

Lesson Plan: Electromagnetism (age 14 – 16) – Electromagnetic Induction.

Objectives:

The aim of the lesson and experiment is to help the student investigate how the principle of electromagnetic induction.

Lesson introduction (15 min):

Recap on any previous learning on electromagnetism. Introduce subject area and refer students to the Electromagnetic Induction 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 investigate electromagnetic induction.

Extension activity: complete the additional experiment.

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 Faraday’s Law, and get students to complete the Electromagnetic Induction Student Quiz at www.twothirtyvolts.org to establish levels of understanding.

Resources required:

For each student pair: Two metres of insulated copper wire, a bar magnet, two magnadur magnets on a holder, a sensitive meter, a mounted coil of wire of a few hundred turns.

Access to internet for www.twothirtyvolts.org

Expected Outcomes:

By the end of the session students will understand the principle of electromagnetic induction and the basis of Faraday’s Law.

Student sheet: Electromagnetism – Induction.

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Introduction:

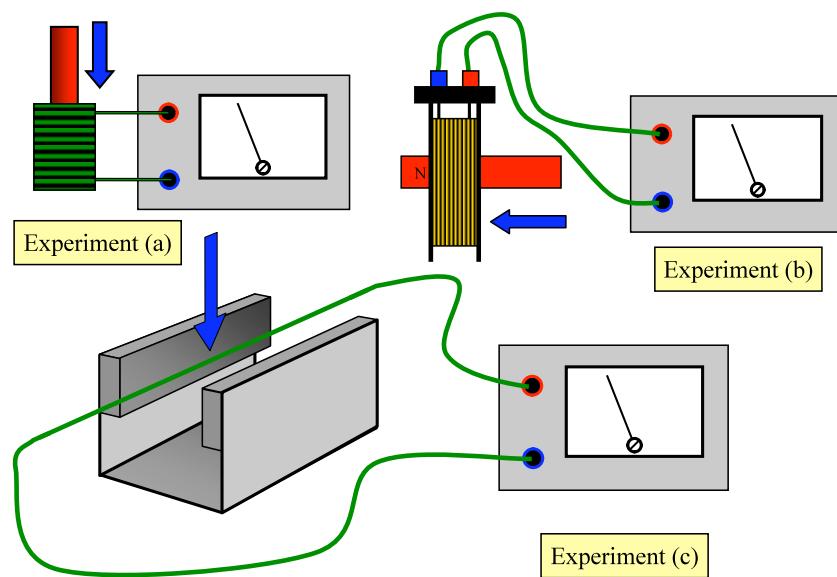
Access and review the Electromagnetic Induction Student Revision Notes at www.twothirtyvolts.org.

Activity:

Working in pairs undertake the following tasks:

Experiment (a)

Wind the copper wire into a coil of 20 turns. Connect it to the meter. Hold the coil still and push the North pole of the magnet into the coil. Record what happens. Now try the same with the South pole. Try moving it fast and then slowly. Now hold the magnet still and move the coil. Watch carefully as the meter movements will be small. Record the size and direction of the current on the meter in the Worksheet table.



Experiment (b)

Connect the wire to the meter as shown in the diagram. Move it downwards between the two magnets, record what happens on the meter. Now move it upwards. Now move the wire sideways between the magnets and then from end to end. Watch carefully as the meter movements will be small. Record the size and direction of the current on the meter in the Worksheet table. How do these readings compare with those you got in the first experiment?

Further work:

An extension activity is to undertake:

Experiment (c).

Repeat experiment (a) but this time use the large mounted coil.

Complete Electromagnetic Induction Student Quiz at www.twothirtyvolts.org .

Linked Resources

www.twothirtyvolts.org:

Electromagnetic Induction 14 -16 Student Revision Notes

Electromagnetic Induction 14 -16 Revision Quiz

Worksheet: Electromagnetism – Induction.

Experiment (a):

Action	Size of Current	Direction of Current

Experiment (b):

Action	Size of Current	Direction of Current

Experiment (c):

Action	Size of Current	Direction of Current