TwoThirtyVolts ...and all things electrical

Lesson Plan: Electromagnetism (age 14 – 16) – Generators.

Objectives:

The aim of the lesson and experiment is to help the student to construct a simple DC generator and AC generator.

Lesson introduction (15 min):

Recap on any previous learning on electromagnetic induction. Introduce subject area and refer students to the Generators Student Revision Notes in the 'Education' section of www.twothirtyvolts.org . Allow time for students to review these. Explain experiment and learning objectives.

Lesson activity (25 min):

Group students in pairs and task them to:

- Perform the experiments detailed in the Student Sheet to construct DC and AC generators.

Lesson demonstration (10 min):

Select some of the students to inform the rest of the class about their findings.

Lesson review (10 min):

Recap on learning from the experiments, the basis of both DC and AC generators, and get students to complete the Generators Student Quiz at www.twothirtyvolts.org to establish levels of understanding.

Resources required:

For each student pair: Motor/generator kit. Voltmeter (a.c and d.c) Leads An oscilloscope or equivalent.

Access to internet for www.twothirtyvolts.org

Expected Outcomes:

By the end of the session students will understand the principles of and be able to construct both DC and AC generators.

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Student sheet: Electromagnetism – Generators.

Objectives:

By the end of the session you will understand the principles of and be able to construct both DC and AC generators.

Resources required:

Motor/generator kit. Voltmeter (a.c and d.c), Leads, An oscilloscope or equivalent.
Access to internet for www.twothirtyvolts.org

Introduction:

Access and review the Generator Student Revision Notes at www.twothirtyvolts.org .

Activity:

Working in pairs undertake the following tasks:

(a) DC generator
Build your DC generator as shown in Figure 1. Connect the voltmeter across the ends of the coil using the wires shown and then gently spin the axle. Observe what happens to the voltmeter reading. Try spinning the axle both ways and also faster and slower. If you have access to an oscilloscope connect your generator to the Y input and repeat the experiment. Record in the Worksheet table the effects of spin speed and spin direction.

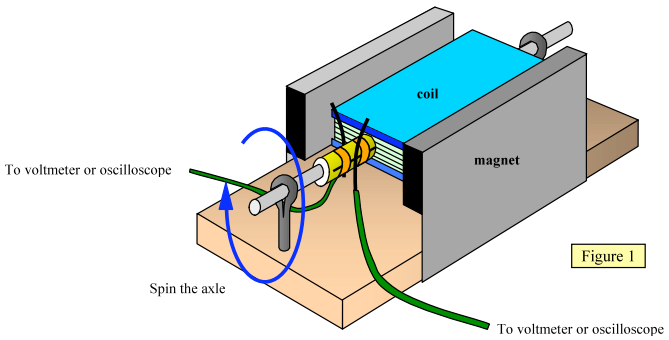

Figure 1

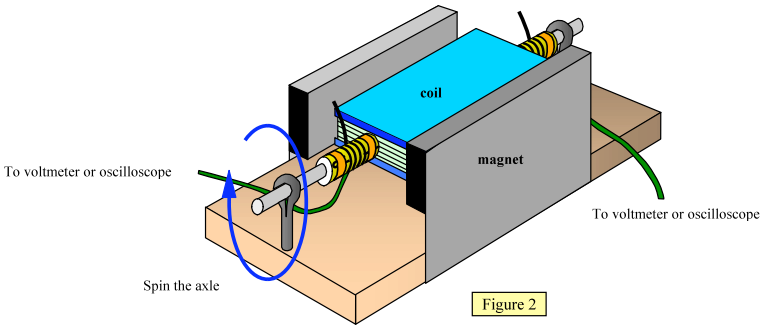

Figure 2

(b) AC generator
Repeat the experiment using the AC generator shown in Figure 2. Cover both ends of the axle with insulating tape. Bare both ends of the wire and wrap it round the axle over the insulating tape.

Further work:

Complete Generators Student Quiz at www.twothirtyvolts.org .

Linked Resources

www.twothirtyvolts.org:

Generators 14 -16 Student Revision Notes
Generators 14 -16 Revision Quiz

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Worksheet: Electromagnetism – Generators.

Experiment DC Generator:

Spin Speed	Spin Direction	Observation

Experiment AC Generator:

Spin Speed	Spin Direction	Observation

Other Observations: