
Faraday Electricity Discovery Kit — Teacher’s Guide (Version 1.0)

Designed for KS2–KS3 Classrooms

1. Introduction

This guide supports teachers in delivering the Faraday Electricity Discovery Kit with scientific accuracy and confidence. It aligns with the **How It Works** guide and the **Pupil Worksheet**, providing background knowledge, teaching strategies, and model answers.

2. Learning Objectives

By the end of the lesson, pupils will:

- Understand **electromagnetic induction**
- Observe how **moving magnets induce electric current** in a coil
- Connect the experiment to **real-world electricity generation**
- Use scientific vocabulary confidently:
magnetic field, current, electrons, energy conversion

These objectives reflect your original list.

3. Background for Teachers

3.1 Faraday’s Discovery

In 1831, Michael Faraday discovered that **moving a magnet through a coil of wire creates an electric current**. This process — *electromagnetic induction* — is the foundation of every generator used today.

Your original text states:

“Michael Faraday discovered in 1831 that moving a magnet through a coil of wire creates an electric current.”

3.2 What’s Happening in the Wire

Electricity is the movement of **electrons**.

- Electrons move freely through metals

- **Protons and neutrons remain tightly packed in the nucleus**
- Only electrons respond to the changing magnetic field

This matches your original explanation.

3.3 Energy Conversion

The experiment demonstrates energy conservation:

- Pupils provide **mechanical energy** (movement)
- The coil produces **electrical energy**
- The galvanometer or motor shows the result

Your original guide notes:

“Energy is conserved by converting mechanical movement energy into electrical energy.”

4. Preparing the Classroom

- Ensure all kit components are present and functional
- Demonstrate safe handling of magnets and wires
- Position pupils so they can clearly see the **galvanometer needle**
- Keep the workspace clear for fast/slow magnet movement tests

This section is based on your original preparation notes.

5. Teaching Tips

- Begin with a **starter activity** exploring magnetic attraction and repulsion
- Encourage pupils to **predict** before each test
- Emphasise how **speed and direction** affect the galvanometer
- Use questioning to guide understanding:
 - *What changed?*
 - *What stayed the same?*
 - *Why did the needle move more this time?*

- Reinforce the key idea: **a changing magnetic field induces current**
- Link movement → induction → electricity → real generators

These points reflect your original teaching advice.

6. Suggested Lesson Flow

Starter (5 minutes)

Explore magnetic forces using the **levitation pole**.
Introduce the idea of *magnetic fields* and *movement*.

Main Investigation (15–20 minutes)

Pupils move magnets through the coil:

- Fast vs slow
- In vs out
- Different distances
- Different orientations

Observation (5 minutes)

Record galvanometer needle movements.
Encourage pupils to sketch the needle direction.

Discussion (10 minutes)

Analyse results using the Pupil Worksheet prompts.
Highlight the relationship between **speed**, **direction**, and **needle deflection**.

Key Idea (2 minutes)

A **changing magnetic field** induces an electric current.

Challenge / Extension (optional)

Connect the experiment to **power station generators**.

This structure is based directly on your original “Suggested Lesson Flow.”

7. Answers to Pupil Questions

Your original answers have been polished and expanded for clarity.

- **Why does the needle move more when the magnet moves faster?**
Because the magnetic field changes more quickly, inducing a stronger current.
 - **Why does the needle move in different directions?**
The direction of current depends on whether the magnet is moving *into* or *out of* the coil.
 - **What makes the electricity?**
A **changing magnetic field** pushes electrons through the wire.
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8. Extension Ideas

- Investigate how **more coil turns** affect current
- Test **different magnet strengths**
- Explore **magnetic field mapping** with the compass
- Discuss Faraday's impact on modern electricity
- Compare the kit to **wind turbines, dynamos, and generators**

These extensions reflect your original suggestions.

9. Safety Notes

- Handle magnets carefully to avoid pinching
- Keep magnets away from electronics
- Do not connect the galvanometer to high-voltage sources
- Supervise pupils during fast magnet movements

Your original safety notes are preserved here.

10. Summary

This guide ensures teachers can confidently deliver the Faraday Electricity Discovery Kit with clear scientific explanations, structured enquiry, and engaging hands-on activities.

Your original closing line is reflected here:

“This guide ensures teachers can confidently deliver the Faraday Electricity Discovery Kit lessons with clear scientific explanations and engaging activities.”
