Contents

ENGLISH LANGUAGE

It's beautiful, rich and diverse, but there is no denying that it is full of strange rules and even stranger exceptions. It pronounces *bough*, *rough*, *cough* and *through* so that they don't rhyme and *jerk*, *dirk*, *work* and *murk* so that they do. In other words, it's a minefield. This chapter tries to throw light on some of the most frequent areas of confusion.

MY HUSBAND AND ... WHO?

One of the things that people find hardest about English is the correct use of pronouns. After all, if the Queen says, 'My husband and I …', it must be right, mustn't it?

But no, not necessarily. It all depends on where in the sentence it comes. Let's look at the rules.

Sentence structure: subject, verb and object

A basic English sentence consists of a subject, a verb and an object:

- The subject **performs the action** of the sentence.
- The verb tell us **what the action is**.
- The object is **the recipient of the action**.

Easier with a few examples, perhaps:

The dog chased the ball.
I am reading a book.
Old Macdonald had a farm.

The subjects of these sentences are *the dog*, *I* and *Old Macdonald.* They are the ones that are doing something. You'll remember, I'm sure, that a verb is a 'doing word', so the verbs in these sentences are *chased*, *am reading* and *had*: they describe the action that is taking place. The objects are *the ball*, *a book* and *a farm*. Ask yourself 'The dog chased what?' and the answer will be the object of the verb.

OK? With me so far? Good.

Pronouns

Pronouns are the little words that stand in place of nouns, to save us having to repeat the nouns over and over again. It would be tedious, for example, to say:

Caroline is writing Caroline's book because Caroline has agreed to write the book.

Instead, we substitute pronouns:

Caroline is writing her *book because* she *has agreed to write* it.

English does not alter the form of nouns to show what role they play in a sentence (as Latin and German, for instance, do), but it does alter the form of pronouns:

I as the subject of a sentence becomes *me* as the object.

MATHS

The problem with maths, as I recall it from school, was that you spent a lot of time proving that there were 180° in a triangle and making sense of equations such as $a^2 + b^2 = c^2$, but that no one bothered to explain why you needed to know these things. With that in mind, this chapter is going to concentrate largely on the elements of maths that are of use to most of us in everyday life. I'm going to assume that you know your times tables and can do simple sums: if not (and I'm sorry, purists, I hear your pain), feel free to dig out a calculator at any stage.

(JUST A FEW) ARITHMETICAL BASICS ...

Even simple sums require a bit of specialist vocabulary, so let's start there.

The four basic functions in arithmetic are **addition**, **subtraction**, **multiplication** and **division**:

Addition: when you add two or more numbers together, you get the **sum** of those numbers.

Subtraction: subtract one number from another and the answer is the **difference** between them.

Multiplication: multiply two or more numbers together and the answer is the **product**.

Division: divide one number (the **divisor**) into another (the **dividend**) and the answer is a **quotient**. If the divisor does not go into the dividend an exact number of times, what is left over is the **remainder**.

Subtraction is addition in reverse and division is multiplication in reverse. For example, 4 + 8 = 12. Reverse the process, by subtracting the 8 from 12 and you are back with 4.

Similarly, $4 \times 8 = 32$
Reverse the process: $32 \div 8 = 4$

It works with larger numbers too. That's one of the beauties of maths: once you have established a principle, it holds true with any numbers you care to think of.

With addition and multiplication, the order you put the numbers in doesn't matter (3 + 4 is the same as 4 + 3; 2 × 7 is the same as 7 × 2). With subtraction and division it does matter (7 – 2 is not the same as 2 – 7, nor is 10 ÷ 2 the same as 2 ÷ 10).

Most numbers that we deal with in real life are **positive**, that is, they are larger than zero. If you subtract a larger number from a smaller one (as in 2 – 7), you end up with a **negative** number (–5). When you did 'problems' at school and deducted 7 apples from 2 apples, the resulting –5 apples were of academic interest only. However, try putting £200 into the bank and then withdrawing £700 – you'll soon see that this has a real-life implication.

SCIENCE

If you weren't one of those to whom science came naturally, you may have felt that all that theory, all those equations and all those laws about gases you learnt at school were just a bit pointless. So, although I've divided this chapter into biology, chemistry and physics in the conventional way, I've tackled each topic from the point of view of a practical, daily-life sort of issue. With any luck, therefore, it'll give you answers to some of the questions that all too often began with 'Who gives a **** about …?'

BIOLOGY

Although your days of dissecting frogs are probably a distant memory, biology still has its uses. This section touches on ecology, genetics, amino acids, bacteria and viruses and plant cell biology – surely enough to reignite some of that long-dormant interest.

Will your children have blue eyes or brown?

OK, not an entirely everyday question, but nonetheless one that a lot of people speculate about. Eye colour is dictated by **genes**. Each gene is a length of DNA which carries the code required to produce a specific protein and therefore to determine eye colour, hair colour and other aspects of

physical appearance (not to mention gender, intelligence, a tendency to certain diseases and myriad other things).

Quantities of genes go together to form a **chromosome**. The normal human body contains forty-six chromosomes in twenty-three matching pairs; during reproduction the pairs from the mother split and half of them come together with half of those from the father, so that the offspring inherits a combination of the genes of both parents. Different versions of the same gene are called **alleles**.

At its simplest, the alleles are either **dominant** or **recessive**. With eye colour, a blue allele is generally recessive and brown dominant. This means that in order to produce blue eyes, a child must inherit two 'blue' alleles, one on each chromosome in the appropriate pair. If there was a combination of blue and brown, the brown would dominate.

So if both parents have blue eyes, there are only 'blue' elements present and the baby will have blue eyes.

However, a person with brown eyes may have two brown alleles, or they may have just one brown allele, plus a recessive blue allele. Say both parents are what is called **heterozygous** (they have two different alleles, a blue and a brown), the possible combinations for their children are:

blue from mother + blue from father = blue-eyed baby
blue from mother + brown from father = brown-eyed baby
brown from mother + blue from father = brown-eyed baby
brown from mother + brown from father = brown-eyed baby

Because brown eyes will appear wherever there is a brown allele, there is a one in four chance that these parents will produce a blue-eyed child but a two in three chance that a

HISTORY

Where to start? What to put in and what to leave out? When the subject is as vast as world history, the answers to those questions have to be selective. This chapter, therefore, is primarily a timeline of some key events of the last 600 years, with occasional deviations to expand on topics where the theme of 'Oh yes, remind me – what was that about?' seems most pertinent.

1453 Constantinople, which has been in Christian hands, falls to the Turks; it becomes the capital of the Muslim Ottoman Empire. Refugee Christian scholars bring their knowledge into Western Europe, fuelling the Renaissance (see opposite).

1455 Johannes Gutenberg's Bible, the first book produced using movable type, is completed: for the first time books can be mass-produced and the spread of information is taken out of the control of the Church. Many people regard this as the single most important event in history.

1472 The Portuguese explorer Lopo Gonçalves crosses the equator and discovers the Southern Hemisphere.

1485 The Wars of the Roses end when Richard III is defeated and killed at the Battle of Bosworth. Henry Tudor becomes Henry VII, the first monarch of the Tudor dynasty.

The Renaissance

The name means 'rebirth' and it's used to refer to the rebirth of interest in all things Greek and Roman – art, literature, architecture, philosophy – which began in Italy as early as the twelfth century and spread across Europe over the next 400 years. Along with it came a flowering of humanist ideas that emphasized the intellectual, scientific and philosophical importance of Man.

Many of the great names of the Renaissance had more than one talent: Leonardo da Vinci (painter, designer, engineer, student of anatomy and mirror-writing), Michelangelo (painter, sculptor and poet), Brunelleschi (architect, sculptor and goldsmith), Vasari (architect, painter and art historian) and many more. Although all these people were Italian, the label Renaissance may also be attached to the great Dutch humanist scholar Erasmus, the German theologian Martin Luther (see **The Reformation** on page 85), the English writers of the Elizabethan period, including Shakespeare, Christopher Marlowe and Edmund Spenser, and the French poets Joachim du Bellay and Pierre de Ronsard.

Hand in hand with humanist thought came advances in science and technology: there was Gutenberg (see **1455**, opposite), explorers who wanted to show that the earth was round and the Polish astronomer Nicolaus Copernicus, one of the first to put forward the heretical suggestion that the earth moved round the sun: all 'Renaissance men'.