Activity: Nuclear Energy Power Plants

FOR THE TEACHER

Summary
In this activity, students will write a persuasive essay in which they state an opinion about whether the number of nuclear plants should be increased or decreased.

Grade Level
High school

NGSS Alignment
This activity will help prepare your students to meet the performance expectations in the following standards:
- **HS-ETS1-1**: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- **Scientific and Engineering Practices**:
  - Engaging in Argument from Evidence
  - Obtaining, Evaluating, and Communicating Information

Objectives
By the end of this lesson, students should be able to
- Bulleted list of what students should be able to do by the end of the lesson.
- Should be specific and measurable

Chemistry Topics
This lesson supports students’ understanding of
- Pros and cons of nuclear power

Time
**Teacher Preparation**: 15 minutes
**Lesson**: 90 minutes to 3 hours

Materials
- Computer lab
- Preselected websites with information about nuclear power such as:
  - [http://dsc.discovery.com/tv-shows/curiosity/topics/10-pros-cons-nuclear-power.htm](http://dsc.discovery.com/tv-shows/curiosity/topics/10-pros-cons-nuclear-power.htm)
  - [http://www.pbs.org/newshour/forum/november96/nuclear_power.html](http://www.pbs.org/newshour/forum/november96/nuclear_power.html)
  - other possible websites (not education-specific sites, general media): [http://online.wsj.com/article/SB121432182593500119.html](http://online.wsj.com/article/SB121432182593500119.html)
  - [http://www.reuters.com/article/2012/05/04/us-japan-nuclear-idUSBRE8430BO20120504](http://www.reuters.com/article/2012/05/04/us-japan-nuclear-idUSBRE8430BO20120504)

Safety
- No safety precautions need to be taken for this activity.
Teacher Notes

- Ask students to view one of the two websites listed above and in 5 minutes, choose a topic. They should either support the building of more power plants or fewer.
- They should weigh benefits vs. risks, discuss waste disposal, and conditions that must be met by these power plants before they come to a community.
- A grading rubric and outline are in the Student Activity Sheet. It’s up to the teacher whether they want to share these resources with the students or not.
- You could ask students to share their work with a congressman, newspaper, or other public forum.

FOR THE STUDENT

Student Activity Sheet: Do We Need More Nuclear Energy Plants in the U.S.?

Lesson

Do the benefits of nuclear energy outweigh the risks? Would you want to have a nuclear power plant in your state? Would you accept nuclear waste in your state? Are there restrictions you think should be in place, or any other conditions that should be met in order for these power plants to be built and used?

In this activity, you are going to write a persuasive essay based on your ideas about nuclear energy. You are trying to persuade the reader to accept and interpret available information on nuclear power the same way that you do. You need to be very clear about your position. State it succinctly and support it with strong arguments and relevant information. The five paragraphs of your essay will follow this format:

1. Introduction and statement of your position or claim.
2. Use each paragraph to support your claim with relevant details and facts.
3. Use at least three specific sources of information.
4. Acknowledge at least two reasons why there may be opposing opinions to your own, but explain why you stand by your position.
5. Give your essay a clear ending by reviewing your strong arguments in a concise conclusion.

Outline for Essay

1. Introduction
   a. What are Nuclear Power Plants?
   b. Why are they controversial?
   c. What is your opinion?
   d. What evidence will you use to support your opinion (summarize)?

2. Body paragraphs (2+3): Evidence
   a. Reason 1 (specific)
      i. Quote or fact
      ii. Analysis, what you think about what they said/did
   b. Reason 2 (specific)
      i. Quote or fact
      ii. Analysis, what you think about what they said/did
   c. Reason 3 (specific)
      i. Quote or fact
      ii. Analysis, what you think about what they said/did

3. Opposing views and Rebuttal
   a. The opposition’s strongest argument 1 (general)
      i. Quote or fact
ii. Rebuttal, why you disagree (specific evidence)

b. The opposition’s strongest argument 2 (general)
   i. Quote or fact
   ii. Rebuttal, why you disagree (specific evidence)

4. Conclusion
   a. Restate your opinion
   b. Review your strong arguments
   c. Review your rebuttal to the opposition
   d. Conclude with a general restatement of your ideas

5. Bibliography in APA format (use [www.calvin.edu/library/knightcite](http://www.calvin.edu/library/knightcite) for help formatting references)

Follow the rubric and assess your own essay. Ask yourself "DID I?" for each criterion? For example, "Did I give clear and accurate reasons in support of my claim?"

<table>
<thead>
<tr>
<th>Criteria</th>
<th>4</th>
<th>3</th>
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<th>1</th>
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<tbody>
<tr>
<td>The claim</td>
<td>I make a claim and explain why it is controversial.</td>
<td>I make a claim but don't explain why it is controversial.</td>
<td>My claim is buried, confused and/or unclear.</td>
<td>I don't say what my argument or claim is.</td>
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<tr>
<td>Reasons in support of the claim</td>
<td>I give clear and accurate reasons in support of my claim.</td>
<td>I give reasons in support of my claim but I may overlook important reasons.</td>
<td>I give one or two weak reasons that don't support my claim and/or irrelevant or confusing reasons.</td>
<td>I do not give convincing reasons in support of my claim.</td>
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<tr>
<td>Reasons against the claim</td>
<td>I discuss the reasons against my claim and explain why it is valid anyway.</td>
<td>I discuss the reasons against my claim but leave some reasons out and/or don't explain why the claim still stands.</td>
<td>I say that there are reasons against the claim but I don't discuss them.</td>
<td>I do not acknowledge or discuss the reasons against the claim.</td>
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<tr>
<td>Voice and tone</td>
<td>It sounds like I care about my argument. I show how I think and feel about it.</td>
<td>My tone is OK but my paper could have been written by anyone. I need to tell more about how I think and feel.</td>
<td>My writing is bland or pretentious. There is either no hint of a real person in it or it sounds like I'm a fake.</td>
<td>My writing is too formal or too informal. It sounds like I don't like the topic of the essay.</td>
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<tr>
<td>Sentence fluency 2 pts</td>
<td>My sentences are clear, complete, and of varying lengths.</td>
<td>I have well-constructed sentences.</td>
<td>My sentences are sometimes awkward, and/or contain run-ons and fragments.</td>
<td>Many run-ons, fragments and awkward phrasings make my essay hard to read.</td>
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<td>Conventions 2 pts</td>
<td>I use correct grammar, spelling, and punctuation.</td>
<td>I generally use correct conventions. I have a couple of errors I should fix.</td>
<td>I have enough errors in my essay to distract a reader.</td>
<td>Numerous errors make my paper hard to read.</td>
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