

★ The Cosmic Energy Ball



Teaching Notes

Explore Electricity Through Touch, Toys & Teamwork

Curriculum Links: KS1, KS2 & KS3 Science – Electricity, Everyday Materials, Working Scientifically

🔧 What You Need:

- 1 Cosmic Energy Ball
- A selection of household items:
Pens, pencils, metal spoons, plastic spoons, scissors, hammer, screwdriver, keys, small toys, etc.
- Labels or signs: **CONDUCTOR** and **INSULATOR**



🔌 Activity 1: The Human Circuit

Objective:

Understand how electricity needs a complete circuit and conductive materials to flow.

Instructions:

1. **Gather volunteers.** Explain that their bodies will act as "wires" in a human electrical circuit.
2. **Form a circle.** Have everyone hold hands.
3. Place the **Cosmic Ball** in one person's hand so their thumb touches one metal strip (electrode).
4. The person opposite touches the other electrode with a pointed finger.

➡ **What happens?** The ball flashes and buzzes!



Why? You've made a complete circuit using human bodies as conductors.

5. **Now break the circle.** The ball stops working.
6. Let everyone have a go at being the switch – breaking and remaking the circuit.

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💡 Activity 2: Conductor or Insulator?

Objective:

Sort everyday materials based on their electrical conductivity.

Instructions:

1. Place all test items in a central pile.
2. Repeat the human circuit setup, but this time:
 - Break the circuit by placing the object **between** the two people.
 - Only test **one item at a time**.
3. Ask:
 - Does the ball light up and buzz?
→ **Yes = CONDUCTOR**
→ **No = INSULATOR**



Example:

- **Hammer** (wood/plastic handle): No light = **Insulator**
- **Hammer** (metal head): Yes light = **Conductor**

🧐 Let's Get Scientific

Key Terms:

- **Conductor:** A material that lets electricity flow (e.g., metal).
- **Insulator:** A material that blocks electric flow (e.g., plastic, wood, cloth).
- Clothes work like plastic wire coatings – they stop electricity from escaping.

🧠 Challenge Questions:

- What happens if someone pulls a sleeve over their hand before connecting?

Created by Scientific Sue | **Sparks of imagination are at the heart of creativity!**

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- Why do scissors and hammers behave as both conductors and insulators?

👥 Group Extension: The Mega Circuit

Try creating the **longest human circuit** you can. Can the ball still light up at the ends? What happens if one person in the chain wears gloves or stands on a damp patch?

Troubleshooting Tip:

If the ball is buzzing unexpectedly (even when the circuit is broken), have participants stand on a **dry tray or mat**. Damp floors can accidentally complete the circuit!

🎨 Creative Twist: Playdough People

Playdough is salty – that means it can **conduct** electricity!

Try building a chain of playdough "people" and see if you can light the ball.



📖 Science in a Nutshell

- Electricity flows through **complete circuits**.
- A **battery** provides the force (voltage) that pushes electrons.
- **Switches** open or close circuits.
- **Your body** can conduct electricity – so can metals and saltwater.

Think of it like the body's circulatory system:

Heart = Battery

Blood Vessels = Wires

Organs = Lightbulbs or Buzzers

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Curriculum Links

Curriculum Area	Objective	Key Stage
Electricity	Identify appliances that use electricity; Construct simple circuits; Recognise materials as conductors or insulators	KS2 (Age 7–11)
Materials	Compare everyday materials based on properties like conductivity	KS1 & KS2
Working Scientifically	Ask questions, perform tests, observe and classify materials	KS1 & KS2
Electricity and Electromagnetism	Current and potential difference in series and parallel circuits; resistance and its effect; use of models to explain circuit behaviour	KS3
Matter – Particle Model	Relate the properties of materials to their atomic structure (linked to conductivity)	KS3
Scientific Thinking	Develop explanations using abstract ideas and models; evaluate data and identify patterns	KS3

Want More Electrifying Fun?

Try these from our **Science It!** collection:

- [Wandarama](#) – Build your own static electricity wand
- [litterbugs](#) – Make your own motor-powered insects
- [Creative Circuits](#) – Explore how switches, motors, and buzzers work

Extra Science Bit: Why Does the Pencil Trick Work?

Got a pencil sharpener handy? Try this:

Sharpen **both ends** of an ordinary pencil and add it into your testing circle. You'll find that the **Cosmic Energy Ball** will only light up when **both people are touching the exposed graphite** in the centre.

Why?

 **Because graphite (carbon)** – like metal – is a **conductor of electricity**. It allows charged particles (electrons) to flow through it.



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The wooden part of the pencil, however, is an **insulator** – it blocks the flow of electricity. So, unless both ends are stripped to reveal the graphite, the circuit won't complete.



The Science Behind It

- In **physics**, when testing solid materials, only **metals and carbon graphite** are considered electrical conductors.
- In **chemistry and biology**, electricity can also flow through **liquids** – but only when **charged particles (ions)** are present, like in salty solutions.



Why Do Humans Conduct Electricity?

Believe it or not, **your body is naturally wired** to carry electric signals!

- Our **nervous system** relies on electricity to send messages – it's how we move, think, and react.
- Elements like **sodium (Na^+)**, **potassium (K^+)**, and **calcium (Ca^{2+})** are dissolved in water inside our bodies. These elements form **charged ions** that can carry electric currents.
- Even our **skin** can conduct electricity — especially when we're sweaty.



Ever tasted your sweat? It's salty because it contains **sodium chloride (NaCl)**. When dissolved in sweat, sodium and chloride become **Na^+ and Cl^- ions**, making it easier for electricity to flow across the skin.

So... the **sweatier your helpers are**, the **more conductive they become!**



Final Thoughts

Electricity is powerful, fun – and everywhere. In just over a century, it's transformed our world. Let your pupils explore, wonder, and discover through this safe and engaging activity. Whether you're a teacher or parent, remember:

Curiosity is the current. Play is the power. Science is the spark.



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