

WKS – Nuclear Reactors / Accidents
Alchemists Dream, Three Mile Island,
Chernobyl & Fukushima

Name _____
Period _____
Date _____

Today we will read an article about the first nuclear reactor and watch videos detailing the accidents that occurred at nuclear power plants. These videos and others can be found at my Nuclear Chemistry YouTube playlist: <https://www.youtube.com/playlist?list=PLzy4QGtywlo-r21ny8w3zfAuclqcAcUJC>

I. Article: The Alchemist's Dream

Read the attached article, "The Alchemist's Dream" and answer the following questions

1. The first controlled fission reaction was set up at the University of Chicago. What basic substances made up the pile?
2. What was the purpose of the cadmium sulfide solution?
3. What was the purpose of the graphite?
4. What material was used for the control rods?

II. Video: Three Mile Island (<https://youtu.be/-6mpqbBORhA?t=42s>, <https://youtu.be/-NVlxVzMj5E>)

5. What is the basic chain of events that occurred at the TMI power plant?

6. What is the "China Syndrome" that was feared?

III. Video: Nova: Back to Chernobyl (Full Video @ <https://youtu.be/e3FjkBozlu0>)

7. Make a list of the basic things that went wrong in the Chernobyl power plant and led to the meltdown.

8. List and explain two structural/design factors make the Chernobyl power plant more dangerous than an American power plant?
 - a) *Reactor Design:*

 - b) *Reactor Structure:*

9. What is the purpose of the sarcophagus? Why was it necessary to build a new containment structure (Chernobyl's New Shield: <https://youtu.be/nPO-7FaWFKA>, Chernobyl's New Shelter moves slowly into place: <https://youtu.be/zbpJqAIHJ6U>)

IV. Video: Understanding the Accident of Fukushima Daiichi NPS (<https://youtu.be/JMaEjEWL6PU>)

10. How did the original cause of the Fukushima disaster differ from TMI and Chernobyl?

11. What is different about the Fukushima reactor?

12. Why did the reactors overheat and experience a meltdown?

13. What caused the reactors to explode?