CAPITOLO

3

How It's Made

Every object around you was once just an idea in somebody's head.

OBIETTIVI

1. I can talk about materials, how things are made and how they are recycled, and form nouns with *-tion* and *-sion*.
2. I can use the passive in the present simple and past simple, and in other tenses with modals, *will*, the present perfect and the present continuous.
3. I can use *have something done* to talk about services that other people do for me.
4. I can describe a process step by step with sequencers, and ask how something works.
5. I can write an impersonal description of a process for a science fair.
6. I can talk about Brunel's works in Bristol and compare them with a great Italian engineering work.

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Look around you. The chair you are sitting on, the window, the phone in your bag, the bridge on your way to school: somebody designed them, and somebody made them. In this unit the friends of the **Bristol–Turin Link** get ready for an online **science fair**, where every team explains how something is made or recycled. Marta and Callum write about glass, Giulia and Marta describe how paper gets a second life, and Grandad Arthur takes Lily to see one of the most famous bridges in Britain.

When we describe how things are made, the object is often more important than the person who made it. Nobody knows who made your water bottle, and nobody cares! That is why English uses the **passive**: *Glass **is made** from sand. The bridge **was designed** by Brunel.* You learn the passive in all the tenses you know, and **have something done**, for the things other people do for you.

3.1 Vocabulary: Materials and Processes

3.1.1 Materials

In *English 1* (Unit 14) you learnt to say what an object is *made of* and what it is *used for*. Now let's look at the materials more closely. Tabella 3.1 groups the most common ones. Most materials are uncountable nouns: *a lot of plastic*, *some glass* (✗ *a plastic*, ✗ *glasses* when you mean the material). *A glass* is a thing you drink from; *glasses* are what you wear on your nose.

Tabella 3.1 Materials and the things made of them

Material	Where it comes from	Things made of it
plastic	oil and gas (and, more and more, recycled plastic)	bottles, toys, phone cases
glass	sand, soda ash and limestone, melted together	bottles, jars, windows, screens
steel	iron mixed with a little carbon	bridges, cars, knives, tins
aluminium (AmE *aluminum*)	a metal made from a rock called bauxite	drink cans, foil, bikes, planes
cotton	a plant	T-shirts, jeans, towels
wool	sheep	jumpers, scarves, blankets
cardboard	wood (or recycled paper)	boxes, packaging

Careful with pronunciation: British *aluminium* /ˌæljəˈmɪniəm/ has five syllables and the stress on *-MIN-*, while American *aluminum* /əˈluːmɪnəm/ has four, with the stress on *-LU-*. Both are correct in their own country. Many materials also have an adjective: *a plastic bag, a glass door, a steel bridge, a cotton shirt* — here the noun simply works as an adjective — but *wool* becomes *woollen* and *wood* becomes *wooden* (English 1, Unit 14).

3.1.2 Processes

A **process** *(ita: procedimento, processo)* is a series of actions that you do to make or change something. These verbs describe the life of an object, from the idea to the bin and back again:

- **design** — decide how something will look and work, and draw it: *Engineers design bridges.*
- **produce** — make things, usually in large numbers: *The factory produces a million bottles a week.*
- **assemble** *(ita: montare, assemblare)* — put the parts of something together: *The phones are assembled in a factory.*
- **pack** and **deliver** — put things in boxes, then take them to shops or homes.
- **melt** *(ita: fondere, sciogliere)* — make something solid become liquid with heat: *Ice melts at 0 °C.*
- **mould** *(ita: modellare, stampare)* (AmE *mold*) — give a soft or liquid material a shape: *The hot glass is moulded into bottles.*
- **recycle** — treat used materials so that they can be used again: *Paper, glass and cans can be recycled.*

3.1.3 Engineering

Engineers use maths and science to design and build machines and structures. A **bridge** takes a road or a railway across a river or a valley; a **tunnel** goes through a mountain or under a river; a **railway** (AmE *railroad*) is the track that trains run on, and also the company that runs them; a **ship** is a large boat that carries people or goods across the sea. All four words are in this unit's Culture page, because one man in Bristol built all four.

3.1.4 Word formation: nouns with *-tion* and *-sion*

Many verbs make a noun with the suffix *-tion* or *-sion*: *produce → production, decide → decision*. Italian has the same family of words (*produzione, decisione*), so these nouns are easy to understand — but watch the spelling, and the stress: it always falls on the syllable just before the ending: *pro**DUC**tion* /prəˈdʌkʃn/, *de**CI**sion* /dɪˈsɪʒn/. The ending *-tion* sounds /ʃn/; *-sion* sounds /ʒn/ after a vowel (*decision*) and /ʃn/ after *l, n, s* (*discussion*). Tabella 3.2 shows the main spelling patterns.

Tabella 3.2 Verb → noun with *-tion* and *-sion*

Verb ending	Change	Examples
most verbs	+ *-ion* / *-tion*	*invent → invention, collect → collection, protect → protection*
-ate	*-ate → -ation*	*create → creation, educate → education*
-ise (AmE *-ize*)	*-ise → -isation*	*organise → organisation*
-duce	*-duce → -duction*	*produce → production, reduce → reduction*
-de, *-d*	*→ -sion*	*decide → decision, explode → explosion, extend → extension*
-ss, *-mit*	*→ -ssion, -mission*	*discuss → discussion, permit → permission*
irregular	—	*describe → description, explain → explanation, pollute → pollution*

Careful: not every process verb has a *-tion* noun. *Deliver → delivery*, *pack → packaging*, *recycle → recycling*, *design → design* (the same word), *assemble → assembly*. When you are not sure, check a dictionary: never invent ✗ *recyclation* or ✗ *deliveration*.

LEARNING TO LEARN

Word families. When you learn a new word, learn its family at the same time: the verb, the noun (for the action and for the person) and the adjective. You learn three or four words for the price of one, and you understand texts much faster. Record them in a table in your vocabulary notebook, like this:

Verb	Noun (thing / action)	Noun (person)	Adjective
produce	*production, product*	*producer*	*productive*
invent	*invention*	*inventor*	*inventive*
recycle	*recycling*	—	*recyclable, recycled*

Mark the stress, because it often moves: *PRO-duct* but *pro-DUC-tion*. Leave an empty cell when a form doesn't exist, and fill it when you meet the word in a text. A good learner's dictionary shows word families next to each entry.

3.2 Reading: From Sand to Screen

Before you read. Look at the glass objects around you: a window, a bottle, the screen of your phone. What do you think glass is made from? Is it the same material in all three? Discuss with a partner for one minute.

For the Link science fair, each team of students from Bristol and Turin wrote an article for the shared blog. Marta and Callum chose glass. Read their article. (*testo della redazione*)

From Sand to Screen

The Link Blog · Science Fair Special — by Marta (Turin) and Callum (Bristol)

You probably look through glass a hundred times a day: when you check the weather through a window, when you drink a glass of water, when you read a message on your phone. But have you ever asked yourself what glass actually is? The answer may surprise you: it is mostly sand.

A recipe with three ingredients. Ordinary glass is made from three main raw materials: silica sand, soda ash and limestone. About three quarters of the mixture is sand. The ingredients are weighed, mixed and put into a huge furnace, where they are heated to about 1,500 °C. At that temperature the mixture melts and becomes a thick, glowing liquid, a bit like honey. Then it is shaped while it is still hot, and it is cooled slowly so that it doesn't crack.

Bottles and windows. Bottles and jars are made in moulds. A drop of hot glass falls into a mould, air is blown into it, and a bottle appears in a few seconds. Window glass is made in a completely different way. For centuries flat glass was difficult to produce, but in the 1950s a British engineer, Alastair Pilkington, and his colleague Kenneth Bickerstaff had a brilliant idea: the hot liquid glass is poured onto a bath of melted tin. Tin is heavier than glass, so the glass floats on top, like oil on water, and becomes perfectly flat. This method is called the float process, and most of the window glass in the world is still made this way.

The glass in your pocket. The screen of a smartphone is made of a special glass. It has to be very thin, very clear and very strong, because phones are dropped all the time. To make it stronger, the glass is put into a bath of hot salt: tiny particles from the salt take the place of smaller ones in the surface and squeeze it together, so the glass is much harder to break. That doesn't mean it can't be broken, as Callum discovered last month when his phone fell out of his pocket on the bus. (He has had the screen replaced. It cost him two months of pocket money.)

A second life. The best thing about bottles and jars is that they can be recycled again and again. In Bristol, glass is collected from bottle banks and from the boxes that people leave outside their homes. In Turin, glass and cans are collected together in special bins. The glass is taken to a recycling plant, where it is sorted by colour, because green, brown and clear glass must not be mixed. Metal lids and plastic labels are removed. Then the glass is crushed into small pieces called *cullet*. The cullet is mixed with new sand, soda ash and limestone and melted again. Because cullet melts more easily than the raw ingredients, the furnace needs less energy. Finally, the liquid glass is moulded into new bottles and jars, which are filled, sold, used… and collected again.

Our advice? Next time you finish a jar of jam, don't throw it in the general rubbish. Rinse it, put it in the right bin, and it will be back on a shop shelf as a new jar. Not bad for a handful of sand!

The five steps of glass recycling are shown in Figura 3.1.

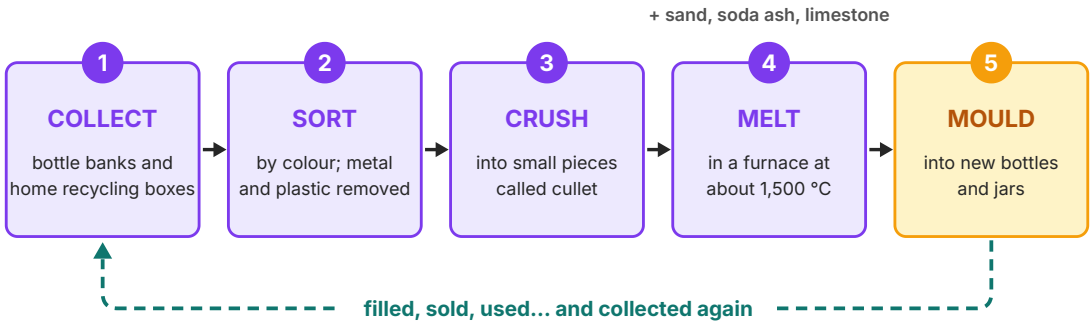


Figura 3.1 How a glass bottle is recycled. In step 4 the cullet is melted together with new raw materials (sand, soda ash, limestone); the dashed arrow shows that the cycle can start again.

Language in context

Count the passive verbs in the article: there are more than twenty! Notice why the writers use them. In *Glass is made from three main raw materials* or *The glass is crushed into small pieces*, nobody cares *who* does the action: the glass is the topic. Notice also that the writers never use *by* + agent: it isn't necessary. Look at the sequencers that guide the reader through the process (*then, finally*), the noun *raw materials (ita: materie prime)*, and *has had the screen replaced*: Callum didn't replace the screen himself. You study this structure in the Grammar section.

3.3 Grammar: The Passive, *have something done*

3.3.1 The passive: present simple and past simple

Compare these two sentences: *Brunel* ***designed*** *the bridge.* / *The bridge* ***was designed*** *by Brunel.* They give the same information, but they start from a different point. The first is **active**: the subject (*Brunel*) does the action. The second is **passive**: the subject (*the bridge*) receives the action. Figura 3.2 shows how an active sentence becomes passive: the object becomes the new subject, the verb becomes ***be* + past participle**, and the old subject can be added with *by*.

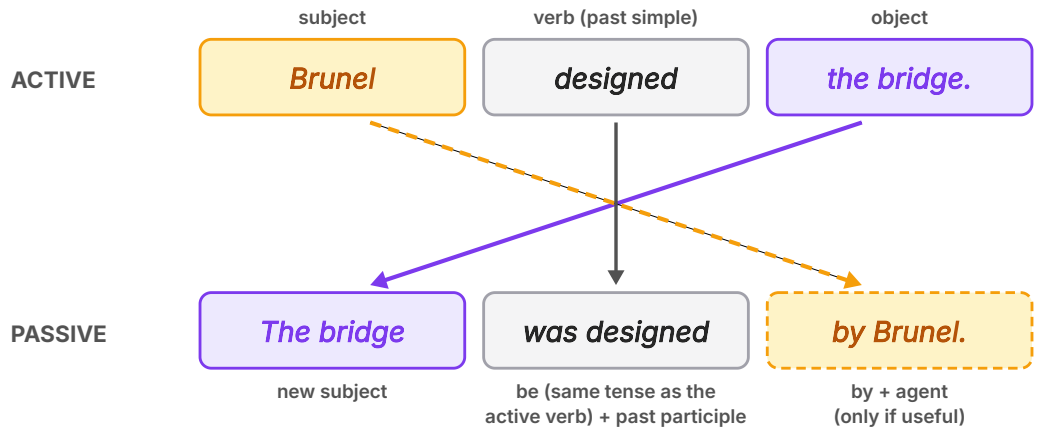


Figura 3.2 From active to passive. The object of the active sentence becomes the subject of the passive one (violet arrow); the verb becomes *be* + past participle, with *be* in the same tense as the active verb; the person who did the action, the agent, can follow *by* (amber, dashed: optional).

In the present simple, *be* is *am / is / are*; in the past simple it is *was / were*. The past participle is the third form of the verb: *made, built, sold, invented* (see the appendix, Tabella A.1, for the irregular ones).

Tabella 3.3 The passive: present simple (*am / is / are* + past participle)

Affirmative	Negative	Questions	Short answers
*Glass **is made** from sand.* *Cans **are recycled**.*	*Glass **isn't made** from oil.* (is not made) *Lids **aren't recycled** with the glass.*	***Is** glass **made** from sand?* *Where **are** phones **assembled**?*	*Yes, it is. / No, it isn't.* *Yes, they are. / No, they aren't.*

Tabella 3.4 The passive: past simple (*was / were* + past participle)

Affirmative	Negative	Questions	Short answers
*The bridge **was opened** in 1864.* *The tickets **were sold** online.*	*It **wasn't finished** in Brunel's life.* (was not finished) *We **weren't told**.*	***Was** the ship **built** in Bristol?* *When **were** you **born**?*	*Yes, it was. / No, it wasn't.* *Yes, we were. / No, we weren't.*

When do we use the passive?

- When the action, or the thing that receives it, is more important than the person who does it: *Millions of bottles are recycled every day.*

- When we don't know who did it, or it is obvious: *My bike was stolen last night.* (I don't know who stole it.) *He was arrested.* (Obviously by the police.)
- To describe processes, in science and in the news: *The water is heated to 100 °C.* The passive makes the style **impersonal** — it doesn't talk about *I* or *you*.

The person or thing that does the action is called the **agent**. Use *by* + agent only when it adds useful information: *The Clifton Suspension Bridge was designed by Brunel* (important: Brunel is famous), but ✗ *Glass is made from sand by workers* — of course it is made by people! In most passive sentences there is no agent at all. Remember also ***was / were born***, which is always passive in English: *Grandad Arthur was born in Bristol in 1956. Where were you born?*

ESEMPIO SVOLTO

Make the sentence passive: *A British company built the first factory in 1920.*

1. **Find the object:** *the first factory*. It becomes the new subject: *The first factory…*
2. **Find the tense of the active verb:** *built* = past simple. So *be* goes in the past simple, agreeing with the new subject (singular): *was*.
3. **Add the past participle** of *build*: *built* → *The first factory was built…*
4. **Keep the other information** (time, place): *…in 1920.*
5. **Agent?** *a British company* adds some information, so you can keep it: *The first factory was built by a British company in 1920.* If it were *people* or *they*, you would leave it out.

GRAMMAR IN ITALIANO

La forma passiva (passive). Si forma come in italiano: *be* (essere) al tempo del verbo attivo + participio passato: *The bridge was designed by Brunel* = Il ponte fu progettato / è stato progettato da Brunel. Il complemento d'agente si introduce con *by* (da), ma si usa solo se è un'informazione utile.

Uso. L'inglese usa il passivo molto più dell'italiano, soprattutto nelle descrizioni di processi, nelle istruzioni e nelle notizie. Dove l'italiano usa il *si passivante* o il *si impersonale*, l'inglese usa spesso il passivo: *Qui si parla inglese* → *English is spoken here*; *Il vetro si fa con la sabbia* → *Glass is made from sand*. Attenzione: in inglese l'ausiliare è sempre *be* (mai *come* o *go* come in italiano *viene fatto, va fatto*).

Nato: *I was born in 2011* (passato!), ✗ *I am born*. In italiano diciamo *sono nato*, ma in inglese la nascita è un evento concluso: past simple.

ERRORE FREQUENTE

✗ *The bridge was design by Brunel.* → ✓ *The bridge was* ***designed*** *by Brunel.* (serve il participio passato, anche se in italiano lo pronunci in fretta: la *-ed* si scrive sempre)

✗ *The bridge designed by Brunel in 1831.* → ✓ *The bridge* ***was*** *designed…* (senza *be* non è un passivo, è una frase senza verbo)

✗ *I am born in Turin.* → ✓ *I* ***was*** *born in Turin.*

✗ *The phones are assembled from robots.* → ✓ *…****by*** *robots.* (*da* = *by* per l'agente; *made from* indica invece il materiale)

3.3.2 The passive in other tenses

The passive works in every tense: only *be* changes, and the past participle stays the same. Tabella 3.5 shows the forms you need this year; the complete table is in the appendix (Tabella D.1).

Tabella 3.5 The passive in other tenses

Tense	*be* + past participle	Example
present continuous	*am / is / are* **being** + *pp*	*The bridge* **is being repaired**, *so it's closed this week.*
present perfect	*have / has* **been** + *pp*	*Two new bottle banks* **have been put** *outside the school.*
will future	*will* **be** + *pp*	*The winners* **will be announced** *on Friday.*
modal verbs	*can / must / should…* **be** + *pp*	*Glass* **can be recycled** *again and again.* *Lids* **must be removed**.

Notice the meaning of each one. The present continuous passive describes an action in progress now: *Sorry, your phone* ***is being repaired*** *— come back at five.* The present perfect passive gives news, or a result now: *Our school* ***has been chosen*** *for the final!* Modal passives are very common in instructions and rules: *Batteries* ***shouldn't be put*** *in the general rubbish. Tickets* ***can be bought*** *online.*

GRAMMAR IN ITALIANO

Il passivo negli altri tempi. Cambia solo il verbo *be*, che prende il tempo del verbo attivo; il participio passato resta sempre uguale.

• presente progressivo: *is being repaired* = è in riparazione, lo stanno riparando (adesso)
• present perfect: *has been chosen* = è stato scelto (risultato presente)
• futuro: *will be announced* = sarà annunciato
• modali: *can be recycled* = può essere riciclato, si può riciclare; *must be removed* = deve essere tolto, va tolto.

Confronto con l'italiano. L'italiano *va + participio* (*va tolto*) si traduce con *must / has to be* + participio (*it must be removed*). Il progressivo passivo non ha un equivalente diretto: spesso in italiano usiamo una forma attiva impersonale (*stanno riparando il ponte*).

ERRORE FREQUENTE

✗ *The road is repairing.* → ✓ *The road* ***is being repaired****.* (la strada non ripara: viene riparata — manca *being*)

✗ *Glass can recycled.* → ✓ *Glass can* ***be*** *recycled.* (dopo un modale serve *be*)

✗ *The results will announced tomorrow.* → ✓ *The results will* ***be*** *announced tomorrow.*

3.3.3 *have something done*

Callum didn't repair his phone himself: he took it to a shop, and somebody repaired it for him. To say this, English uses **have something done**: ***have* + object + past participle**. *Callum* ***had his screen replaced****. I* ***had my hair cut*** *yesterday. We're* ***having our kitchen painted*** *next week.* The verb *have* changes tense; the object and the past participle stay the same.

Tabella 3.6 *have something done*

Tense	Example
present simple	*Mum* ***has*** *the car* ***serviced*** *every year.*
present continuous	*We* ***'re having*** *a new kitchen* ***fitted*** *at the moment.*
past simple	*Callum* ***had*** *his phone screen* ***replaced****.*
present perfect	*Giulia* ***has had*** *her hair* ***cut*** *— it looks great!*
be going to	***I'm going to have*** *my eyes* ***tested****.*
questions / negatives	*Where* ***did*** *you* ***have*** *your bike* ***repaired****? I* ***didn't have*** *it* ***repaired****: I did it myself.*

Compare: *I **cut** my hair* (I did it myself, with scissors, in front of the mirror — be careful!) and *I **had** my hair **cut*** (a hairdresser did it). Questions and negatives are made with *do / does / did*, because here *have* is a normal verb.

GRAMMAR IN ITALIANO

have something done (far fare qualcosa). Si usa per i servizi che qualcun altro fa per noi, di solito pagando: *I had my hair cut* = mi sono fatto tagliare i capelli. Ordine: *have* + oggetto + participio passato. È l'equivalente di *farsi / far* + *infinito*: *Mi faccio riparare la bici → I'm having my bike repaired.*

Attenzione all'ordine: l'oggetto va **prima** del participio. *I had my car washed* (qualcuno l'ha lavata per me) ≠ *I had washed my car* (trapassato: l'avevo lavata io).

ERRORE FREQUENTE

✗ *I cut my hair at the hairdresser's.* → ✓ *I **had my hair cut** at the hairdresser's.* (se lo fa un altro, serve *have* + oggetto + participio)

✗ *I made repair my bike.* → ✓ *I **had my bike repaired**.* (non tradurre *far fare* con *make*)

✗ *She had cut her hair.* (= lei se li era tagliati da sola) per dire che è andata dal parrucchiere → ✓ *She had her hair cut.*

APPROFONDIMENTO

The *get* passive (B1+). In informal spoken English, *get* sometimes replaces *be* in the passive, especially for things that happen unexpectedly, and often for bad news: *My phone **got broken** on the bus. Three people **got hurt** in the accident. Did you **get invited** to the party?* In the same way, people say *get something done* instead of *have something done*: *I need to **get my hair cut**.* In writing, and in formal English, use *be* and *have*.

3.4 Listening and Speaking: Describing a Process

Listening 1. On a sunny Sunday in October, Grandad Arthur takes Sam and Lily for a walk across the Clifton Suspension Bridge, high above the River Avon. Listen to your classmates reading the script (books closed): what does Lily want to know? How does Grandad explain it?

Tabella 3.7 Listening script — How does it stay up?

Lily	Grandad, why doesn't the bridge fall down? It's so high!
Arthur	Good question! Let me show you how it works. Can you see those two big towers, one at each end?
Lily	Yes. They look like castles.

Arthur	Well, first the towers were built. Then those enormous chains were hung over the tops of the towers. Can you see them? They go down in a curve, like a smile, and up again on the other side.
Sam	And where do the chains end, Grandad?
Arthur	They go down into the rock on both sides of the gorge. They're fixed in tunnels, deep under the ground, so they can't move.
Lily	What are all those thin sticks?
Arthur	Those are the hangers. They're iron rods. They hang from the chains, and the road is held up by them. So the road hangs from the chains, the chains are held by the towers, and the towers stand on the rock. That's why it's called a suspension bridge: the road is suspended — it hangs.
Sam	So what happens when a car drives across?
Arthur	The weight goes up the hangers into the chains, along the chains to the towers and the rock. Clever, isn't it?
Lily	Who made it?
Arthur	It was designed by a man called Brunel, almost two hundred years ago. But he never saw it finished. It was completed after he died.
Lily	That's sad.
Arthur	A bit. But look — it's still here, and we're walking on it!

Listening 2. A week later, the two Link teams plan their science fair presentation on a video call. Listen (books closed): which process do they choose, and how do they divide the work?

Tabella 3.8 Listening script — Planning the presentation

Callum	Can you hear us, Turin? Great. So, our glass article is finished. Now we need the poster. Marta, you said you had an idea?
Marta	Yes! What about paper? Everybody uses it, but nobody knows how it's recycled. Giulia and I could do it.
Sam	Good idea. How does it work, exactly? I know it goes in the blue bin, and then… I have no idea.
Giulia	OK, I've read about it. First, the paper is collected and taken to a recycling plant. Then it's sorted, because some paper can't be recycled, like greasy pizza boxes.
Callum	Really? Pizza boxes? I always put them in the recycling.
Giulia	Not the greasy parts! After that, the paper is mixed with water, so it turns into a kind of grey soup. It's called pulp.
Sam	And what happens to the ink?
Marta	That's the clever part. The ink is removed with soap and air bubbles. Once the pulp is clean, it's spread on a big screen, pressed between rollers and dried. Finally, it's rolled up into huge rolls of new paper.

Sam	Can paper be recycled for ever?
Marta	No, that's the interesting thing. The fibres get shorter every time. Paper can only be recycled about five to seven times.
Callum	Right. So, Turin does the paper poster. Sam and I will do the aluminium cans, OK?
Giulia	Perfect. Let's check the slides on Friday, shall we?

Useful language. Tabella 3.9 collects phrases for describing a process and for asking how something works.

Tabella 3.9 Useful language — describing a process and asking how something works

Function	Phrases
asking how something works	*How does it work? · How is it made? · What happens next / after that? · What is it made of / used for? · What's this part for?*
starting	*First (of all), … · To start with, … · The first step is to…*
continuing	*Then… · Next… · After that… · After + noun / -ing (After melting, …) · Once the pulp is clean, …*
at the same time	*While this is happening, … · Meanwhile, …*
finishing	*Finally, … · At the end, … · The last step is…*
checking you understand	*So, if I understand correctly, … · You mean that…? · Sorry, could you explain that again?*

DA RICORDARE

Sequencers. *Then, next, after that* start a sentence and are followed by a comma or by the clause directly: *Then the glass is crushed. Once* (= as soon as, after) joins two clauses: *Once the glass has cooled, it is packed. At the end* means at the last point of something (*at the end of the process*); *in the end* means finally, after a long time or many problems (English 1, Unit 9) — don't mix them up. And *finally*, in a process, simply introduces the last step.

Speaking tasks

1. **Pair work: How does it work?** Student A chooses an everyday object (a toaster, a bicycle, a lift, a coffee maker) and explains how it works, step by step, using at least three sequencers. Student B asks at least two questions from the Useful language table, and checks understanding (*So, if I understand correctly…*). Then swap.
2. **Describe a process.** In groups of three, explain how one of these things is made or happens: bread, a pizza, chocolate, a school newspaper, a podcast. Use the passive where the person is not important (*The dough is left for two hours*).

3. **Discussion.** Which things do you and your family recycle? Which do you throw away? Is it easy to recycle where you live? What could your school do better?

3.5 Writing: Describing a Process

For a science fair, a poster or a report, you often have to describe a process: how something is made, how a machine works, what happens in an experiment. Here is the text that Giulia and Marta wrote for their paper poster.

Tabella 3.10 Model text — describing a process

How Paper Is Recycled
Every year millions of tonnes of paper are thrown away. But paper doesn't have to end its life in the bin: it can be recycled and made into new paper. This is how it happens.
First, used paper and cardboard are collected from homes, schools and offices and taken to a recycling plant. There, they are sorted into different types, and anything that cannot be recycled, such as plastic or food, is removed.
Next, the paper is mixed with water in a large machine and turned into pulp, a thick grey mixture of fibres. After that, the ink is removed with soap and air bubbles, and the pulp is cleaned.
Once the pulp is clean, it is spread on a moving screen, where the water drains away. Then it is pressed between heavy rollers and dried. Finally, the new paper is rolled up and sent to factories, where it is made into newspapers, boxes and notebooks.
Paper cannot be recycled for ever, because its fibres get shorter each time. However, it can be recycled about five to seven times — so think before you throw it away!

ESEMPIO SVOLTO

Analyse the model.

1. **Title**: a clear, simple question or statement (*How Paper Is Recycled*).
2. **Paragraph 1 — introduction**: why the topic matters, and what the text will describe (*This is how it happens.*).
3. **Paragraphs 2–4 — the steps**, in order, one stage per paragraph, each introduced by a sequencer: *First… Next… After that… Once… Then… Finally…*
4. **Paragraph 5 — conclusion**: an interesting fact and a message to the reader.
5. **Grammar**: the present simple passive for the steps (*is collected, are sorted, is removed*), modal passives for possibility (*can be recycled, cannot be recycled*). There is no agent: we don't need to know who does each step.
6. **Register**: **impersonal** and factual — no *I*, almost no *you*, no contractions except in the final message to the reader.

Checklist. Before you hand in a process description, check that: (1) the steps are in the right order and each one is clear; (2) each new stage starts with a sequencer; (3) you use the passive when the person doing the action doesn't matter, with the right form of *be*; (4) every past participle is correct (check the irregular ones); (5) the register is impersonal; (6) you have an introduction and a short conclusion.

Your task. Write a description of a process for your class science fair (120–150 words). Choose one: how an aluminium can is recycled; how bread is made; how a plant makes its food (photosynthesis — simply!); how a mobile phone is assembled and delivered. Use the model and the checklist.

3.6 Culture: Brunel's Bristol

In Bristol one name is everywhere — there is even a main road called Brunel Way. It is the name of the engineer who changed the city in the 19th century: **Isambard Kingdom Brunel**. In 2002, when the BBC asked the public to vote for the greatest Briton of all time, Brunel came second, after Winston Churchill. Figura 3.3 puts his life and his main Bristol works on a timeline.

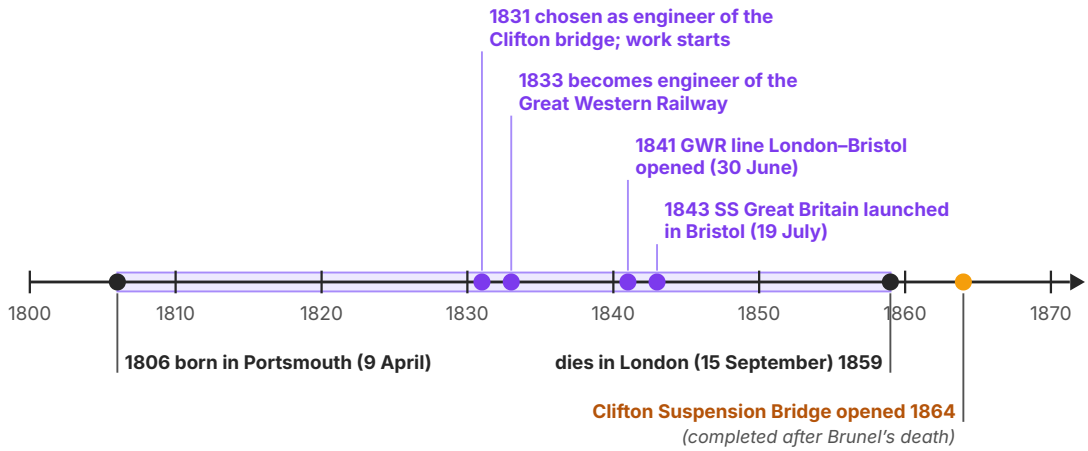


Figura 3.3 Isambard Kingdom Brunel (1806–1859) and three of his great works for Bristol, on a proportional time axis. The violet band is his life; the Clifton Suspension Bridge (amber) was opened five years after his death.

3.6.1 A young engineer

Brunel was born in Portsmouth, on the south coast of England, on 9 April 1806. His father, Marc Brunel, was a French engineer who had moved to England, and the boy was trained by his father from an early age. When Isambard was still in his twenties, he was given two enormous

jobs in Bristol. In 1831 his design for a bridge across the Avon Gorge was chosen, and in 1833 he was made the engineer of a new railway company, the **Great Western Railway** (GWR).

3.6.2 A railway and a ship

The GWR was built to connect London and Bristol, about 190 kilometres apart. Brunel planned the whole line himself, with bridges, stations and tunnels: the longest one, the Box Tunnel, near Bath, is almost three kilometres long. The line was fully opened on 30 June 1841. But Brunel had a bigger dream: passengers would take the train from London to Bristol and then a ship from Bristol to New York. So he designed ships too.

The most famous one, the **SS *Great Britain***, was launched in Bristol on 19 July 1843. She was a revolutionary ship: she was the first to combine an iron hull — the body of the ship, which was usually made of wood — with a screw propeller instead of paddle wheels. In 1845 she crossed the Atlantic in 14 days. She sailed for decades, but in the end she was abandoned in the Falkland Islands. In 1970 she was brought back to Bristol and towed up the river, under the Clifton Suspension Bridge, to the same dry dock where she had been built. Today she is a museum ship, and she is visited by thousands of people every year.

3.6.3 The bridge that Brunel never saw

Building a bridge across the Avon Gorge was a difficult and expensive project. Work started in 1831, but it was stopped many times because there wasn't enough money. When Brunel died in London on 15 September 1859, only the two towers were standing. His friends and colleagues decided that the bridge should be finished as a memorial to him. The design was changed and made stronger, and chains from another Brunel bridge in London, which had just been demolished, were used. The **Clifton Suspension Bridge** was finally opened on 8 December 1864. Its main span is about 214 metres long, and the deck is about 75 metres above the river at high water. Figura 3.4 shows how a suspension bridge like this one works: the deck hangs from the chains, which pass over the towers and are fixed in the rock.

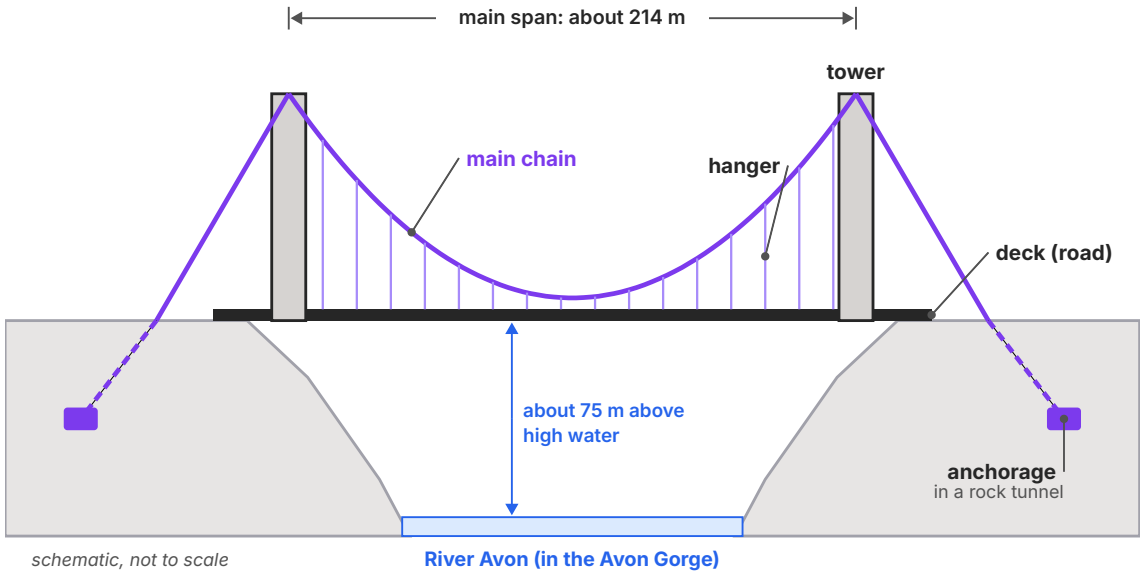


Figura 3.4 Schematic elevation of a suspension bridge like the Clifton Suspension Bridge (not to scale). The deck hangs from vertical hangers; the hangers hang from the main chains; the chains pass over the two towers and are fixed in tunnels in the rock at both ends.

Media text: an infographic

Sam and Callum's team made an **infographic** — a picture that gives information with numbers, charts and very few words — for the Hillside Green Team, the school recycling club. Look at Figura 3.5 for one minute, then answer the questions.

COLLEGAMENTI

Chemistry: why recycling saves energy. To make new aluminium, the metal must be extracted from a rock, bauxite: first a white powder, alumina, is produced, and then the metal is separated from it by electrolysis — a process that uses huge amounts of electricity. To recycle a can, the aluminium only needs to be melted: pure aluminium melts at about 660 °C. According to the International Aluminium Institute, recycled aluminium needs about 95% less energy than new aluminium.

Glass is different. Its raw materials are melted at about 1,500 °C, and recycled glass (cullet) also has to be melted again. But cullet melts more easily than sand, soda ash and limestone, which haven't reacted yet, so every load of cullet in the furnace saves some energy — less than with aluminium, but still worth it.

Maths: if making one new can uses 100 units of energy, how many units does a recycled can use? (100 − 95 = 5 units: one twentieth.)

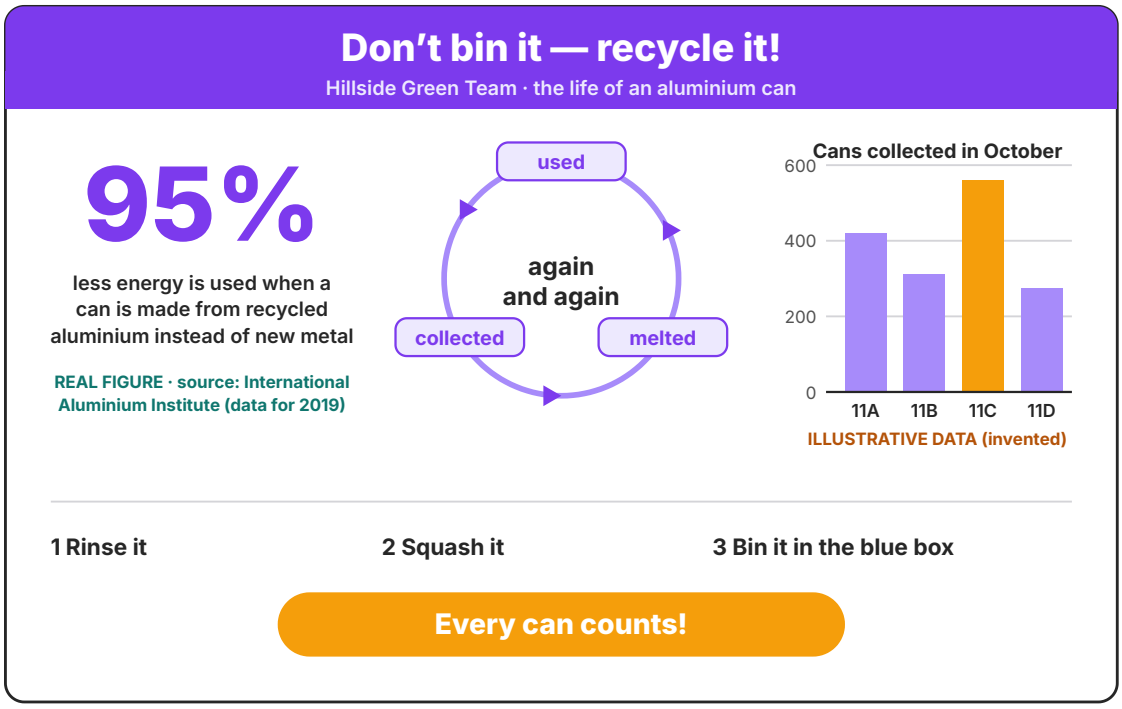


Figura 3.5 The Hillside Green Team's infographic about aluminium cans (an original media text). The 95% figure is real (International Aluminium Institute, data for 2019); the numbers in the bar chart are invented for this exercise.

1. What is the first thing your eyes see? Why do you think the designers made it so big?
2. Which number on the infographic comes from a real source? Which numbers are invented? How can a reader tell the difference?
3. Why is the bar of class 11C a different colour? What does the poster want the other classes to feel?
4. Find two imperatives. Why are they used on posters and in adverts?
5. Is there any information that is missing — for example, what happens to cans that are not recycled? Would it make the infographic more or less persuasive?

Compare with Italy

Italy has great engineering works of the 19th century too. The most famous is the **Fréjus rail tunnel** (also called the Mont Cenis tunnel), which connects Bardonecchia, in Piedmont, with Modane, in France. It is 13.7 kilometres long. Work started in 1857 and was directed by the engineer Germain Sommeiller. At first, the rock was dug by hand, but then new drilling machines were introduced, which were powered by compressed air. The two teams met under the moun-

tain on 26 December 1870, and the tunnel was opened on 17 September 1871. At that time it was the longest tunnel in the world. Today it is still part of the railway line between Italy and France.

Discuss. Is there a bridge, a tunnel, a railway or a building near where you live that you think is a great work of engineering? When was it built, and who was it designed by? Find out and tell the class, using the passive.

SINTESI

- Materials (*plastic, glass, steel, aluminium, cotton, wool, cardboard*) are usually uncountable; many work as adjectives (*a glass door*), but *wooden, woollen*.
- Process verbs: *design, produce, assemble, pack, deliver, melt, mould, recycle*.
- *-tion / -sion* nouns: *production, decision, invention, discussion*; the stress falls just before the ending.
- The passive = *be* (in the tense of the active verb) + past participle: *is made, was designed*.
- Use the passive when the action or the object is more important than the agent, when the agent is unknown or obvious, and to describe processes.
- Add *by* + agent only when it is useful information; *made from* introduces a material, not an agent.
- *was / were born*: ✓ *I was born in 2011*, ✗ *I am born*.
- Other tenses: *is being repaired, has been chosen, will be announced, can be recycled*.
- *have* + object + past participle for services: *I had my hair cut* (somebody did it for me).
- To describe a process: sequencers (*first, next, after that, once, finally*), passive, impersonal register.
- Brunel (1806–1859) built the Great Western Railway and the SS *Great Britain*; the Clifton Suspension Bridge was completed after his death and opened in 1864.
- In Italy, the Fréjus rail tunnel (13.7 km) was opened in 1871.

ESERCIZI

Vocabulary

1. ● Match the materials (1–6) with the things made of them (a–f). 1 wool · 2 cardboard · 3 steel · 4 cotton · 5 aluminium · 6 glass — a a drink can · b a T-shirt · c a jumper · d a box for shoes · e a window · f the frame of a bridge

2. ● Ice _____ quickly in the sun.
   - **A.** moulds
   - **B.** assembles
   - **C.** melts
   - **D.** packs

3. ● The parts of the bikes are made in China, but they are _____ in Italy.
   - **A.** assembled
   - **B.** melted
   - **C.** delivered
   - **D.** designed

4. ●● Complete the sentences with the words in the box: *design · deliver · recycle · produce · pack · mould*. a This factory can _____ 5,000 cars a year. b Architects _____ buildings; builders build them. c Please _____ your plastic bottles: don't throw them away. d The workers _____ the hot plastic into the shape of a toy. e We _____ the boxes in the morning and _____ them to the shops in the afternoon.

5. ●● Write the noun with *-tion* or *-sion*. a produce → _____ b decide → _____ c invent → _____ d explain → _____ e discuss → _____ f educate → _____ g reduce → _____ h describe → _____

6. ●● Complete with a noun formed from the verb in brackets. a The _____ of the bridge took more than thirty years. (construct) b We need your parents' _____ to go on the school trip. (permit) c Air _____ is a big problem in many cities. (pollute) d There was a loud _____ in the factory, but nobody was hurt. (explode) e Brunel's _____ to use iron for the ship was very modern. (decide)

7. ●● Odd one out. Which word does not belong? Say why. a cotton · wool · steel · bridge · b melt · mould · tunnel · recycle · c railway · ship · tunnel · factory worker · d production · decision · delivery · invention

Grammar

8. ● Complete with the present simple passive of the verbs in brackets. a Glass _____ (make) from sand, soda ash and limestone. b Our bins _____ (empty) every Tuesday. c English and Irish _____ (speak) in Ireland. d Where _____ these phones _____ (assemble)? e Plastic lids _____ (not / recycle) with the glass. f The hot glass _____ (pour) onto a bath of melted tin.

9. ● Complete with the past simple passive of the verbs in brackets. a The Clifton Suspension Bridge _____ (open) in 1864. b Brunel _____ (bear) in Portsmouth. c The SS *Great Britain* _____ (launch) in 1843. d _____ the Fréjus tunnel _____ (dig) by hand? — Only at first. e Callum's phone _____ (not / damage) badly: only the screen. f When _____ you _____ (born)?

10. ● Your bike _____ at the moment, so you can borrow mine.

A. is repairing
B. is being repaired
C. has repaired
D. repairs

11. ● Batteries must _____ in a special bin.

A. put
B. be put
C. been put
D. to be put

12. ● Good news! A new bottle bank _____ outside the school.

A. was being put
B. puts
C. is putting
D. has been put

13. ● The results of the science fair _____ next Friday.

A. will be announced
B. will announce
C. are announcing
D. announced

14. ●● Rewrite the sentences in the passive. Use *by* only if the agent is useful. a Brunel designed the SS *Great Britain*. b They make cardboard from wood or recycled paper. c Somebody has stolen my bike! d People will recycle the cans. e Workers are building a new railway station. f You can buy tickets online.

15. ●● Active or passive? Choose the correct form. a The first iPhone *sold / was sold* in 2007. b Brunel *died / was died* in 1859. c My grandad *worked / was worked* in an engineering company. d Our school *built / was built* in 1975. e The ship *arrived / was arrived* in New York after 14 days. f Thousands of people *visit / are visited* the ship every year.

16. ●● Complete with *have* + object + past participle, in the tense given. a Giulia / her hair / cut (past simple) → Giulia _____ . b We / our house / paint (present continuous) → We _____ . c I / my eyes / test (*be going to*) → I _____ . d Callum / his phone screen / replace (present perfect) → Callum _____ . e Mum / the car / service (present simple, every year) → Mum _____ every year.

17. ●● Find the mistakes and correct them. a ✗ The bridge was design by Brunel. b ✗ I am born in Turin in 2011. c ✗ Glass can recycled. d ✗ The road is repairing. e ✗ The toys are made by plastic. f ✗ I cut my hair at the hairdresser's yesterday.

18. ●●● Translate into English. a Il vetro si può riciclare all'infinito. b Questo ponte è stato costruito nel 1864. c Mi sono fatto riparare la bici ieri.

Reading and Listening

19. ● Read "From Sand to Screen" again. True (T), false (F) or doesn't say (DS)? a Glass is made mainly from sand. b The mixture is heated to about 150 °C. c Bottles are made in moulds. d Marta and Callum visited a glass factory for their article. e Phone screens are made of ordinary window glass. f In Turin, glass and cans are collected together.

20. ●● Answer the questions about the article. a Why is the hot glass cooled slowly? b Why does window glass become flat in the float process? c Why must glass be sorted by colour? d What is cullet, and why does it save energy? e What happened to Callum's phone, and what did he do?

21. ●● Listening 1 (Tabella 3.7). According to Grandad Arthur, what holds up the road of the Clifton Suspension Bridge?

    A. the two towers directly
    B. the hangers, which hang from the chains
    C. the rock under the river
    D. columns in the river

22. ●● Listening 2 (Tabella 3.8). Complete the steps of paper recycling in the right order: a the ink is removed · b the paper is collected · c the pulp is pressed and dried · d the paper is sorted · e the paper is mixed with water · f the new paper is rolled up. Then answer: how many times can paper be recycled, and why not for ever?

23. ●●● Look at the infographic (Figura 3.5). Which number can you trust, and why? Which features of the poster are designed to persuade rather than to inform? Write 3–4 sentences.

Writing and Speaking

24. ●● Write six sentences about things in your home or your town, using the passive: two in the present simple, two in the past simple, one with a modal, one with *have something done*. Example: *My house was built in 1960.*

25. ●● Write a description of a process (120–150 words): how an aluminium can is recycled. Use the infographic, the Collegamenti box and these notes: collected – sorted (magnets remove steel cans) – crushed into blocks – shredded – melted (aluminium melts at about 660 °C) – made into sheets – made into new cans.

26. ●●● Speaking. Work in pairs. Student A is a visitor at the SS *Great Britain* museum, Student B is a guide. A asks at least four questions about the ship (When…? Where…? Who… by? What… made of?); B answers using the passive and the information in the Culture page. Then swap: the Clifton Suspension Bridge.

Towards B1

27. ●● Multiple-choice cloze. Choose the correct word (A, B, C or D) for each gap. *The Box Tunnel, near Bath, (1) ___ designed by Brunel for the Great Western Railway. It was dug through a hill, and the work (2) ___ about two and a half years. Up to 4,000 men worked on it at the same time, and about a hundred of them (3) ___ killed. When the tunnel (4) ___ opened in 1841, it was the longest railway tunnel in the world. Today it is still (5) ___ by trains, and thousands of passengers (6) ___ through it every day.* 1 A is B was C has D did · 2 A took B was taken C made D spent · 3 A did B had C were D are · 4 A has B did C had D was · 5 A using B use C used D uses · 6 A are taken B take C is taken D takes

28. ●● Open cloze. Write ONE word in each gap. *Have you ever wondered how chocolate (1) ___ made? First, the beans (2) ___ taken out of the fruit of the cocoa tree and left in the sun. (3) ___ that, they are roasted, like coffee. Then they (4) ___ crushed and mixed with sugar and milk. (5) ___ the mixture is smooth, it is poured into moulds. Finally, the bars are packed and delivered to the shops, where they are (6) ___ by people like you and me!*

29. ●●● Sentence transformation. Complete the second sentence so that it means the same as the first. Use between two and five words. a They built our school in 1975. → Our school _____ in 1975. b A hairdresser cut my hair yesterday. → I _____ yesterday. c People speak Irish in the Gaeltacht. → Irish _____ in the Gaeltacht. d It's possible to recycle cardboard. → Cardboard _____ . e They have chosen Giulia's team for the final. → Giulia's team _____ for the final.

30. ●● Short message. Your phone is broken and you have taken it to a repair shop. Write a message to your English friend (35–45 words): say what happened to the phone, explain that it is being repaired, and say when you will get it back and how your friend can contact you until then.

31. ●●● Article. Your school magazine is asking for articles with the title *A great work of engineering*. Write about a bridge, a tunnel, a building or a machine that you admire (about 100 words): what it is, when and how it was built, who it was designed by, and why you think it is great.

PER APPROFONDIRE

- SWA
- EGU
- RED
- OAL

Glossario del capitolo

Agent
complemento d'agente — the person or thing that does the action, after *by*

Aluminium (AmE aluminum)
alluminio — a light, silver-coloured metal: *a drink can*

Assemble
montare, assemblare — put the parts of something together

Cardboard
cartone — thick, stiff paper used for boxes

Engineer
ingegnere — a person who designs and builds machines, bridges, roads, etc.

Have something done
farsi fare qualcosa — I had my hair cut.

Impersonal (register)
impersonale — a style that does not talk about *I* or *you*

Infographic
infografica — a picture that gives information with numbers, charts and few words

Melt
fondere, sciogliere — become liquid, or make something liquid, with heat

Mould (AmE mold)
modellare, stampare (verbo); stampo (nome) — give a shape to a soft or liquid material

Process
procedimento, processo — a series of actions that make or change something

Raw material
materia prima — a natural material used to make something: *Sand is a raw material for glass.*

Recycle
riciclare — treat used materials so that they can be used again

Sequencer
connettivo di sequenza — first, then, next, after that, finally

Steel
acciaio — a strong metal made of iron and a little carbon

Suspension bridge
ponte sospeso — a bridge whose deck hangs from chains or cables

The passive
la forma passiva — be + past participle: *It was built in 1864.*

Word family
famiglia di parole — produce, production, producer, productive

Soluzioni

1. 1 c · 2 d · 3 f · 4 b · 5 a · 6 e

2. C — *melt* = become liquid because of heat

3. A — *assemble* = put the parts together

4. a produce · b design · c recycle · d mould · e pack, deliver

5. a production · b decision · c invention · d explanation · e discussion · f education · g reduction · h description

6. a construction · b permission · c pollution · d explosion · e decision

7. a *bridge* (not a material) · b *tunnel* (not a process verb) · c *factory worker* (a person, not a structure or means of transport) · d *delivery* (not a *-tion / -sion* noun)

8. a is made · b are emptied · c are spoken · d are … assembled · e aren't (are not) recycled · f is poured

9. a was opened · b was born · c was launched · d Was … dug · e wasn't (was not) damaged · f were … born

10. B — present continuous passive: an action in progress now

11. B — modal + *be* + past participle

12. D — present perfect passive: news, a result now

13. A — *will* + *be* + past participle

14. a The SS *Great Britain* was designed by Brunel. · b Cardboard is made from wood or recycled paper. · c My bike has been stolen! · d The cans will be recycled. · e A new railway station is being built. · f Tickets can be bought online. (The agent is useful only in a.)

15. a was sold · b died · c worked · d was built · e arrived · f visit *(die, work, arrive non hanno oggetto: non possono essere passivi)*

16. a had her hair cut · b 're (are) having our house painted · c 'm (am) going to have my eyes tested · d has had his phone screen replaced · e has the car serviced

17. a was designed · b I was born · c can be recycled · d is being repaired · e are made of / from plastic · f I had my hair cut

18. a Glass can be recycled again and again (for ever / endlessly). · b This bridge was built in 1864. · c I had my bike repaired yesterday.

19. a T · b F (about 1,500 °C) · c T · d DS · e F (a special glass, made stronger with a bath of hot salt) · f T

20. a So that it doesn't crack. · b Because the liquid glass floats on a bath of melted tin, which is heavier. · c Because green, brown and clear glass must not be mixed. · d Glass crushed into small pieces; it melts more easily than the raw ingredients, so the furnace needs less energy. · e It fell out of his pocket on the bus and the screen broke; he had it replaced (it cost him two months of pocket money).

21. B — *the road is held up by* the hangers, which hang from the chains

22. b, d, e, a, c, f. About five to seven times, because the fibres get shorter every time.

23. Model answer: *The 95% figure can be trusted, because a real source is given (the International Aluminium Institute). The bar chart is invented, as the label says. The poster persuades with a big number, bright colours, imperatives (Don't bin it, Rinse it, Squash it) and a slogan (Every can counts!). The highlighted bar makes the other classes want to compete.*

24. Model answer: *My jumper is made of wool. Our rubbish is collected on Mondays. My house was built in 1960. The bridge in my town was opened in 1912. Glass can be recycled at the end of my street. I have my hair cut every two months.*

25. Model answer: *Aluminium cans are one of the easiest things to recycle, and recycling them saves a lot of energy. This is how it is done. First, the cans are collec-*

ted from recycling bins and taken to a plant. There they are sorted: steel cans are removed with magnets, because aluminium is not magnetic. Next, the aluminium cans are crushed into large blocks and transported to a factory. After that, they are shredded into small pieces and the paint is removed. Then the pieces are melted in a furnace (aluminium melts at about 660 °C). Once the metal is liquid, it is poured into moulds and made into big blocks, which are rolled into thin sheets. Finally, the sheets are made into new cans, which are filled and sent back to the shops. Recycled aluminium needs about 95% less energy than new aluminium! (≈ 140 words) Check: sequencers, present simple passive, impersonal register.

26. Model: *A: When was the ship launched? B: She was launched in 1843, here in Bristol. A: Who was she designed by? B: By Isambard Kingdom Brunel. A: What was the hull made of? B: Iron — most ships were made of wood then. A: How did she get back here? B: She was brought back from the Falkland Islands in 1970.* Check: correct passive questions (*was / were* + subject + past participle).

27. 1 B was · 2 A took (*take* + time; active) · 3 C were · 4 D was · 5 C used · 6 A are taken (plural subject *passengers*; the trains take them)

28. 1 is · 2 are · 3 After · 4 are · 5 Once (When) · 6 bought (sold, eaten)

29. a was built · b had my hair cut · c is spoken · d can be recycled · e has been chosen

30. Model answer: *Hi Sam! Bad news: I dropped my phone yesterday and the screen broke. It's being repaired at a shop in the centre, and it will be ready on Thursday. Until then, please send me an email or call my mum's phone. Speak soon!* (≈ 43 words)

31. Model answer: *The Mole Antonelliana is the symbol of my city, Turin. It was designed by the architect Alessandro Antonelli, and it was started in 1863 as a synagogue. But Antonelli made the building taller and taller, and in the end the project was taken over by the city. It was finished in 1889, after Antonelli's death. Today it is used as a museum of cinema, and you can go up inside it in a glass lift. I think it is great because it shows that one man's crazy idea can become a whole city's favourite building.* (≈ 100 words) Check: passive in several tenses, clear structure, a personal opinion at the end.