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| **Faraday and Lenz law**  |
| **3 SECOND MUSICAL GRAPHIC INTRODUCTION**overlapping circles of Kids doing experiments (SEE [www.globisens.com](http://www.globisens.com)) then logo flies in |
| In 1831 Michel Farady discovered one of the most important laws in Physics: he predicted that a change in a magnetic field inside a coil will produce electricity. Here is where it gets interesting… The electricity produced in the coil will create an electronic current, which in turn will, create another magnetic field. So in 1834 Heinrich Lenz came up with the shortest law in science history – consisting of a single minus sign, added to the Faraday equation. Lenz claimed that the new magnetic field created in the coil will oppose the original magnetic field Confused? Don’t worry a simple, easy experiment will make it all clear. | Show magnet and wire…Then speed it up and show magnet spinning out of control. |
| So let’s prove the Faraday and Lenz Laws. All we need is the Physio Labdisc, a magnet, a coil and two banana cables  | Show equipment |
| We’ll select the Physio voltage sensor measuring between -500 to +500 Mili Volts25 samples per secondAnd 10,000 samples | Show setup |
|  We’ll connect voltage Labdisc sensor to the coil using the two banana cables and using the crocodile clips we’ll connect the coil. | Show wire coil and banana cable to Labdisc |
| We click run and start measuring :  | Split screen – show the magnet movment in the coil and also the GlobiLab screen |
| We will insert the magnet into the coil and see what happens. We got a negative voltage pulse. We will pull out the magnet and observe a positive voltage pulse. Let’s do it again – negative, positiveLenz was right – increasing the magnetic field in the coil will decrease the voltage created, and vise versa. What about the intensity of the created voltage. Let’s run the experiment again.Moving the magnet slowly – creates low voltage pulses. When moving the magnet faster we get a much higher set of pulses. Now let’s insert the magnet into the coil and see what happens. The voltage reading is zero. Why? It’s obvious that there was a magnetic field inside the coil? … Well – remember what Faraday predicted: The **CHANGE** in the magnetic field is responsible for creating electricity. No change equals no electricity  | Move to GlobiLab screens work |
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| Next time you turn on the TV at home, try to imagine life without electricity, and say thanks to Faraday, the inventor of the first electricity generator! |  Make screen go fuzzy like TV screen. |
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| **Part Three: “Acid Rain” Outside**  |
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| Your students are surrounded by burning fossil fuels, being used to run vehicles, produce electricity, heat, industry and more… As a result our cities are covered in a layer of smog.But just like many world leaders and industrialists, your students also find it hard to really understand the environmental effects of burning fossil fuel. So let’s give them a head start… To create a simulation of the pollution process and determine the pH of acid rain all we need is a Labdisc Biochem, a Beaker, PH-meter, Straw and some Distilled water. | Talk to camera and show equipment |
| Gases like carbon dioxide produced by fossil fuels burning mainly react in the atmosphere with water and oxygen. The result is an acid solution which when it falls as water is called acid rain. This falls on and damages forests, building, lakes and streams. Many water bodies are seriously affected because the basin soils can’t neutralize new loads of acidity and so the pH range of 5 to 7 that plants and animals need to survive is disrupted. | Maybe show images of lakes and streams? |
| In the setup we select the ph sensor, 1 sample per second for 100 samples. | Show setup |
| We then pour 50 mL. of distilled water into the beaker. And insert the pH sensor to the beaker. We can press run and record the initial pH for a few seconds. Now let’s simulate high levels of carbon dioxide entering the atmosphere… we’ll blow into the water with the straw for one minute, while recording the pH level. then, stop recording.  | Show experiment |
| Let’s view our results in a line graph. We will use markets to show pH values from the initial and final states of the water – before and after we breathed the carbon dioxide into the straw. | Move to GlobiLab screens  |
| As you can see we polluted the water with carbon dioxide and caused the pH to drop and the level of acidity to rise. The same effect as acid rain has on our water reserve.  | To camera |
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