



Electric motors

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COURSE SUMMARY



Electric motors

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Origin: HUNGARY

Implemented in: Czech Republic, Slovakia and Romania

Description: Its aim is to teach students the basic principles of electric motors by building a working model of an electric motor for classroom use. The lessons start with a short pre-questionnaire that the students need to fill in order to show the teacher how much knowledge they already have on this topic. Then the students are divided into groups of three. Each group chooses one experiment and collects the required materials from a little box, and each student within the group is assigned a role: a reporter, a camera person and a presenter who has to create a short presentation on the experiment. The work of the students starts by

Electric motors



News Forum

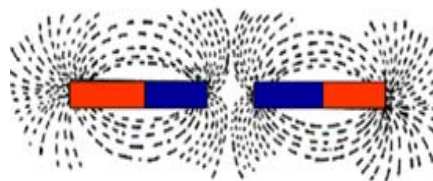
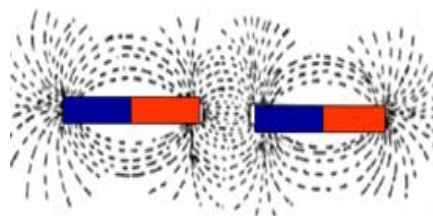


Forum for your "student-teacher" questions concerning the GPs.

Topic 1

Short presentation of the problem

Magnets both attract and repel each other. Like poles repel, opposite poles attract.



1820: Hans Christian Ørsted discovered that a wire with an electric current flowing through it produced a magnetic field.

The strength and direction of the magnetic field varies according to the strength and direction of the electric current. Wrapping a wire around an iron core and running a current through it produces a strong magnetic

watching a video on an experiment which they have to reproduce. During the reproduction the students have to follow their roles. The mechanical construction experiment is filmed with a digital camera by the camera operator, the video can be embedded in the presentation that the reporter creates, and the third student will finally have to present the whole experiment to the class. The added value of this GP, as stated by the creator, is that "students are able to make their experiments alone; they can discuss in teams and even argue about a scientific topic during their observation. Students are involved in the teaching of the new material, and they start to learn to predict before they conclude their observation."


More information:Spice
GP - Electric motors

effect; this is called an electromagnet. These discoveries led to the invention of electric generators and electric motors. An electric motor turns electricity back into motion, this is the basis of modern electric drives.



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GP

implementation_**5**

Participants

Badges

General

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My courses

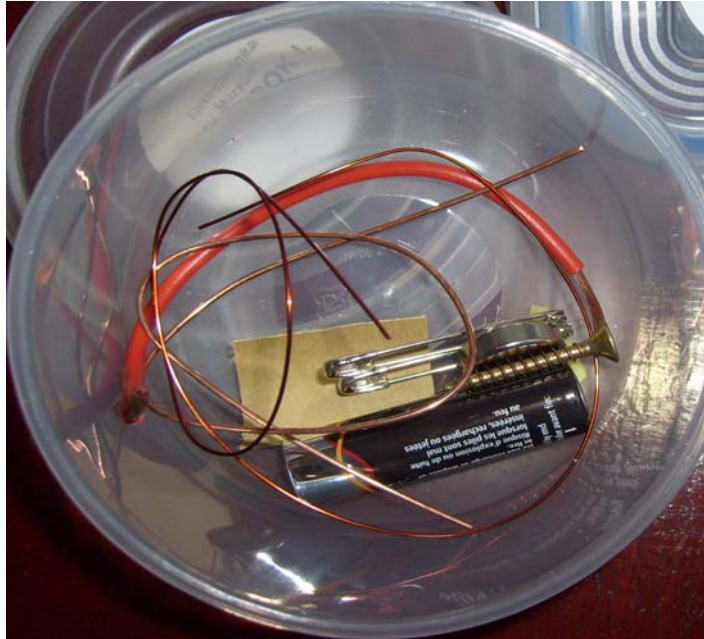
ONLINE**USERS**

(last 5 minutes)

None

Topic 2**Overview and timeline**

1. Students have 10 minutes to fill in individually the attached pre-questionnaires for reviewing of their previous knowledge.
2. Students should be divided in groups of 3 pupils. Each group chooses a reporter, chooses one experiment, and collects the required materials (from a little box, prepared in advance).



3. Each group of opens the website indicated in their worksheet, and looks at the video. After watching the video, students start to reproduce the experiment described in the worksheet. One student from each group records the experiment with a digital camera (making photo and video)

Another student designs a short Power Point presentation (one slide) about their experiment, containing the recorded video and photo. (15 minutes)

3. The reporters from every group present their observation and conclusion in front of the class and show the prepared slide with the photo and own video (5 minutes / group).

Students compare different experiments made in the class in parallel groups, and discuss the different observations and conclusions presented.

4. Students have 10 minutes to fill in individually the attached post-questionnaires.

TIMELIME

Topic 3**Basic Skills students need to use the GP**

Work with the computers, use as tool Microsoft Office Power Point program, basic knowledge of electricity and magnetism.

Reading, understanding and interpreting the texts of the worksheet attached.

Students should know how to record video and photo.

Students should be trained to present work in class.

Students know how to open video file from the the Internet.

Topic 4

Necessary Teaching Material

- MSPowerpoint
 - Internet
 - Worsheet
 - Questionnaires
-

Topic 5

Key facts students need to know before the start of the GP

Students should be able to setup simple experiments.

Basic IT Knowledge (using MSPowerpoint)

Topic 6

Aims of the GP

Students should work in groups and learn basic principles of electric motors.

Every student has to present his or her opinion to the group about a common topic.

Students get experience in preparation of the hands-on experiments : build a working model of an electric motor for classroom use.

Topic 7

Time involved in preparing and teaching this

GP

50 min

Topic 8

Tips and tricks I learned when implementing

the GP

Students should have enough experience in reproducing, setting up hands-on experiments after description and watched video.

Topic 9

HOW DO YOU EVALUATE THIS GP & THE STUDENTS' ACHIEVEMENT?

How would I assess the students?

Students can get **maximum: 15 points** for their activity, during the class.

- 5 point for correct answers of pre-questionnaires
 - 5 point for correct answers of post-questionnaires
 - 2 point for correct prediction and conclusion made after the experiment
 - 2 point 5 point for uploaded work (pps) with video and photo
 - 1 points for the cooperation
-

Topic 10

How would I evaluate the GP in order to see whether students profited more from it that by using a traditional teaching method?

Working with teams, making in parallel setup of the experiments, and changing the experiments by rotation is more effective than teaching electric motors without any experiment. The visualization of the happening is more imperishable than just talking about a phenomena without the experiment.

Topic 11

Added value

Students are able to make their experiments alone, they can discuss in teams and even argue about a scientific topic during their observation. Students are involved in the teaching of the new material, and they start to learn to predict before they conclude their observation.

Topic 12

1st experiment (15 minutes)



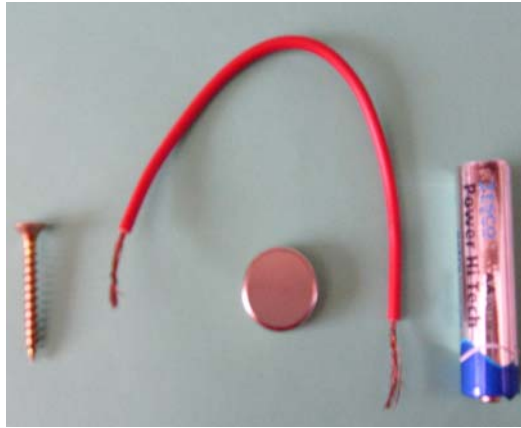
Video: <http://videa.hu/videok/tudomany-technika/1st-experiment-clip-motor-paper-oyn7khJjAbf9DqSy>



Worksheet 1st

Topic 13

2nd experiment (15 minutes)



Video: <http://videa.hu/videok/tudomany-technika/2nd-experiment-electric-motors-BkIV069QG7MbWBQJ>



Worksheet 2 nd

Topic 14

3rd experiment (15 minutes)



Video: <http://videa.hu/videok/tudomany-technika/3rd-b-experiment-homopolar-motor-ikicKqBDLSvRn8tk>



Worksheet 3 rd

Topic 15

4th experiment (15 minutes)



Video: <http://videa.hu/videok/tudomany-technika/3rd-a-experiment-homopolar-motor-23YGwBPGkI2u9zYZ>



Worksheet 4 th

Topic 16

5th experiment (15 minutes)



Video: <http://videa.hu/videok/tudomany-technika/electromagnet-sGspNt6IMJKme3Pf>



Worksheet 5 th

Topic 17

Pre-questionnaire students (10 minutes)

PPS created after the implementation by my students



pps1



pps2



pps3



pps4



pps5



pps6



pps7



pps8



pps9



pps10



pps11



pps13



pps14



pps12

Film from Slovakia

Topic 18

Post-questionnaire students (10 minutes)

Topic 19

Links

<http://www.howstuffworks.com/electromagnet.htm/printable>

http://education.jlab.org/qa/electromagnet_is.html

Online quiz: http://members.shaw.ca/vict/magnetism_test.htm



pps12

Topic 20

Crossword (game for the best group)



Crossword for students



Quiz



This practice has been funded with support from the European Commission. This practice reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



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