Charging by friction: attraction and repulsion

Teacher / technician

YEAR 10 / LESSON 33 / PHYSICS ONLY

Staff preparation and answer guidance. Keep separate from student sheets. Attraction alone does not identify charge sign. Record unclear results honestly and discuss humidity, handling and leakage.

Coverage and delivery

Physics only: 2.22P, 2.23P, 2.25P. Conductors, insulators and charging.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, ten groups of three

Item	Per pair / setup	Class total
Polythene rods	2 per group	20
Alternative insulating rods, cloths, stirrups and stands	1 of each per group	10 of each
Paper-piece trays	1 per group	10
Matched battery, lamp, leads and samples	Staff demonstration	1 set
Booklets	1 per learner	30

Immediate safety

Use smooth intact rods and keep them away from faces, electronic equipment and flames. Rub rods with cloth, not hair or clothing being worn. Staff check the battery circuit; never bridge the battery directly. No high-voltage generator is used.

Preparation and delivery

Read alongside the student method

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1. Pilot clean dry rods and cloths in the room conditions. Provide ten groups of three and secure suspended rods at bench height.

2. Use a matched low-voltage battery and lamp with the sample gap in series. Check metal, graphite and plastic samples; avoid sharp edges and glass rods.

Close of lesson

- Collect paper pieces, disconnect the battery and return rods and cloths dry.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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- Charge can move through it readily.
- Electrons; nuclei remain within the material.
- They repel.
- Yes, through charge redistribution or polarisation.
- Contact can transfer charge and alter the test.
- Moist surface films can allow charge to leak away.

References and provenance

Pearson Physics specification

IOP: electrostatic charges

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.