

### Procedures:

#### Steps/Activities by the teacher:

- Discuss with students what nuclear fusion and fission are and why they are important to know/understand.
- Read through the National Geographic's article titled, "Living with the Bomb" as a class. Suggestion: Read popcorn style (calling on students randomly to read) and add in clarifying comments. Make sure to pre-read the article and pick out words that your students will struggle with to explain; pause every few paragraphs to have students answer the questions provided.

#### Steps/Activities by Student(s):

- Read through the National Geographic's Article titled, "Living with the Bomb" as a class. Answer the questions on the handout as your read the article.
- Write essay about the global impacts of Hiroshima and Nagasaki.

### Learning Objectives:

- Students will have an understanding of nuclear fission and how the bombings of Hiroshima and Nagasaki used nuclear fission.

- Students will have an understanding of how the bombings of Hiroshima and Nagasaki changed the ability of the scientific community to do valuable research.

**Related Activities:**

**Physics/Chemistry:**

- Have students connect this back to what they have learned in class about nuclear fusion and nuclear fission by writing an essay about the global impacts of nuclear fusion and fission being used in the world. Although the essay will focus on the use of nuclear fission, the implications of nuclear fusion will be implied.

**Skills Used:** Students will use their information locating skills in order to find relevant information in the article. Students will use their ability to find evidence in an article in order to write an essay stating the implications of the bombs.

**Homework/Assessment:** The assessment will come in the form of an essay discussing the global implications of the bombs.

**Differentiation:**

- **Advanced-** If you have a few students that are able, have them read the article and answer the questions on their own. They can also look online independently to find another article about the implications of the bombs in order to write their essay with more evidence.
- **Struggling-** If you have a few students that are struggling, you can go through a copy of the text in advanced and underline/circle key words and define them. You can also write clarifying notes in the margins in order to help them better comprehend the information.

**Standards Alignment**

**Next Generation Science Standards:**

NGSS HS-PS1-8: Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. [Clarification Statement: Emphasis is on simple qualitative models, such as pictures or diagrams, and on the scale of energy released in nuclear processes relative to other kinds of transformations.]

**National Curriculum Standards Science:**

- B. Physical Science (Grades: 9-12)
  - 3 Chemical reactions
- F. Science in Personal and Social Perspectives (Grades: 9-12)
  - 5 Natural and human-induced hazards
- G. History and Nature of Science (Grades: 9-12)
  - 2 Nature of scientific knowledge
  - 3 Historical perspectives

**Standard Source:** NSES 1996 from National Academies Press

## **ISTE NETS for Students:**

### High School

- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
  - a. Identify and define authentic problems and significant questions for investigation
  - b. Plan and manage activities to develop a solution or complete a project
  - c. Collect and analyze data to identify solutions and/or make informed decisions
  - d. Use multiple processes and diverse perspectives to explore alternative solutions

**Standard Source:** ISTE NETS for Students, 2007

Name: \_\_\_\_\_  
Date: \_\_\_\_\_  
Period: \_\_\_\_\_

### **Hiroshima and Nagasaki: Science that Would Change History**

**Instructions:** As we read the article, answer the questions that follow in complete sentences.

1. What did Oppenheimer fear would happen with the knowledge to make nuclear weapons?
2. What happened in Hiroshima and Nagasaki?
3. What did Abdul Qadeer Khan do with his knowledge of nuclear weapons and how did this lead to the spread of threats of nuclear attacks?
4. What is the Nuclear Nonproliferation Treaty (NPT)?
5. What threats of nuclear attacks have happened since the bombings at Hiroshima and Nagasaki?
6. What countries currently have nuclear weapons?
7. What measures have been taken since the cold war in order to end the use of nuclear weapons?
8. What happened in Iran which posed a threat to other countries?

