

The Atomic States of America

Name: _____

1: *What happened* in the town of Shirley?

2: *How many* nuclear power plants are there in the U.S.?

3: Why is nuclear considered to be a “*green energy*”?

4: *How much does it cost* to put a nuclear reaction online?

5: *What happened* at Three Mile Island, PA on March 28, 1979?

6: What was “*The Manhattan Project*”? What did they find out (science)?

7: What was the “*Atoms for Peace*” project?

8: **Explain and diagram** how a nuclear power plant works

9: What are the **pros** of nuclear energy? What are the **cons**? What are the **risk/rewards**?

10: How many nuclear reactors are there worldwide?

How much of the world’s energy percentage is this? _____%

In France, what percentage of the energy is from nuclear reactors? _____%

What about Japan? _____%

11: *What percentage* of our power comes from nuclear in the U.S.? _____%

12: *Who* regulates these power plants? What happens if there is a problem at a plant?

13: *What happened* in Japan in 2011 (**Fukushima**)?

14: *How close* is Indian Point Power Plant from New York City? How many people live and work within 50 miles of it?

15: What is the **re-licensing procedures** for the Nuclear Regulatory Commission? *Why?*

16: How are *wind and ocean currents* involved with how radiation falls?

17: **Radiogenic Cancers** (Cancer from exposure to radiation) take _____ to see.

18: What is the difference between a **RAD** and a **REM** radiation exposure?

19: A single alpha particle can:

20: What are some common types of **nuclear radiation**? *What do they cause?*

- **X-rays:**

- **Gamma Rays:**

- **Alpha Particles:**

- **Beta Particles:**

What does it mean when radiation is **cumulative**?

21: (*Common types of radiation*)

- Strontium-90

- Caesium-137

- Iodine-131

- Plutonium- 239

- **Tritium- 3:** *What is the problem with Tritium?*

22: What are *some common products* that contain natural amounts of radiation?

23: What happened at **Brookhaven**?

24: Who is in charge (government) of nuclear power plants?

25: What is Tritium measured in (units)? What is a safe level for drinking water?

26: What is a *half-life*? What is the *half-life of Plutonium*?

27: What do we currently do with the nuclear waste? What were some of the ideas in the past?

28: What is **Yucca Mountain, Nevada**? What are the pros/cons?

29: What is the *magnitude* of the contamination at Fukushima power plant meltdown?

APES FRQ 2004 (Question #3)

Radioactive isotopes are widely used in the field of medicine, in the generation of electricity, and in the military. The use of radioactive isotopes has increased significantly over the past fifty years, leading to a corresponding increase in the amount of radioactive waste produced. The question of how to deal with radioactive waste is a topic of on-going environmental concern.

a: Explain how the properties of low-level radioactive waste differ from those of high-level waste and how these properties lead to different storage requirements. For one of the two types of radioactive waste, give an example of a specific isotope that may be present in the waste, and explain how human activity generates the waste.

b: The United States Department of Energy recently chose Yucca Mountain in Nevada as the site for the deep underground burial of high-level radioactive waste. Describe THREE characteristics of an ideal underground storage site for high-level radioactive waste.

c: Identify TWO other options that have been suggested for the long-term management of radioactive wastes. Discuss the feasibility of each method.

d: Exposure to high levels of ionizing radiation has adverse effects on human health and can result in immediate death. Identify one sublethal adverse effect on human health that can result from exposure to ionizing radiation, and explain how this effect is caused by the radiation.