



# Colour-blind children

Red, yellow, pink and... what? Karen Sullivan examines how being colour-blind can impact on a child's education, and why screening before entering nursery can make a big difference to their wellbeing.

ONE OF the very first things we teach young children are the colours of the world around them. They learn that grass is green, the sky is blue and those shiny apples in the fruit bowl are red. But what if the colours we describe – the colours we see – are not the same for the children we are teaching? What if the world around them is a muddle of colours that bears no resemblance to their reality?

Colour-blindness may, for many of us, have been considered something of a joke, with brothers, fathers or husbands who seem incapable of matching articles of clothing appropriately – or who have a tendency to choose completely the wrong colour of carpets, paint or jumpers, despite clear instructions.

In fact, chances are, most of us have known someone colour-blind, because this condition affects one in 12 males, and one in 200 females, to varying degrees. But colour-blindness is no laughing matter, particularly for children whose education is largely based upon the use of colour to teach, highlight, warn and explain.

## What is colour-blindness?

In most cases, colour-blindness is a genetic condition, usually inherited from our mothers (who probably are not colour-blind themselves). Less frequently, it can be acquired as a result of long-standing health problems, such as diabetes, Multiple Sclerosis, and liver and eye diseases.

Although it is not entirely clear what goes wrong, it is believed that faulty 'cones' in the retina (which are responsible for colour discrimination) are at the root of the problem. There is no cure and in some cases people can go through their whole lives without knowing that they view the world completely differently to their peers. Our ability to see colour is characterised as follows:

- **Trichromacy:** This is effectively 'normal' colour vision. Trichomats use all three types of light cones in their retinas correctly, and perceive all colours as they should be seen.
- **Anomalous trichomacy:** This occurs when one of the cones in the retina is slightly out of alignment, so there are three possible effects, depending upon which cone is faulty. For example:
  - Protanomaly** is a reduced sensitivity to red.
  - Deuteranomaly** (the most common type of colour-blindness) is characterised by a reduced sensitivity to green.

**Tritanomaly** is a reduced sensitivity to blue. There are also different degrees of each of these conditions, with some people perceiving colour almost normally, to an almost total absence of perception of the problem colour.

**Dicromacy** occurs in people who have only two retinal cones that are able to perceive colour, which results in a total absence of one colour.

**Protanopia** involves an inability to see red, while those who suffer from **Deuteranopia** can never see green. Those with **Tritanopia** will never be able to perceive blue.

- **Monochromacy:** This involves seeing no colour whatsoever, with the world appearing as different shades of black, white and grey.

Blue blindness and monochromacy are very rare, but red/green colour blindness is quite common and, generally speaking, people with red or green colour blindness have difficulty distinguishing between red, green, brown, orange, yellow and grey. All of these colours appear to be varying shades of murky green. Blue and yellow can be seen, but shades of blue and purple are confused because it contains an element of red.

## Why does it matter?

Consider how we instruct children in early years settings. We ask children to pick up the red brick. We encourage their ability to sequence in advance of reading by asking them to form colourful patterns with beads or other visual materials.

We use colour in our descriptions of virtually everything, from the big brown dog, to the pretty pink flower and the green door that marks the entrance to the loo. We ask them to fill in colouring sheets in specific colours, and sing songs about the colours of the rainbow.

If children are not 'getting' a percentage of what we are saying, they are not learning to full capacity, and this is a problem that can not only undermine their confidence at an extremely impressionable age, but provide a faulty foundation for future learning.

And it goes further. Many colour-blind children are, for example, fussy about eating green vegetables – largely because they appear as a uniform, unpalatable brown. They may struggle to pass the ball to a team mate, because the bibs they are wearing to differentiate the teams look much the same. Balls and toys may be lost in grass because they



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*The photo above represents deuteranopia, which is a total inability to perceive green*

cannot be picked out. Children may struggle to dress themselves because they are unable to match socks or pick out their own clothing from a colourful pile discarded after playtime.

Books highlighting 'familiar' key words and sounds are largely useless to colour-blind children, as are those that use colour-on-colour printing, which is almost impossible for many colour-blind children to read.

Many children feel embarrassed about not being able to choose the appropriate crayon or colour of paint, or to accurately describe things around them. They may be slower to follow instructions, because those relating to colour may make very little sense. Indeed, they may seem 'slow' or 'hesitant' in many situations, because they can and will be perplexed by the need to make choices based on something they simply cannot see.

### **'It breaks my heart'**

Kathryn Albany-Ward has set up Colour Blind Awareness, a community interest project, to raise awareness of the needs of colour-blind individuals in the community. Her efforts stem from the diagnosis of colour-blindness in her seven-year-old son, who suffers from the severe form of deuteranopia (see opposite).

Kathryn was shocked to learn that not only do the majority of teachers have no training in colour-

blindness and its impact upon children in an educational environment, but that children are not screened for the condition at school entry – it is not considered to be a special educational need despite placing children at a serious disadvantage in most elements of their education, and there is little or no provision to help children who simply cannot see or operate using colour.

'Ross was seven when I realised that he might have a problem with colour,' says Kathryn. 'And, even once I knew he was colour-blind, I was shocked to find out he had a severe condition that would prevent him from seeing so many colours.'

'I find this time of year [November, at the time of writing] quite hard because he has no idea about autumn leaves, and he can only actually see the firework displays as murky green, blue, yellow and white. He knows what colours rainbows are supposed to be, but can only see blue, yellow and murky green.'

'He can't really make out the decorations on a Christmas tree. Last year I cried when I asked him what colour Father Christmas wore, and he said, "brown". This year we have a tree with blue lights, so he is able to share the pleasures of Christmas decorations. He adores it.'

'When Ross was a toddler, I told him off for picking green strawberries, little knowing that, to him, they were the ones that stood out. I now realise that there must have been numerous occasions like this across the years, when we thought he was being silly or difficult by getting things so wrong.'

'We are lucky that he kept wanting to please us and didn't just give up. How on earth he fooled us into believing he could see his colours, I'll never know. It must have involved a huge amount of effort on his part not to look stupid at nursery.'

Kathryn explains that Ross often becomes embarrassed or angry if someone asks him to describe the colour of something. She has noticed that if he is discussing things like the makes of 'supercars' with his friends, he does not contribute when they talk about colours. But that is not to say that the Albany-Ward family does not use colour as a vehicle for description – in fact, quite the opposite. Kathryn explains that it is important to use colour descriptively, to enable Ross to work out the saturation and brightness of colours, which helps him to marry what they say with what he actually sees.

They are careful to provide more detailed descriptions, however. For example, the 'red Audi' rather than the 'red car'. They have also taken steps to help him choose and use colours correctly at school.

'Ross is fanatical about using the correct colours for his drawings and so on, a result of being embarrassed so many times when he was younger, so he has his own sets of paints and crayons, and so on, all marked with their actual colour name.'

'His school has gone out of its way to name all the coloured paints and pencils in the art and DT rooms, so now he is confident about his use of colours there.'



He has recently identified “mahogany”, purely by shade and brightness, and he is very proud of this.’

Kathryn explains that many children do not admit to struggling with colours, even if they do know that they are somehow different from their peers. They would rather attempt to join in than draw attention to themselves. This can, however, lead to frustration and even anger, when the measures designed to support learning actually undermine it.

## So what can you do?

First of all, consider screening children as they enter your nursery. A local optician may be able to arrange this, as can the visual impairment team in your local authority. Alternatively, contact Kathryn Albany-Ward at [www.colourblindawareness.org](http://www.colourblindawareness.org), for details of online testing and other forms of assessment. Knowing which children are colour-blind (and chances are that there will be at least one in every year group), can help you to make appropriate provision for their education.

Take care of lighting. Bright light can make it easier for children to recognize colour. Colour-blind children should be seated in good natural light.

Take time to group and label things like beads, bricks and colouring material according to colour. Little ones will obviously find it difficult to read labels using words, but you could find a creative alternative. For example, the red beads could be labelled with a photograph of an apple; the green ones with leaves.

Most young children learn the colours of things, even if they do not know what they are, and can confidently tell you that the sky is blue, even if they cannot see it. Therefore, giving them clues can help them to make the correct associations and learn to use and choose colours appropriately.

Avoid using colour-on-colour books and other support materials. Black on white will be most appropriate for colour-blind children. In sports and games (including board games), ensure that children can see who is on his or her ‘team’, and that they can see the ball or the ‘men’ on the board.

Checking computer settings, web pages and computer-based teaching aids to ensure that the child can pick out the relevant information. Colour-blind children may struggle with coloured ‘keys’ that provide instructions and information. Use strong contrast on white or chalkboards; red, green or pastel colours should not be used to highlight teaching points.

Encourage children to help each other choose colours when drawing, painting or colouring, and to reinforce their use by using the correct name. Many colour-blind children will eventually memorise their colours through repeated experience of their use.

Think about how you colour-code boxes of toys, art materials and books. If you are teaching reading, use symbols rather than ‘colours’ for different levels of books, or clearly explain to children which box is theirs. Talk to parents about how they can support their children at home, and direct them to the Colour Blind Awareness website for help.

Finally, take care to ensure that no child is teased or bullied for using incorrect colours, and deal with self-esteem issues immediately.

## What about the future?

Colour-blindness is an under-recognised and little understood condition, but awareness is growing. Kathryn’s work has successfully brought the issues to the attention of a number of schools, who are taking steps to screen children and adapt the curriculum and teaching materials to their needs.

The issue is being strongly supported by The Speaker of the House of Commons John Bercow MP and also been brought to the personal attention of the Education Secretary Michael Gove MP, and Sarah Teather MP, Minister of State responsible for SEN.

Sarah Teather recently confirmed: ‘While colour-blindness is not itself regarded as a special educational need, I would expect schools to make every effort to ensure that such children are not disadvantaged and that staff are alert to some children having difficulty differentiating certain colours so they can find their way round any problems.’

It is perplexing that this condition is not considered an SEN, because it has a clear impact upon a child’s ability to learn, but Colour Blind Awareness is taking steps to rectify this situation, and will rely upon the support of parents, teachers, carers and nursery workers with experience of the issues. It is also gratifying to hear that Colour Blind Awareness is starting to work – a few enlightened board game manufacturers and textbook publishers are ensuring that their products are suitable for children with the condition.

In the meantime, however, it is worth taking on board the guidelines suggested, to ensure that any children in your care make the most of the opportunities available to them. Even if they cannot see what we are seeing, they can understand their world a little better if we help them to make sense of the colours that define it.

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## Key points

- The average UK co-educational school classroom will be host to at least one colour-blind child
- In an average box of 24 coloured pencils, a child who has the most common form of colour-blindness will be able to accurately name only four colours, although they will probably be able to guess more
- As colour-blind children are not currently supported in the classroom, from an early age and before they begin to learn to read and write, most feel inadequate, some lose confidence and struggle to cope, some are put off school and some become unwilling to learn and develop into disruptive pupils
- Most colour-blind children are unaware of their condition, many only realise they are colour-blind at secondary school. Many do not admit it
- Because a greater number of boys suffer, they are disadvantaged and lag behind girls in many subjects, including maths, science, geography, reading, sport, food technology and in any lessons where teaching uses colour as a talking point