Lise Meitner, Austrian Nuclear Physicist
Research Questions – Possible Answers

1. **What were Meitner’s greatest accomplishments?**
   - In 1905, she became the second woman to receive a doctorate in physics from the University of Vienna.
   - She was the first woman Professor of Physics in Germany.
   - Theoretical explanation of nuclear fission.
   - Earlier, she discovered new isotopes of the element protactinium.

2. **How was Meitner viewed in the workplace and the scientific community at large?**
   - Her research and collaboration was valued by Otto Hahn, her collaborator. However, Hahn did not defend her when other people denigrated her research.
   - Other physicists, including Albert Einstein, greatly admired Meitner’s work and thought she was more capable than Hahn.
   - Because she was a woman, there were many places she was not allowed to work, and many people who did not respect her research.

3. **Who was Meitner influenced by in her scientific career and with whom did she collaborate?**
   - Received her position at the Institute of Theoretical Physics in Berlin from Max Planck.
   - She collaborated with Otto Hahn, a chemist, for several decades.
   - She worked with her nephew, Otto Frisch, to explain the results of nuclear fission.

4. **What sacrifices did Meitner make for her career?**
   - She did not marry or have long-term romantic relationships.
   - She worked for no pay as a “guest” at several times in her career.
   - She was forced out of the Kaiser Wilhelm Institute and to flee Germany due to anti-Jewish laws. She moved to Sweden to continue working.
   - She was not allowed in the classrooms of the University of Berlin, working in the basement of the Chemical Institute.

5. **Was Meitner encouraged in her work by mentors, friends, or family?**
   - She was encouraged and financially supported by her father.
   - Originally dissuaded from research by Max Planck, she later became his assistant.
   - She collaborated with her nephew, Otto Frisch.
   - She had a close professional relationship with Otto Hahn, and he encouraged her research, though he did not always defend her scientific expertise.
Discussion Questions – Possible Answers

1. **How do Meitner’s biographies compare to her depiction in the video?**
   - She was portrayed as shy in both, but to a much greater extent in the video.
   - We get a much better background from the biographies than the video.

2. **How did her obstacles as a girl growing up in turn-of-the-century Vienna affect her growth as a scientist?**
   - She required private tutoring when she was young since she wasn’t allowed the same education as boys.
   - She was only a few people who recognized and encouraged her talent in mathematics; many people thought women couldn’t be good at it.

3. **What challenges did Meitner face in the workplace?**
   - She was not allowed to work in the main Chemical Institute buildings, so she was forced to work in the basement.
   - Many scientists did not believe a woman could do good scientific work, and didn’t trust her results.

4. **What sacrifices did Meitner make for her work?**
   - She worked for no pay for the early part of her career.
   - She did not marry, focusing on her career over relationships.

5. **How would you characterize Meitner’s relationships with her male collaborators, namely Otto Hahn and Otto Frisch?**
   - Otto Hahn was seen as the leader by other chemists and outsiders. Lise was seen as more capable than Hahn by physicists.
   - Otto Frisch was much younger than Meitner, and he followed her lead in their collaborations.

6. **What factors prevented Meitner from achieving the same level of recognition as her colleagues?**
   - Prejudice against women by many scientists.
   - She was Jewish in a time of extreme anti-Semitism.
   - She worked in an interdisciplinary field that was between both physics and chemistry.

7. **What are the possible reasons behind Otto Hahn’s Nobel Prize not being jointly awarded to him and Meitner?**
   - Prejudice against women.
   - She worked and was trained in physics, but Hahn was receiving the Nobel Prize in Chemistry.
   - She was Jewish in a climate of anti-Semitism.
   - The Noble Committee preferred experimental results to theoretical ones.

8. **What effects did World War II have on Meitner’s career?**
   - She was forced to leave Germany and abandon her position.
- She was not at Berlin when Otto Hahn did critical experiments bombarding uranium with neutrons, and she had to interpret the results through letters.
- The 1944 Nobel Prize for Chemistry was awarded only to Otto Hahn, rather than jointly with her or with Hahn’s junior collaborator Fritz Strassman.