Teachers' notes

Lesson notes

Electromagnetic Induction

1) Students will be able to identify the relative motion of a conductor in a perpendicular magnetic field as a source of electron flow.

2) Students will be able to use hand rules and conservation of energy in the context of the generator effect.

Back

Teachers' notes

Lesson notes

Subject	Physics 30
Topic	topic
Title	title
Grade(s)	12
Cross-curricular link(s)	curr.
Prior knowledge	know.

Intended learning outcome(s)

Teachers' notes

Lesson notes

Back

Electromagnetic Induction

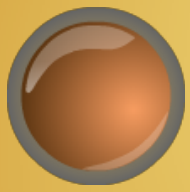
Recall: Oersted discovered that a current carrying wire (i.e. moving charges) produce a magnetic field

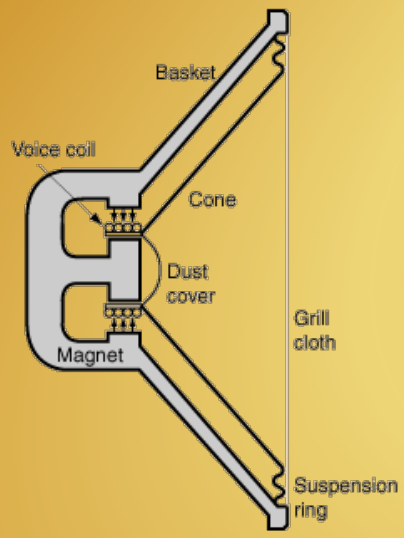
Michael Faraday discovered that a conductor moving relative to a perpendicular magnetic field will induce a current to flow in the conductor. This process is called electromagnetic induction

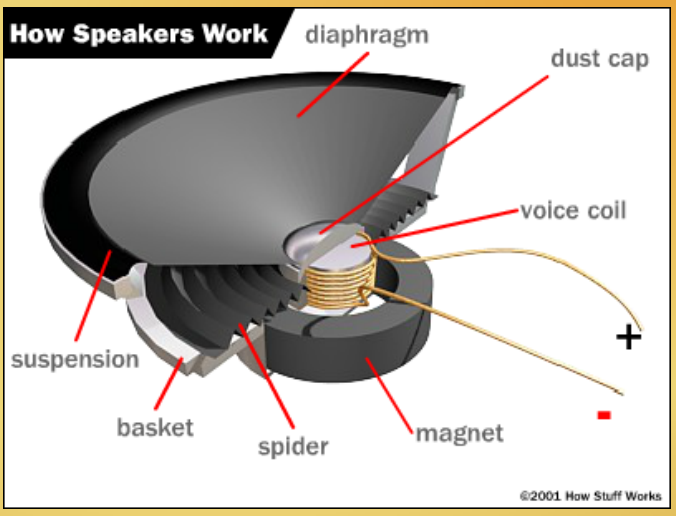
This process is often referred to as the generator effect

Motors vs generators

Motors: convert electrical energy into kinetic energy when a F_m is exerted on a current carrying wire in an external magnetic field




Basket
Voice coil
Cone
Dust cover
Magnet
Grill cloth
Suspension ring


How Speakers Work
diaphragm
dust cap
voice coil
suspension
basket
spider
magnet
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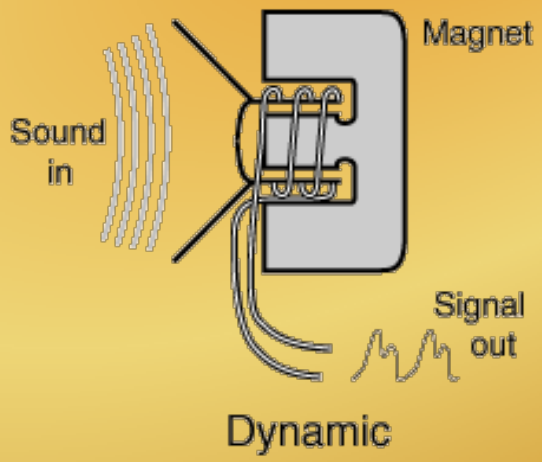
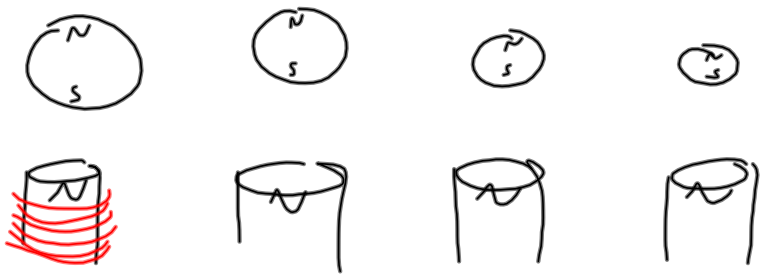
©2001 How Stuff Works

Generators: convert kinetic energy into electrical energy when a wire is moved through an external magnetic field

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Quick Summary:

Motors:

Generators:

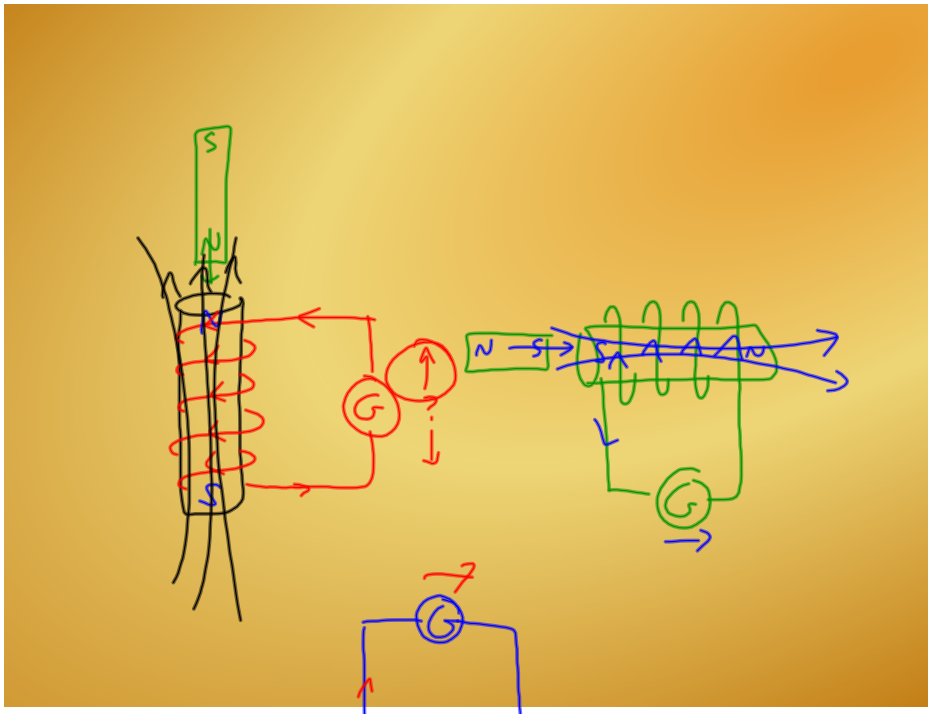
Lenz's Law

An application of conservation of energy: we must do work if we're going to get charges moving (i.e. if we're to obtain some electrical energy)

$$\sum E_{before} = \Sigma E_{after}$$

$$E_{k(initial)} = E_{electrical} + E_{k(final)}$$

Lenz's law: the magnetic field produced by an induced magnetic field will oppose the cause of the current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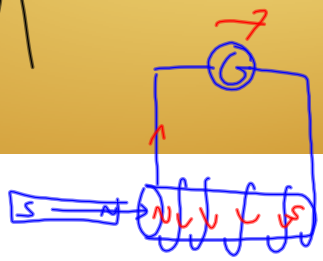
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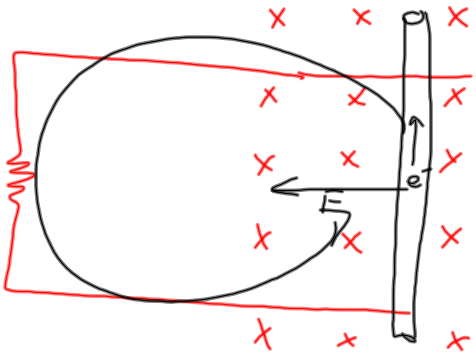
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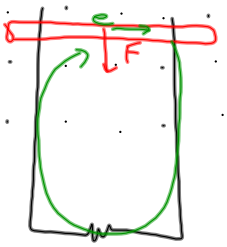
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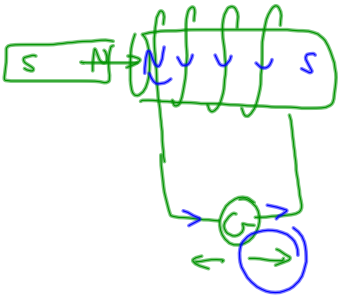
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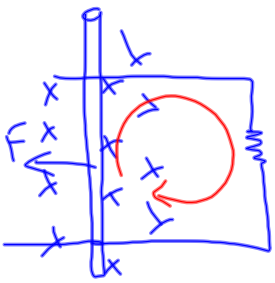
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Attachments

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