Perspectives

Make your work accessible for all | The benefits of thinking differently | How braille is inspiring creativity | Colour blindness and graphic design

Sightsavers

Sightsavers | Perspectives

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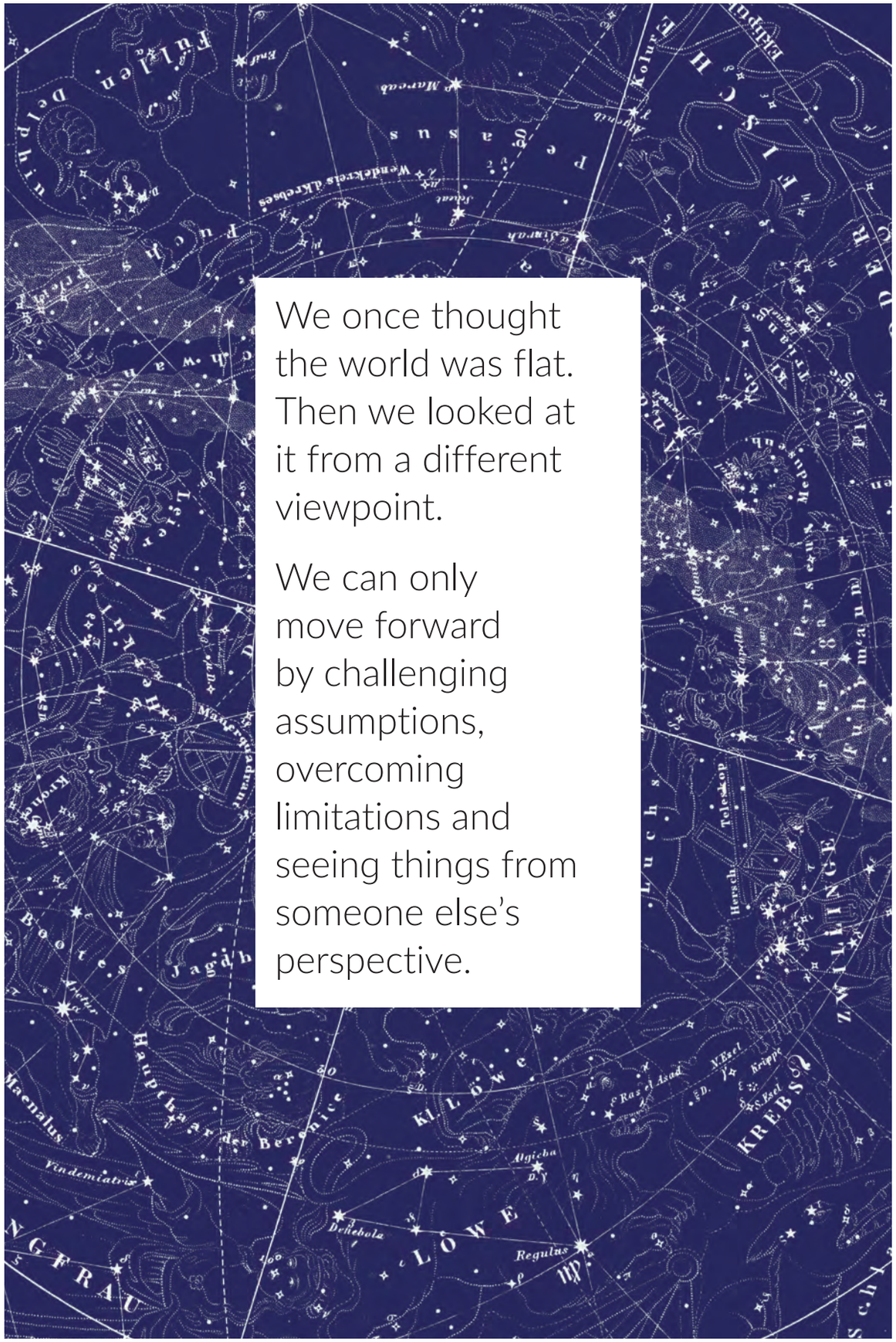


Sightsavers works in 30 countries to protect sight and fight for the rights of people with disabilities. Our vision is of a world where no one is blind from avoidable causes, and where people with disabilities participate equally in society.

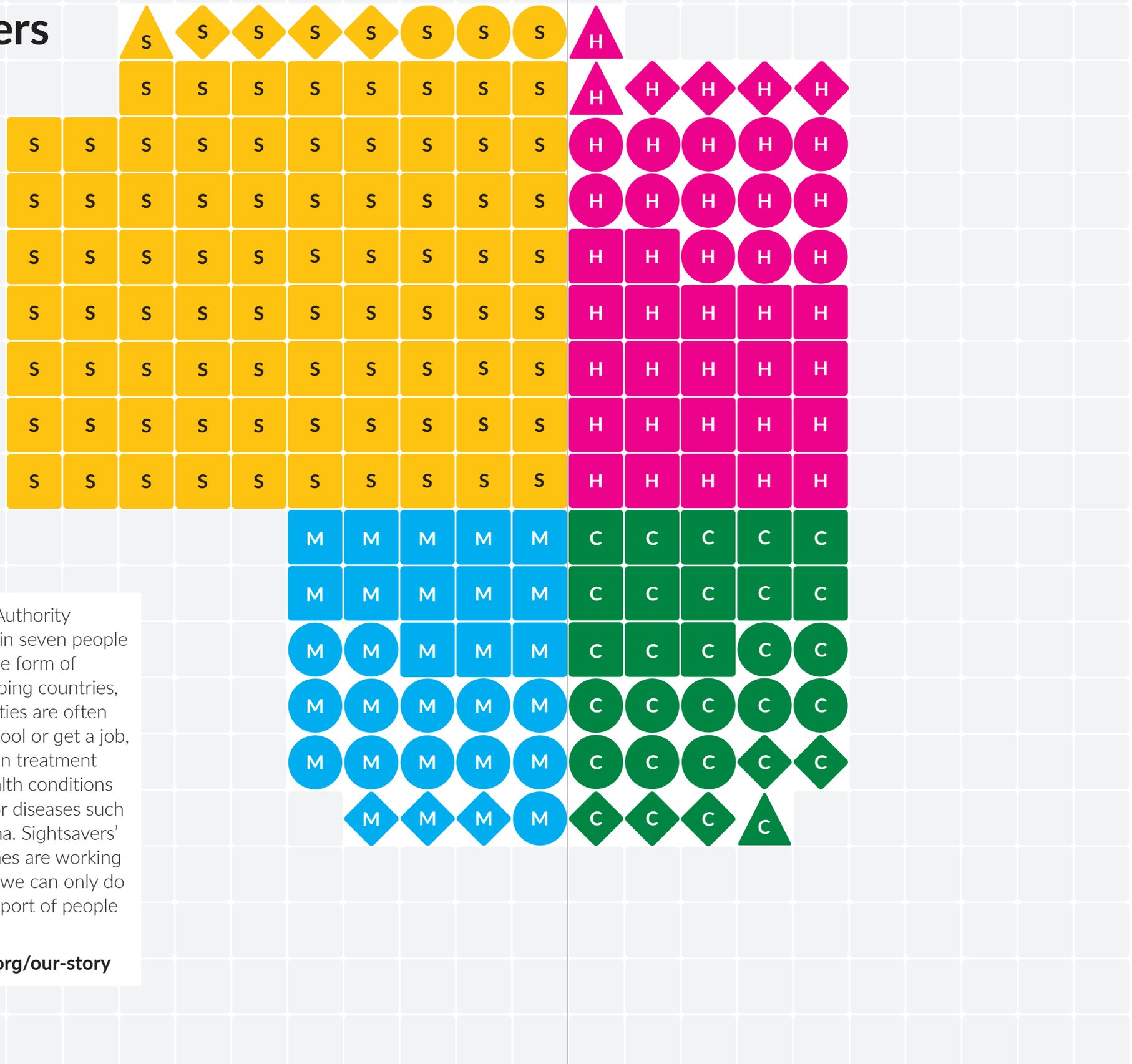
We aim to prevent **avoidable blindness** and restore sight in some of the poorest parts of the world by diagnosing and treating conditions such as cataracts.

We're fighting to eliminate **neglected tropical diseases** such as river blindness and trachoma, which affect more than a billion people around the world.

We **empower people with disabilities** so they can go to school, get a job and access healthcare, and we campaign to reduce discrimination and stigma.

In numbers

Figures from the UK



Sight

- S — Wears glasses
- S — Colour blind
- S — Moderate to severe visual impairment
- S — Registered blind

Hearing

- H — Some form of hearing loss
- H — Adults with tinnitus
- H — Uses hearing aids
- H — Profoundly deaf

Mobility

- M — Left-handed
- M — Some form of mobility issue
- M — Uses a wheelchair

Cognition

- C — Dyslexia
- C — Dyspraxia
- C — ADHD
- C — Autism

= 500,000 people

The World Health Authority estimates that one in seven people worldwide has some form of disability. In developing countries, people with disabilities are often unable to go to school or get a job, and may miss out on treatment for preventable health conditions such as cataracts, or diseases such as blinding trachoma. Sightsavers' inclusive programmes are working to change this, but we can only do it thanks to the support of people like you.

www.sightsavers.org/our-story

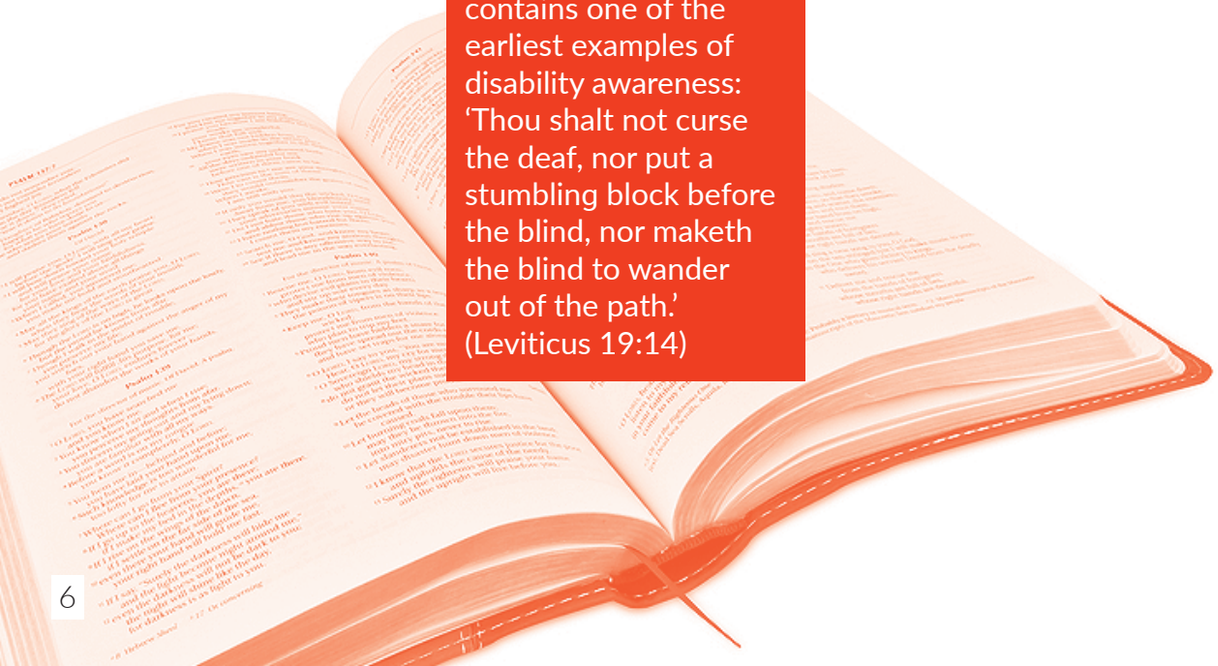
A history of inclusion

525 BCE

Images of wheeled chairs made specifically to carry people start to appear in Chinese art. It's thought they were designed for members of the nobility, to make them seem important, rather than to help people with disabilities.

500 BCE

The Old Testament contains one of the earliest examples of disability awareness: 'Thou shalt not curse the deaf, nor put a stumbling block before the blind, nor maketh the blind to wander out of the path.' (Leviticus 19:14)



1300s

Spectacles were invented in northern Italy, although no one is sure who made the first pairs. The early frames consisted of magnifying glassed riveted together by the handles so they could sit on the nose. The earliest surviving examples, dated to the 15th century, were found under the floorboards of a German convent in 1953.

1550s

French battlefield surgeon Ambroise Paré invented artificial limbs including a mechanical hand operated by catches and springs. He started as a 'barber surgeon', in the days when barbers also removed teeth and amputated limbs. (The striped barbershop pole represents the bloody napkins used during bloodletting.)

1595

The first wheelchair designed for disability was built for King Philip II of Spain. The 'invalid's chair' had small wheels attached to the end of its legs, and a platform for the king's feet. It couldn't be self-propelled – it's likely the king always had servants transporting him around.

1824

A 15-year-old Louis Braille developed a tactile system of raised dots to help blind people communicate. He spent several years refining his system, although his original versions didn't include the letter W, which was not part of the French alphabet at the time (it was added later in the 19th century).

Helen Keller was born in Alabama in the US: at 19 months old she caught an illness – possibly meningitis – that caused her to lose her sight and hearing. Her teacher, Anne Sullivan, who was also blind, devised a system for communicating with her by spelling out words in her palm. Helen later became the first deafblind person to earn a degree.

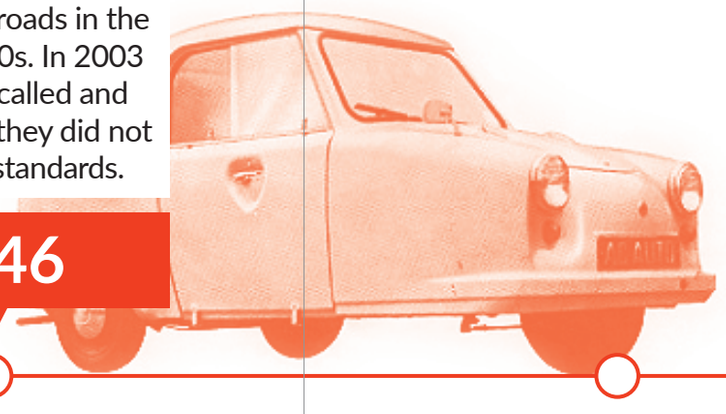
1880

1925

Frida Kahlo di Rivera was injured in a bus accident in Mexico City at the age of 18. Several people were killed, and Kahlo suffered a broken spine, collarbone, pelvis and ribs: she remained in bed for months. Bored, she started to paint. A special easel enabled her to paint lying down, with a mirror above her bed so she could create self-portraits.

After noticing the number of men injured in the war, Bert Greeves started building small single-seater cars for people with physical impairments. With three wheels, blue paintwork and handlebars instead of a steering wheel, the Invacar (aka 'invalid carriage') was a common sight on UK roads in the 1960s and 70s. In 2003 they were recalled and scrapped as they did not meet safety standards.

1946

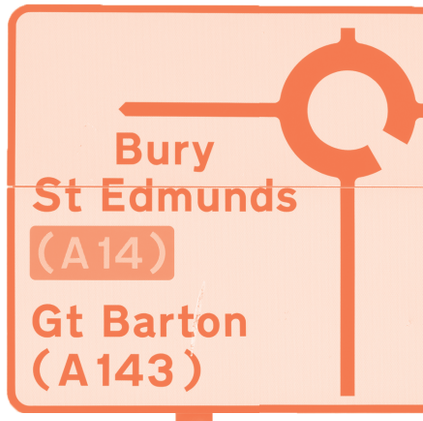


1948

A group of war veterans with spinal injuries competed in an archery contest at the Stoke Mandeville Games, marking the birth of the Paralympics movement. Previously, athletes with disabilities had competed at the Olympics: in 1904, US gymnast George Eyser, who had an artificial leg, won three gold medals in a single day.

Margaret Calvert and Jock Kinnear launched their Transport typeface for road signs in the UK. The sans-serif design was created to be as easy to read as possible: the curved strokes of many of the letters, such as the curl on the lower-case L and T, ensured the words could be recognised from a distance when travelling at speed. The typeface is still used on all UK road signs today.

1963



1970

The Chronically Sick and Disabled Persons Act was introduced in the UK: the first in the world to give legal rights to people with disabilities. Public buildings were required to provide parking and toilets for people with disabilities, and blue badge permits for cars were introduced to allow disabled drivers to park in places where other drivers can't, such as on double yellow lines.

1972

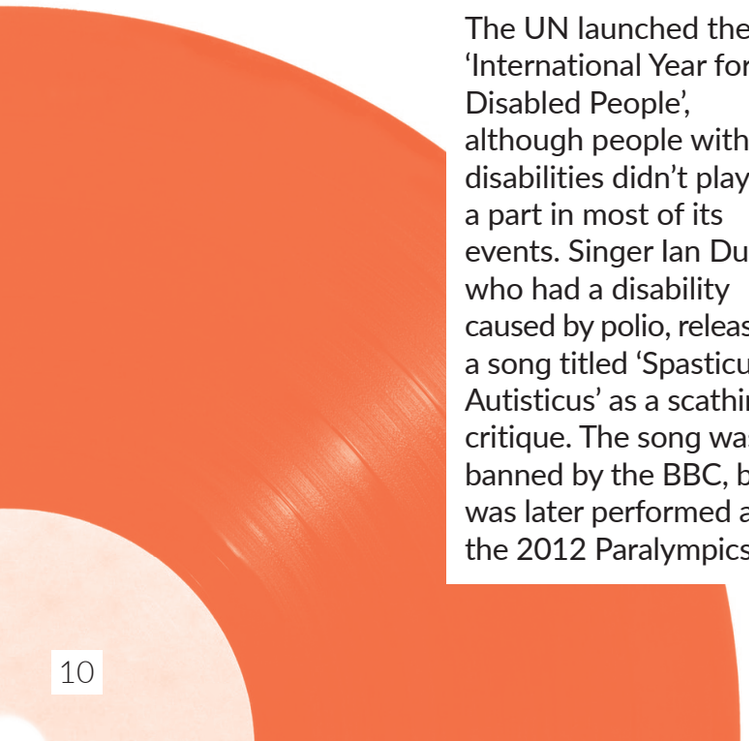
British TV soap Crossroads was the first to feature a character with a disability. Roger Tonge, who played Sandy, had been diagnosed with Hodgkin lymphoma, which affected his mobility – he could only appear sitting down or lying. Rather than writing him out, a plotline was developed where Sandy was paralysed in an accident and started using a wheelchair.

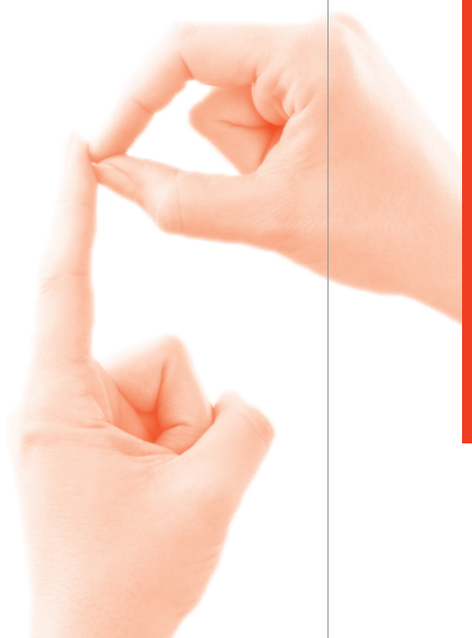
1981

The UN launched the 'International Year for Disabled People', although people with disabilities didn't play a part in most of its events. Singer Ian Dury, who had a disability caused by polio, released a song titled 'Spasticus Autisticus' as a scathing critique. The song was banned by the BBC, but was later performed at the 2012 Paralympics.

1992

Up to 1,500 disabled people took to the streets to protest against ITV's 24-hour Telethon fundraiser, which they said showed a pitiful, stereotypical portrayal of people with disabilities. They chained themselves to buses and used their wheelchairs to disrupt traffic. "The police arrested us, then let us go as they didn't have accessible vehicles to take us to the cells," said one protester.





2003

British Sign Language (BSL) was officially recognised by the UK government as a full, independent language. It is very different to its US counterpart, American Sign Language (ASL) – the two are mutually unintelligible, even though both countries share the same spoken language.

2006

The UN Convention on the Rights of Persons with Disabilities was adopted to promote equality and protect the human rights of people with disabilities. It helped to change the perception of people with disabilities from recipients of pity to equal members of society. As of April 2018, 177 countries have ratified the Convention, with the notable exception of the USA.

2013

The GOV.UK website won the Design Museum's Design of the Year award for its "well thought out yet understated design". It aimed to set new accessibility benchmarks with a simple layout that could be used by everyone. The Daily Mail missed the point entirely: it made fun of the site's basic approach with the headline: "And the award goes to boring.com." P

It ain't easy seeing green

Sightsavers' digital designer **Matt Roberts** explains how his colour blindness helps him to look at things differently

"It wasn't until secondary school that I found out I was colour blind. I never noticed anything out of the ordinary: the corridors of my primary school were probably pasted with coloured sugar paper cutouts spelling 'Yellow' or 'Red', but it didn't ring any alarm bells. On sports day, I never had any problem working out which team I was in – I always managed to wear the right colour T-shirt for the annual egg and spoon race.

When I was 12, during a routine eye check, the optometrist passed me the Ishihara colour vision test. (It's named after Japanese eye specialist Shinobu Ishihara, who invented it in the 1900s.) You've probably seen something similar: a circle of coloured dots, with a number picked out in a different colour.

> Being told that my favourite brown trousers are actually green was rather awkward

"Read me the number," the optometrist asked. "What number?" I replied. I couldn't distinguish colours: it was as clear – or unclear – as that.

I was told I had a variation of colour blindness where I can't easily tell the difference between reds and greens. That doesn't mean I can't tell what colour grass is; instead, I find it almost impossible to spot berries in a holly bush. Day to day I don't notice it, and it doesn't stop me doing everyday tasks, although being told that my favourite brown trousers are actually green was rather awkward.

From an early age I loved drawing and colour-by-numbers. I never seemed to have any issues with it, but I suppose when you're growing up, parents and teachers

I wouldn't say my colour blindness has held me back

don't necessarily assume every child who draws a purple dog is colour blind.

Throughout school and university I was interested in all aspects of art and design, from Jackson Pollock and Joan Miró to Zaha Hadid, David Carson and Stefan Sagmeister. The artists and designers I admire mainly break conventions in shape and form, and don't rely solely on colour to capture an audience – they focus on expression and concepts, rather than using a single element to evoke a response.

I wouldn't say my colour blindness has held me back too much in my design career. If I'd wanted to be a pilot, it would have been a different matter. But being colour blind means I instinctively design colour-blind-friendly work – I can't help it. If I can't read a block of text on a coloured background, I'll change it. And I've always been old fashioned when it comes to checking my work. I'm not too shy to ask: "Excuse me, can you check that this colour is what I think it is?"

Did you know?

Transport for London produces a monochrome version of the Tube map for people with colour blindness, which uses patterns instead of colours to differentiate between each train line.

A different spectrum

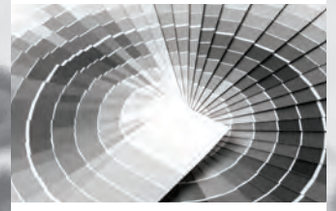
Worldwide, it's thought that colour blindness affects one in 12 men and one in 200 women. There are three main types, and the effects can range from almost normal colour perception to not being able to see a particular colour at all.

Regular vision

Deuteranomaly

Protanomaly

Tritanomaly



Achromatopsia

Deuteranomaly

A reduced sensitivity to green light. This is the most common form of colour blindness, affecting about 60 per cent of people with colour vision deficiency.

Protanomaly

A reduced sensitivity to red light. People with deuteranomaly and protanomaly generally have difficulty distinguishing between red, green, brown and orange, and often confuse blue and purple hues.

Tritanomaly

A reduced sensitivity to blue light, and much rarer than the other two types. This makes it difficult to tell the difference between blue and yellow, violet and red and blue and green, so the world generally appears as red, pink, black, white, grey and turquoise.

Achromatopsia

An inability to see any colours. Also known as monochromatic vision, it's extremely rare, affecting about one person in 33,000. Those with the condition can only see shades of black, white and grey.

Christmas is the only time when I find it challenging, design-wise – everyone traditionally wants reds and greens on everything. At that point, I have to look at the concept I've chosen. Is it strong enough that if I strip the colour out to simulate colour blindness, it still works? Thankfully, over the years, trends have steered towards more sophisticated colour combinations.

My main frustration is when I come across designs that use ill-conceived colour palettes, because it makes it nearly impossible for me to see them. Graphs are an absolute pain! There are so many occasions where the shades of blue, purple and green look so

I view colour blindness as a positive

similar to me that the key may as well not exist. At the very least, the designers could consider a better contrast of tints. At best, different patterns would make understanding trends, forecasts and profits a whole lot easier.

I do get it: certain colours are 'trendy', 'punchy' and 'fresh' (replace with your favourite buzzword). But if your product is for mass consumption, why design it in such a way that people can't read it?

There are loads of tools and plugins that are available to simulate colour blindness and other visual impairments. Many of them let you overlay a window on top of any project you're working on, to visualise colours as they are perceived with various types of colour blindness. It only takes a second, but can make the difference between people understanding and appreciating your work, and ignoring it altogether because they're unable to see it.

Recently, I invested in some Enchroma glasses that aim to correct colour blindness: they use coloured lenses to filter certain types of light, adjusting your perception of colour. I was hoping they'd help me see the world through 'normal' eyes. But would they change my approach to design and colour?

When I first put them on, it was surreal – brilliant, but surreal. I was smiling from ear to ear. Everything looked more vibrant – ColourHD! Wow! I noticed colours were brighter and easier to distinguish. Is this what most people see, I wondered?

I love wearing them and being able to see colours 'properly' for the first time. But if I'm honest, why should I be normalised? I wear them to see what most people see, but I like to view colour blindness as a positive: a more natural way to appreciate design for people who can't differentiate colours as well as others. My real-life experience of colour blindness gives me greater insight and empathy – and I wouldn't change it for the world." P

For tips on producing work that is colour-blind-friendly, **see page 49**

Practical problems

People with red/green colour blindness may not be able to tell the difference between green and red tomatoes, ripe and unripe bananas, or ketchup and chocolate sauce.

Electrical goods that have red/green/orange LED displays can be frustrating, as all the colours often look the same.

Changes in skin colour caused by blushing, sunburn, rashes or pallor can be difficult to spot.

Opposing sports teams' colours may be hard to tell apart. Cricket and hockey balls can disappear against a green background, and snooker balls may all look the same.

Gardening is often challenging: flowers are hard to distinguish from their leaves, and it can be tricky to tell whether a plant is dead or alive. Picking strawberries can be a long, slow process.

Source: **colourblindawareness.org**

Through my eyes

The world can look very different for people with visual impairments. Meet five people that Sightsavers has worked with, and see what life looks like for them

Cataracts are caused by a build-up of protein that clouds the eye's lens, which can lead to blurred vision and eventual blindness. Surgery can restore sight by removing the clouded lens and replacing it with an artificial lens.

Kausar

Pakistan

"I lost my sight about four or five years ago. It went gradually until I could see almost nothing – there was just haze and fog. I hadn't seen my children's faces in about a year.

"We didn't get help before because of poverty. The word 'operation' frightened me, but because I wanted to see, I had to do it. When my bandage was removed, I saw my daughter – now I can see everything.

"I used to think about how my family would manage. Now I can help. I am happy I can see… life will be good."

Glaucoma is caused when the eye's drainage becomes blocked, leading to pressure that can damage the optic nerve and cause blindness. There's no treatment to restore the sight loss caused by glaucoma, but eye drops or surgery can prevent it from happening.

Shyam

India

"I was not born blind, but became blind later. For the last 15 years my vision has got worse – I can see black, white and yellow, and I can make out colours from a distance. At night I can see the moon, but not the stars.

"The doctor said I have glaucoma. Even if it can be treated, I can't afford it. I have no money.

"I cook and clean for myself, so why can't I work? I would like to have kids, but the community doesn't believe in marriage if you are not earning."

Refractive errors such as short-sightedness are caused when the eye is an irregular shape, making it difficult to focus clearly. It can be corrected with contact lenses, spectacles or surgery.

Riya

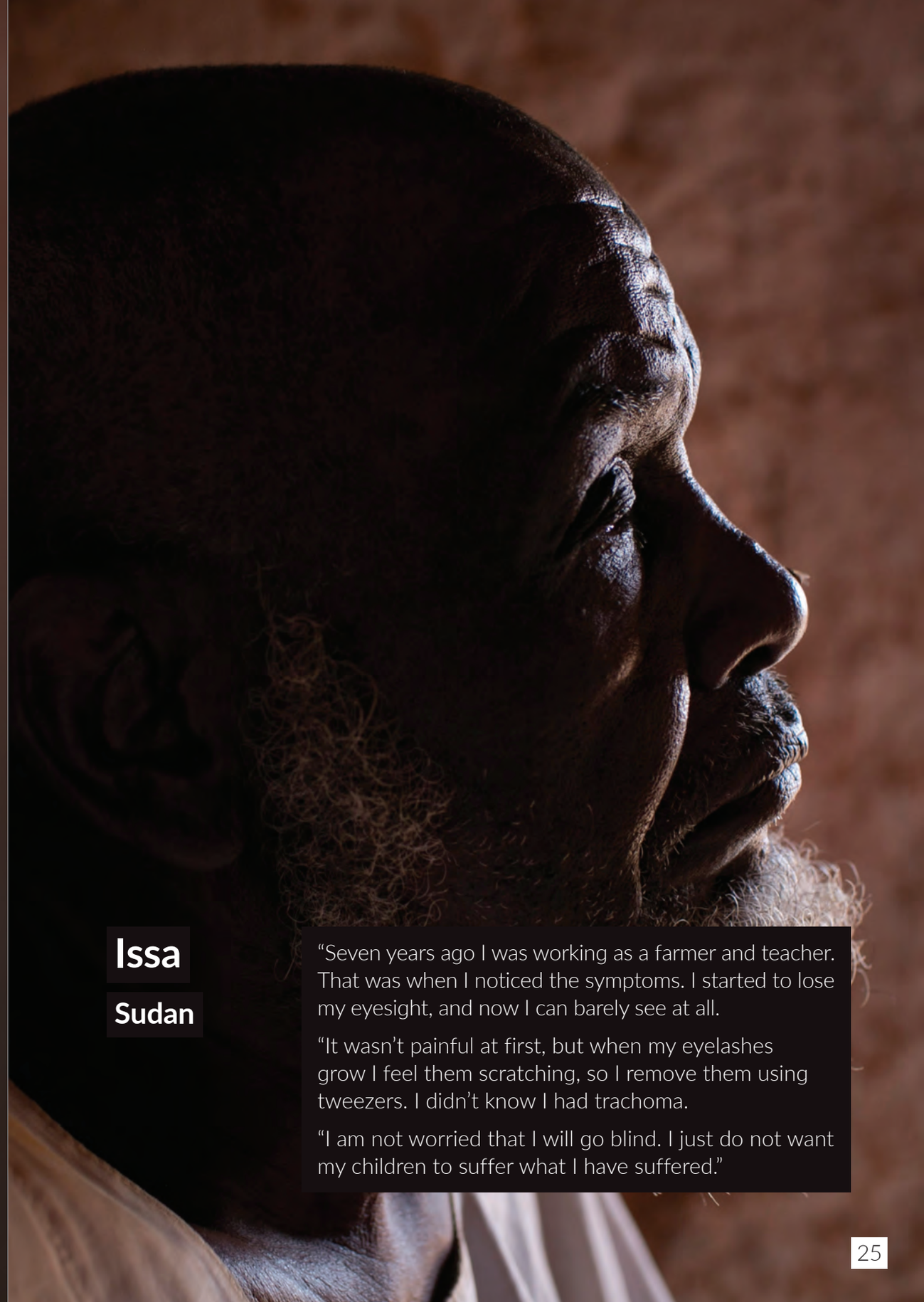
India

"My friends don't understand what is wrong with my eyes. I felt bad as they would call out to me, saying: 'Please Riya, come and play with us!' But I was scared I would fall and get hurt.

"Education is important to me. I want to be a doctor. But I couldn't see what the teacher was writing on the board. I couldn't keep up with the other children.

"Then one day my teacher tested our eyes and told me I needed glasses. Now I will be able to see the board – I will be able to continue learning and going to school."

Trachoma is an infection that causes scarring to the eyelid, making the eyelashes turn inward and scrape against the eye. This leads to pain and, eventually, blindness. The infection can be treated with antibiotics, while surgery can stop the eyelashes rubbing against the eye.



Issa

Sudan

"Seven years ago I was working as a farmer and teacher. That was when I noticed the symptoms. I started to lose my eyesight, and now I can barely see at all.

"It wasn't painful at first, but when my eyelashes grow I feel them scratching, so I remove them using tweezers. I didn't know I had trachoma.

"I am not worried that I will go blind. I just do not want my children to suffer what I have suffered."

Worldwide, 36 million people are **blind**, meaning they have very limited or no residual sight.

Did you know 75 per cent of sight loss can be cured or prevented? Sightsavers works in the world's poorest countries, helping millions of people like Shyam, Simon Peter, Issa, Riya and Kausar. We perform eye screenings, provide surgery, distribute medication to prevent blinding diseases and empower people whose vision cannot be restored.

Simon Peter

Uganda

"On the day I was abducted, I went to school as usual. That evening, the rebels took me. My parents say I was 11 years old. I spent nine years in the bush, fighting for the rebels.

"During one battle, a bullet lodged behind my eye and I was totally blind. Although I eventually escaped and returned home, I never saw my parents' faces again.

"But I was determined. Before I was abducted, I had been interested in my education. So I learned to knit, and now I teach knitting. Teaching helps me to forget what happened, and for the first time I am free."

Braille in the spotlight

Nearly 200 years after it was invented, Louis Braille's tactile writing system is holding its own alongside new technology, and is inspiring designers and artists to get creative

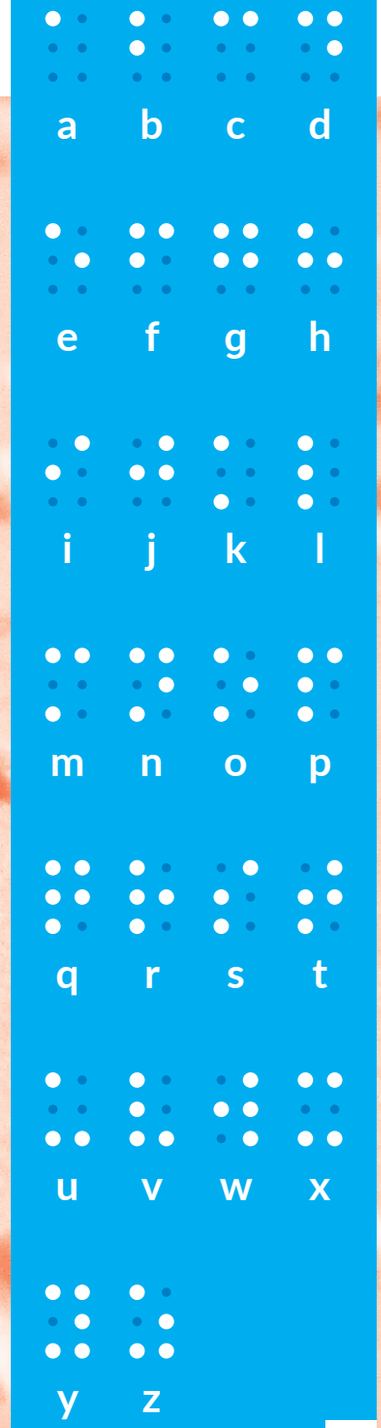
> "Blind people must be treated as equals, and communication is the way this can be brought about"
>
> Louis Braille

When 11-year-old Louis Braille first came up with the idea of a simple tactile alphabet, few could have foreseen the impact it would have. His ingenious system revolutionised communication for people with visual impairments, enabling them to read independently for the first time. The characters, made up of different combinations of six dots set in a 2x3 grid, can be used to represent everything from basic letters and numbers to advanced mathematics and music.

Today, more than 30,000 people in the UK use braille to help them communicate. And even in the modern digital age, this 200-year-old invention is holding its own alongside smartphones and modern technology.

"Braille fulfils many uses that other technology cannot – it's about finding the right solution for each individual and set of circumstances," says James Bowden, a braille expert at the Royal National Institute of Blind People (RNIB), who is also a braille user. "Screenreaders, which convert text into synthesised speech, can allow someone to digest a long document at speed, but this doesn't always provide precision. Reading the same document in braille would enable you to spot spelling inconsistencies, and go back over any complex passages or sections to memorise or critique them."

Braille alphabet



Many braille users extol the benefits of tactile communication, saying it's far quicker for everyday uses such as labelling CDs and DVDs, identifying food packaging or organising paperwork. Using braille for such tasks is becoming more widespread: in October 2005, an EU directive decreed that all pharmaceutical products must be labelled to make them accessible for people with visual impairments.

Cleaning products such as bleach have, for years, featured warnings in braille, yet many organisations have now taken this further: some supermarkets have started including braille on their own-brand packaging, and many restaurant chains offer braille menus. There are also hundreds of books and magazines produced in braille, including novels, puzzle books, music magazines, chess guides and general interest titles.

It's a far cry from the world Louis Braille experienced in the early 19th century, where there was little support available for people with disabilities, and no reliable way for blind people to read and write independently. Louis had been blind since the age of three, after accidentally stabbing himself in the eye with one of his father's tools. As he grew up he was offered a place at one of the first schools in the world for blind children, the Royal Institute for the Blind in Paris.

When Louis was 11, his teachers invited a French army captain, Charles Barbier, to give a talk

Tactile bricks to teach braille

At first glance, Braille Bricks look like Lego. But there's a subtle difference: the studs on each brick spell out letters in braille. The aim is to help blind children learn to read and write by piecing together the characters to form words. The bricks can also be used by children without visual impairments, so both groups can play and learn together.

Arthur Sacek, a design specialist who helped to create the bricks, says: "Some schools have braille typewriters that punch paper as you type. But once the paper is marked, you can't go back and change it. With the bricks, if you make a mistake, you take the piece out and put another in."

The bricks were developed by the Dorina Nowill Foundation for the Blind in Brazil, which has released a limited run of the toys.

at his school. Barbier had invented 'night writing', a military code created for Napoleon, who wanted his soldiers to be able to communicate silently in the dark. Barbier's system, which used up to 12 dots to represent individual sounds, was deemed to be too difficult for soldiers to learn. But scientists thought it might be useful for people with visual impairments.

The system piqued young Louis's interest, although he spotted some flaws: Barbier's characters were based on sounds, not letters, which made it difficult to write, and each 12-dot symbol was too large for people to read without moving their hand.

Louis's idea was to simplify the code, using up to six dots in specific patterns to represent each letter of the alphabet. He worked tirelessly on his system, and at the age of 15 he presented the fruits

"Designers often forget that braille is not a visual medium"

of his labour for the first time. He continued to revise it over several years, and the expanded English version, published in 1905, is almost unchanged today.

As braille use becomes more widespread, and awareness about accessibility grows, organisations around the world are keen to get on board. Many designers and artists are taking the opportunity to get creative with tactile communication. But it's not quite as simple as just translating a few words, or slapping a braille sign on a wall.

"Incorporating braille into your work should not just be a tick-box exercise," says Bowden. "The most important first step is to consider your audience.

"If you do decide that braille would help, the next step is to obtain guidance to make sure the braille is accurate and positioned or published in the most user-friendly way. I've seen examples where braille has been inaccurately produced or stuck onto surfaces upside down, meaning it's not particularly useful. I've also been told about instances in hotels where the braille numbers on the doors of the rooms are different to the print numbers.

"Designers often forget, sadly, that braille is not a visual medium. Those who use it need to use their fingers to read the raised dots, meaning that it is no use to have a braille sign where it cannot be reached. Having said that, there are some incredibly helpful uses of braille in public buildings, such as on the buttons in lifts, allowing blind and partially sighted people to find their way around with confidence."

Bowden says the main barrier for braille use is lack of knowledge and understanding among the public, as well as professionals working in education, health and social care. But it doesn't need to be this way.

"Learning the braille alphabet is relatively simple," he explains. "Anyone can do it, although it can take a while to train your fingers to sense the dots by touch. But just like reading standard print, the more you practice, the better you get. The commitment can put people off, as can the mistaken belief that it's too complicated or that braille is outdated. But with time, it can be extremely worthwhile, improving access to information and independence." P

The RNIB provides information and support about living with sight loss. Visit **www.rnib.org.uk** or call **0303 123 9999**.

A screenreader-friendly version of this article can be found at **www.sightsavers.org/perspectives**. If you'd like a copy in braille, email **accessibility@sightsavers.org**.

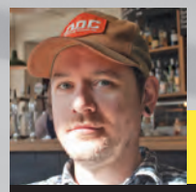
Graffiti you can touch

‘The Blind’ is a 34-year-old graffiti artist from Nantes in France who, despite his name, has full vision. He uses oversized braille characters to create urban art that can be appreciated by people with visual impairments.

The artist came up with the idea of tactile graffiti in 2004. “I realised blind people didn’t have access to urban art, even though it’s meant to be seen by as many people as possible,” he explains. Using a stencil, a glue gun and tiny half-spheres of plaster, which he prepares in advance, he decorates walls in his home town of Nantes, as well as further afield in Europe and the US.

“I realised blind people didn’t have access to urban art”

Most of his work has a double meaning. He wrote ‘Do not touch’ on a church wall in Nantes, ‘Love is blind’ in Venice, and ‘Your money or your sight’ in front of the Brussels stock exchange: the latter was so well received that the Braille League in Brussels recently hired him to decorate its offices.



Expert view

“Accessible design is good design”

Digital accessibility specialist **Joshua Marshall** helped to transform the GOV.UK website to make it as inclusive as possible. The site has won numerous accolades, including a D&AD Black Pencil.

Why is accessibility important?

I could say it’s a human rights issue, or that it’s illegal not to. I could say it’s fairer, or that it’s a basic quality issue – it definitely is all of those things. But for me, making things accessible is a smarter way to get your message to as many people as possible. We all want to be heard and understood.

Disability isn’t always a fixed or permanent thing. Each of us will have some sort of impairment at one point or another. Plenty of impairments are situational too, so you may not even consider yourself disabled or impaired but still be unable to do something.

It’s not helpful if you’re outside with your phone on a sunny day and the contrast is so bad you can’t read the screen. Or if you need both hands to pinch the screen to make the text readable, but you’re holding a wriggling baby. Or if your arthritis makes the pinch gesture impossible. I prefer to remove barriers from people accessing my content, not add them.

What are the first things you look for in terms of accessibility?

The first thing is the content. I want it to be understandable and clear: does it use headings, subheadings, paragraphs and lists, and does it use them correctly? Are you using big words to show off your vocabulary, or shorter words that a wider audience are able to understand? Is it full of jargon or acronyms? Are you communicating the meaning of images if people are unable to see them?

I want consistency too. Don’t use one format for lists on one page and a totally different design on another. If something looks like a button, it should act like one. Links should look similar so I know what’s safe to click on.

The colour contrast should be good enough that I can spot the difference between colours, even if I’m colour blind. Ideally, the text size won’t make me squint, and the line height and white space will make it easy to read. My process is: can I read it? Can I understand it? Can I operate it? And can I go from the start to the end without asking for help?

“No one ever complained about using something that was too well designed”

What are some of the common pitfalls?

The most common problem is not bothering to try to make it accessible in the first place, closely followed by not considering your audience when trying to work out what to focus on.

Don’t overthink things! Consider your language and your content, then think about what you’re trying to communicate and take it from there. One size won’t fit all, but you’ll be able to accommodate far more people than just users with disabilities by focusing on inclusion.

And don’t forget user testing. Not everyone has the budget for extensive testing, or the network to find users of different abilities, but there are plenty of organisations who can help.

What do you say to designers who worry about accessibility compromising the aesthetic of their work?

By creating accessible designs, you’re making sure your work will be used by more people, not fewer. No one ever complained about using something that was too well designed, and they won’t complain if you’ve put in the time to make your design more inclusive. Accessible design is good design.

The best designs are basically invisible because you can’t remove anything else from them, and the design communicates meaning so well you don’t even notice it’s there. Ray Eames has a wonderful quote that sums up how I feel: “What works good is better than what looks good, because what works good lasts.”

For more tips on making your work accessible, see page 49.

The gadgets I can't live without

Disability advocates share the essential technology that makes their lives easier

A wristband helped me to write again

Graphic designer **Emma Lawton** has Parkinson's, causing tremors that make it difficult for her to write and draw

"I was diagnosed at the age of 29. I'd just been promoted to creative director, but found it impossible to sketch or write – I worried I'd lose my job to someone more effective.

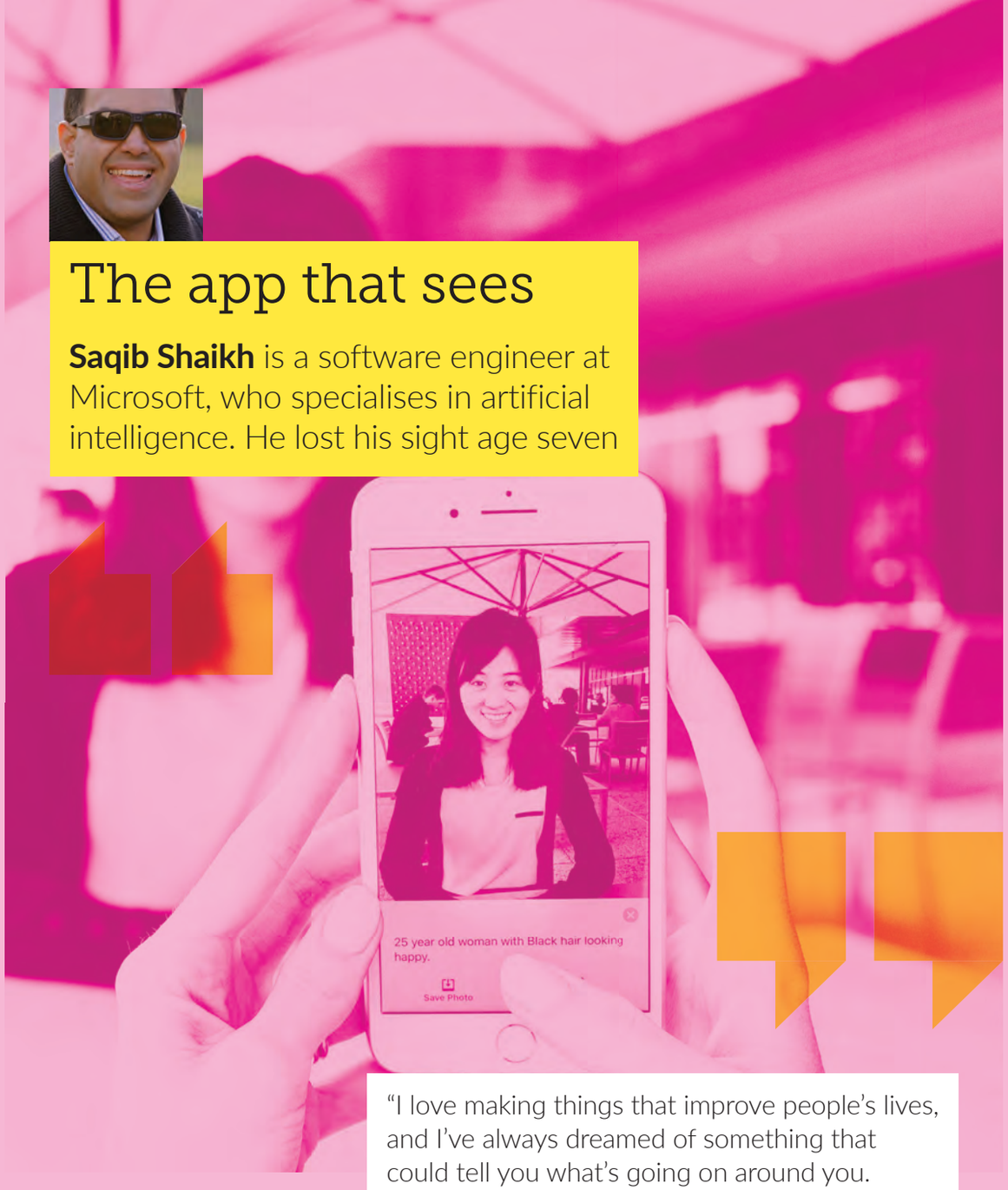
"In 2016 I applied to be on a TV documentary that was looking for people with challenges they could help to solve using technology.

I met Haiyan Zhang from Microsoft Research: she created the 'Emma' wristband that vibrates, distracting my brain so my muscles can focus on putting pen to paper.

"When I first strapped it on and wrote my name, I felt really emotional: that someone had made this for me, that my name belonged to me again, and that the future was hopeful. It has reassured me that my skills as a designer are worth saving."

The app that sees

Saqib Shaikh is a software engineer at Microsoft, who specialises in artificial intelligence. He lost his sight age seven



"I love making things that improve people's lives, and I've always dreamed of something that could tell you what's going on around you. I teamed up with like-minded engineers to make the Seeing AI app, which narrates the world for you: it can read text and describe the general age and gender of people and their emotions.

"Years ago this was science fiction. But artificial intelligence is improving at an ever-faster rate, and I'm excited to see where we can take this."

Hearing aids controlled by smartphone

Molly Watt is an inclusive technology advocate who has Usher syndrome: she was born deaf and was severely sight-impaired by the age of 14

"I couldn't live without my digital hearing aids. I control them from my iPhone via an app: if I'm in a place that's really busy, I can make a few adjustments, reduce background noise and focus on the person in front of me.

"Before I turned 20 I hadn't been able to make a phone call. Now I can stream the sound to my hearing aids via Bluetooth. I can stream music to them and actually hear the lyrics. And if my hearing aids are playing up, I don't need to visit my audiologist – instead, I send a report via an app, and the audiologist sends a software update to fix the problem.

"All my Apple gadgets have accessibility features that I rely on daily: magnifier, speech, large text. Without them I wouldn't feel safe, independent or confident."

A spoon with a lid

Grant Douglas has cerebral palsy. He was awarded an MBE in 2018 for his work helping people with shaky hands

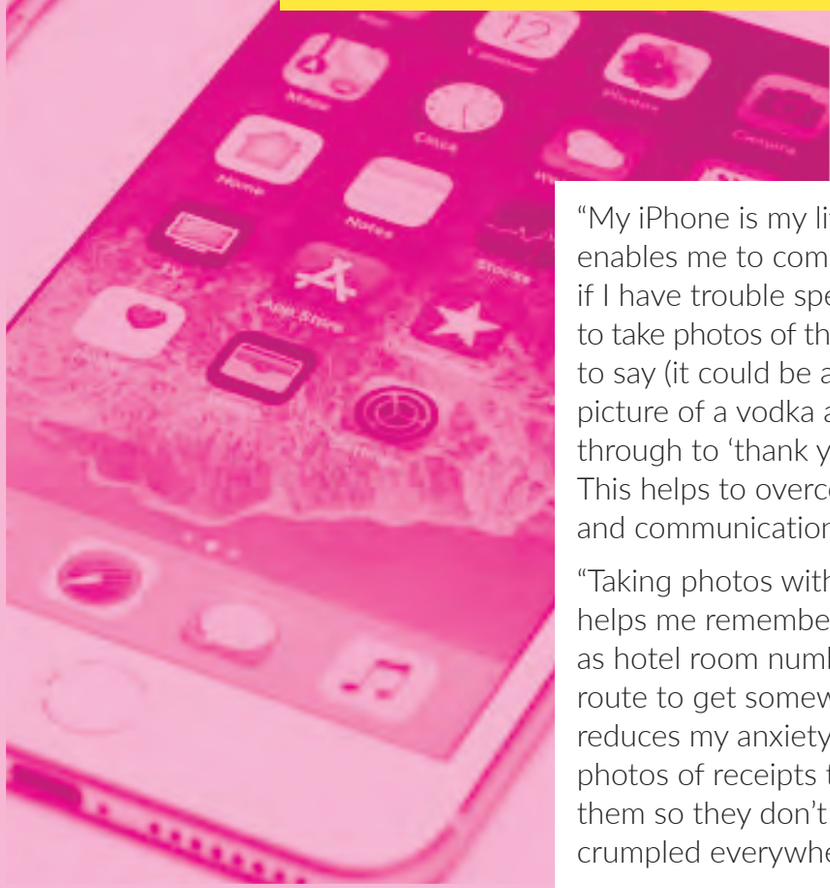
“I don’t let having cerebral palsy get in my way, but I have poor hand control and I struggle to eat cereal or soup. I tried a few things, but nothing worked. Then I had the eureka moment: I needed a spoon with a lid.

“The S’up spoon has a deep cavity that helps to keep the food inside until it’s tipped into your mouth, and it’s discreet enough to use in a restaurant. It can help people with Parkinson’s, cerebral palsy and tremors, as well as people who have injured their dominant arm and have to eat with their other hand.

“It has transformed how I eat and taken away the frustration. Now I can eat what I want, when I want, without relying on others to help.”

My iPhone helps me manage my life

Robyn Steward has Asperger’s and works as a consultant to promote better understanding of autism. She is also a keen musician



“My iPhone is my lifeline – it enables me to communicate even if I have trouble speaking. I use it to take photos of things I may want to say (it could be anything from a picture of a vodka and Diet Coke through to ‘thank you’ in Russian). This helps to overcome language and communication barriers.

“Taking photos with my phone helps me remember things, such as hotel room numbers or the route to get somewhere, which reduces my anxiety. I also take photos of receipts to organise them so they don’t just end up crumpled everywhere.

“The world is illogical, and that’s a big problem for people on the spectrum – understanding that the world doesn’t make sense.”

The benefits of thinking differently

Companies are discovering that employing staff with conditions such as autism and dyslexia can boost creativity and encourage innovation

Building an inclusive society is what the world should aim for. And when it comes to business, particularly the creative industries, diversity brings with it a proven competitive edge.

Research shows companies that employ an 'inherently diverse' workforce – involving the traits we're born with, such as gender, race and sexual orientation – are more likely to be successful. The New York-based Center for Talent Innovation found such companies were nearly twice as likely to have expanded their annual market share, and three times more likely to have captured a new market than less diverse organisations. It's believed a diverse workforce is more likely to innovate and allow new ideas to be heard.

One under-explored but increasingly valued way of diversifying is to seek out employees with conditions such as autism and dyslexia. This approach focuses on the concept of neurodiversity: the idea that these neurological differences are the result of natural variations in our DNA, and are to be recognised, respected and celebrated.

Many senior industry figures are now promoting the benefits of employing people with conditions such as autism, dyslexia, ADHD and dyspraxia. But, as with mainstream education, the employment market has grown up around the majority 'neurotypical' mindset. Even if companies want to employ people who see things through a slightly different lens, recruitment processes and working environments aren't always accepting of difference.

> **"Dyslexia is a privilege because it helps you to see differently from other people"**
>
> David Bailey

A common misconception surrounding neurodiversity is that autistic people have savant skills or are maths or computer geniuses – a mistaken belief sometimes referred to as 'Rain Man syndrome'. Sarah Wild, head teacher at Limpsfield Grange, a specialist school for girls with autism, believes this can be a barrier for her students. "Often it is true that autistic boys are gifted at maths or science. Although that doesn't mean some girls aren't too, as a rule, our students are incredibly creative, often with well-developed skills in storytelling, writing and illustration."

Chef Jamie Oliver is an advocate for embracing different approaches. "I've always been passionate about the fact that there are different types of intelligence, and

everyone has the ability to be brilliant," he told Made by Dyslexia, a campaign group also supported by dyslexic entrepreneur Richard Branson. "You could be good at something very simple, and turn it into a life's work."

Photographer David Bailey is another creative pioneer who credits his achievements to his different way of seeing the world. Asked by the Guardian what he sees as the key to his success, Bailey, without hesitation, cites his dyslexia. "I think dyslexia is a kind of privilege because it helps you to see differently from other people," he explains.

Some global companies, especially those centred on innovation, have taken notice of these creative strengths, adapting their HR, management processes and team structures to be more accommodating of neurodivergent workers. Microsoft, British intelligence service GCHQ and German software house SAP all have well-documented programmes that make it easier to recruit employees that a GCHQ representative describes as having a "spiky skillset" – meaning they may be incredibly gifted in certain areas, but fall behind in others. And this approach is beginning to filter through to companies outside of these industries.

The BBC's Cape project ('Creating a Positive Environment'), led by user experience designers Leena Haque and Sean Gilroy, has spearheaded this in the UK. It was set up to improve the support given to neurodivergent employees through initiatives such as staff workshops and producing films highlighting issues that people may face at work.

Haque is on the autism spectrum and although she holds multiple degrees, she says getting into work was challenging, and says once she had a job it was hard to find the right level of support. "Line managers and

What is neurodiversity?

Neurodiversity is the idea that the neurological differences found in conditions such as autism and dyslexia are the result of natural variations in the brain. The term was championed by the autistic community, who were tired of being compared to the 'neurotypical' majority. It is used to refer to autism, ADHD, dyslexia and dyspraxia, which occur regardless of intellectual ability, and all share traits related to organising and processing information.

Autism often allows individuals to focus on detail, and many people with autism may have exceptional knowledge around areas of personal interest. People with 'classic' or 'non-verbal' autism may be unable to communicate using commonly understood language, while people with Asperger's or so-called 'high-functioning' autism may be highly intelligent but can have difficulty understanding social cues. Actress Daryl Hannah and motorbike racer Guy Martin have been open about their autism.

ADHD (attention deficit hyperactivity disorder) may affect a person's ability to pay attention, control impulses or keep still. People with ADHD are able to concentrate intensely on subjects they're interested in, referred to as 'hyperfocus'. Olympic gymnast Simone Biles and impressionist Rory Bremner both have ADHD.

Dyslexia affects language and literacy skills, regardless of education. People with dyslexia may have above-average visual and spatial processing skills, and are often sensitive to light. Well-known people with dyslexia include director Steven Spielberg and designer Cath Kidston.

Dyspraxia affects coordination and the way a person controls their muscles, and may affect their speech and the order in which they carry out tasks. Daniel Radcliffe and musician Florence Welch both have dyspraxia.

colleagues may have heard of autism, but the level of understanding was often missing," she explains. She found life at the BBC much better, with more empathic colleagues and useful mentoring, but could see there was room for improvement.
"I suggested the BBC could help people understand more about the issues facing neurodivergent people in employment," Haque says. "And with the organisation's support, Cape was born."

This support for Cape goes all the way to the top, with approval from BBC director-general Tony Hall, and its positive approach to attracting different types of thinkers is catching on. Wayne Deakin, the former executive creative director of digital agency AKQA, recently revealed he is autistic via an article in Campaign magazine. He urged readers to "get chief executives… to start embracing different minds now that there are proven returns".

But how does it work in practice? In Barcelona, creative agency La Casa de Carlota actively seeks out employees with autism and Down syndrome, not through a sense of social justice (importantly, all staff are paid industry salaries), but because it believes doing so provides an advantage over its neurotypical competitors.

"Lots of people think we're being kind by employing people who have Down syndrome and autism," says creative director Joan Teixido. "But I don't feel like I'm being kind. I feel like a wily b*****d! These guys have a unique form of originality that, until now, the creative industry hasn't harnessed."

Surely professions founded on the principles of innovation and communication should be tapping into this rich source of creativity. So what's holding things back?
"A lot of people are scared of making mistakes, but good creativity always needs risks," says Teixido. "That's how I see the future of this industry: original design, original people." P

Visual

This sentence is not very clear to read because of the size and choice of font

This sentence is clear

Use large, clear fonts

Sans-serif fonts are often preferred for their legibility. Choose a font that has clear differences between each character (such as a capital i, a lower-case L and a number 1) to ensure they're not confused. Avoid fonts with over-stylised characters and glyphs (keep an eye on ampersands and lower-case Gs).

A minimum point size of 12pt is recommended for print. Turning off ligatures also makes the font easier to read.

abc
xyz

Avoid using too many typefaces

Designs that use only one or two typefaces are usually easier on the eye – too many can create a confusing visual layout. This is bad for everyone, particularly people with reading difficulties such as dyslexia.

Check your text colour

Make sure your typography is visible to readers with low vision. Black on white is usually the first choice for maximum legibility. A cream or yellow background is often preferred by people with dyslexia, while people with very low vision may prefer to read yellow on black.

This sentence is clear

This sentence is clear

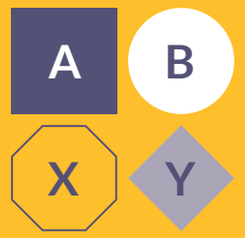
This sentence is clear

This sentence is not clear

These graphics are too similar

Use clearly contrasting colours

Avoid orange with red, for example: people with colour blindness may not be able to tell the difference between them. You can check the colour contrast of your work using a plugin such as Colour Contrast Analyser, which simulates different types of colour blindness, or view your work in greyscale. This is particularly important in graphs and tables.



These graphics are much clearer

Don't rely on colour alone to convey a message

People with certain types of colour blindness may not be able to see a red error message, for example. If in doubt, use contrasting patterns and clear labels to differentiate your content.

and another thing...

Check your work

Use these tools to see how your designs look to people with colour blindness, visual impairments and more.

Sim Daltonism
A simulator for Mac and iPhone that uses a coloured filter to recreate different types of colour blindness.
www.michelf.ca/projects/sim-daltonism

Funkify
This Chrome extension helps you view web pages through the eyes of users with visual impairments, dyslexia, trembling hands and more.
www.funkify.org

Colour Contrast Analyser
Recommended by the World Wide Web Consortium to simulate colour blindness and cataracts.
www.developer.paciellogroup.com/resources/contrastanalyser

Text

Particularly burdensome

Difficult

Use clear, simple language

Unclear, flowery or confusing writing is a barrier to all readers, but can be particularly challenging for people with reading or processing difficulties. Keep paragraphs and sentences short, use familiar words and avoid jargon. Organise your writing into a logical order, then stick to the point. The aim isn't to dumb down: it's about saving people's time and making sure they don't have to re-read your writing to decipher what you mean.

Align text to the left

This makes it easier for people to see where each line begins. Avoid justifying text, as this creates uneven gaps between words, and try to keep lines to a maximum of 60 to 70 characters.

Justified text leads to uneven spacing, which can be hard to read.

Centred text can make it difficult to see where each line begins.

Text that's aligned to the left is easier for people to follow.

NOT LIKE THIS PLEASE

Try it like this instead

Use sentence case

Capitalising just the first letter of a sentence is much easier to read. Capitalisation can be problematic for people with dyslexia and visual impairments, particularly if whole words or sections are all in capitals. It can also prove tricky for screenreaders, which may interpret consecutive upper-case letters as acronyms (reading CONTACT US as 'Contact U.S.', for example).

Avoid multiple line breaks

Any extra spacing or paragraph breaks will be read out by screenreader as 'space' or 'return', which can be annoying for listeners.

Take care with symbols

Certain symbols won't be recognised by every screenreader, so use 'per cent' instead of %, 'and' instead of '&', and 'number' instead of '#'.

www.website.com

www.website.com

Avoid underlining and italics

These can be hard to read for people with visual impairments and dyslexia, as they can make words appear to run into each other.

and another thing...

Dyslexia-friendly fonts

Dyslexic readers often experience reversed characters, jumbled letters or distorted text jumping over the page, but specialist fonts can help to counteract this.

A study by graphics expert Dr Rob Hillier found people with dyslexia generally prefer fonts with light weights, long ascenders and descenders, perpendicular letters and uniform strokes. He then developed the **Sylexiad** typeface: each character is as distinct as possible to help readers distinguish between them.

Several fonts have followed this lead. **Dyslexie** has heavier lines at the base of each character to 'anchor' them to the line. **OpenDyslexic** is a free font that follows a similar style, while **Lexie Readable** aims to capture the clarity of Comic Sans without the negative design associations.

Digital

Many of the guidelines in the previous pages also apply to digital content. However, web accessibility has its own international technical standards, known as the Web Content Accessibility Guidelines (WCAG). Some of the most important points are explained here.

For more details, see **www.w3.org/WAI/intro/wcag**

Header 1

Header 2

Make sure you have a hierarchy

Structure your content in a logical, meaningful way

This enables people to adapt the content according to their needs and still understand it. Always use the appropriate HTML header tags for headings and subheads, and use the correct HTML for all structural elements – these will be picked up by screenreaders, for example. All pages should have clear, unique titles.

This graph shows...

Provide text alternatives for non-text content

All images, graphs and tables should feature alt text – a simple text description of what the content depicts. This is read aloud by screenreading software, helping people with visual impairments to understand the content. You should also ensure the content can be changed into other forms people may need, such as large print, braille, symbols or simpler language.

Add captions and other alternatives for multimedia

Captions, text transcripts, audio description, sign language and audio-only formats all provide an alternative way to convey the information.

Use more than one sense to convey information

Don't rely solely on shape, sound, position or size. For example, 'Click the button on the right' is no use to someone who cannot see. Instead, use clear copywriting to clarify all instructions. This will benefit everyone, not just people with disabilities.

Don't rely solely on colour

Instructions such as 'Click the green button' may be meaningless to people with colour blindness, so back this up with some clarifying information. Also, watch out for graphics such as pie charts. Never rely on colour to differentiate the segments. Instead, add clear labels or patterns.

Make it easy to hear content

Don't use audio content that plays automatically: it may prevent screenreader users being able to navigate your site, as they do so by relying on sound.

Use a keyboard

All parts of your site should work using keyboard commands, including forms, menus and the shopping cart. Try unplugging your mouse to see if you can still navigate the site, for example by using the tab or arrow keys. Make sure this sequence is logical and meaningful.

Make links easy to understand

All links should be clearly labelled with descriptive anchor text. People who use a screenreader can choose to hear all links on a page read out in a list, which isn't much use if all links are labelled 'Read more' or 'Click here'. Instead, try 'Read more about our organisation' or 'Visit our blog'. Links that point to the same destination should have the same description.

Click here

Visit our blog

Read more

Read about...

Take care with moving content

Anything that moves, blinks or scrolls should have an option to pause, stop or hide it – ideally, you should remove these items completely. You should never add anything that flashes more than three times a second, as this could cause seizures.

User personas

Life can create all sorts of barriers for people with disabilities and learning difficulties. Don't be one of them.

To ensure your work is accessible for the widest possible audience, use what you've learned from this guide and think about these personas. Will these people be able to appreciate your work?

Natasha, London

Age 22 · Dyslexia

Malcolm, Lagos

Age 37 · Visually impaired

Iqbal, Mumbai

Age 26 · Deaf

Annie, Stockholm

Age 30 · Cerebral palsy

www.sightsavers.org