



# NUCLEAR POWER

***"Now, I am become Death, the destroyer of worlds."***

Robert Oppenheimer (1904 – 1967), American theoretical physicist and lead scientist of the Manhattan Project to develop the nuclear bomb

## 1. Nuclear Energy Discussion

1. Does nuclear power worry you in any way? Why or why not?
2. Would you be happy to live near a nuclear power plant? Why or why not?
3. Can you think of any times when nuclear power failed? Can you think of any nuclear meltdowns?
4. Could nuclear power be considered clean energy?
5. Is it better or worse for the environment than using fossil fuels to produce energy?
6. Do you think we should build more or less nuclear power plants?
7. Would you use a 'mini' nuclear reactor in your home if it were considered safe and would mean no more electric bills?
8. Should all countries have access to nuclear power technology? What are the reasons for and against?

## 2. Nuclear Power Vocabulary

- **to split the atom** (verb) – *nuclear fission; when the nucleus of an atom splits into smaller nuclei, causing a nuclear reaction.*
- **nuclear waste** (noun) – *spent radioactive material left over from used in nuclear reactions.*
- **dirty bomb** (noun) – *a conventional bomb that also contains radioactive material intended to be dispersed over an area to deny future access to that area.*
- **rogue state** (noun) – *a country considered a threat to regional or world peace.*
- **nuclear winter** (noun) – *the resulting winter conditions caused by largescale nuclear war and the cloud cover that would block out sunlight for several years.*
- **mutually assured destruction (MAD)** (noun) – *the belief (hope) that when two countries have nuclear weapons, they would never attack each other (first strike) as they would both be destroyed in a subsequent retaliation (second strike).*

**Using the vocabulary words above, complete the following sentences (remember to use the correct form of the word, e.g. verb conjugation or plural noun):**

1. The most widely favoured solution for **nuclear waste** is to bury it deep in the ground in a lead container.
2. While people have criticised the idea of **mutually assured destruction**, it is true that so far, those countries with nuclear weapons have never used them against each other.
3. It's crazy how humans can **split the atom**, but we can't figure out a way for toilets to clean themselves!
4. The United States added Iran to its list of **rogue states**, accusing it of secretly trying to develop nuclear weapons and funding terrorist organisations.
5. Security experts have suggested that the main threat of a **dirty bomb** would be panic, rather than any significant radioactive contamination.
6. A **nuclear winter** would have a devastating effect on the world's biosphere. Plants would die due to a lack of sunlight, meaning animals would also perish as the food supply dries up.

### **Nuclear Power vocabulary comprehension questions**

1. Was splitting the atom a good idea?
2. What should we do with nuclear waste?
3. Are you concerned terrorists are trying to create a dirty bomb?
4. Which countries are considered rogue states?
5. How would you survive in a nuclear winter?
6. Is MAD mad?

### 3. Video: How Nuclear Power Plants Work

You are going to watch a video by TED Ed called "How do nuclear power plants work?"

**Watch the video here:** <https://yourenglishpal.com/blog/esl-conversation-lesson-plan-nuclear-power/>

**While you watch the video, answer the following questions:**

#### Multiple choice

1. The first atom to be split by scientists was from which element?  
a) *Plutonium*                      b) *Hydrogen*                      **c) *Uranium***
2. For how many years would 1kg of nuclear fuel power the average American home?  
a) *24*                                      **b) *34***                                      c) *44*
3. How does the general public feel about nuclear power?  
a) *supportive*                      **b) *hostile***                                      c) *indifferent*
4. What kind of particle would you NOT find in an atomic nucleus?  
**a) *electrons***                      b) *protons*                                      c) *neutrons*

#### Sentence completion

5. With a controlled chain reaction, a nuclear power plant can produce **energy** consistently and stably for many years.
6. To moderate the speed of neutrons, modern reactors use purified **water** to increase the rate of fission.
7. Water heated by nuclear reactions creates **steam** that turns a turbine to produce electricity.
8. During a **meltdown**, uranium melts and produces radioactive vapours.

#### Short answer

9. What is an even greater problem once nuclear fuel has been used? **Storage**
10. Where is plutonium not found? **In nature**
11. What is the half-life of plutonium? **24,000 years**
12. What could be made from plutonium waste? **Bombs**

## 4. Nuclear Weapons Conversation Questions

1. Have you seen any films or TV shows about nuclear war? What happened?
2. When and why have nuclear weapons been used in the past? How close did the world come to nuclear war during the Cold War?
3. Are you concerned about the possibility of nuclear war in the future? What might cause a future nuclear war? Can a nuclear war actually be won?
4. Which countries have nuclear weapons? Which countries wouldn't you trust with nuclear technology? Why? If your country doesn't have nuclear weapons, do you think it would be a good idea for your country to develop nuclear weapons? If it does, do you think this is a good thing or a bad thing?
5. The United States set an annual budget of \$44 billion in 2021 for its nuclear weapons programme. Is it worth it? Can you think of any better ways to spend that money?
6. Would the world be safer or more dangerous if every country had nuclear weapons?
7. Do you think it's possible that terrorists could develop, or gain access to, nuclear weapons?
8. Should all nuclear weapons be banned? Why or why not? How can the world reduce the number of nuclear weapons or eliminate them entirely?

## 5. Nuclear Power Writing Task

Write about your opinion of nuclear power. Try to use some of the vocabulary you learned earlier in this lesson. In your answer, you could include some of the following topics:

- What concerns you have about nuclear power.
- How nuclear power could help the environment.
- Whether you think nuclear power or renewable power is the best alternative energy source for governments to invest in.

### Alternative exam practice question:

Many people argue that nuclear power is just too dangerous to be considered a viable alternative for fossil fuels. However, others argue that despite a few well-publicised accidents, nuclear power is relatively safe and has proven to be a much more reliable alternative to fossil fuels than renewable energy. Discuss both these views and give your own opinion.