Faraday Electricity Discovery Kit — Pupil Worksheet (Version 1.0)

Name: _____ ***Date:*** _____

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1. What Are We Investigating?

Today you will explore **how moving a magnet can make electricity**.
This idea was discovered by **Michael Faraday in 1831**, and it is still how power stations work today.

My prediction:

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2. Equipment Checklist

Tick each item when you have it:

☐ Copper coil
☐ Ring magnets
☐ Galvanometer
☐ Connecting wires
☐ Levitation pole

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3. Starter Activity — Magnetic Forces

Use the levitation pole to explore attraction and repulsion.

A. What happens when the magnets face the same way?

B. What happens when you flip one magnet around?

C. What does this tell you about magnetic fields?

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4. Main Investigation — Making Electricity

Move the magnets through the coil and watch the galvanometer needle.

Test 1 — Slow movement

What happens to the needle?

Test 2 — Fast movement

What happens now?

Test 3 — Move the magnets in and out of the coil

What changes?

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5. Results Table

Test	What You Changed	What You Observed (Needle Movement)
1	Speed: slow	_____
2	Speed: fast	_____
3	Direction	_____

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6. Thinking Questions

A. When did the galvanometer needle move the most? Why?

B. Why does the needle move in different directions?

C. What has to change for electricity to be made?
(Hint: think about the magnet.)

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7. Key Idea (Write in your own words)

Electricity is made when…
(Hint: A changing magnetic field pushes electrons in the wire.)

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8. Challenge Question (Optional)

How is this experiment similar to how electricity is made in a power station?
(Hint: Power stations also use moving magnets and coils.)

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9. Self-Assessment

Circle one:

I can explain what electromagnetic induction is: **Yes / Almost / Not yet**
I can describe what happened in the experiment: **Yes / Almost / Not yet**
I can use words like *current*, *magnetic field*, *electrons*: **Yes / Almost / Not yet**

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10. Simple Science Box — What's Really Happening

(Based on your original explanation)

- When you move the magnet, your **movement energy** is turned into **electrical energy** in the coil.
- **Energy is never created or destroyed** — it just changes form.
- **Only electrons move** to make electricity.
  Protons and neutrons stay in the nucleus and do not take part.
- The needle moves because a **changing magnetic field pushes electrons** in the wire.
- Moving the magnet faster or changing direction makes the needle move more.

Volta Electricity Discovery Kit — Pupil Worksheet (Vesrion1.0)

Name: _____ ***Date:*** _____

1. What Are We Investigating?

Today you will explore **how two different metals in salty water can make electricity**. This idea was discovered by **Alessandro Volta in 1800**, and it is still how batteries work today.

My prediction:

2. Equipment Checklist

Tick each item when you have it:

☐ Copper plates
☐ Zinc plates
☐ Test tubes with caps
☐ Saltwater (electrolyte)
☐ Connecting wires
☐ LED or voltmeter

3. Starter Activity — Metals & Electricity

Look at the two metals you will use: **copper** and **zinc**.

A. How are the two metals similar?

B. How are they different?

C. Why do you think we need *two different* metals to make electricity?

4. Main Investigation — Building a Battery

You will build a simple battery cell using copper, zinc, and saltwater.

Test 1 — One cell

What voltage do you see on the voltmeter?

Test 2 — Two cells in series

What changes?

Test 3 — Four cells in series

Can you light the LED?

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5. Results Table

Test	What You Changed	Voltage / LED Result
1	One cell	_____
2	Two cells	_____
3	Four cells	_____

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6. Thinking Questions

A. Why does adding more cells increase the voltage?

B. Why do we need saltwater in the test tubes?

C. Which metal gives electrons, and which metal receives them?

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7. Key Idea (Write in your own words)

Electricity is made when…
(Hint: A chemical reaction pushes electrons from zinc to copper.)

8. Challenge Question (Optional)

How is this experiment similar to the batteries inside phones, torches, or electric cars?

9. Self-Assessment

Circle one:

I can explain how a simple battery works: **Yes / Almost / Not yet**
I can describe what happened in the experiment: **Yes / Almost / Not yet**
I can use words like *electrode*, *electrolyte*, *voltage*, *electrons*: **Yes / Almost / Not yet**

10. Simple Science Box — What's Really Happening

- **Zinc gives up electrons**, and **copper receives electrons**.
- Saltwater allows **ions** to move so the reaction can continue.
- Electrons travel through the wires to the LED or voltmeter.
- Only **electrons** move in the wires — protons and neutrons stay in the nucleus.
- Adding more cells **adds more voltage**, making the LED brighter.

PUPIL WORKSHEET — Detect Static Electricity

Young Einstein Science Kit

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1. What you are investigating

You are going to use a simple detector to **see static electricity**.
When a charged balloon comes close to the metal plate, the thin metal leaf moves.
This shows that **like charges repel**.

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2. Equipment

- Balloon
- Wool cloth / jumper
- Static electricity detector (metal plate, rod, leaf, plastic box)

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3. Predict

Before you start, write your prediction:

What do you think will happen when the charged balloon is brought near the metal plate?

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.....

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4. Method

1. Rub the balloon on your hair or clothing to **charge it up**.
2. Hold the balloon close to (but not touching) the metal plate.
3. Watch the **metal leaf** carefully.
4. Move the balloon away again.
5. Try different distances and different fabrics.

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5. Observe

Write or draw what you see:

What happened to the metal leaf when the balloon came close?

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.....

What happened when the balloon moved away?

.....
.....

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6. Explain

Use these words to help you:
charge, **repel**, **attract**, **electrons**, **static**, **metal**, **balloon**

Why did the leaf move when the balloon came close?

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.....

Why does the balloon not need to touch the metal?

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.....

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7. Real-life links

Static electricity is used in many modern technologies.

Match the use to the explanation:

Technology	**What static electricity does**
Car paint spraying	A. Charged particles stick to the right places
Laser printers	B. Charged paint is attracted to the car body
Air purifiers	C. Dust is trapped by charged plates

Write the correct letters:
Paint spraying: ___ Printers: ___ Air purifiers: ___

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8. Challenge Questions

1. Why does hair stand up when you rub a balloon on it?

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2. Why does a balloon sometimes stick to a wall?

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3. Why is the detector inside a plastic box?

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9. Key Ideas to Remember

- Rubbing creates **static electricity**.
- A charged balloon can move charges in metal **without touching**.
- **Like charges repel** → the leaf moves away.
- Static electricity is used in **painting, printing, and cleaning air**.
