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**ATOM: CLASH OF TITANS**

Video Questions

1. One year before Ludwig Boltzmann died, a young Albert Einstein published a paper about his research with pollen. What did his research conclude? ***Water is made of atoms “jiggling” about and jostling the pollen on the surface…atoms must exist. He mathematically “proved” the size of the atom.***
2. There are more atoms in one glass of water than there are… ***glasses of water in all the oceans of the world.***
3. Which two leading physicists worked together at Manchester University studying atoms between 1911 and 1916? ***Ernest Rutherford and Neils Bohr***
4. What radioactive material did Rutherford use in his “alpha particle cannon”? ***Radium***
5. Geiger calculated that one in 8,000 alpha particles behaved differently than expected when shot at the piece of gold foil…what was this “strange” behavior? ***They bounced back***
6. If the nucleus is the size of a soccer ball (futbol), how far away would the nearest electron be? ***½ mile away***
7. If you could remove all of the empty space from atoms, how big would a person be? ***The size of a grain of salt***
8. What did Bohr describe the atom as to try and explain quantum leaps? ***A tall, multi-storied building with the nucleus at the ground floor***
9. What famous scientist “hated” Bohr’s explanation of atoms? ***Albert Einstein***
10. Schrodinger used a wave pulsing around the nucleus to describe what part of the atom? **Electrons**
11. Heisenberg was booed out of a lecture hall when he responded to Schrodinger’s lecture about his wave equation. Why did Heisenberg disagree with Schrodinger? ***He believed you couldn’t have a physical visualization of the model.***
12. Heisenberg’s uncertainty principle says that we can never know an atom’s ***speed*** and its ***position*** at the same time.
13. Heisenberg and Bohr theorized that atoms behave like ***waves*** when you *aren’t* looking at them, but they behave like a ***particle*** when you *are* looking at them.
14. At the Solvay Conference in Brussels in 1927, who led the two “sides” that debated quantum mechanics? ***Bohr (quantum mechanics) vs. Einstein (traditional physics)***
15. Who won the argument at the Solvay Conference with the “Copenhagen Interpretation”? ***Bohr, Borne, Heisenberg, Pauli***