

Nuclear Power: Friend or Foe?

1. Task Overview
2. Classroom Activity
3. Student Task: Parts 1 and 2
4. Task Specifications and Scoring Rubrics

Task Overview (20 minutes for classroom activity, 120 minutes for performance task = 140 total minutes)

Classroom Activity (20 minutes)

Using visual stimuli (chart and photo), the teacher invites students to share prior knowledge of nuclear power. By way of class discussion, and in order to contextualize the examination of stimuli in Part 1, students are reminded of two basic understandings about nuclear power: 1) that it is one among several ways that societies produce electricity and 2) that its use is controversial.

Part 1 (50 minutes)

Students examine and take notes on the stimuli, a series of Internet sources that present both sides of the nuclear debate. Constructed-response questions call upon the students to summarize and evaluate the presented sources.

Part 2 (70 minutes)

Students refer to their notes as needed to compose a full-length argumentative report. Students are allowed access to the stimuli they examined in Part 1. Pre-writing, drafting, and revisions are involved.

Scorable Products

Student responses to the constructed-response research questions at the end of Part 1 and the report completed in Part 2 will be scored. Notes completed in Part 1 and pre-writing and drafting in Part 2 will not be scored.

Teacher Preparation / Resource Requirements

This is a computer-based test that requires an interface for each test-taker. The testing software will include access to spell check, but not to grammar check. The teacher should ensure that sufficient blank paper and writing tools are available for student note-taking. Ideally, the teacher has access to a projector and PowerPoint-like software for presenting images in the introductory Classroom Activity, but these images can also be distributed as handouts.

Teacher Directions for the Classroom Activity

Introductory Classroom Activity (20 minutes)

- Present on a projector (or distribute a handout of) the pie chart on the production of electricity in the U.S. (see attached).
- After giving students a moment to look at the chart, ask, “What do you think this chart is telling us? What would you guess that its title or caption is?”
- After taking a few responses, affirm or state that the chart provides data on where electricity comes from in the United States.
- Invite students to briefly define the various kinds of energy sources that appear on the chart: hydroelectric, renewables, nuclear, etc.
- Ask, “Which of the sources accounts for just over 19% of America’s electricity?”
- After a student has identified nuclear power, ask, “What do you know about nuclear power? How does it produce electricity?”
- While students share what they know about the technology of nuclear power, show them the photograph of the functioning nuclear power plant, the Susquehanna Steam Electric Station in Pennsylvania (see attached). (Explain that the white emissions are steam.)
- If students do not know anything about nuclear power technology, tell them that it comes from a device (a nuclear reactor) that creates a chain reaction that breaks up the nucleus of an atom so that it produces energy. Usually heat from this process is used to generate electricity.
- Say to the students, “In the performance task that you are going to participate in today, you will learn more about nuclear power and the debate over its pros and cons. Eventually, you will need to take a position on whether we should encourage or discourage the use of nuclear power, and you will defend your point of view in an argumentative report. It is important to know that, as the pie chart indicates, nuclear power is one way that our country currently gets its electricity. Some people support it and think it might even be a bigger piece of the pie. Others oppose it and would like to see it disappear from the pie chart altogether.”

Teacher Directions for Parts 1 and 2

Part 1 (50 minutes)

Students should receive the sources, directions, questions, report assignment, and any other material related to the task. They should receive the constructed-response questions in Part 1 and the report assignment in Part 2.

1. Initiate the online testing session.
2. Pass out the note-taking guide, reminding the students that its use is optional and unscored.
3. Alert the students when there are 25 minutes remaining in Part 1.
4. Alert the students when there are 5 minutes remaining in Part 1.
5. Have students write their names on any notes. Collect all student notes.
6. Close the testing session.

Stretch Break

Part 2 (70 minutes)

1. Initiate the testing Part 2.
2. Allow students to access the sources, their notes, and their answers to the constructed-response questions presented in Part 1. They will not be allowed to change their answers.
3. Once 15 minutes have elapsed, suggest students begin writing the report.
4. Alert the students when 30 minutes remain.
5. Alert students when 15 minutes remain and suggest they begin revising their reports.
6. Close the testing session.

Student Directions for Parts 1 and 2

Part 1 (50 minutes)

Your task

You will conduct some research on the pros and cons of nuclear power and then write a report arguing your opinion on the use of nuclear power for generating electricity.

Steps to follow

In order to plan and compose your report, you will do all of the following:

1. Review and evaluate the results of an Internet search on the pros and cons of your topic.
2. Make notes about the information from the sources.

- Answer two questions about the sources.

Directions for beginning

You are chief-of-staff for your local congresswoman in the U.S. House of Representatives. She has called you into her office to outline an urgent project.

“I have received advance notice,” she says as you sit down, “that a power company is proposing to build a nuclear plant in the southeastern corner of our state. The plan will be announced to the public tomorrow morning, and citizens and journalists will want to know what my position is on this controversial issue. To be honest, I am not sure how I feel about it. We currently don’t have any nuclear power plants in this state, so I haven’t taken time to consider the issue deeply.”

“I need you,” she continues, “to conduct a brief survey of the pros and cons of nuclear power. Summarize what you have learned and report back to me this afternoon.”

Back in your office, you enter “nuclear power pros and cons” into a Google search engine, and it returns what looks like a promising mix of articles, videos, and data charts. You must review and evaluate these sources and summarize their arguments—both pro and con—before reporting back to the congresswoman.

You have been provided with and are encouraged to use a note-taking guide that will help you gather and process your findings.

Research Questions

After you have reviewed the research sources, answer the questions below. Your answers to these questions will be scored. Also, they will help you think about the sources you have read and viewed, which should help you write your report. Answer the questions in the spaces provided below each question.

- From the sources you have reviewed, summarize 3 major arguments that support, and 3 major arguments that oppose, the use of nuclear power for generating electricity. For each of the arguments, cite at least one source that supports this fact or point of view.

Argument / Fact in Favor of Nuclear Power	Source Supporting This Argument
1.	
2.	
3.	
Argument / Fact in Opposition to Nuclear Power	Source Supporting This Argument
1.	
2.	
3.	

- Evaluate the credibility of the arguments and evidence presented by these sources. Which of the sources are more trustworthy and why? Which of the sources warrant some skepticism because of bias

or insufficient evidence?

Part 2 (70 minutes)

You will now have 70 minutes to review your notes and sources, plan, draft, and revise your report. You may use your notes and refer to the sources. You may also refer to the answers you wrote to the questions in Part 1, but you cannot change those answers. Now read your assignment and the information about how your report will be scored; then begin your work.

Your Assignment

Back in the congresswoman's office, you start to hand her your notes on the pros and cons of nuclear energy, but she waves away your papers.

"Some emergency meetings have come up and I don't have time to review your research notes," she says. "Instead, go ahead and make a recommendation for our position on this nuclear power plant. **Should we support the building of this nuclear plant in our state, or should we oppose the power company's plan?** Be sure that your recommendation acknowledges both sides of the issue so that people know that we have considered the issue carefully. I'll review your report tonight and use it for the press conference tomorrow morning."

Write an argumentative report that recommends the position that your congresswoman should take on the plan to build a nuclear power plant in your state. Support your claim with evidence from the Internet sources you have read and viewed. You do not need to use all the sources, only the ones that most effectively and credibly support your position and your consideration of the opposing point of view.

Report Scoring

Your report will be scored on the following criteria:

1. **Statement of purpose / focus and organization:** How well did you clearly state your claim on the topic, maintain your focus, and address the alternate and opposing claims? How well did your ideas logically flow from the introduction to conclusion using effective transitions? How well did you stay on topic throughout the report?
2. **Elaboration of evidence:** How well did you elaborate your arguments and discussion of counterarguments, citing evidence from your sources? How well did you effectively express ideas using precise language and vocabulary that were appropriate for the audience and purpose of your report?
3. **Conventions:** How well did you follow the rules of usage, punctuation, capitalization, and spelling?

Now begin work on your report. Manage your time carefully so that you can:

- plan your report
- write your report
- revise and edit for a final draft

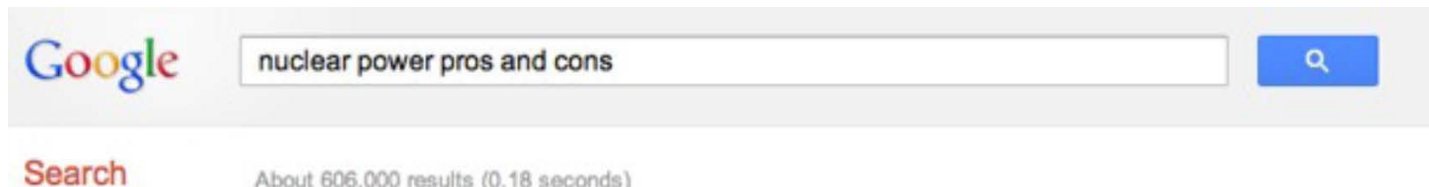
Word-processing tools and spell check are available to you.

Type your response in the space provided. Write as much as you need to fulfill the requirements of the task; you are not limited by the size of the response area on the screen.

Note-Taking Guide

Research Source	Published by . . .	Arguments for Nuclear Power	Arguments against Nuclear Power	How reliable is the evidence from this source?

Source information:



[Nuclear power - Wikipedia, the free encyclopedia](http://en.wikipedia.org/wiki/Nuclear_power)

en.wikipedia.org/wiki/Nuclear_power

Nuclear power is the use of sustained nuclear fission to generate heat and electricity. **Nuclear power** plants provide about 6% of the world's energy and 13– 14% ...

[James Hansen on Nuclear Energy - YouTube](http://www.youtube.com/watch?v=alrxqx_B34s)



www.youtube.com/watch?v=alrxqx_B34s

Nov 16, 2010 - 1 min - Uploaded by Newsweek Magazine

"NASA's premier climate change expert believes that next-generation, safe **nuclear power** is an option which we need to develop. And it is being ..."

[LETTER TO THE EDITOR: Against plans for nuclear power plant](http://ottumwacourier.com/letters/.../Against-plans-for-nuclear-power-plant)

ottumwacourier.com/letters/.../Against-plans-for-nuclear-power-plant

Mar 17, 2012 – I would like to comment on Mid-American Energy's intent to build a **nuclear power** plant in Iowa. We already have one **nuclear** plant in Palo, ...

[Look inside Fukushima's meltdown zone a year later - YouTube](http://www.youtube.com/watch?v=-6oQAYunXqk)

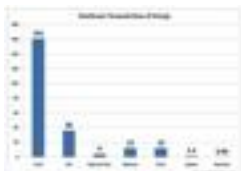


www.youtube.com/watch?v=-6oQAYunXqk

Feb 28, 2012 - 3 min - Uploaded by CNN

CNN's Kyung Lah reports from the meltdown zone. ... Look inside Fukushima's meltdown ...

[The Truth About Nuclear Power - Reason.com](http://reason.com/archives/2011/03/25/the-truth-about-nuclear-power)



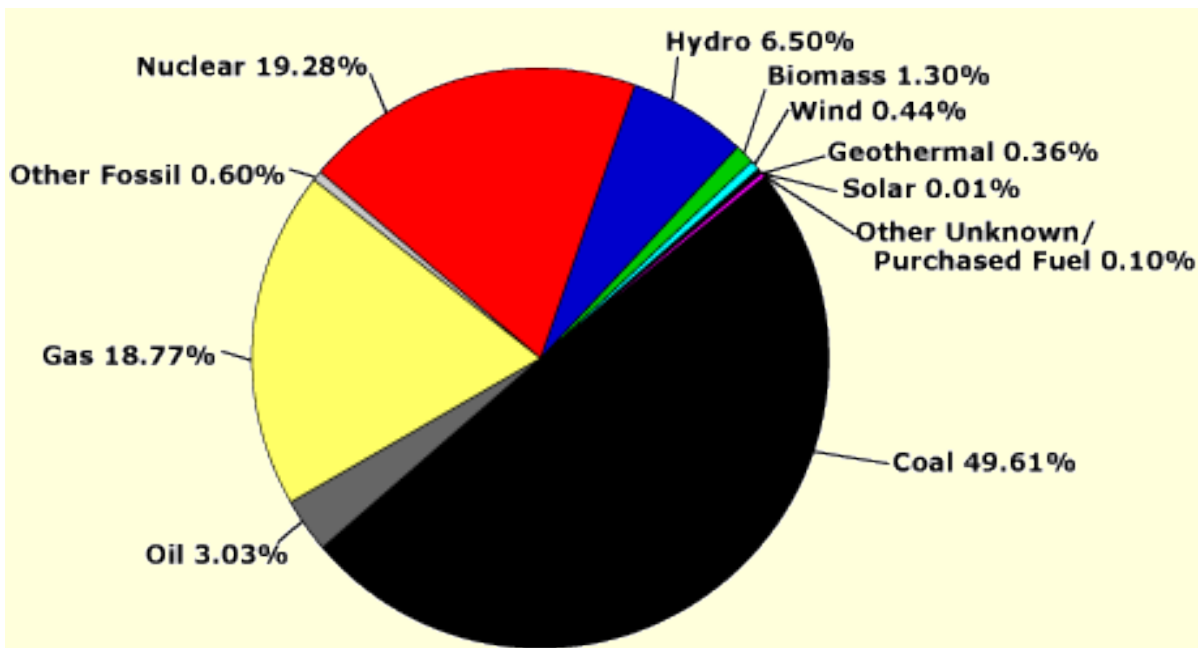
reason.com/archives/2011/03/25/the-truth-about-nuclear-power

The chart here uses data compiled from various sources to compare the deaths per unit of energy produced. Deaths resulting from the production of nuclear power are over 4000 times less than the rate of death resulting from the production of energy from coal....

[LETTER TO THE EDITOR: Nuclear a cost-effective energy source ...](http://www.washingtontimes.com/.../nuclear-a-cost-effective-energy-source...)

www.washingtontimes.com/.../nuclear-a-cost-effective-energy-source...

Jan 3, 2012 – The truly rational view of Mario Salazar on **nuclear power** should be a lesson on dispassionately ... The Washington Times ... LETTER TO THE EDITOR: Nuclear a cost-effective energy source ... to the real alternatives of burning gas, oil and coal, and much more reliably than alternatives like wind and solar.



Source: U.S. EPA, eGRID, year 2005 data.



Task Specifications:

Title:	Nuclear Power: Friend or Foe?
Grade:	10/11
Claim(s):	2: Students can produce effective and well-grounded writing for a range of purposes and audiences. 4: Students can engage in research/inquiry to investigate topics and to analyze, integrate, and present information.
Primary Target(s):	These claims and targets will be measured by scorable evidence collected. Claim 2 7: COMPOSE FULL TEXTS: Write full persuasive pieces/arguments about topics or texts, attending to purpose and audience: establishing and supporting a claim, organizing and citing supporting evidence (from texts when appropriate) from credible sources, and providing a conclusion appropriate to purpose and audience. 8: LANGUAGE & VOCABULARY USE: Strategically use precise language and vocabulary (including academic and domain-specific vocabulary and figurative language) and style appropriate to the purpose and audience when revising or composing texts. 9: EDIT/CLARIFY: Apply or edit grade-appropriate grammar, usage, and mechanics to clarify a message and edit narrative, informational, and persuasive/argument texts. Claim 4 2: ANALYZE/INTEGRATE INFORMATION: Gather, analyze, and integrate multiple sources of information/evidence to support a presentation on a topic. 3: EVALUATE INFORMATION/SOURCES: Evaluate relevancy, accuracy, and completeness of information from multiple sources. 4: USE EVIDENCE: Cite evidence to support arguments or conjectures.
CCSS/Standard(s):	W-1a-e, W-4-9, L-1-3, L-6, RI-7, RLiteracy-7, WLiteracy-8-9
DOK:	4
Difficulty:	Medium
Score Points:	Up to 10
Task Source:	SBAC / Stanford Center for Assessment, Learning, & Equity (SCALE)
Item Type:	Performance Tasks
Target-specific attributes (e.g., accessibility issues):	Students with visual impairments may need alternative formats to access written texts, graphic stimuli, and video or audiovisual material. Students with physical or other impairments may need to be provided with appropriate alternative means to entering lengthy text using a keyboard.
Grade Level of Stimuli:	9-10

Stimuli:	Authentic Internet sources pre-selected and presented to the students as the top hits of a simulated Google search. Should present a range of media that includes text, video, and data charts. Collectively, the sources must provide an overview of the topic and present both sides of the controversy. Sources must also vary in terms of their credibility and reliance on evidence. See attached PDF for a draft of an example. Links are functioning and open actual Internet sources that could be used for this task.
How this task contributes to sufficient evidence for the claims:	In order to complete the performance task, students 1. Evaluate and select information from a series of sources 2. Write an argumentative report effectively demonstrating • a clearly-established claim about the topic • presentation of relevant supporting evidence, details, and elaboration consistent with the position, sources, purpose, and audience • effective organization of ideas • adherence to conventions and rules of grammar, usage, and mechanics • control of language for purpose and audience
Task Notes:	This task attempts to address the challenge of assessing real-life research skills within the constraints of a standardized, on-demand test. The use of a simulated Internet search result pointing to authentic Internet sources allows the task designer to recreate the challenges posed by research in the real world: namely, most of it is now done on the Internet, which requires vigilance and skill in evaluating the reliability of what you find there. In this way, students are asked not simply to synthesize the stimuli, but to evaluate the credibility and reliability of the stimuli before synthesizing a subset of the presented sources.

Scoring information for questions:

1. Claim 4, Target 4

2-point Research (Grades 6–11) Use Evidence Rubric (Claim 4, Target 4)	
2	The response gives sufficient evidence of the ability to cite evidence to support arguments and/or ideas.
1	The response gives limited evidence of the ability to cite evidence to support arguments and/or ideas.
0	A response gets no credit if it provides no evidence of the ability to cite evidence to support arguments and/or ideas.

2. Claim 4, Target 3

2-point Research (Grades 6–11) Evaluate Information/Sources Rubric (Claim 4, Target 3)	
2	The response gives sufficient evidence of the ability to evaluate the credibility, completeness, relevancy, and/or accuracy of the information and sources.
1	The response gives limited evidence of the ability to evaluate the credibility, completeness, relevancy, and/or accuracy of the information and sources.
0	A response gets no credit if it provides no evidence of the ability to evaluate the credibility, completeness, relevancy, and/or accuracy of the information and sources.

Rubric and scoring information for full-write:

4-Point Argumentative Performance Task Writing Rubric (Grades 6–11)					
Score	4	3	2	1	NS
Statement of Purpose/Focus and Organization	<p>The response is fully sustained and consistently and purposefully focused:</p> <ul style="list-style-type: none"> claim is clearly stated, focused, and strongly maintained alternate or opposing claims are clearly addressed claim is introduced and communicated clearly within the purpose, audience, and task <p>The response has a clear and effective organizational structure creating a sense of unity and completeness:</p> <ul style="list-style-type: none"> consistent use of a variety of transitional strategies to clarify the relationships between and among ideas logical progression of ideas from beginning to end effective introduction and conclusion for audience and purpose strong connections among ideas, with some syntactic variety 	<p>The response is adequately sustained and generally focused:</p> <ul style="list-style-type: none"> claim is clear and mostly maintained, though some loosely related material may be present context provided for the claim is adequate within the purpose, audience, and task <p>The response has an evident organizational structure and a sense of completeness, though there may be minor flaws and some ideas may be loosely connected:</p> <ul style="list-style-type: none"> adequate use of transitional strategies with some variety to clarify the relationships between and among ideas adequate progression of ideas from beginning to end adequate introduction and conclusion adequate, if slightly inconsistent, connection among ideas 	<p>The response is somewhat sustained and may have a minor drift in focus:</p> <ul style="list-style-type: none"> may be clearly focused on the claim but is insufficiently sustained, or claim on the issue may be somewhat unclear and/or unfocused <p>The response has an inconsistent organizational structure, and flaws are evident:</p> <ul style="list-style-type: none"> inconsistent use of transitional strategies and/or little variety uneven progression of ideas from beginning to end conclusion and introduction, if present, are weak weak connection among ideas 	<p>The response may be related to the purpose but may provide little or no focus:</p> <ul style="list-style-type: none"> may be very brief may have a major drift claim may be confusing or ambiguous <p>The response has little or no discernible organizational structure:</p> <ul style="list-style-type: none"> few or no transitional strategies are evident frequent extraneous ideas may intrude 	<p>Insufficient, illegible, in a language other than English, incoherent, off-topic, or off-purpose writing</p>

4-Point Argumentative Performance Task Writing Rubric (Grades 6–11)					
Score	4	3	2	1	NS
Evidence/Elaboration	<p>The response provides thorough and convincing support/evidence for the writer's claim that includes the effective use of sources, facts, and details. The response achieves substantial depth that is specific and relevant:</p> <ul style="list-style-type: none"> • use of evidence from sources is integrated, comprehensive, relevant, and concrete • effective use of a variety of elaborative techniques <p>The response clearly and effectively expresses ideas, using precise language:</p> <ul style="list-style-type: none"> • use of academic and domain-specific vocabulary is clearly appropriate for the audience and purpose 	<p>The response provides adequate support/evidence for the writer's claim that includes the use of sources, facts, and details. The response achieves some depth and specificity but is predominantly general:</p> <ul style="list-style-type: none"> • some evidence from sources is included, though citations may be general or imprecise • adequate use of some elaborative techniques <p>The response adequately expresses ideas, employing a mix of precise with more general language:</p> <ul style="list-style-type: none"> • use of domain-specific vocabulary is generally appropriate for the audience and purpose 	<p>The response provides uneven, cursory support/evidence for the writer's claim that includes partial or uneven use of sources, facts, and details. The response achieves little depth:</p> <ul style="list-style-type: none"> • evidence from sources is weakly integrated, and citations, if present, are uneven • weak or uneven use of elaborative techniques <p>The response expresses ideas unevenly, using simplistic language:</p> <ul style="list-style-type: none"> • use of domain-specific vocabulary may at times be inappropriate for the audience and purpose 	<p>The response provides minimal support/evidence for the writer's claim that includes little or no use of sources, facts, and details:</p> <ul style="list-style-type: none"> • Use of evidence from sources is minimal, absent, incorrect, or irrelevant <p>The response's expression of ideas is vague, lacks clarity, or is confusing:</p> <ul style="list-style-type: none"> • uses limited language or domain-specific vocabulary • may have little sense of audience and purpose 	<p>Insufficient, illegible, in a language other than English, incoherent, off-topic, or off-purpose writing</p>

2-Point Argumentative Performance Task Writing Rubric (Grades 6-11)			
Score	2	1	NS
Conventions	<p>The response demonstrates an adequate command of conventions:</p> <ul style="list-style-type: none"> errors in usage and sentence formation may be present, but no systematic pattern of errors is displayed and meaning is not obscured adequate use of punctuation, capitalization, and spelling 	<p>The response demonstrates a partial command of conventions:</p> <ul style="list-style-type: none"> errors in usage may obscure meaning inconsistent use of punctuation, capitalization, and spelling 	<p>Insufficient, illegible, in a language other than English, incoherent, off-topic, or off-purpose writing</p>