Nuclear Energy: Friend or Foe

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Overview:

The objective of the lesson is to evaluate the benefits and challenges of continued development and dependence on nuclear energy as a source of power for developed, as well as developing nations. Using the essential questions "How can people cooperatively solve common challenges?" and "What responsibilities do we owe the preservation of the Earth's environments?" students will work as cooperative teams to investigate the current status of nuclear energy production and dependence, the geo-political issues arising from new access to nuclear power sources, and the impact of nuclear energy on the environment. Student learning and team research will be presented through a classroom "Fishbowl Global Summit".

Grade Level: 7th grade Middle School Geography classrooms

National Geographic Standards:

The World in Spatial Terms-

1. How to Use Maps and Other Geographic Representations, Tools, and Technologies to Acquire, Process, and Report Information From a Spatial Perspective.

3. How to analyze the spatial organization of people, places, and environments on Earth's surface. *Places and Regions-*

4. The physical and human characteristics of places.

7. The Physical Processes That Shape the Patterns of Earth's Surface.

11. The Patterns and Networks of Economic Interdependence on Earth's Surface.

13. How the forces of cooperation and conflict among people influence the division and control of Earth's surface.

Environment and Society-

14. How Human Actions Modify the Physical Environment.
15. How Physical Systems Affect Human Systems.
16. The Changes That Occur in the Meaning, Use, Distribution, and Importance of Resources.

The Uses of Geography-

17. How to apply geography to interpret the past.
18. How to apply geography to interpret the present and plan for the future.

State Oklahoma Academic Standards for 7th Grade Geography:

OAS 2012	OAS 2019
Literacy Skills Standard 1: The student will develop and demonstrate Common Core Social Studies reading literacy skills.	**Read Critically and Interpret Informational Sources:** Students will engage in critical, active reading of grade-level appropriate primary and secondary sources related to key social studies concepts, including frequent analysis and interpretation of informational sources.

7.1.A.1 Cite specific textual evidence to support analysis of primary and secondary sources.	**4.A.6-8.1** Paraphrase the main idea and cite evidence from primary and secondary sources; provide an accurate summary of a source distinct from prior knowledge or opinion.
7.1.A.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.	**4.A.6-8.1** Paraphrase the main idea and cite evidence from primary and secondary sources; provide an accurate summary of a source distinct from prior knowledge or opinion.
7.1.A.3 Identify key steps in a text's description of a process related to history/ social studies.	**3.A.6-8.4** Distinguish multiple causation, immediate and long-term cause-effect relationships by constructing timelines which reflect related events.
Literacy Skills Standard 2: The student will develop and demonstrate Common Core Social Studies writing literacy skills.	**Engage in Evidence-Based Writing:** Students will apply effective communication skills by developing a variety of evidence-based written products designed for multiple purposes and tasks, in order to demonstrate their understandings of social studies concepts, ideas, and content.
6.2.A.1 Write arguments focused on discipline-specific content.	**5.A.6-8.3** Compose argumentative written products by introducing a claim, recognizing an opposing viewpoint, and organizing evidence and commentary from credible sources.
Content Standard 5. The student will analyze the interactions of humans and their environment in the Eastern Hemisphere.	**7.4** The student will analyze the interactions of humans and their environment in the Eastern Hemisphere.
5.1 Cite specific textual and visual evidence to describe the relationship between the distribution of major renewable and nonrenewable resources and evaluate how the three levels of economic activities (primary, secondary, and tertiary) contribute to the development of a country or region.	**7.3.6** Describe the distribution of resources and evaluate how the three levels of economic activities (primary, secondary, tertiary) contribute to the development of a country or region.
5.2 Evaluate the effects of human modification of and adaptation to the natural environment including the **E.** Benefits and dangers of nuclear power generation as exemplified by the environmental disaster at Chernobyl.	**7.4.4** Evaluate the effects of human modification of and adaptation to the natural environment through transformation caused by agriculture, the use of modern irrigation methods, industry, demand for energy, and urbanization.
5.3 Integrate visual information to analyze regional problems and policies having spatial dimensions in the Eastern Hemisphere.	**2.B.6-8.1** Draw upon gathered information to analyze how a specific problem can manifest itself in local, regional, and global levels over time, evaluating options for individual and collective solutions.

Resources Needed:

Internet Access to Livebinders (optional)
Nuclear Energy Friend or Foe Powerpoint presentation
Disaster at Chernobyl reading passage
Full Steam Ahead reading passage
Nuclear Expansion Challenges reading passage Germany Folds on Nuclear Power reading passage
Nuclear Agendas to Watch reading passage
Japan's Triple Disaster reading passage
Nuclear Club reading passage (optional)
Iran's Nuclear Program reading passage (optional)
North Korea Threatens reading passage (optional)
Nuclear Map & Graph Packet
(Energy Sources map, Global Support poll, Nuclear Power world map, World Consumption & Future graphs, Reactors Shutdown map & graph)
Nuclear Energy Cartoon Packet (optional)
Nuclear Energy Ads Packet (use livebinder)
Large blank paper for student ads
Colored Markers
Sticky Notes
Livebinder website:
http://www.livebinders.com/play/play?id=1838788 Videos:
Nuclear Energy Explained: Benefits & Challenges
http://www.cfr.org/interactives/IG_Nuclear/index.html?cid=ppc-Google-grant-nuclear_energy_guidenuclear_energy&gclid=CK_o6fibk8gCFQdufgod4pQLvg#/overview/ No to Nukes in Germany https://www.youtube.com/watch?v=6sw-y3j2Ljw
Danger of Nuclear Weapons (optional)
Iran Nukes at Stake (optional)
Why Some Have Nuclear Weapons (optional)
http://www.cfr.org/interactives/IG_Nuclear/index.html?cid=ppc-Google-grant-nuclear_energy_guidenuclear_energy&gclid=CK_o6fibk8gCFQdufgod4pQLvg#/the-future/

Time Frame: 3 class periods

Procedures:

1. Display the two essential questions for the class to see, posted on two opposite sides of the classroom: "How can people cooperatively solve common challenges?" and "What responsibilities do we owe the preservation of Earth's environments?" Ask students view the first cartoon of the Powerpoint presentation. Using a "crop it" tool or their own hands to form a "crop tool", ask students to highlight on the cartoon where they would find evidence to respond to the following questions: A. Crop it to show the first thing that caught you eye.
B. Crop it to show what the topic of the cartoon is about.
C. Crop it to show one perspective toward this topic.
D. Crop it to show proof of a conflict over this topic.
E. Crop it to show the future of this topic.

F. Crop it to show how the artist feels about this topic.

Conduct a brief class discussion. How does this cartoon relate to the essential questions? Do you have preexisting opinions or perspectives about the topic of nuclear energy? If so, what are they? Where and when did you form such opinions?

2. Inform students that they'll be examining the benefits and potential risks to our environment brought about by the use of nuclear energy. Following opportunity for whole-class investigations and extended team research, a mock trial will be conducted in which opposing views can be expressed and explored.
3. Give each student a copy of the *Nuclear Expansion Challenges* reading passage. Allow time to read the article together. Ask students to identify the potential benefits and risks associated with nuclear energy. Begin a Pro/Con chart in the classroom, noting information from this first passage.
4. Show the videoclip, *Nuclear Energy Explained*. Add to the classroom Pro/Con chart additional benefits and risks associated with the use of nuclear energy.
5. Use the *Nuclear Energy; Friend or Foe* Powerpoint presentation to further examine and summarize key issues associated with the use of nuclear energy. Ask students to pay close attention to their assigned "stakeholder" group and their views toward further development of nuclear power. Students might wish to make a list of additional information they have learned from the Powerpoint which can help them understand their stakeholder's point of view.
6. Mock Trial Preparation: Inform the class that they will be putting Nuclear Energy on trial to determine if it should be considered a Friend to be continued or a Foe to be discontinued as a future source for energy. Review the roles of the Mock Trial (attachments) and assign roles for each student to play.
7. Students working in groups or partnerships depending on their roles in the mock trial will be provided mobile devices or computer lab time to explore the Livebinder website. All resources mentioned in this lesson are located for easy access by students. This is the preferred method for continued study; however, if devices or computer lab time/space is not available, teachers may use the supplemental resources as a whole-class lesson.

10. Conduct a mock trial, according to the procedures provided. The teacher will serve as the judge, keeping strict time limits for each phase of the trial, so that each side has equal opportunities to make its case.

11. Following the mock trial, the teacher will ask students to step out of the roles. Give each student a largesized sticky note. Provide time for each student to decide if nuclear energy is a friend or foe, based on their own personal opinion. Each student will write a one-sentence explanation supporting his/her decision on the sticky note. Allow time for students to post their votes onto the Pro/Con classroom chart. Read comments aloud and discuss their conclusions.

12. Conduct a brief classroom discussion. In what ways is a mock trial process similar to a real-world arena for decision- making? Did you learn to perceive decision-making in a different way because you represented different stakeholders with opposing points of view toward nuclear energy?

Assessment:

Return student attention to the two essential questions. Give time for students to discuss how their opinions have changed. Use the set of historic and contemporary advertising posters to discuss which support and which oppose the further development of nuclear energy. Point out aspects of the posters which reflect specific benefits and risks that have been discovered through team research and the fishbowl global summit. Allow time for individuals or partners to create their own advertisement defending or opposing the use of nuclear energy in the

future. Allow time for gallery walks of student's ads. Inform students that their ads should include specific reasons and evidence to support their ad's perspective.

Extension for Enrichment:

Option 1: Students will be provided copies of the Nuclear Energy Cartoon Packet. Selecting three of the four cartoons, students will analyze the artist's message. Allow students to display one of their favorite cartoons from the packet, explaining it to the class and how the cartoon depicts information they have learned from other print or visual sources in their research.
Option 2. Provide time for students to further explore a news-worthy aspect of nuclear energy's production- the development and proliferation of nuclear weapons. Use the optional reading passages and video clips in the livebinder to conduct this enrichment opportunity.