Preview

1 Match the dates with the inventions.

1879 1903 1865 1783 1810

1 _____

2 _____

3 _____

4 _____

5 _____

a lantern

solar power

a light bulb

a torch

a gas lamp

2 Label the pictures 1–5 with these words.

a battery electricity the sun oil gas

3 What do the things in exercise 1 use to make them work? Complete the sentences with the words in exercise 2.

1 A lantern uses _____ .
2 Solar power uses _____ .
3 A light bulb uses _____ .
4 A torch uses _____ .
5 A gas lamp uses _____ .

Speaking

1 What products do you own that use batteries? Name three things that you have in your office or home that use electricity.

2 Which type of energy (oil, solar, electricity, batteries or gas) do you think is best? Why?

Reading 1

1 Some people in the world don't have electricity in their home. How many, do you think?

a 60 million b 600 million c 1.6 billion

Read the article on the opposite page and check your answer.

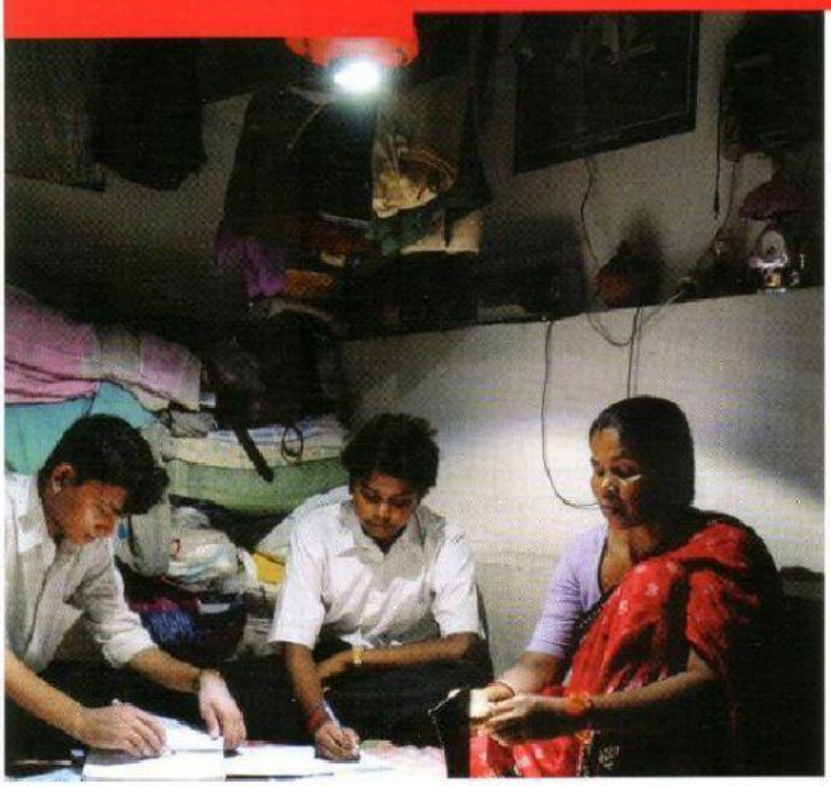
2 Read the article again and answer the questions.

1 What countries does the article mention?
2 What are the disadvantages of oil lanterns?
3 What are the four ways that LED lights helped people?

3 Complete the sentences from the article.

1 Dr Irvine-Halliday _____ on a walking trip to Nepal.
2 People in the villages _____ lanterns to light their homes.
3 He _____ the Light Up The World Foundation.
4 When people began to use LED lights, it _____ their lives.

4 What are the advantages of LED lighting? What is the main problem with LED lights at the moment?



Glossary

LED (n) equipment that produces light (LED = light emitting diode)

smelly (adj) having a bad smell

pollution (n) things that make the air, water, etc. dirty

ideal (adj) perfect

productivity (n) how quickly a person or company can work

accidental (adj) not planned

afford (v) have enough money to buy

Practical solutions

Lighting up the world

LED lights help in areas without electricity

[1] Dr Irvine-Halliday is a professor of electrical engineering at the University of Calgary in Canada. Dr Irvine-Halliday went on a walking trip to Nepal in 1997 and he saw that people in the villages used lanterns to light their homes. The lanterns were smelly and dangerous and the light wasn't very bright. Dr Irvine-Halliday wanted to help solve the problem. So, he started the Light Up The World Foundation. It is a charity that gives LED lights to thousands of people around the world.

[2] About 1.6 billion people worldwide don't have electricity. They use oil in their lamps. But it is an expensive fuel. It is also inefficient and causes indoor and outdoor air pollution.

[3] LED lights are an ideal solution to the problem. They only need a little power and this means that people can use them in areas where there is no electricity. They can run on AA batteries, or solar power. LEDs can give up to 100 times more light than lanterns, and they last a long time. When people began to use LED lights, it changed their lives. They increased productivity and it gave them more time to study. It also reduced health problems and accidental fires.

[4] Now, it is important to make LEDs less expensive. For example, families in rural Kenya spend about $7 a month on oil for lighting. A solar-powered LED lamp lasts longer, but many people cannot afford the $25 to $50 that the lamps cost to buy. When charities and other organisations find a solution to the price problem, the future could be bright. ■

The Economist

Speaking

1 Do you think these things are good or bad – do they improve our life or not? Give reasons for your answers.

mobile phones refrigerators the internet microwave ovens television

I think refrigerators are useful because they keep food cold.
I think television is bad because it stops families talking in the evening.

2 What things did people do for communication and entertainment before they had electricity?

Vocabulary

1 Which words in the box refer to people and which refer to places?

professor	university	laboratory	workshop
scientists	technician		

2 Complete the sentences with the words above.

1 He studied science at the _____ of Heidelberg.
2 We have modern scientific equipment in the new _____ .
3 The _____ began their experiments two years ago.
4 The lights were manufactured in a large _____ in Taiwan.
5 A _____ is a skilled scientific or industrial worker.
6 Dr Charles Milton is a _____ of Engineering at Oxford.

Listening 1

1 Lou works in the complaints department of an electricity company. Listen to his conversation with a customer and answer the questions.

1 What is the customer's problem?
2 What is Lou's solution?

2 Listen again. Are these sentences true or false?

1 The customer doesn't have an account number. *false*
2 The engineer arrived on Thursday morning.
3 The engineer left after five minutes.
4 He didn't return in the afternoon.
5 The customer doesn't have a meeting in the morning.
6 Lou arranges for the engineer to visit at twelve o'clock.

Language check

Past simple negative, question and short answer

Study the examples and complete the sentences in the table.

a *He **didn't return**.*
b *When did the engineer **arrive**?*
c *Did they **solve** the problem?*
d *Yes, they **did**. No, they **didn't**.*

Past simple	
Negative	**Open question**
I, You, etc. [1]_____ [verb].	What [2]_____ I, you, etc. [verb]?
Closed question	**Short answer**
Did I, you, etc. [verb]?	Yes, I, you, etc. did. No, I, you, etc. [3]_____ .

The verb *to be* does not use the auxiliary *did*.

*I **wasn't** in a meeting. They **weren't** on time.*

__Were__ you the person who spoke to the customer? Yes, I __was__. / No, I __wasn't__.

For more information, see page 160.

Practice

1 **Look at the sentences about the article on page 69. Make them negative.**

1 Dr Irvine-Halliday went on a walking trip to Norway.
Dr Irvine-Halliday didn't go on a walking trip to Norway.
2 The villagers used electricity in their homes.
3 The lanterns were very bright.
4 Dr Irvine-Halliday was a professor of medicine.
5 He made a profit from the LED lights.
6 The LED lights increased health problems.

2 **Complete the questions and answers using *did*, *didn't*, *was*, *wasn't*, *were* and *weren't*.**

1 When *did* Alessandro Volta invent the battery?
2 I think it _____ in 1928.
3 No, it _____ . It _____ in 1800.

4 _____ Percy Shaw invent the microwave oven?
5 No, he _____ . The inventor _____ Percy LeBaron Spencer.

6 Who _____ Bernard Silver and Norman Woodland?
7 _____ they writers?
8 No, they _____ . They _____ postgraduate students who invented the barcode.

3 **Write questions for a technology quiz.**

1 Theodore Maiman / build / first laser?
Did Theodore Maiman build the first laser? Yes, he did.
2 When / IBM / produce / first personal computer?
3 John Logie Baird / invent / radio?
4 Who / Carlton C Magee?
5 What / Alexander Graham Bell / invent?
6 What country / Guglielmo Marconi / from?

4 **Take turns to ask and answer the questions. The answers are on page 149.**

Speaking

Work with a partner. Take turns to ask and answer questions about when you were younger. Think of more questions to ask.

like / school? *Did you like school?*
visit / other countries?
have / a pet animal?
live / city?
play / sport?
go / college?

Reading 2

1 **Read the text below and answer the questions.**

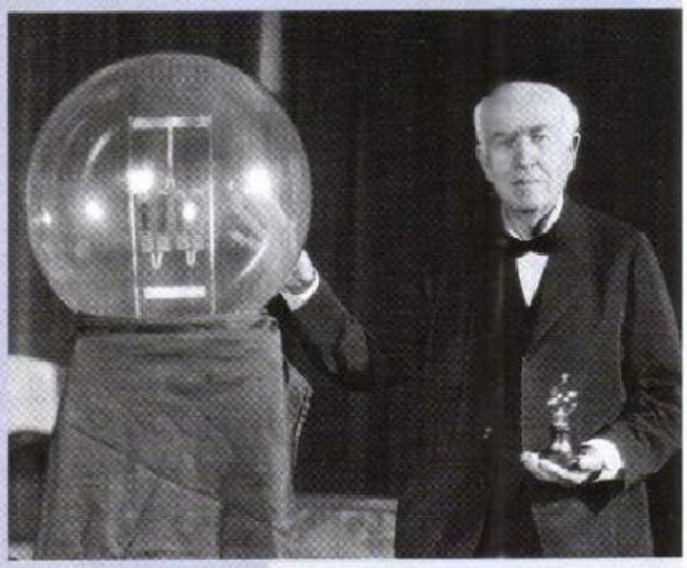
1 Where was Edison born?
2 Did all Edison's inventions succeed the first time?
3 Who helped him develop his inventions?

2 **Use the prompts to write questions. Then read the text again and answer them.**

1 Edison's teachers / think he was clever?
Did Edison's teachers think he was clever? No, they didn't.
2 Edison / develop / 1,303 inventions?
3 Why / Edison / think / failures / be / important?
4 Who / he / marry?
5 When / Edison / create / Edison Electric Light Company?
6 What / Edison Electric Light Company / become?
7 Where / he / build / his research laboratory?
8 When / he / die?

Finding solutions: Thomas Alva Edison

Thomas Edison was a great inventor. He thought that every technological problem had a solution. Edison developed more than 1,093 inventions. They included the electric light bulb, the typewriter and an early movie camera. Sometimes he did thousands of experiments to get an invention right. He worked on some ideas for many years to improve the product. Edison thought that his failures were important because he and his scientists learned from each one. 'I failed my way to success,' he said.



Important dates

1847 Edison was born in Ohio in the USA. At school, his teachers thought that he wasn't clever so his mother educated him at home.
1871 Married Mary Stilwell.
1878 He created the Edison Electric Light Company. Later it became the General Electric Company.
1887 He built an invention factory in Menlo Park, near New York City. It was the world's first research laboratory. A team of scientists helped Edison develop his inventions.
1931 Died in New Jersey, USA.

Glossary

experiment (n) a scientific test
failure (n) something that doesn't succeed
success (n) something that succeeds

Speaking

1 **What inventors come from your country? What did they invent?**

2 **Do you think it is important to learn from failure? Why? / Why not?**

Career skills

Explaining a technical problem

Sometimes we need to explain a technical problem. It is useful to say what the problem is and then explain what we did. Look at the following examples.

a *It doesn't work.*
b *I turned on [the computer].*
c *I plugged in [the computer].*
d *The [keyboard] didn't work.*
e *Can you fix it?*
f *There's something wrong with [the keyboard].*

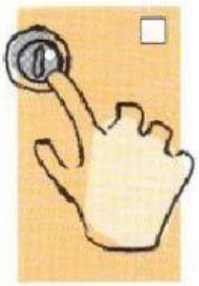
Listening 2

1 Listen to a conversation between a customer and a sales assistant. Number the phrases a–f above in the order you hear them.

2 Listen again and number the pictures a–d in the correct order. Label the pictures with these sentences.

I turned on the computer.
I read the instructions.
The keyboard didn't work.
I plugged in the computer.

a



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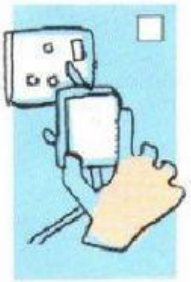
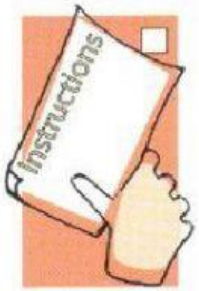


c



d

Speaking

Work with a partner. Take turns to practise the conversation below between a sales assistant and a customer. If necessary, check the information your partner gives.

Sales assistant	Customer
Can I help?	
	Explain you bought a TV from the shop last week. It doesn't work.
Ask what problem is.	
	Respond: Turned on TV – no picture.
Ask if read the instructions.	
	Respond: Yes.
Apologise for the problem.	
	Ask if he/she can fix it.
Agree to fix the TV.	
	Thank sales assistant for his/her help.

Dilemma & Decision

Dilemma: The best solution?

Brief

Rathansay is a small island in northern Scotland. It makes money from tourism (10 per cent) and agriculture (85 per cent). Electricity on the island is expensive and there are often problems: there are times when the houses and businesses have no power. CleanEnergy is a company that builds wind turbines. The machines can produce cheap electricity for the community. CleanEnergy wants to build wind turbine machines on Rathansay. Decide if this is a good solution for Rathansay's energy problems.

Task 1

Work with a partner and look at a case study about a similar island. Student A look at the information on this page. Student B turn to page 144.

Student A

Prepare questions to ask to complete the information. For example:

What did Merrin Island have problems with? or
Did Merrin Island have problems with electricity or gas?

Case study: Merrin Island, Wales
Merrin Island makes all of its money from tourism.
We had problems with our [1]*gas / electricity* supply for ten years. In [2]*2005 / 2007*, we decided to have wind turbines on the island. The wind turbines were clean but they weren't [3]*noisy / quiet*. The cost of our electricity fell by 20 per cent. Most of the people on the island [4]*didn't like / liked* the wind turbines. The tourists didn't like the machines. Tourism fell by [5]*15 / 25* per cent. So the solution wasn't a complete success, but it wasn't a failure. Our electricity is [6]*more / less* expensive, but the tourists don't like the wind turbines and that's a problem for the island.

Task 2

Ask and answer your questions and complete the information about Merrin Island. Then use the information to decide if the Rathansay community should build wind turbines on their island.

Useful phrases

I think the island should ...
It's a good idea because ...
It's not a good idea because ...

Write it up

Write a short report to Rathansay Community Projects about which choice is best for the island. Include the information about Merrin Island that helped you decide.

The best plan for Rathansay is to have / not to have wind turbine machines.
On Merrin Island in Wales ...

Decision:

Listen to Katrina Belkin, a consultant who worked on a similar project, talking about the decision that she thinks is best for Rathansay. Do you agree with her ideas?