

COLOUR VISION DEFICIENCY

**You have just been told your child
has colour vision deficiency.**

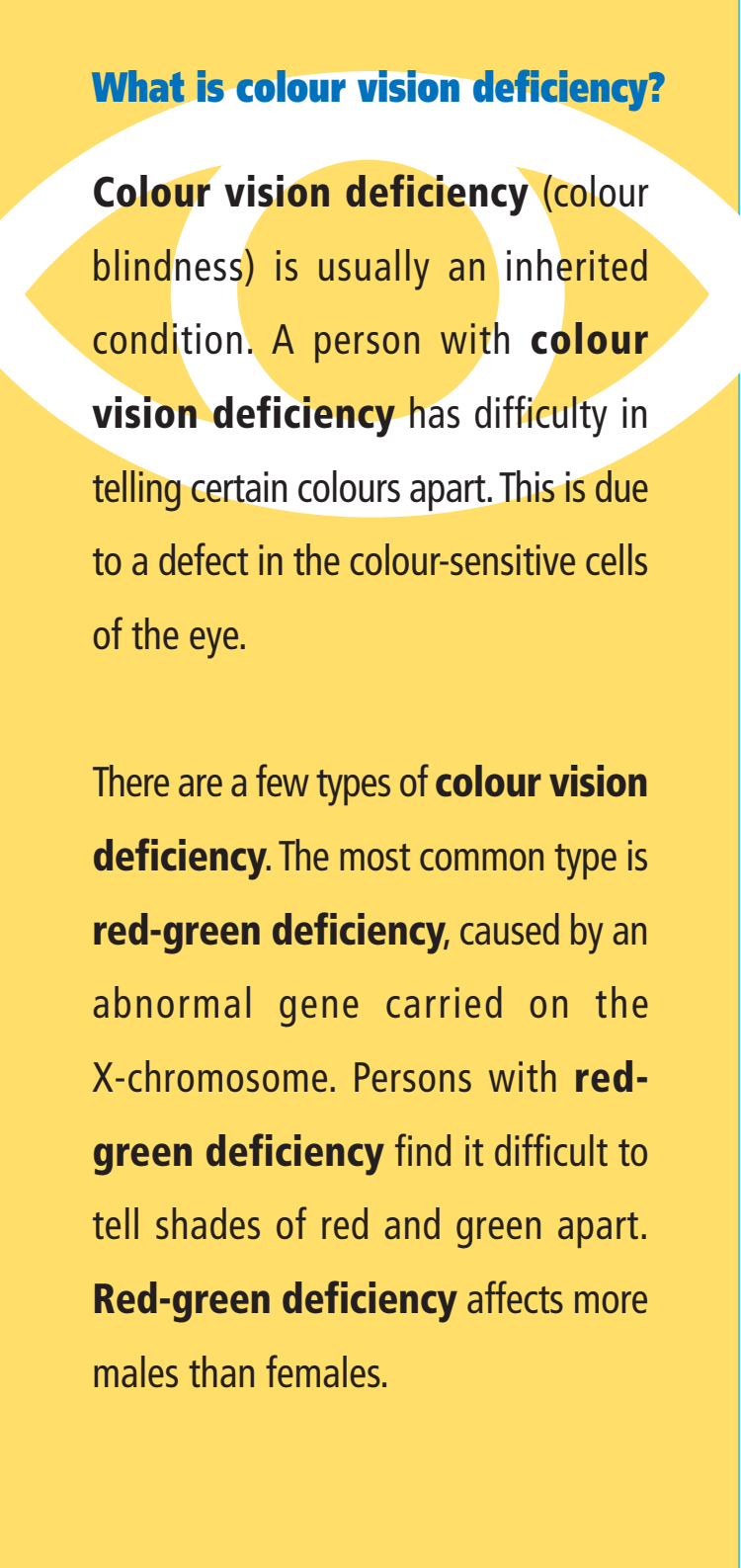
What does this mean?

Is it a disease?

Can it be cured?



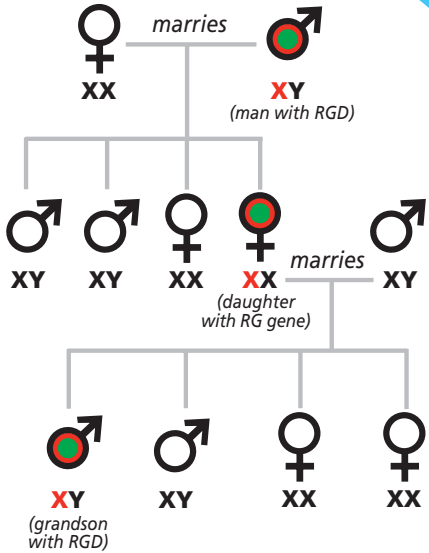
What is colour vision deficiency?



Colour vision deficiency (colour blindness) is usually an inherited condition. A person with **colour vision deficiency** has difficulty in telling certain colours apart. This is due to a defect in the colour-sensitive cells of the eye.

There are a few types of **colour vision deficiency**. The most common type is **red-green deficiency**, caused by an abnormal gene carried on the X-chromosome. Persons with **red-green deficiency** find it difficult to tell shades of red and green apart. **Red-green deficiency** affects more males than females.

GENERATION



KEY

- Male with normal colour vision
- Female with normal colour vision
- Male with abnormal colour vision
- Female carrying an abnormal colour vision gene
- X = X-chromosome
- X = X-chromosome carrying the abnormal colour vision gene
- Y = Y-chromosome

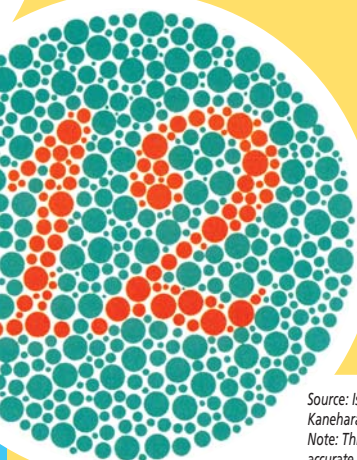
All males have one X and one Y-chromosome (XY);
all females have two X-chromosomes (XX)



How red-green deficiency is inherited



If a man with **red-green deficiency (RGD)** marries a woman with normal colour vision, their daughter has a 50% chance of carrying the abnormal colour vision gene (RG gene). Since females have a second X-chromosome that usually masks the effect of the abnormal gene, she is not affected (i.e. she can distinguish red-green colours normally) but she carries the RG gene. When she marries a man who has normal colour vision, there is a 50% chance that her son will have **red-green deficiency**.



Test yourself

*What do you see
in this figure?*

(For answer, please see below)

Source: Ishihara's Tests for Colour Deficiency, 1997, Kanehara & Co. Ltd. Copyright owned by Isshinkai Foundation.
Note: This is a reproduced colour deficiency test plate. For accurate testing with original test plates, please consult a doctor.

The **blue-yellow deficiency** is much less common. This is also inherited, but the gene is not carried on the X-chromosome. Hence this type affects males and females equally. In very rare cases of complete colour deficiency, the person cannot see any colours except shades of black, white and grey.

Colour vision deficiency cannot be cured. However the affected person can learn to adapt to his condition.

(Answer: A number 74.)

Colour Vision Deficiency and Careers

Colours are frequently used to mark differences between objects in everyday life. Certain jobs or careers require some degree of colour identification. Some of these careers are listed below. They are grouped according to how important colour vision is in the nature of the job.

These lists are meant as a guide and are not comprehensive. In addition, there are different activities within a listed industry and there may be jobs within the industry that do not require full colour vision.

List 1: Occupations/Careers/Industries requiring perfect colour vision

- Air forces (certain grades)
- Navy (certain grades)
- Army (certain grades)
- Civil aviation
- Colour matcher in dyeing, textiles, paints, inks, coloured paper, ceramics, cosmetics
- Carpet darter/inspector, spinner, weaver, bobbin winder
- Electrical work (electrician, electronics technician, colour TV mechanic, motor mechanic, telephone installer)
- Navigation (pilot, fisherman, railways)
- Police (certain grades)

List 2: Occupations/Activities where defective colour vision may be an asset

- Camouflage detection.

List 3: Careers/Jobs/Occupations/Industries where defective colour vision is a handicap and important consequences might result from errors of colour judgment.

- Air traffic controller
- Buyer
 - textile
 - yarns
 - timber
 - food eg. fruit, cocoa
- Car body resprayer/toucher
- Cartographer
- Ceramics and chemicals
 - painter/decorator of pottery
 - inspector (quality control)
- Chemists and chemicals
 - laboratory analyst
 - food chemist
 - teacher of chemistry
 - manufacturer of chemicals, polishes and oils
- Colour printer, etcher, retoucher
- Colour photographer
- Colour TV technician
- Coloured pencils/chalks/paints manufacturing
- Colourist/colour matcher for paints, paper, pigments, inks, dyes, wallpaper
- Cotton grader
- Coroner
- Forensic scientist
- Market gardener eg. fruit
- Meat inspector
- Oil refining
- Paper making
- Pharmacist
- Plastics
- Paint maker and distributor
- Restorer of paintings/works of art
- Safety officer
- Tanner

List 4: Careers/Jobs/Occupations where good colour vision is desirable, but defective colour vision would not necessarily cause a handicap.

- Accountant
- Anaesthetist
- Architect
- Arts
 - graphic design
 - commercial
 - advertising
- Auctioneer
- Barmaid/barman
- Bacteriologist
- Baker
- Beautician
- Botanist
- Brewer
- Butcher
- Builder/bricklayer
- Buyer
 - textiles
 - yarn
 - timber
 - food eg. fruit, cocoa
- Carpenter
- Carpet/linoleum fitter/planner
- Chiropodist
- Clothes designer
- Cook/chef
- Coroner
- Confectioner
- Cosmetics director (stage, film, TV)
- Dental surgeon and technician
- Draughtsman
- Dressmaker
- Driving instructor
- Driver in public services eg. bus
- Engineer (various disciplines)
- Farmer
- Fishmonger
- Florist
- Forester
- Furrier
- Gardener and landscape gardener
- Geologist
- Gemologist eg. setting stones, diamond grader
- Grocer
- Hairdresser
- Horticulturist
- Illumination engineer
- Interior decorator/designer/planner
- Jeweller
- Librarian
- Lighting director (stage, film, TV)
- Manicurist
- Metallurgist
- Milliner
- Miner
- Nurse
- Optometrist/ophthalmologist/orthoptist
- Osteopath
- Painter
- Pharmacist assistant (counter service)
- Physician
- Physiotherapist
- Post office counter assistant
- Potter
- Salesperson for
 - fabrics, drapery, yarns, wool carpets
 - garments/footwear
 - china and glass
 - linen
 - cosmetics/toiletries
 - jewellery
 - confectionery
 - stationery
- Shoe repairer
- Storekeeper
- Surgeon
- Tanner
- Tailor
- Telephone switchboard operator
- Theatre/stage props manager
- Veterinary surgeon
- Waiter
- Window dresser
- Zoologist