G quantifiers: all, every, both, etc. V science P stress in word families

SPEAKING & LISTENING

- Look at the cartoon. Do you think the father gives a good answer? Why (not)?
- **b** Read the article. With a partner, try to explain the meaning of the highlighted science words. Use the context to help you.
- c Now answer questions 1-8. Choose the correct option.
- d 10.1 Listen to a scientist explaining each fact. Did you get the answers right?

Listen again. What did the scientist say about...?

- 1 the reason we can see more blue light than violet light
- 2 the effect of the Sun's heat on ocean water
- 3 the number of daylight hours that the moon is visible
- 4 six hours per year
- 5 what happens in your brain when you blink
- 6 the function of the cornea
- 7 the effect of cooler air on water vapor
- 8 what happens when something with a high mass is compressed
- Which questions do you think you could now answer if you were asked them by a child?

Daddy, why...?

"Why is the sky blue?" "Why is the sea salty?" Children are always asking difficult questions like these about the world around us, but in a recent survey, nearly 25% of parents said they didn't know the answers, and 21% admitted that they made the answers up!

Can you answer eight simple science questions that parents struggle to answer?

I Why is the sky blue?

- A Because the light from the Sun reflects off the blue water of the ocean.
- **B** Because the Earth's atmosphere scatters more blue light than red light from the Sun.

2 Why is the sea salty?

- A Because salt dissolves into the water from seaweed and other plants.
- B Because salt dissolves into the water from the land around it.
- 3 Why can we sometimes see the moon during the day?
 - A Because as it rotates around the Earth, it reflects the Sun's rays during daytime as well as night time.
 - B Because sometimes during the day, the Sun doesn't shine as brightly.

4 Why do we have a leap year?

- A Because every four years, the Earth goes around the Sun
- **B** Because the Earth takes slightly more than 365 days to go around the Sun.



5 Why do we blink?

- A To keep our eyes moist and clean.
- **B** To help us stay awake.

6 Why does cutting onions make us cry?

- A Because they produce a gas that irritates our eyes.
- **B** Because they give off dry particles that irritate our eyes.

7 What is a cloud?

- A A mixture of warm gases rising from the Earth.
- **B** A mixture of water vapor, ice, and dust floating in the sky.

8 What is a black hole?

- A A place in space where gravity pulls so hard that even light cannot get out.
- **B** A "vacuum cleaner" in space that swallows up everything around it.

2 VOCABULARY & PRONUNCIATION science; stress in word families

a Look at the questions and complete the subject column in the chart.

What is the name for the study of....?

- 1 the natural and physical world
- 2 forces, heat, light, sound, and electricity
- 3 how solids, liquids, and gases react with each other
- 4 people, animals, and plants
- 5 the moon and the planets
- 6 how characteristics are passed through generations
- 7 plants and their structure
- 8 animals and their behavior

subject	person	adjective
1 <u>sci</u> ence	<u>sci</u> entist	scien <u>ti</u> fic
2		
3		
4		
5		
6		
7		
8		

b 10.2 Listen and check. Then try to complete the other two columns.

Stress in word families

In some word groups, the stressed syllable changes in the different parts of speech, e.g., <u>sci</u>ence, <u>sci</u>entist, scientific.

- d Practice saying the word groups.
- e 10.4 Listen and write six phrases using words from the chart in **a**.

f Complete the sentences with a word from the box.

clone discovery drugs experiments guinea pigs laboratory research side effects tests theory

1 Scientists carry out experiments in a ______.

2 Archimedes made an important ______ in his bathtub.

3 Isaac Newton's experiments proved his ______ that gravity existed.

4 Before a pharmaceutical company can sell new ______, they have to do ______ to make sure they are safe.

5 Scientists have to do a lot of ______ on the possible ______ of new drugs.

6 People can volunteer to be ______ in clinical trials.

7 In 1996, scientists were able to ______ a sheep for the first time, which they named Dolly.

g 10.5 Listen and check, and mark the stress on the multi-syllable words in **bold**. Practice saying the sentences.

3 SPEAKING

Work with a partner. **A** interview **B** with the questions in the green circles. Then **B** interview **A** with the blue circles.

Which scientific subjects do / did

you study in school?
What do / did you
enjoy the most / the
least?

Do you think it's more important to study science than arts in school / college?

Which scientist (living or dead) do you most admire? Why? Which scientific subjects from school are / have been most useful to you?

Are
you OK
with eating
geneticallymodified food?
Why (not)?

If you were sick, would you agree to be a guinea pig for a new kind of treatment?

Do you think it is acceptable for animals to be used for cosmetics testing? Is any animal testing

Is it worth
spending millions
of dollars sending
expeditions to distant
planets, e.g., Mars?
Why (not)?

Would you clone your pet?
Do you think it will ever be acceptable to clone a person?

What would you most like scientists to discover in the near future?

4 READING

- Talk to a partner. Have you seen any movies or TV shows, or read any books, where...?
 - people discover aliens that look a little like humans on another planet
 - · spaceships travel faster than the speed of light
 - people can teleport themselves long distances
 - people can make themselves invisible
 - machines look and behave like humans
 - people can learn something very quickly by plugging themselves into a computer
- b Read an article about the sci-fi concepts in a. Score each one from 1–5, according to what the writer says about how likely it is to happen (1 = very unlikely, 5 = very likely). Then compare with a partner. Did you agree on the scores?

The reality of sci-fi

Just how plausible are the ideas we hear about in science fiction? LiveScience examines some popular concepts.



Aliens that look like us

Many fictional aliens have a human-type body. But how likely is it that intelligent alien life would develop a body shape similar to ours? It seems unlikely that organisms evolving for millions of years on another world would fit comfortably into our clothes. But the evolutionary circumstances on alien planets may have been similar to those that led humans to develop arms and legs, and fingers to manipulate tools. Some scientists say that our two-legged, symmetrical body shape could be the "optimal design for an intelligent being." Perhaps there is no other choice than for intelligent aliens to look like humans.

Traveling faster than light

Einstein's general theory of relativity says that nothing can travel faster than light. However, this theory doesn't place limits on the speed at which space expands or contracts. Some physicists believe that faster-than-light travel is a real possibility. A type of energy bubble around a



spaceship, for instance, could in theory make space-time contract in front of the ship and expand behind it. Gerald Cleaver, a physicist at Baylor University, says that the objects inside the bubble would move faster than the speed of light in relation to the space around.

Teleportation

Digital information can be transmitted via computers, and in a similar way, some physicists have transmitted another type of information (called quantum information) nearly 10 miles (16 kms). However, this is a long way from teleporting



actual material, or indeed, a person. Scientifically speaking, teleportation faces extreme obstacles. There are ideas for how to do it, but these are only speculative right now.

Invisibility cloaks

In the Star Trek universe, enemies hide, or "cloak," their spaceships. Scientists say that anti-detection technologies might be possible, but invisibility cloaks like those in science fiction and fantasy are quite a way off. "What you see



in Harry Potter is far-fetched," says David Smith, professor of electrical and computer engineering at Duke University. "However, in the last few years, researchers have made a lot of progress on making objects invisible. Partial cloaks that work like sophisticated camouflage – rather like the alien in the 1987 movie *Predator* – might be achievable," says Smith.

Intelligent machines

Robots and computers are already far better than humans at factory work or calculations. However, machines still cannot manage many basic activities, such as tying a shoelace while having a conversation. "From 50 to 60 years of Artificial



Intelligence research, we know that teaching machines to do a specific task, for example, playing a game, is a lot easier than creating a machine that has the common sense of a three-year-old child," said Shlomo Zilberstein, a professor of computer science. Many scientists believe that highly intelligent machines will be available in the coming decades. But it is questionable whether computers will achieve the human-like ability to feel or understand free will – an idea at the heart of many sci-fi stories.

Instant learning

In the movie *The Matrix*, knowledge can be uploaded into the brain in seconds, via a computer plugged into the skull. Some emerging research suggests that the speed at which we learn a skill can be technologically boosted. For



instance, scientists have managed to stimulate the brain to improve performance of visual tasks. Perhaps someday, the acquisition of knowledge and skills could happen at broadband-like speeds via surgically implanted and plug-in hardware. "The concept is not totally implausible," says neuroscientist Bruce McNaughton. "But it might take a couple of hundred years."

- c With a partner, look at the highlighted words and phrases in the article on p.98. Check what ideas they refer to. Then decide whether they mean a) likely, b) not very likely, but possible, or c) extremely unlikely.
- d Which thing in the article do you think...?
 - might happen in the next 50 years
 - you would really like to happen
 - will never happen

Talking about future possibilities
I'm pretty sure...will
I'd really like...to happen / exist /
be invented
I don't think...will ever...

e In small groups, discuss the possibility of the following things happening, and whether or not they would be a good thing.

a colony on Mars bringing extinct animals back to life flying cars space tourism controlling the weather

- **5 GRAMMAR** quantifiers: all, every, both, etc.
- a With a partner, circle the correct word or phrase.
 - Some scientists think that all
 / every intelligent aliens would have a human-like body shape.
 - 2 All the / All evidence suggests that scientists could invent a way to make things invisible.
 - 3 Einstein's theory of relativity doesn't explain *all / everything* about the universe.
 - 4 No / None machines can currently tie a shoelace and hold a conversation at the same time.
 - 5 Both / Both of David Smith and Shlomo Zilberstein are computer scientists.
 - 6 Either / Neither teleportation nor instant learning are going to be easy to achieve.
- b G p.150 Grammar Bank 10A
- c Take the Science quiz with a partner.
- d 10.9 Listen and check.

1 In "direct current," the electrons...

a move in only one direction. b move in both directions. c don't move at all.

- 2 Helium gas can be found...
- a only in liquid form.
- b in neither liquid nor solid form. c in both liquid and solid form.
- 3 Adult giraffes remain standing...
- a some of the day.
- b all day.
- c most of the day.
- 4 Of all the water on our planet,... is found underground.
- a hardly any of it b about half of it
- b about half of it c most of it
- C IIIOSCOTIC
- 5 Snakes eat...
 - a only other animals.
 - b either other animals or eggs.
- c either other animals or fruit.
- 6 A diamond can be destroyed...
 - a by either intense heat or acid.
 - b by both intense heat and acid.
 - c only by intense heat.
 - 7 The human brain can continue to live without oxygen for...
 - a nearly two minutes.
 - b nearly six minutes.
 - c a few hours.
 - 8 In our solar system,...
 - a neither Pluto nor Neptune are now considered to be planets.
 - b both Pluto and Neptune are considered to be planets.
 c Pluto is no longer considered to be a planet.
 - When we breathe out,...
 - a most of that air is oxygen.
 - b none of that air is oxygen.
 - c some of that air is oxygen.
 - 10 An individual blood cell makes a whole circuit of the body in...
 - a nearly 60 seconds.
 - b nearly 45 seconds.
 - c a few minutes.





quantifiers: all, every, both, etc.

all, every, most

1 All animals need food.

10.6

All fruit contains sugar.

All (of) the scientists at the conference agree with the theory.

The animals all look sad. The animals are all healthy.

- 2 Everybody is here. Everything is very expensive.
- 3 Most people live in cities. Most of the people in this class are women.
- 4 All of us work hard and most of us come to class every week.
- 5 Every room has a bathroom. I work every Saturday.
- 1 We use all or all (of) the + a plural or uncountable noun.
- all = in general, all (of) the = specific
- all can be used before a main verb (and after be).
- 2 We use everybody / everything (= all people, all things) + singular verb, e.g., Everything is very expensive. NOT All is very expensive.
- We sometimes use not before everybody / everything. etc., e.g., Not everybody likes sunbathing.
- 3 We use most to say the majority; most = general, most of = more specific.
- 4 We often use all / most of + an object pronoun, e.g., all of us, most of them, all of you, most of it.
- 5 Use every + singular countable noun to mean "all of a group."

Q every and all + time expressions

Note the difference between every and all + time expressions.

every day = Monday to Sunday all day = from morning to night

no, none, any

- 1 Is there any milk? Sorry, there's no milk. There isn't any (milk). 10.7
- 2 A Is there any food?
 - B No, none. / There's none. But none of us are hungry.
- 3 Come any weekend! Anyone can come.
- 1 We use no + a noun after a + verb, or any + noun after a verb, to refer to zero quantity.
- 2 We use none in short answers, or with a + verb to refer to zero quantity. We can also use none + of + pronoun / noun.
- 3 We use any (and anything, anyone, etc.) and a + verb to mean it doesn't matter what, who, etc.

both, neither, either

- 1 Both Pierre and Marie Curie were scientists. Neither Pierre 10.8 nor Marie Curie was (were) aware of the dangers of radiation. Marie Curie wanted to study either physics or mathematics. In the end, she studied the two subjects.
- 2 She and her husband both won Nobel Prizes. Pierre and Marie were both interested in radium.
- 3 Both of them won the Nobel Prize. Neither of them realized how dangerous radium was.
- 1 We can use both...and..., neither...nor..., and either...or... to join two nouns, verbs, or other kinds of expressions.
- Use both...and... + nouns to talk about two people / things, etc., when they are the same. The verb is always plural.
- Use neither...nor + nouns to refer to two people / things, etc., when you mean not the one and not the other. You can use either a singular or plural verb. Neither John nor his brother live / lives at home.
- Use either...or... to talk about a choice between two alternatives.
- 2 When both refers to the subject of a clause, it can also be used before a main verb but after be.
- 3 We often use both / either / neither + of + object pronoun, e.g., us, them, etc., or + of the + noun.

Circle the correct word or phrase.

We've eaten (all the) all cake.

- 1 Most of / Most my family lives near me.
- 2 All / Everything is ready for the party. We're just waiting for the guests to arrive.
- 3 Most / Most of people enjoy the summer here, but for some it's too hot.
- 4 Gina goes dancing all / every Friday night.
- 5 We don't have any / no onions for the soup.
- 6 Any / None of us want to go out tonight. We're all exhausted.
- 7 Nobody / Anybody can go to the festival. It's free.
- 8 I have two very close friends, but unfortunately either / neither of them lives near me.
- 9 I'd like to have a bigger table, but there's no / none room in my kitchen.

b Right (\checkmark) or wrong (x)? Correct the wrong sentences.

Both Mike and Alan passed the exam. ✓ He neither watches the news or reads a newspaper. X He neither watches the news nor reads a newspaper.

- 1 Both the kitchen and the bathroom needs cleaning.
- 2 The food wasn't cheap nor tasty.
- 3 I have two children, but neither of them look like me.
- 4 My sister and I both were late for school.
- 5 It's or Jane's or Karen's birthday today.
- 6 Neither the food nor the service in this restaurant is good enough for what they charge.
- 7 Neither my best friends called to see how I was.
- 8 We can walk either or take the bus.
- 9 My parents love horses, and both of them ride every
- 10 We can go on vacation either in July or in August.