

AoW 14 Directions:

1. Read and thoroughly annotate the text (20 points)
2. Create a well-written summary of the text. Your summary should include 5 words that use your WWW word parts. Underline the words with word parts in them. (10 points for summary, 3 points for each vocab. word)
3. Circle 5 words that contain a WWW root in the article. Annotate what the root means and what the word means based on context. (5 points for each word)
4. Correctly answer the multiple choice questions. (5 points per question)

PRO/CON: Amid climate change, should we use more nuclear power?

By Tribune News Service, adapted by Newsela staff 02.05.16 Grade Level **8** Word Count **1,520**

PRO: Nuclear energy can cut our carbon emissions to zero

Despite competition from natural gas and wind and solar energy, nuclear power has no equal. It is the best way to produce carbon-free electric power, and is likely to remain so well into the future.

Carbon emissions are the main cause of the greenhouse effect that is producing global warming. Carbon-containing gases released by the burning of fuels are remaining in the atmosphere and trapping heat. Over time, they have caused average global temperatures to rise, putting the planet at risk. Clearly, a carbon-free source of energy is a valuable resource in the fight against planet-threatening climate change.

Nuclear power now accounts for more than 60 percent of the United States' zero-carbon electricity and a new generation of technologically advanced reactors is on the horizon. Nuclear power is playing an essential role in the battle to reduce greenhouse gas emissions. Even environmentalists should welcome its benefits.

“Nuclear is the only 24-hour-a-day, seven-day-a-week source of power that does not result in the emission of greenhouse gases,” says energy expert Eileen Claussen. “It’s hard to believe we can limit temperature increases, and their associated impacts, without a vastly expanded use of nuclear energy.”

Reliable, Effective And Affordable

Many claim that nuclear power is dangerous because of the risk of radiation leaks. In fact, the industry has an excellent safety record. In the more than a half-century since the first commercial nuclear reactor began producing electricity, there has not been a single death or injury from a radiation-related nuclear power plant accident in the United States. No other major industry has an equally good safety record.

Nuclear power has endured because it has proved reliable, effective and affordable. The basic facts are not in dispute among energy policymakers.

In America, the performance of nuclear plants has improved significantly since 1990. The average capacity factor — how often a power plant actually delivers power to the electric grid — has steadily gone up. In 2014, it was at 90 percent for the approximately 100 operating U.S. reactors.

The average capacity factor in 1998 was 80 percent, compared to only 66 percent in 1990. Despite a reduction in the number of plants, the U.S. nuclear industry actually generated more electricity last year than it did in 2005.

The 439 reactors now operating around the world are meeting the annual electrical needs of more than a billion people. Almost 70 reactors are under construction, including five in the United States. Another 159 are on order or planned.

In France, nuclear power supplies 75 percent of the electricity, with enough to spare to provide almost a quarter of the electricity in Europe. However, in China, the world's biggest carbon polluter, nuclear energy provides only 2 percent of the power. Coal remains China's main energy source, and its use is increasing not only in China but throughout Asia.

Meeting Two Global Goals

In December of last year, representatives of most of the world's nations met in Paris, France, to discuss ways to combat climate change. The agreement they signed set an ambitious global goal: bringing net carbon emissions down to zero by the second half of this century.

This would seem, at first glance, an impossible task. Until, that is, you consider that both France and Sweden have been able to greatly increase their use of carbon-free nuclear power in a relatively short time. European energy experts say the results would be dramatic if the world were to build nuclear reactors at the same rate as the French and Swedish have. Electricity from coal and natural gas could be replaced in 25 to 34 years.

During this period, electric vehicles powered by nuclear-generated electricity could dramatically reduce the need for oil. These changes would have a huge impact on global carbon emissions and would help prevent dangerous climate change.

The challenge to meet the new climate control goals is daunting. If present trends continue, the world's population will increase to more than 9 billion by 2040, with global electricity demand nearly doubling. Unless the use of zero-carbon nuclear power is greatly increased, it likely will be impossible to both meet future energy demand and prevent dangerous climate change. Nuclear power is the only way to achieve both those goals at the same time.

CON: Look to the sun and the wind instead of nuclear plants

The 2015 Paris climate agreement set a remarkable goal. It calls for all countries to reduce emissions of greenhouse gases substantially. Most of these emissions come from the burning of fossil fuels — coal, oil and natural gas — and the message could not be clearer: We need to change the way we generate and use energy, and do so quickly. The United States set itself a modest goal: cutting emissions by 26 percent to 28 percent from 2005 levels by 2025.

Despite opposition from Congress, President Barack Obama has moved toward that goal. The most notable step so far is the Environmental Protection Agency's Clean Power Plan. The plan will regulate coal-fired power plants and set new vehicle fuel-economy standards.

Embracing Renewable Energy

The question now is what additional policy actions will most help in meeting — or preferably exceeding — the target for emission reductions. Perhaps the most realistic approach is to increase the use of low-energy or no-carbon energy

sources, among them nuclear power and renewable energy. Renewable energy sources, also called renewables, include such things as wind power and solar power.

China has embraced this approach. It plans to double its nuclear power capacity, and has 24 new plants now under construction. However, China also is investing heavily in wind and solar power, as it has been for years.

Should the U.S. do the same? Yes, but only in part. Currently, our 99 nuclear reactors generate about 19 percent of electrical output, yet only account for about 8 percent of total energy consumption. The lion's share of the energy we use, about 81 percent, comes from fossil fuels.

Nuclear power will have an important role to play, but it is unlikely to replace much fossil fuel use. It is still too expensive and too risky. A better bet is to invest in renewables, while also working to make our energy use more efficient, as most of the world is now doing.

Nuclear Power Is Very Expensive

Despite construction of new reactors by China and other Asian nations, globally nuclear electricity production has been leveling off while wind and solar power are soaring. There are good reasons for these trends.

One is cost. The nuclear plants under construction in the United States, the first after more than three decades, are expected to cost \$8 billion to \$9 billion each, possibly more. It is also very expensive to safely shut down plants, which eventually becomes necessary.

These very high costs make it difficult for the private utilities that provide our electricity to increase nuclear power generation. They see more promise and lower costs in natural gas-powered plants or in turning to renewables. The difficulty of disposing of the radioactive waste that nuclear plants create is another big reason to avoid an increase in nuclear power. There is currently no acceptable nuclear waste disposal method.

There is also always the chance of the kind of disaster that occurred when Japan's Fukushima plant leaked radiation-contaminated water, poisoning the surrounding area. The U.S. public remains understandably concerned that such a disaster could occur here. A better way is to invest heavily in renewables, as well as in energy conservation and efficiency. Both conservation and increased energy efficiency can cut energy demand sharply.

We Must Act Quickly

Increased energy efficiency and conservation can be achieved in a variety of ways. Among them are improved building design, greater reliance on public transit, modernization of the electrical grid, and better lighting, heating and cooling systems. The United States should put more funds into research on promising energy technologies.

The federal government has long favored and heavily subsidized nuclear power and fossil fuels. For the past decade, renewables and efficiency finally have begun to receive significant support. We should accelerate that trend.

Summary:

Pro/Con Climate Change Questions

1. Read the first paragraph of the PRO article. How does this paragraph engage readers on the topic of nuclear energy's value?
 - A. by making a strong statement and framing an opinion as fact
 - B. by presenting a controversial issue as a puzzling dilemma
 - C. by using vivid detail to help readers visualize a situation
 - D. by reminding readers of shared values and ideals

2. Why does the CON author include the section "We Must Act Quickly"?
 - A. to discuss the value of reducing greenhouse gas emissions
 - B. to acknowledge the obstacles to reducing greenhouse gas emissions
 - C. to predict future problems caused by increasing greenhouse gas emissions
 - D. to offer a range of solutions to the problem of greenhouse gas emissions

3. Read this paragraph from the PRO article.

Many claim that nuclear power is dangerous because of the risk of radiation leaks. In fact, the industry has an excellent safety record. In the more than a half-century since the first commercial nuclear reactor began producing electricity, there has not been a single death or injury from a radiation-related nuclear power plant accident in the United States. No other major industry has an equally good safety record.

Which paragraph from the CON article MOST directly responds to the paragraph above?

- A. Despite construction of new reactors by China and other Asian nations, globally nuclear electricity production has been leveling off while wind and solar power are soaring. There are good reasons for these trends.
 - B. These very high costs make it difficult for the private utilities that provide our electricity to increase nuclear power generation. They see more promise and lower costs in natural gas-powered plants or in turning to renewables.
 - C. There is also always the chance of the kind of disaster that occurred when Japan's Fukushima plant leaked radiation-contaminated water, poisoning the surrounding area. The U.S. public remains understandably concerned that such a disaster could occur here.
 - D. Increased energy efficiency and conservation can be achieved in a variety of ways. Among them are improved building design, greater reliance on public transit, modernization of the electrical grid, and better lighting, heating and cooling systems.
4. What advantage of nuclear power is discussed by the PRO author, but not considered by the CON author?
 - A. Nuclear power pollutes less than wind and solar energy.
 - B. Nuclear power is less expensive than wind and solar energy.
 - C. Nuclear power is safer than wind and solar energy.
 - D. Nuclear power is more dependable than wind and solar energy.