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Word Generation - Unit 2.09

Focus Words

generate | derives | advantage | consume | contaminate



WEEKLY PASSAGE

Pilgrim Nuclear Station sits just off the road forty miles from Boston. This power plant makes electricity by heating water with a controlled nuclear reaction. Boiling water makes steam. The steam turns a turbine to **generate** electricity. Power lines take electricity **derived** from the plant all over the state of Massachusetts.

President Obama and other politicians want to build more nuclear power plants like Pilgrim. They see nuclear power as a good alternative to expensive oil. Because we **consume** so much oil in America, we depend on oil from other countries. Nuclear power can be made right here so nuclear energy cannot be cut off by another country. Nuclear power has another major **advantage**. It does not pollute the air like gas or coal does.

People who are concerned about nuclear power point to safety issues. Some nuclear power plants have leaked radioactive chemicals. The chemicals are blown by the wind and can **contaminate** water in nearby communities. Doctors have found higher

rates of cancer in towns near the Pilgrim power plant.

The biggest worry about nuclear power is a meltdown. In a meltdown, the nuclear reaction gets out of control inside the plant. It gets so hot, the building explodes or breaks apart. Clouds of poisonous chemicals spread over a huge area. At Chernobyl, in Eastern Europe, a nuclear plant meltdown in 1986 spread contamination all over Europe. Thousands of people developed cancer after the meltdown. After the Chernobyl disaster, the U. S. stopped building new nuclear power plants.

Supporters of nuclear power believe that safer power plants can prevent these problems. They want the U. S. to start building nuclear power plants again. Is nuclear power worth the risks?

Nuclear power: Our energy future, or danger to society?

FOCUS WORDS OF THE WEEK

generate : (verb) produce

FORMS:

EXAMPLES OF USE:

NOTES:

derives : (verb) comes from

FORMS:

EXAMPLES OF USE:

NOTES:

advantage : (noun) helpful quantity

FORMS:

EXAMPLES OF USE:

NOTES:

consume : (verb) to use up

FORMS:

EXAMPLES OF USE:

NOTES:

contaminate : (verb) poison; pollute

FORMS:

EXAMPLES OF USE:

NOTES:

Nuclear power: Our energy future, or danger to society?



PROBLEM OF THE WEEK


Americans **consume** more energy each year, and we are looking for cleaner, greener ways to produce it. Nuclear power has many **advantages**. It doesn't pollute the air, and it can be produced in the U.S. But nuclear opponents raise several concerns. One is nuclear waste. Nuclear waste **derives** from the nuclear reactions that create nuclear energy, as well as from the mining and enrichment of nuclear fuel. If nuclear waste is not stored properly, it can **contaminate** soil and water. Some nuclear waste will remain dangerous for thousands of years.

Yucca Mountain in Nevada has been proposed as a site for long-term storage of nuclear waste. But this has **generated** a lot of controversy. Many Nevada residents don't want a nuclear dump in their home state. In 2001, the Environmental Protection Agency set safety standards for Yucca Mountain for the next 10,000 years.

Option 1: The average American lives about 80 years. How many lifetimes is 10,000 years?

- A) 125 lifetimes
- B) 130 lifetimes
- C) 135 lifetimes
- D) 210 lifetimes

Option 2: An appeals court ruled that the 10,000-year safety standards for Yucca Mountain were inadequate. After all, some nuclear waste may be dangerous for hundreds of thousands of years. The new EPA safety standards cover the next million years. Write 10,000 and 1 million in scientific notation. How many orders of magnitude separate the two numbers?

 **Discussion Question:** With violence in the Middle East and worries about global warming, traditional energy sources like oil and coal are falling out of favor. The **advantages** of nuclear power seem increasingly appealing. Many experts say nuclear power is safe. They say that many of the fears people have about nuclear power **derive** from misinformation and from the confusion of nuclear power with nuclear weapons. But nuclear waste remains a problem. A long-term, ultra-secure facility is needed. But, given the fact that leaks could **contaminate** the local environment, no one wants this facility to be in his or her backyard. The Obama Administration has cut government funding for the Yucca Mountain facility. Meanwhile, the nation's nuclear power plants continue to **generate** nuclear waste. Where should it go?

Nuclear power: Our energy future, or danger to society?



THINKING SCIENTIFICALLY

Ms. Kahn’s class is discussing the connection between nuclear power plants and cancer.

“Cancer is a terrible disease,” says Erin, “and if nuclear power plants are causing more people to suffer from it as a result of **contaminating** their surroundings, then I don’t think we should use nuclear energy.”

“But think about all of the terrible pollution and political problems caused by other sources of energy,” says Kristopher. “If there is a way that we can both **generate** clean energy and gain a political **advantage** then I think we should consider it.”

“Besides,” suggests Lucinda, “cancer is a very complicated disease with many different causes. How sure are we that exposure to nuclear power plants really causes cancer?”

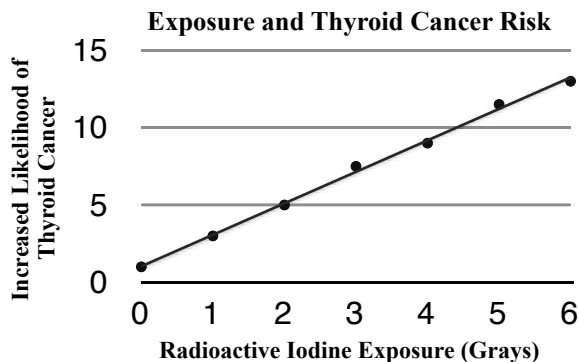
“That’s a good question, Lucinda,” says Ms. Kahn. “Let’s take a look at the cancer rates around Chernobyl after the nuclear power plant accident there in 1986.”

➔ Ms. Kahn searched the Internet and found the following informational website about some of the effects of the Chernobyl meltdown.

Thyroid Cancer Study following the Chernobyl Accident in Ukraine

The thyroid gland uses iodine to control how quickly your body uses energy and delivers important hormones to the rest of your body. However, when nuclear power plants melt down or just leak a little bit, they release a radioactive version of iodine into the environment that can get into the water and food supplies of the local community. When people digest these contaminated foods, their thyroids collect the radioactive iodine instead of regular iodine. This collection of radioactive material in the thyroid gland can cause thyroid cancer to develop, especially in children and adolescents.

After the Chernobyl meltdown in 1986, researchers began tracking over 13,000 children and adolescents who were exposed to high doses of radioactive iodine. They monitored the health of these young people over the next 25 years and found the following relationship between how much radioactive iodine they were exposed to and how likely they were to develop thyroid cancer.



Within this group of 13,000 people, scientists recorded three times as many incidents of thyroid cancer in comparison to a typical group of people who were not exposed to radioactive iodine.

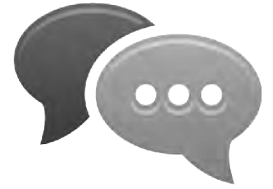
From these data, can you conclude that being exposed to radioactive iodine causes thyroid cancer in children and adolescents?

If someone were exposed to 7 Grays of radioactive iodine, how many times more likely would they be to develop thyroid cancer?

Do you think this study is relevant to decisions about how we generate electricity in the United States?

Data Source: <http://chernobyl.cancer.gov/studies.html>

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DEBATING THE ISSUE

Get ready...

Pick one of these positions (or create your own).

A Nuclear power is too risky and should not be used. We cannot risk contaminating the air, earth, and water.

B Nuclear power will save us from pollution and conflict over foreign oil and should be used as much as possible.

C The advantages of nuclear power are worth the risks as long as we pay attention to safety issues.

D We can solve our energy problems by conserving energy and using safe sources like solar power.

E _____

Get set...

Be ready to provide evidence to back up your position during your class discussion or debate. Jot down a few quick notes:

GO!

Be a strong participant by using phrases like these.

I believe that...

I agree with you, but...

You make a good point, but have you considered...

Can you show me evidence in the text that...

