



# ELECTRICITY

## B1

WINSTON  
ACADEMY

# BEFORE YOU BEGIN

## A Did you know these? Tick the information you already know about electricity!

- 1 Electricity was not invented but discovered; it already exists in nature!
- 2 Electricity travels faster than we can imagine; it reaches up to 10,776,167.42 km per hour.
- 3 Electricity plays an important role in our body: it helps our heart keep beating!
- 4 We can get electricity from various forces such as wind, water, the Sun, or even animal waste. So, we have many eco-friendly options!
- 5 We think electrical cars are new, but Robert Anderson developed the first model in 1930s. Yet they are still not very common.
- 6 Unfortunately, we waste more electricity than we produce worldwide. We should / can unplug the devices when we don't use them to change this!
- 7 Ancient Egyptians knew how powerful lightning and electricity in some fish were. That's why they called those fish "Thunderers of the Nile".
- 8 When lightning strikes, it falls from the cloud down to the ground. But what we see is actually the electrical charge travelling back to the cloud from the ground!
- 9 The electrical charge of a single lightning bolt can light up to 100 lightbulbs for an entire day!
- 10 Lightning bolts are also unbelievably hot! They can reach temperatures of 30,000°C.

**B Match the words to the pictures.**

current

harm

heat

environment

cable

device

tool

lightning

movement

chemical





# WHAT IS ELECTRICITY?

## Before Reading

*What do you know about electricity?*



Electricity is a type of energy that can gather in one place or flow from one place to another. When electricity gathers in one place, it is known as static electricity (electricity that does not move); electricity that moves from one place to another is called current electricity.

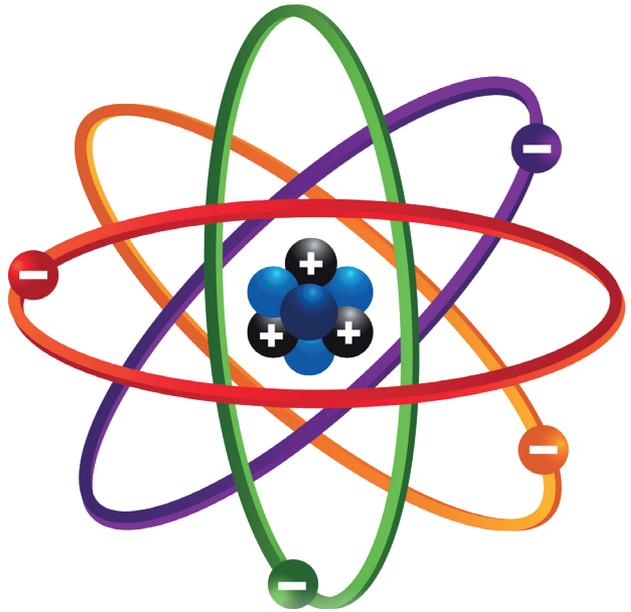
## Static Electricity

Static electricity often happens when you rub things together. If you rub a balloon against your pullover 20 or 30 times, you'll find the balloon sticks to you. This happens because rubbing the balloon gives it an electric **charge**<sup>1</sup>. The charge makes it stick to your pullover like a magnet, because your pullover gains an opposite electric charge. So, your pullover and the balloon attract one another like the opposite ends of two magnets. Lightning is also caused by static electricity. As rain clouds move through the sky, they rub against the air around them. This makes them build up a huge electric charge.

<sup>1</sup>**charge:** the amount of electricity that is carried



The atom is the smallest unit of an object. There are protons, neutrons, and electrons in an atom. Electricity is the result of electron movement in atoms.



### **Current Electricity**

When electrons move, they carry electrical energy from one place to another. This is called current electricity or electric current. A lightning bolt is one example of an electric current, but it does not last very long. Electric currents are also used in all the electrical devices that we use, from washing machines to computers and from smartphones to vacuum cleaners. These electric currents last much longer.



Have you heard of the terms “potential energy” and “kinetic energy”? Potential energy means energy that is kept for use in the future. A car at the top of a hill has potential energy, because it has the potential (or ability) to go down the hill in the future. When it’s going down the hill, its potential energy turns into kinetic energy (the energy something has because it’s moving).

Static electricity and current electricity are like potential energy and kinetic energy. When electricity gathers in one place, it has the potential to do something in the future. Electricity in a battery is an example of potential electrical energy. When we use the energy in the battery to give power, energy flows from the battery, and it becomes kinetic energy.



### WEB SEARCH

*Go online and find other examples of static and current electricity, and share them with your friends.*

# EXERCISES

## CHAPTER 1

### COMPREHENSION CHECK

#### A Choose the correct option in the sentences below.

- 1 When you rub a balloon against your pullover, the pullover gains a(n) **positive** / **opposite** electric charge.
- 2 **Static electricity** / **electrical current** causes lightning.
- 3 Electricity is the result of **electron** / **neutron** movement.
- 4 Sub-atomic particles carry **electrical energy** / **kinetic energy** from one place to another.
- 5 A lightning bolt is an example of **potential energy** / **current electricity**.
- 6 When something has **potential** / **kinetic** energy, it means that it can use energy in the future.
- 7 A car has kinetic energy when **it's going down the hill** / **it stays still on top of a hill**.
- 8 It becomes kinetic energy when the energy in the battery **flows to the device** / **remains in the battery**.

#### B Answer the questions.

- 1 How can you get static electricity?

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- 2 What happens in rain clouds before a lightning happens?

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- 3 What are the three main particles in an atom?

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- 4 What is an electrical current?

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- 5 How is kinetic energy created?

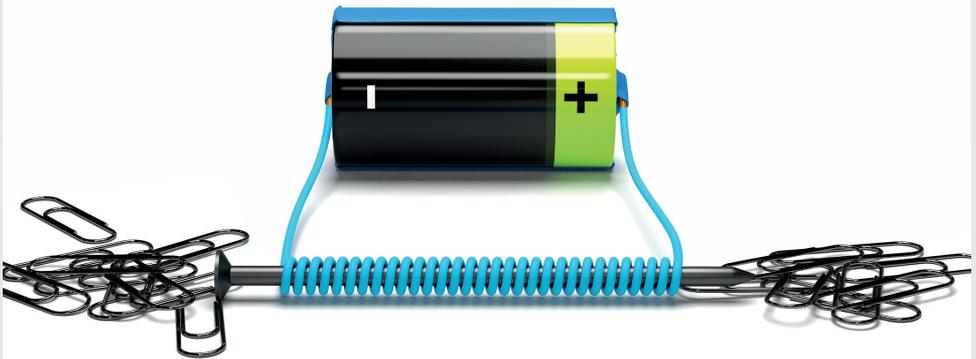
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## Experiment 2

### Make an Electromagnet!

An electromagnet is a magnet that uses electrical current. Follow the steps below to make one for yourself!

- 1 You need a dry-cell battery, a long piece of copper wire, electric tape, and a large iron nail.
- 2 Peel the wire's plastic cover on both ends.
- 3 Cover the nail with the copper wire. Make sure it doesn't overlap.
- 4 Connect the ends of the wire to the positive and negative ends of the battery.
- 5 Tape both ends of the wire to the battery terminals to keep them there.
- 6 Find some paper clips, iron materials or other magnetic items and test your electromagnet.
- 7 What is the difference between an ordinary magnet and an electromagnet? Go online to find the answer.
- 8 Share the information with your friends.



# GENERAL EXERCISES

## COMPREHENSION CHECK

**A** Match the questions to the answers below.

- 1 What makes up an atom?
  - 2 Why is measuring electric power important?
  - 3 How do we carry electricity to our houses?
  - 4 What happens when electrons move around materials?
  - 5 What do we use a circuit breaker for?
  - 6 When did we start to use the word electricity?
  - 7 Can electricity be changed into other energy forms? If yes, which ones?
  - 8 What helps us use devices without plugging them in?
  - 9 Which animal is an example of electric fish?
  - 10 What is the difference between a conductor and an insulator?
- 
- a The former allows electrons to transfer electricity, while the latter prevents them from moving around.
  - b Yes, it can be turned into heat, light, sound or movement energy.
  - c Protons, neutrons and electrons.
  - d Batteries.
  - e In the 17<sup>th</sup> century.
  - f For cutting off the electricity if there is a problem in a circuit.
  - g Because if you give too much electric power to a device, it can start a fire.
  - h Eel.
  - i They transfer electricity.
  - j Through cables that are buried underground.

**C** Read the text below and choose the best word (a, b, or c) for each space. There is an example at the beginning (0).

As tiny (0) **electron** particles move, they give us this wonderful thing called electricity. Little particles allow electricity to flow around, which is called (1) \_\_\_\_\_. Moving electricity can only move in a complete circuit, which is powered by a power source, like a(n) (2) \_\_\_\_\_ or a plug. As you connect those two together, you can power your device. Where does this electricity come from to the plugs in our homes? Mostly, they come from (3) \_\_\_\_\_ at big power stations. It is then (4) \_\_\_\_\_ through cables. Those cables are made of (5) \_\_\_\_\_ so that they allow electricity to pass, and covered with (6) \_\_\_\_\_ so that they are safe for us to touch. From the plug, your machine receives large currents of electricity, which make the (7) \_\_\_\_\_ of the machine work. Relatively smaller currents of electricity control the machine's (8) \_\_\_\_\_. Remember, if you ever have a problem with your machine, just call a(n) (9) \_\_\_\_\_ and keep yourself safe! When you use electricity, you have to pay for it. You pay to electricity companies that check how much electricity you use by looking at your electricity (10) \_\_\_\_\_.

- |    |                                       |                 |                            |                  |                            |                 |
|----|---------------------------------------|-----------------|----------------------------|------------------|----------------------------|-----------------|
| 0. | <input checked="" type="checkbox"/> a | electron        | <input type="checkbox"/> b | neutron          | <input type="checkbox"/> c | proton          |
| 1  | <input type="checkbox"/> a            | electric charge | <input type="checkbox"/> b | electric current | <input type="checkbox"/> c | electric field  |
| 2  | <input type="checkbox"/> a            | battery         | <input type="checkbox"/> b | engine           | <input type="checkbox"/> c | conductor       |
| 3  | <input type="checkbox"/> a            | engines         | <input type="checkbox"/> b | programmer unit  | <input type="checkbox"/> c | generators      |
| 4  | <input type="checkbox"/> a            | generated       | <input type="checkbox"/> b | broken           | <input type="checkbox"/> c | transferred     |
| 5  | <input type="checkbox"/> a            | batteries       | <input type="checkbox"/> b | conductors       | <input type="checkbox"/> c | insulators      |
| 6  | <input type="checkbox"/> a            | insulators      | <input type="checkbox"/> b | electricians     | <input type="checkbox"/> c | conductors      |
| 7  | <input type="checkbox"/> a            | meter           | <input type="checkbox"/> b | engine           | <input type="checkbox"/> c | programmer unit |
| 8  | <input type="checkbox"/> a            | programmer unit | <input type="checkbox"/> b | battery          | <input type="checkbox"/> c | generator       |
| 9  | <input type="checkbox"/> a            | insulator       | <input type="checkbox"/> b | engine           | <input type="checkbox"/> c | electrician     |
| 10 | <input type="checkbox"/> a            | meter           | <input type="checkbox"/> b | generator        | <input type="checkbox"/> c | engine          |

# GLOSSARY

**attract:** (verb) to make something move towards itself

- ▶ Magnets **attract** objects that are made of metal.

**automatically:** (adverb) working without human control

- ▶ The camera starts working **automatically**.

**bill:** (noun) a written document of money that you need to pay for the services

- ▶ They don't have enough money to pay the **bill**.

**build up:** (phrasal verb) to increase or develop

- ▶ You should talk to her before your anger **builds up** inside you.

**bury:** (verb) to put something into a hole and put soil on it

- ▶ They **buried** the money to hide it.

**cable:** (noun) equipment that is used to carry electricity

- ▶ Be careful of the TV **cables** while cleaning the floor.

**cause:** (verb) to make something happen

- ▶ Stress can **cause** different illnesses.

**charge:** (verb) to put electricity into an electrical device such as a battery

- ▶ I forgot to **charge** my phone, so its battery will die soon.

**chemical:** (noun) a substance that is used or produced by a reaction with changes to an atom or molecule

- ▶ Don't eat too much packaged food because they have a lot of **chemicals** in them.

**complete:** (adjective) the whole of something, not just a part of it

- ▶ We need to read the **complete** book for the exam.

**conductor:** (noun) a material that allows electricity to go through it

- ▶ Metal is a good **conductor** of electricity.

**connect:** (verb) to join two or more things together

- ▶ Can I **connect** my cell phone to your computer?

**connection:** (noun) a relationship between two things, people, or groups

- ▶ There is a **connection** between smoking and heart attack.

**control:** (verb) to make someone or something do what you want

- ▶ The brain **controls** the body.

**correctly:** (adverb) doing something without mistake

- ▶ Make sure that you fill in the documents **correctly**.

**ENGLISH****GERMAN****SPANISH****Chapter 1 - 2 - 3**

<b>charge</b>	aufladen	cargar
<b>complete</b>	ausfüllen	completar
<b>current</b>	Stromstärke	corriente
<b>device</b>	Vorrichtung	dispositivo
<b>heat</b>	Hitze	calor
<b>movement</b>	Bewegung	movimiento
<b>result</b>	Resultat	resultado
<b>source</b>	Ursprung	fuelle
<b>turn on</b>	einschalten	acender
<b>unit</b>	Einheit	unidad

**Chapter 4**

<b>chemical</b>	Chemikalie	química
<b>connect</b>	koppeln	conectar
<b>correctly</b>	korrekt	correctamente
<b>harm</b>	beschädigen	malparar
<b>knowledge</b>	Kenntnis	conocimiento
<b>mainly</b>	meistenteils	mayormente
<b>plug in</b>	einstecken	enchufar
<b>rate</b>	Geschwindigkeit	tasa
<b>reuse</b>	wiederverwerten	reusar
<b>transfer</b>	übertragen	transferir

**Chapter 5**

<b>bury</b>	begraben	soterrar
<b>cable</b>	Trosse	cable
<b>conductor</b>	Leiter	conductor
<b>cover</b>	bedecken	abarcar
<b>eco-friendly</b>	umweltfreundlich	ecológico
<b>insulator</b>	Isolierstoff	aislador
<b>material</b>	Material	material
<b>organise</b>	organisieren	organizar
<b>renewable</b>	regenerative	renovable
<b>shock</b>	Schock	choque
<b>solid</b>	solide	sólido