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|  | **Visual** | **Audio** |  |
| 1. | Picture of Ampere pondering on the Orsted Experiments | *‘Andre-Marie Ampere, a man in the early 1800s, hears a story about a compass needle being deflected for an unknown reason; the only thing nearby being an electric current through a wire.’*  *~~‘This leads to a discovery of one of the most useful equations used in electronics and engineering.’~~* | *10s* |
| 2. | Play Intro Animation (What this might be I have no idea) | *‘Using current-carrying wires and magnets to recreate the effect, he explored the phenomenon; recognising it’s potential, and wanting to understand it.’* | *15s* |
| 3. | **Fade in of Ampere-Maxwell integral equation** | *‘Years later came in James Clerk Maxwell who summarised all of Ampere’s work and extended its application in one fell swoop.’* | *5s* |
| 4. | Ampere’s equation splits into individual parts    and move to annotate a simple fading in diagram of a wire and its B-field circle | *‘It allowed for the calculation of magnetic flux due to a current flowing in a conductor.’* | *10s* |
| 5. | **[Diagram of capacitor showing lack of enclosed charge due to air gap – question marks or some other simple animation (highlighting confusion) to hold attention while narration plays out]** | *‘But an issue became clear, he couldn’t account for the apparently induced current across unconnected capacitor plates – something was missing.’* | *10s* |
| 6. | **[Move capacitor position (from last described animation) on-screen, from centre to lower half; fade-in image of big papa Maxwell above it]** | *‘In stepped James Clerk Maxwell, with one hell of a beard - even for the time.’* | *6s* |
| 7. | **[Show E-flux lines forming between the unconnected plates; more added as potential difference increases (something like a ‘V’ with a vertically increasing-in-length arrow to represent increasing PD or similar)]** | *‘He evolved the thinking behind the mathematics; considering the potential difference physically formed between two unconnected points, and allowed for the electric field that formed to act like a current passing across.’* | 10s |
| 8. | **[Fade in updated full equation in integral form]**  **[Same treatment as Ampere’s previously; equation splits into parts to annotate a diagram, but now updated to include the capacitor]** | `He generalized ampere’s equations of magnetic flux in cases where there wasn’t a enclosed current using electric flux as an additional term`  *‘All this says, is magnetic fields form by the motion of charges, or a changing electric field.’* | *20s* |
| 9 | **[Something like arrows on the annotated diagram showing current flow and field loop directions, and e-field + it’s field loop directions]** | *‘As charges move, they create closed magnetic field loops; and as an electric field increases in strength, a field loops around the central line connecting the plates.’* | 20s |
| 10 | **[Fade-out of previous diagram, fade-in images of Gauss and George Stokes]** | *‘However, thanks to two other Mathematicians and Physicists, it would turn out there was more to this story to be explored.’* | 10s |
| 11 | **[Move images of Gauss and George Stokes to top portion of screen; fade-in simple diagrams of two identical field loops with synced arrows moving around the circumferences. One labelled B.dl and the other Curl(B) (fill in area of the Curl(B) circle for consistency of maths), highlighting they are describing the same physical thing]** | *‘These fellas, who possessed much less impressive beards, proved that the way we think of flux can also be considered in other ways.’* | 10s |
| 12 | **[Fade out Gauss and Stokes images; move loop animations to top half of screen; fade-in Gauss Divergence Theorem (less highlighted) and Stokes Theorem (more highlighted) equations on bottom half of screen]**  **[Fade-out Gauss theorem equation; move Stokes theorem to centre-bottom underneath animated loops]** | *‘Both of these say that we don’t have to think of this all in terms of integration, but also as differentials...’*  *‘...allowing us to take an alternative route into carrying out any calculations; which can be useful if we can’t ideally set things up properly for one or the other.’* | 30s |
| 14 | **Fade in integral form, transform into differential version. Highlight aspects of the equation as is being spoken** | *‘Both forms describe the same physical thing, with some small changes. We just need to consider a current density this time, and the electric field change itself, not it’s flux, for the second part.’* | 15s |
| 15 |  | So where does fit into maxwell’s equations?  Let’s have a look. | 5s |
|  | **Fade all out except gauss law of electric fields** | Gauss's law for static electric fields describes charge densities and the electric field | 7s |
|  | **Fade all out except gauss law of magnetic fields**  **`** | Gauss's law for static magnetic fields describes the structure of the magnetic field | 7s |
|  | **Fade all out except faraday law** | Faraday’s says a changing magnetic field produces an electric field | 7s |
|  | **Fade all out except ampere maxwell law** | Ampere-Maxwell's law which says a changing electric field produces a magnetic field | 7s |
|  | **Show all equations at once** | *‘These four equations are seen to be the fundamental description of the nature of electromagnetism.’*  *Ampere’s law complements faraday’s law and helps describe why electromagnetic waves can propagate on their own*  *‘Maxwell didn't invent all these but rather he combined them, and with this contribution, we have a full description of electromagnetism’* | 25s |