

The Mechanical Universe  
**THE ELECTRIC  
FIELD** 14min



Read the following questions before the video begins. Answer them while the video is in progress. Make note of when you are asked to pass this paper forward for collection. This is an *individual effort*. That means you **DON'T ASK OTHERS FOR ANSWERS**. It *may* count as 10 lab points.

**LISTEN! CONCENTRATE ON THE WORDS! DO NOT BE DISTRACTED BY THE IMAGES! IF YOU ARE EASILY DISTRACTED BY VISUALS, CLOSE YOUR EYES AND JUST LISTEN!**

1. Michael Faraday was (select all that are correct)

- A. born into wealth and privilege.      C. educated at public lectures.  
B. born into modest means.      D. educated at London's finest schools.

2. Coulomb's discovery regarding electric force (select all that are correct)

- A. was already widely suspected; did not come as a surprise to the scientific community.  
B. shocked the scientific community.  
C. followed Descartes's principle of the inverse square law.  
D. followed Newton's principle of the inverse square law.

3. Which of the following forces involve an inverse square relation?

- A. Gravity      B. Electricity      C. Magnetism

4. Watch the segment on flux. Then watch the segment on fields around charges.

5. (T / F) Michael Faraday developed the mathematical equation for the electric field.

6. Watch the extra-groovy, 3-D electric field graphics.

7. When an electric field passes through a conductor

- A. electrons pile up at the surface.      B. electrons redistribute within the conductor.  
C. protons pile up at the surface.      D. neutrons redistribute within the conductor.

8. The electric field inside a conductor is equal to

9. Any metal box that keeps an electric field out is called a

10. James Clerk Maxwell developed the mathematical descriptions of electric and magnetic fields. He thought of Faraday's "lines of force" as

- A. pure rubbish since they couldn't be seen.  
B. pure rubbish because they involved no calculus.  
C. an excellent tool for visualizing the patterns of force.  
D. an excellent tool for proving the futility of calculus.