TEST

Color vision test

A color vision test checks how well you can distinguish and match different colors.

WHAT IT MEASURES
Ability to identify, distinguish, or arrange colors

SAMPLE
None; visual responses to colored targets

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually 5 to 20 minutes

RESULTS IN
Usually immediate; written reports vary by clinic

USED FOR
Screening and assessing inherited or acquired color vision differences

MAIN LIMITATION
Plate tests may miss blue-yellow or subtle acquired changes

Overview

A color vision test checks whether you can tell certain colors apart. It may also identify the type and degree of a color vision difference.

Color vision depends on light-sensitive cells called cones in the retina at the back of the eye. Most color vision differences are inherited and affect red-green discrimination. Color vision can also change because of aging, an eye or health condition, or a medicine.

The familiar Ishihara test uses plates made from colored dots. You identify a number, line, or shape within the dots. Other tests ask you to arrange colored caps or match colored lights.

A color vision test does not measure how sharp your sight is. You may have clear vision but difficulty distinguishing particular colors.

Why the test is ordered

The test may be used to:

Screening does not always provide a complete diagnosis. If the result is unexpected or important for work, education, or safety, more detailed testing may be needed.

- Screen for an inherited color vision difference
- Investigate difficulty recognizing or matching colors
- Assess a new change in color perception
- Check whether a condition or medicine is affecting color vision
- Determine whether you meet a job-specific standard

Who should have the test

Testing may help if you or your child regularly confuses colors, struggles with color-coded schoolwork, or has a family history of color vision differences. Children may compensate by using brightness, position, or labels, so the difference may not be obvious.

Some occupations require formal testing. Standards differ between employers and countries, and an abnormal result does not automatically prevent someone from doing a particular job.

Testing may also be recommended if you have an eye condition, an unexplained vision change, or take a medicine that can affect color perception.

A sudden change in color vision, especially in one eye, needs prompt medical assessment. Seek urgent care if it occurs with sudden vision loss, severe eye pain, new weakness, difficulty speaking, severe headache, or another sudden neurological symptom.

How to prepare

You can usually eat and drink normally. Fasting is not required, and routine medicines can generally be taken as prescribed.

Bring the glasses or contact lenses you use for near vision. Tell the tester if you have cataracts, retinal disease, optic nerve problems, or reduced vision in either eye.

Provide a current list of medicines and supplements. Do not stop a prescribed medicine because of concerns about color vision; discuss them with the prescriber.

Do not wear tinted glasses or color-enhancing contact lenses unless you are specifically being assessed while using them. These filters can change which colors are visible.

What happens during the test

The process depends on the test.

For a plate test, you look at circles made from colored dots and identify a number, shape, or pathway. Each plate is usually shown briefly under controlled lighting. Versions using paths or simple shapes are available for young children and people who cannot read the numbers.

For an arrangement test, you place colored caps, tiles, or discs in order. The pattern of errors can indicate which color combinations are difficult.

A specialist test called an anomaloscope asks you to adjust colored lights until two areas appear to match. It can classify some red-green color vision differences more precisely.

Testing may use both eyes together or each eye separately. Separate-eye testing is useful when a change may have developed later in life.

Understanding your results

Results depend on the instructions and scoring system for the specific test. There is no single reference range for all color vision tests.

A result may be reported as normal, as showing a red-green or blue-yellow difference, or as requiring further assessment. Protan and deutan describe different red-green patterns; tritan describes a blue-yellow pattern.

A "pass" means your responses met that test's cutoff. It does not prove that every aspect of color vision is normal. A "fail" or "outside standard" result does not identify the cause by itself.

Interpretation may be affected by the test version, scoring method, age, vision in each eye, medicines, lighting, and clinical or occupational requirements.

What affects the results

Color vision testing is sensitive to how it is performed. Important influences include:

Coffee, meals, ordinary physical activity, and recent exercise do not usually meaningfully affect standard testing.

- Lighting: Dim or strongly colored light can alter printed colors
- Faded materials: Old or sun-exposed plates may be inaccurate
- Screen settings: Calibration, brightness, night mode, and screen quality affect online tests

- Tinted lenses: Colored glasses or contacts can change responses
- Blurred vision: Poor focus may make shapes difficult to identify
- Cataracts and aging: Lens yellowing can affect blue-yellow discrimination
- Attention: Fatigue, rushing, or misunderstanding instructions can cause errors
- Previous practice: Memorizing plates may produce an apparently normal result
- Medicines or eye conditions: These can cause genuine color perception changes

Accuracy and limitations

Accuracy depends on the test, lighting, materials, scoring cutoff, and type of color vision difference.

Ishihara-style plates are useful for screening inherited red-green differences but may miss blue-yellow or subtle acquired changes. Poor lighting, faded plates, blurred vision, misunderstanding, or an unsuitable display can cause an abnormal result. Memorization or testing the wrong color pathway can produce an apparently normal result.

Plate tests do not necessarily show how someone performs a real-world task or precisely define the degree of a difference. Arrangement tests may be more useful for subtle or acquired changes, while an anomaloscope can provide detailed red-green classification.

Occupational testing may require an approved test. Online tests offer only a rough indication because screen calibration and room lighting cannot be controlled. They should not be used alone for medical or employment decisions.

Risks and complications

Color vision testing is non-invasive and has no significant physical risks. Looking closely at the materials may briefly tire your eyes, but the test does not damage them.

What happens next

If the result is normal and testing was routine, no follow-up may be needed.

An unexpected result may be repeated under controlled lighting or checked with another test. Your eye care professional may assess visual sharpness, the retina, the optic nerve, and each eye separately.

Inherited color vision differences are usually stable. Labels, patterns, phone tools, and position cues can reduce reliance on color alone.

A new or worsening change needs assessment for an acquired cause. Seek urgent assessment for a sudden change, especially in one eye or with sudden vision loss, eye pain, weakness, speech difficulty, or severe headache.

Common questions

Can I drink coffee before a color vision test?

Yes. Coffee does not usually affect testing. Follow different instructions if you are having another test at the same appointment.

Does the time of day matter?

Not usually. Suitable lighting matters more, although fatigue may affect concentration.

Can I exercise beforehand?

Yes. Recent exercise is not known to meaningfully alter standard results.

Should I wear my glasses or contact lenses?

Wear your usual clear corrective lenses if needed. Remove tinted or color-enhancing lenses unless told otherwise.

Can I take the test online?

An online test may suggest a possible difference, but screen settings and room lighting limit reliability. Professionally administered testing is better for medical, school, or employment decisions.

Can color vision change over time?

Inherited differences are usually stable. New changes can occur with aging, cataracts, retinal or optic nerve conditions, other health problems, or some medicines and should be discussed with an eye care professional.

Sources

- National Eye Institute. Color Blindness
- American Association for Pediatric Ophthalmology and Strabismus. Color Blindness



- National Research Council. Procedures for Testing Color Vision . National Academies Press
- MedlinePlus Genetics. Color Vision Deficiency
- Cole BL. Assessment of inherited colour vision defects in clinical practice. Clinical and Experimental Optometry . 2007;90(3):157-175. doi:10.1111/j.1444-0938.2007.00135.x
- Hasrod N, Rubin A. Defects of colour vision: A review of congenital and acquired colour vision deficiencies. African Vision and Eye Health . 2016;75(1):a365. doi:10.4102/aveh.v75i1.365