Static electricity and electric fields

Name _____ Class _____ Date _____

Rubbing two insulators together can transfer **electrons** from one to the other, leaving both charged.

KEY IDEAS

- The material that gains electrons becomes **negatively** charged; the one that loses electrons becomes equally **positively** charged.
- Like charges repel; unlike charges attract. These are non-contact forces.
- A charged object has an **electric field** around it, strongest close to the object.

Section A · Recall

Grade 4–5

1 Which particles are transferred when a balloon is rubbed on a jumper? [1]

Electrons

2 Two negatively charged balloons are held near each other. Describe and explain what happens. [2]

They move apart (repel),

because like charges repel.

3 A polythene rod becomes negatively charged when rubbed with a cloth. Explain what happens to the cloth. [2]

Electrons are transferred from the cloth to the rod,

so the cloth loses electrons and becomes positively charged.

Section B · Fields

Grade 5–6

4 Draw the electric field around an isolated negatively charged sphere. [2]

Straight radial lines pointing inwards towards the sphere

Radial lines (1), arrows pointing towards the sphere (1).

5 Describe how the force on a charged object changes as it is moved closer to another charged object. [2]

The force increases as the distance decreases,

because the electric field is stronger closer to the charged object.

Section C · Stretch

Grade 7+

6 Explain why a spark can jump between a charged object and an earthed conductor. [3]

A large charge builds up, creating a strong electric field (large p.d.).

The field ionises the air, letting electrons flow through it.

Charge flows quickly to earth, producing a spark.

Exam-style question

AQA style

7 A fuel tanker is refuelling an aircraft. Fuel flows through a long plastic hose.

a Explain how the aircraft can become charged. [2]

Friction between the fuel and the hose transfers electrons,

so charge builds up on the aircraft.

b Explain why the aircraft is connected to earth with a metal cable before refuelling. [3]

A build-up of charge could cause a spark,

which could ignite the fuel vapour.

Earthing lets the charge flow safely to the ground.

Total: _____ / 17

How confident am I?	Not yet	Nearly	Got it
I can explain charging by friction using electrons	☐	☐	☐
I can describe how charged objects attract and repel	☐	☐	☐
I can draw and describe electric fields	☐	☐	☐