



**Literacy Design  
Collaborative**

# Atomic Fission, Atomic Bomb

★ TASK ★ LADDER

by Susan Weston

Students will trace the steps from the discovery of atomic fission to the creation of atomic weapons.

As texts, they will engage the August 6, 1945 New York Times coverage of the Hiroshima detonation, and Life magazine photos from Hiroshima, supported by three videos explaining atomic fission and short on-line readings about the challenges of creating and controlling chain reactions. All materials are available on the internet.

The skills section of this module was designed directly from the subject specific grade-level Common Core State Standards for Reading and writing

One of the videos used is “A is for Atom,” a 1952 period piece that is likely to draw some fun student comments. The science is sound, though presented in a light way. The references to “men of science” is especially remarkable when discussing work that owes so much to Marie Curie and Lise Meitner.

This module is designed to be completed in nine classroom hours or eleven fifty-minute periods.

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GRADES

**6 - 8**

DISCIPLINE

 **Science**

COURSE

**Any**

PACING

 **9hr**

# Section 1: What Task?

## Teaching Task

### Task Template IE1 - Informational or Explanatory

After researching original reporting and internet sources , write an essay in which you define atomic fission and explain how the Manhattan Project turned the science of fission into powerful weapon technology . Support your discussion with evidence from the text/s.

## Standards

### Next Generation Science Standards

#### MS-PS1-1

Develop models to describe the atomic composition of simple molecules and extended structures.

#### MS-PS1-5

Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

### Next Generation Science Standards (NGSS Comprehensive)

#### HS-PS1-8.

Focus

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.

### Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects

#### RST.6-8.1

Cite specific textual evidence to support analysis of science and technical texts.

#### RST.6-8.8

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

#### RST.6-8.9

Focus

Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

#### RST.6-8.2

Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

#### RST.6-8.4

Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6—8 texts and topics.

## RST.6-8.5

Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

## RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

## W.8.2

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content

## W.8.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

## W.8.5

With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.

## W.8.7

Focus

Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

## W.8.9

Draw evidence from literary or informational texts to support analysis, reflection, and research.

## Texts

- 🔗 **First Atomic Bomb Dropped on Japan,” New York Times, August 6, 1945,**
- 🔗 **“Hiroshima and Nagasaki: Photos from the Ruins,” Life Magazine**
- 🔗 **“What is Fission?” (Explanatory Video 1, 2 minutes)**
- 🔗 **“A Fission Chain Reaction” from NOVA’s “Hunting the Elements,” (Explanatory Video 2, 3 minutes)**
- 🔗 **“A is for Atom” from General Electric, 1952 (Explanatory video 3, 15 minutes)**
- 🔗 **How Nuclear Bombs Work, by William Harris, Craig Freudenrich, Ph.D. and John Fuller, section on nuclear fuel**
- 🔗 **How Nuclear Bombs Work, section on fission bomb design**
- 🔗 **How Nuclear Bombs Work, section on fission bomb triggers**

## Student Work Rubric - Informational or Explanatory Task - Grades 6-8

	Emerging	Approaches Expectations	Meets Expectations	Advanced
	1	2	3	4
<b>Controlling Idea</b>	Presents an unclear or unfocused controlling idea.	Presents a <b>general</b> controlling idea that <b>addresses the prompt</b> , with an <b>uneven focus</b> .	<b>Presents and maintains a clear</b> controlling idea that addresses <b>all aspects</b> of the prompt.	Presents and maintains a clear and <b>specific</b> controlling idea that addresses all aspects of the prompt and <b>takes into account the complexity of the topic</b> .
<b>Selection &amp; Citation of Evidence</b>	Includes minimal details from sources. Sources are used without citation.	Includes details, examples, and/or quotations from sources that are relevant to the controlling idea. Inconsistently cites sources.	Includes details, examples, and/or quotations from sources that are relevant to the controlling and supporting ideas. <b>Consistently</b> cites sources with <b>minor formatting errors</b> .	Includes <b>well-chosen</b> details, examples, and/or quotations from sources that <b>support</b> the controlling and supporting ideas. Consistently cites sources using appropriate format.
<b>Development / Explanation of Sources</b>	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.	Explanation of ideas and source material is <b>minimal</b> or contains <b>minor errors</b> .	<b>Accurately</b> explains ideas and source material and <b>how they support the controlling idea</b> .	<b>Thoroughly</b> and accurately explains ideas and source material, <b>using reasoning</b> to support and <b>develop</b> the controlling idea.
<b>Organization</b>	Lacks an evident structure. Makes unclear connections among ideas, concepts, and information.	<b>Groups ideas and uses some transitions</b> to connect ideas, with <b>some lapses in coherence or organization</b> .	<b>Groups and sequences</b> ideas to <b>develop the controlling idea</b> . Uses transitions to <b>clarify the relationships among ideas, concepts, and information</b> .	Groups and sequences ideas <b>logically</b> to develop the controlling idea and <b>create cohesion</b> . Uses <b>varied</b> transitions to clarify the relationships among ideas, concepts, and information.
<b>Conventions</b>	Major errors in standard English conventions interfere with the clarity of the writing. Language or tone is inappropriate.	<b>Errors</b> in standard English conventions sometimes interfere with the clarity of the writing. Uses language and tone that are <b>sometimes inappropriate</b> to the audience and purpose.	<b>Consistently applies</b> standard English conventions; <b>minor errors</b> , while noticeable, <b>do not interfere</b> with the clarity of the writing. Uses language and tone <b>appropriate to the audience and purpose</b> .	Consistently applies standard English conventions, <b>with few errors</b> . Demonstrates <b>varied syntax</b> and <b>precise word choice</b> . <b>Consistently</b> uses language and tone appropriate to the audience and purpose.
<b>Content Understanding (Generic)</b>	Attempts to include disciplinary content in explanation or argument but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.	Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.	Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.	Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

## ***Background for Students***

The atomic bomb was one of the biggest news story of the last century. We'll look at how the story was shared at the time, how the science behind it works, and how that science was developed into usable technology.

## ***Extension***

Not provided

## *Section 2: What Skills?*

### ***Preparing for the Task***

**TASK ANALYSIS:** Ability to understand and explain the teaching task prompt.

**SCORING EXPECTATIONS:** Ability to understand and explain what will count as a strong response to the teaching task prompt.

### ***Reading Process***

**EXTRACTING EVIDENCE:** Ability to draw evidence from informational texts to support analysis reflection, and research (WHST.9)

**COMPARING SOURCES:** Ability to draw evidence from informational texts to support analysis reflection, and research. (RST.9)

**CONDUCTING RESEARCH:** Ability to conduct research projects to answer question, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (WHST.7)

### ***Transition to Writing***

**CONNECTING IDEAS:** Ability to begin linking what has been learned in reading to what will be shared in writing

### ***Writing Process***

**ORGANIZATION:** Ability to organize ideas, concepts, and information into broader categories as appropriate to achieving purpose. (WHST.2a)

**INTRODUCTION:** Ability to introduce a topic clearly, previewing what is to follow (WHST.2a)

**DEVELOPMENT:** Ability to develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples (WHST.2b)

**CONCLUSION:** Ability to provide concluding statement that follows from and supports the information or explanation presented (WHST.2f)

**REWRITING:** Ability to develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

## Section 3: What Instruction?

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
<b>Preparing for the Task</b>				
25 mins	<b>TASK ANALYSIS:</b> Ability to understand and explain the teaching task prompt.	<b>LIST</b> Make a list of all the questions you can think of about the teaching task	None	<ul style="list-style-type: none"> <li>Share an image of the front page of the August 6, 1945, New York Times, and explain that the coming module will figure out the science behind the headlines.</li> <li>After students generate individual questions, create a class list and discuss. Where possible, allow students to generate the answers. Where needed, share what you have planned.</li> </ul>
25 mins	<b>SCORING EXPECTATIONS:</b> Ability to understand and explain what will count as a strong response to the teaching task prompt.	<b>RUBRIC TRANSLATION</b> Complete the “What Will Count as a Strong Response? Handout (attached)”	Student work meets expectations if it includes a reasonable set of words for each descriptor	<ul style="list-style-type: none"> <li>With the handout, demonstrate how you would restate the first descriptor, and ask students for suggestions on how to restate the second one.</li> <li>Have students fill in the others individually.</li> <li>Discuss as a class.</li> <li>Ask students to revise their answers before turning them in.</li> </ul>
Additional Attachments:  <b>What Will Count As A Strong Answer</b>				
<b>Reading Process</b>				
20 mins	<b>EXTRACTING EVIDENCE:</b> Ability to draw evidence from informational texts to support analysis reflection, and research (WHST.9)	<b>ANNOTATED TEXT</b> As you read the New York Times article, put an S to the left of each paragraph that provides scientific information.	Student work meets expectations if it shows reasonable annotations of scientific elements with in the article	<ul style="list-style-type: none"> <li>Use the first three paragraphs to demonstrate thinking about what counts as scientific information. (An opinion: the first paragraph definitely gets an S, the third definitely does not, and the one in between is a nice opportunity for discussion.)</li> <li>Ask students to annotate the sections under the headings “Japanese Solemnly Warned” and “Most Closely Guarded Secret.” As they finish, have a class-wide discussion of what they marked.</li> <li>Ask them to annotate the rest of the article, and discuss again.</li> </ul>
30 mins	<b>EXTRACTING EVIDENCE:</b> Ability to draw evidence from informational texts to support analysis reflection, and research (WHST.9)	<b>QUESTION LIST</b> As you re-read the New York Times science paragraphs with your partner, write your questions to the right of each paragraph.	Student work meets expectations if it includes one or more questions per paragraph.	<ul style="list-style-type: none"> <li>Encourage students to take turns “whisper-reading” the paragraphs.</li> <li>Ask one pair to share their questions as you write them on the board. Invite others to add more questions (Added thought: consider starting with a pair that may lack confidence in their skills, making them classroom leaders in this activity.)</li> <li>After students leave, make the class questions into a handout for the next day, leaving space after each question for student notes on answers.</li> </ul>
50 mins	<b>COMPARING SOURCES:</b> Ability to	<b>ANSWERS AND MORE QUESTIONS</b>	Student work meets expectations	<ul style="list-style-type: none"> <li>Show the pictures one at a time, facilitating class discussion of what they see and can figure out as</li> </ul>

	draw evidence from informational texts to support analysis reflection, and research. (RST.9)	After viewing and discussing the Life Magazine pictures of Hiroshima, decide which questions from your list can be partially answered based on what you see. Write your answers on your question list. Add the additional questions that emerge from class discussion.	if reasonable answers are added to the sheet, especially on any questions about the scale of the bomb's impact.	they look. <ul style="list-style-type: none"> <li>Allow time for individual notes on the question sheets, and then discuss.</li> <li>Ask: Do you have more questions? Conduct class discussion to decide whether to add questions at the end of their handout.</li> <li>Hint: keep student note sheets in the classroom to avert tragic losses.</li> </ul>
50 mins	<b>COMPARING SOURCES:</b> Ability to draw evidence from informational texts to support analysis reflection, and research. (RST.9)	<b>ANSWERS AND MORE QUESTIONS</b> After viewing each atomic fission video, decide which questions from your list can be partially answered based on what you see. Write your answers on your question list. Add the additional questions that emerge from class discussion.	Student work meets expectations if reasonable answers are added to the sheet, especially on any questions about atomic fission.	<ul style="list-style-type: none"> <li>View the videos in order of length, so that they provide a scaffold of increasingly detailed explanations.</li> <li>After the first, conduct class discussion about which questions may have been answered.</li> <li>After the second, ask students to note their own answers on their sheets, and then discuss.</li> <li>Before the third, ask students to take notes during the video.</li> <li>The third video will get some laughs. After the second or third class reaction, remind them to take notes.</li> <li>Discuss answers students noted.</li> <li>Again, invite students to propose more questions and conduct discussion on which ones to add.</li> </ul>
50 mins	<b>COMPARING SOURCES:</b> Ability to draw evidence from informational texts to support analysis reflection, and research. (RST.9)	<b>ANSWERS AND MORE QUESTIONS</b> After reading the three pages from the Nuclear Bomb website, decide which questions from your list can be partially answered based on what you see. Write your answers on your question list. Add the additional questions that emerge from class discussion.	Student work meets expectations if reasonable answers are added to the sheet, especially on any questions about atomic fission.	<ul style="list-style-type: none"> <li>Allow student time to read the website pages, answering questions and adding others</li> </ul>
20 mins	<b>CONDUCTING RESEARCH:</b> Ability to conduct research projects to answer question, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (WHST.7)	<b>MORE QUESTIONS</b> After reviewing your notes, identify three questions you still want answered. You can choose questions that are already on the sheet or add new ones.	Student work meets expectations if three content-appropriate questions are clearly identified for research focus.	<ul style="list-style-type: none"> <li>Explain that class will round off its work by spending one period on internet research.</li> <li>Invite students to share out many of their questions.</li> <li>Allow anyone who wants to change questions to do so.</li> </ul>
50 mins	<b>CONDUCTING RESEARCH:</b> Ability to conduct research projects to answer question, drawing on several sources and	<b>NOTES AND SOURCES</b> Each time you find information for your question, make notes on the most important information and be sure to	Student work meets expectations if notes are clear and reflect relevant information.	<ul style="list-style-type: none"> <li>Allow each student to report for one minute on new information gleaned.</li> </ul>



	generating additional related, focused questions that allow for multiple avenues of exploration. (WHST.7)	write down your source (website, name and copyright date of book, name of article and magazine with publication date.		
<b>Transition to Writing</b>				
50 mins	<b>CONNECTING IDEAS:</b> Ability to begin linking what has been learned in reading to what will be shared in writing	<b>CONNECTING IDEAS</b> List what you now know about atomic fission and the Manhattan project	None	<ul style="list-style-type: none"> <li>Before the Quick Write, take a new look at the teaching task.</li> <li>After the Quick Write, ask students what else they want to do to get ready for writing. Allow them to use remaining time to do that work.</li> </ul>
<b>Writing Process</b>				
20 mins	<b>ORGANIZATION:</b> Ability to organize ideas, concepts, and information into broader categories as appropriate to achieving purpose. (WHST.2a)	<b>OUTLINE</b> Make a list of three to five major issues that would make good paragraph topics. Number them.	Work meets expectations if paragraph topics: <ul style="list-style-type: none"> <li>Connect to teaching task.</li> <li>Relate to the evidence students have studied.</li> </ul>	<ul style="list-style-type: none"> <li>Invite students to compare their lists in small groups/</li> <li>Assure students that they can change their topics if they have an Aha! As they talk with classmates.</li> </ul>
30 mins	<b>ORGANIZATION:</b> Ability to organize ideas, concepts, and information into broader categories as appropriate to achieving purpose. (WHST.2a)	<b>ANNOTATED NOTES</b> Hunt through your notes, finding the three to five best pieces of evidence for each of your paragraphs.	Work meets expectations if annotations identify support for each paragraph.	<ul style="list-style-type: none"> <li>As needed, invite individual students to change paragraph ideas if they find that a first idea lacks evidence. Let the whole class hear you congratulate the first student who switches on spotting the problem and then share the solution.</li> </ul>
20 mins	<b>INTRODUCTION:</b> Ability to introduce a topic clearly, previewing what is to follow (WHST.2a)	<b>OPENING PARAGRAPH</b> Write an opening paragraph that includes a controlling idea and sequences the key points you plan to make in your composition	Work meets expectations if it <ul style="list-style-type: none"> <li>Provides direct answer to main prompt requirements.</li> <li>Establishes a controlling idea.</li> <li>Identifies key points that will shape be developed later in the piece.</li> </ul>	<ul style="list-style-type: none"> <li>In pairs, students share their opening paragraphs and discuss ways to improve.</li> </ul>
30 mins	<b>DEVELOPMENT:</b> Ability to develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples (WHST.2b)	<b>BODY PARAGRAPHS</b> Working from your notes, create a paragraph in which you have one topic sentence that shares your main point and multiple other sentences that use evidence from your notes.	Work meets expectations if each paragraph: <ul style="list-style-type: none"> <li>Reflects the student's plan for topics.</li> <li>Includes information from</li> </ul>	

			students' notes.	
20 mins	<b>CONCLUSION:</b> Ability to provide concluding statement that follows from and supports the information or explanation presented (WHST.2f)	<b>CONCLUSION</b> Write a final paragraph that sums up your essay.	Work meets expectations if conclusion provides a fresh, short summary of the main thinking of the piece.	Not Provided
20 mins	<b>REWRITING:</b> Ability to develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.	<b>FEEDBACK FOR A CLASSMATE</b> Read a classmate's essay, noting five strong points and three ways you think could be stronger. Be helpful!	Work meets expectations if feedback is: <ul style="list-style-type: none"> <li>Clearly stated</li> <li>Helpfully stated.</li> </ul>	Before students begin their reviews, have some discussion about what kinds of feedback is most helpful to the person who receives it.
30 mins	<b>REWRITING:</b> Ability to develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.	<b>FINAL DRAFT</b> After considering the feedback, revise your essay	Not Provided	None/Scoring with LDC Rubric.

## Instructional Resources

No resources specified

## *Section 4: What Results?*

### ***Student Work Samples***

No resources specified

### ***Teacher Reflection***

Not provided