Chapter 9: Sources of current
Then and now

Questions from page 122 of *ESA Study Guide Year 10 Science*

Understanding

1. What type of electricity did Galvani think he had discovered? _____
2. Which two metal materials played a part in making the frogs' legs twitch in Galvani's experiment?

   _____ and _____
3. In what year was 'magneto electricity' first produced? _____

Thinking

1. Name the five types of 'electricity' that Faraday showed all produced the same sort of energy.

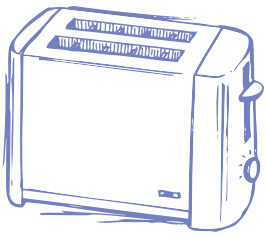
   _____ _____ _____

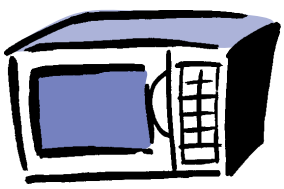
   _____ _____
2. Name two body fluids that are good conductors of electricity.

   _____ _____

Contributing

Write a paragraph to explain how the use of electrical energy has changed people's lives.





Answers (except for 'Contributing') are provided on page 309 of *ESA Study Guide Year 10 Science*

Chapter 9: Sources of current Electricity transfers energy

Questions from pages 123, 124 of *ESA Study Guide Year 10 Science*

Understanding

1. Which parts of atoms move, so forming an electric current? _____
2. Which sort of electricity occurs when electrons are added to or removed from a material by rubbing? _____
3. Complete the table to make a list of 10 objects found in the home that use electricity. For each object, state what the electricity does (as shown).

Object	What the electricity does
TV	Makes sound, makes the screen light up

Thinking

A stereo consists of a transducer that converts electricity into sound. The main energy change is:

Electrical energy ▶ loudspeaker ▶ Sound energy

1. Draw similar energy changes for the following energy conversions. Write down the main energy change for each.
   a. Electricity converted to heat and light by a light bulb.

   ☐ ▶ ☐ ▶ ☐

   b. Light from the Sun converted by a solar cell into electricity.

   ☐ ▶ ☐ ▶ ☐ ▶ ☐

   c. An electric vehicle powered by batteries.

   ☐ ▶ ☐ ▶ ☐ ▶ ☐

   d. A battery-powered torch.

   ☐ ▶ ☐ ▶ ☐ ▶ ☐
2. Complete the following flow diagram that shows how a hydroelectric power station produces electricity:

   Gravitational potential energy of water ▶ ☐ ▶ turbine ▶ ☐

Contributing

Hydroelectricity is 'renewable energy'. State one advantage *and* one disadvantage of hydroelectricity.

_____

_____

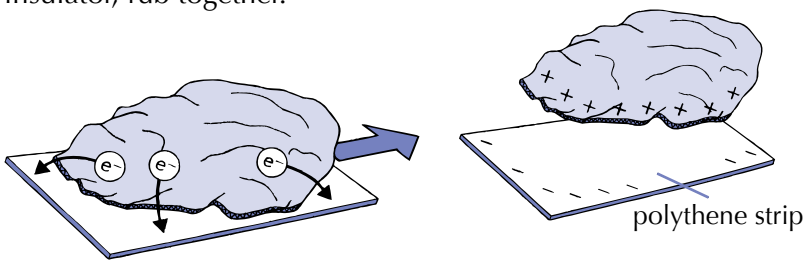
Answers (except for 'Contributing') are provided on pages 309 and 310 of *ESA Study Guide Year 10 Science*

Chapter 9: Sources of current
Static electricity

Questions from pages 127, 128 of *ESA Study Guide Year 10 Science*

Understanding

1. The following diagrams show what happens when two different materials, one of which is an insulator, rub together.



Rubbing a cloth *A charged cloth*

Complete the following explanation using words from the word list.

charges equal electrons gains loses
negative nucleus protons positive

Objects can become charged because the atoms of substances contain both negative and **a.** _____ charges. In an uncharged atom, the number of **b.** _____ (positive charges) is **c.** _____ to the number of electrons (negative **d.** _____). The positively charged protons are in the **e.** _____ of an atom. The **f.** _____ electrons orbit the nucleus. When a polythene strip is rubbed with a cloth, some of the **g.** _____ rub off the cloth and move onto the polythene strip. The cloth **h.** _____ electrons so the cloth ends up with a positive charge. The polythene strip **i.** _____ electrons so the polythene strip ends up with a negative charge.

2. State one danger of static electricity, and one use for static electricity, in everyday life.

Thinking

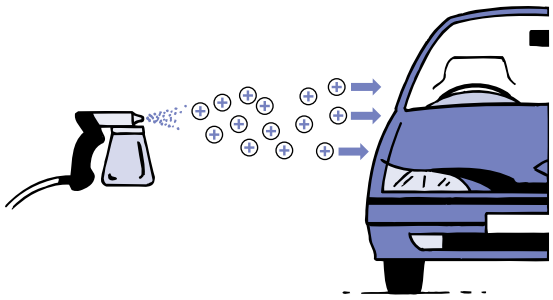
1. Explain why:
   a. nylon clothing sometimes crackles as a person undresses

   b. children getting off a trampoline sometimes get a shock

   c. passengers sliding from a car seat to the ground sometimes get a shock.

2. The diagram showing a car body being sprayed illustrates a use of static electricity.

   When a liquid is sprayed out of a nozzle, the liquid becomes electrically charged. When a car body is spray painted, the droplets of paint become positively charged.



   a. What happens to the droplets of paint as they leave the nozzle?

   b. To make sure most of the paint ends up on the car body, car painters put an electrical charge on the car body. What sort of charge should they give a car? _____

   c. Explain how the charge on the car helps save paint.

Contributing

Research the natural static discharge, lightning, to find out:

- how and why the charge builds up
- what causes the bright flash
- what causes the associated clap of thunder
- how to stay safe in an electical storm.

Answers (except for 'Contributing') are provided on pages 310 and 311 of *ESA Study Guide Year 10 Science*