How electromotive force works (video transcript)

Click here to watch the [video](https://www.youtube.com/watch?v=shJAV59NS6k)

EMF or electro-motive force refers to the voltage created by a battery or by a changing magnetic field. **Counter EMF**, also called back EMF, is a related phenomenon that we will **illustrate** in this animation. Here is a simple circuit **featuring** a battery, a nice **switch** and a light bulb. This circuit also **contains** a wire **coil** that **serves** as an **inductor**. Inductors store energy in the form of magnetic fields that **are generated** around them when a current passes through them. They are called inductors because they induce a voltage in their coils when that magnetic field changes. The elements in this animation **are not represented to scale** and the action we will show in super-slow motion actually takes place **in the blink of an eye**, but this animation is helpful for illustrating how back EMF works.

When we **power** this circuit, the electrons in the current **create** a magnetic field around the wire as they move through it, as shown by these blue arrows. If the wire is formed into a coil like this inductor, the magnetic field lines **converge** in the center, they gradually build up to a maximum magnetic field that is much stronger than the one around the **straight length** of the wire.

Let's watch this again but this time we'll pay closer attention to what's happening in the wire conductor. In this parallel circuit the current can travel either through the inductor or through the light bulb. When the current reaches this **junction** it **splits** and flows to both the inductor and to the light bulb. At first the current flows much more strongly towards the light bulb. This happens because as the magnetic field in the inductor **grows**, it **induces** its own voltage through Faraday's law. This is called electromagnetic induction, so the inductor here is creating a back EMF represented by this yellow arrow. Back EMF always **opposes** the change that created it, so in this instance the back EMF is opposing the change created by turning on the circuit. It opposes the current, the result as you can see is that the back EMF **effectively diverts** the current away from the inductor and towards the light bulb. This causes the bulb to light up, but only **briefly.**

Once the magnetic field around the inductor reaches its maximum field, the back EMF **fades** and the current now **favors the path** through the inductor, because the bulb creates some resistance to the current. The same phenomenon **occurs** when the magnetic field is **shrinking,** which happens when we open the switch and stop current flow from the battery. Once again the back EMF opposes the change that created it. In this case the change is the **cessation** of current, so opposing this change, the back EMF wants to **maintain** the current which flows once again to the bulb, causing it to flash before it fades away all together.

The process of generating electrical current in a conductor by placing the conductor in a changing magnetic field is called electromagnetic **induction** or just induction. It is called induction because the current is said to be induced in the conductor by the magnetic field.

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| 1. counter emf/back emf 2. illustrate 3. featuring 4. switch 5. coil 6. contain 7. serve as 8. inductor/induction 9. induce 10. are generated 11. are not represented to scale 12. in the blink of an eye 13. power 14. converge 15. straight lenth 16. create 17. junction 18. split 19. through 20. grow 21. oppose 22. effectively diverts 23. briefly 24. fade 25. favours the path 26. occur 27. shrink 28. cessation 29. maintain | 1. αντιηλεκτρεγερτική δύναμη 2. απεικονίζω 3. που περιλαμβάνει 4. διακόπτης 5. πηνίο 6. περιέχω 7. λειτουργώ ως 8. επαγωγέας/επαγωγή 9. προκαλώ, επάγω, οδηγώ 10. δημιουργούνται 11. δεν παρουσιάζονται σύμφωνα με τη σωστή κλίμακα 12. για μια στιγμή 13. δίνω ενέργεια 14. συγκλίνω 15. ευθεία γραμμή 16. δημιουργώ 17. διασταύρωση 18. χωρίζομαι 19. μέσα από 20. αυξάνομαι 21. έρχομαι σε αντίθεση με 22. εκτρέπω αποτελεσματικά 23. για λίγο 24. σβήνω, ξεθωριάζω 25. ευνοεί τη διαδρομή 26. συμβαίνω 27. συρρικνώνομαι 28. παύση 29. διατηρώ |

State if the following sentences are True of False.

1. Εmf is the electric power created by a battery or changing magnetic field. …………
2. Counter emf/back emf opposes the change that created it. …………….
3. A conductor in a straight line creates a stronger magnetic field than a coil. …….
4. The circuit in the video contains only a battery, a switch and a light bulb. …………

<https://kome.ai/tools/youtube-transcript-generator->

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