

Follow along worksheet for

## A Very Brief Guide to Particle Accelerators by Tom Williams

- 00:00:30            **1.** Alpha particles scattered through            foil at different angles.
- 00:01:30            **2.** To get positive alpha particles closer to the positive            ...
- 00:01:40            **3.** you need to give them more            .
- 00:02:30            **4.** A            can be described as a heavier sibling to the electron.
- 00:03:20            **5.** You can control the energy and the            of the particles with a particle accelerator.
- 00:04:50            **6.** A magnetic field will change the            a charged particle is travelling in.
- 00:06:00            **7.** Electrostatic accelerators were used in the 1930s to split the            for the first time.
- 00:07:00            **8.** If the electric field is too strong it can            the materials the accelerator is made of  
and the air around it.
- 00:08:30            **9.** To get to higher energies you can increase the
- 00:08:40            **10.** And add more            in the sequence.
- 00:11:00            **11.** The            of the D-shaped electrodes reverses in a cyclotron.
- 00:12:40            **12.** In a synchrotron, particles follow a            path.
- 00:13:50            **13.** The            replaced LEP, in the 27km tunnel at CERN.
- 00:14:30            **14.** Ion implantation is essential in creating the            in smartphones and computers.