

NCS Natural Color System®©

The international language of colour communication in teaching, education and professional development



About colour education

The aim of the NCS study material is to increase understanding of the role and importance of colour. Architects and designers, in fields such as interiors, product and graphic design, all need to understand colour. The same is true of hairdressers, florists, painters, printers and many others from food technology to medicine and research who use colour as a tool in their work. A more thorough knowledge of colour improves the quality of work and gives a greater job satisfaction.



Is colour difficult? It is certainly exciting

All of us who have colour vision 'own' the colours we see and can use them according to our own knowledge, ability and requirements.

Colours are everywhere, we can see them and they belong to us. So let's be more aware of the opportunities which lie in a greater knowledge, a deeper understanding, a personal involvement, and confidence in our own ability.

The NCS study material: an invaluable aid for teaching knowledge of colour

The discovery that colour 'belongs to me', and that 'I can handle colour' can increase confidence and enjoyment in working with colour - and this depends on being able to understand and describe the colours you see.

For the teacher or course leader, it is important to have a range of well designed and stimulating visual aids which allow knowledge of colour to be taught in a straightforward and engaging way.



The NCS system

NCS is an aid to learning, although it's not the answer to every question about colour. NCS describes colour as we see it and is a tool for communicating colour - a 'language' which makes it easier to understand and learn more about colour. Just like the note system in music, it helps us to structure, document and communicate knowledge.

Colour science is knowledge and understanding from different perspectives. It is knowledge based not only on science, art and philosophy but also on technical and practical creative experience.

From time immemorial colour has fascinated people and stimulated the desire to understand the phenomenon. Much exciting and important knowledge has been documented through the pages of history, and new knowledge is continually being developed, together with new media and new techniques with which we can deal with colour.

Is there an easy way to acquire all this knowledge?

Not really - just as there is no short cut to becoming a composer - lengthy study, motivation, creativity and practice may be required. But, as in all learning processes, there are some basic steps to a greater understanding and the NCS study material offers a well-tested way to both teach and learn about colour.

Colour mixing and pigments

Traditionally, knowledge of colour has been related to colour mixing and pigments. From the primary colours (yellow, red and blue), the secondary

and tertiary colours can be mixed. The colours obtained will be the result of your patience, judgment and skills with the paint. A lot of knowledge and many theories about the harmony of colours are based on this type of mixing of pigments.

The new digital world uses three other primary colours: red, green and blue (RGB) to produce the different colours on the monitor screen, and another set of four: cyan, magenta, yellow and black (CMYK) is used in four-colour process to produce full-colour printing.

We all see colour in the same way*

It is new and liberating, from the traditional view of colour science, to realize that colour is what we see! Regardless of how the colour has been mixed or in what context it is shown, we all see it in the same way.

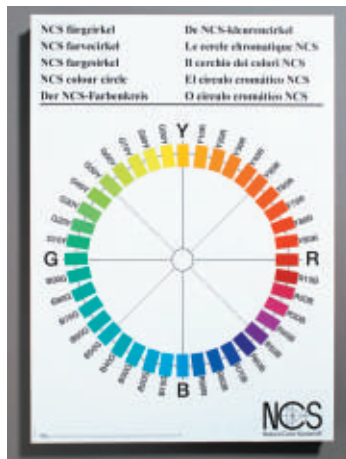
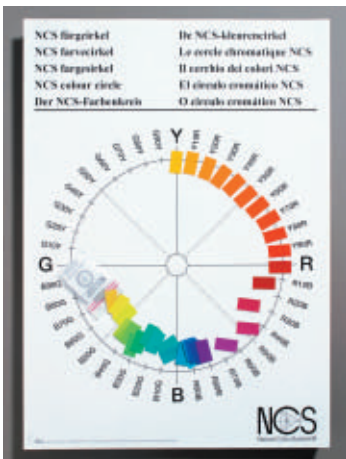
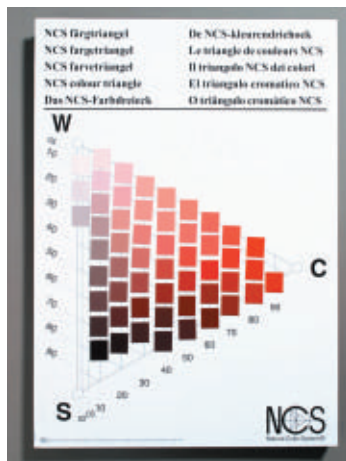
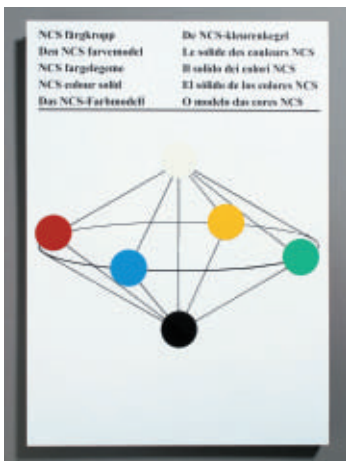
With the increasing realization that colour belongs to the visual process, it was understood that the elementary colours, to which our basic colour perceptions are related, are yellow, red, blue, green, white and black.

Any colour which we see resembles to a greater or lesser extent one or several of these elementary colours.

This is precisely what the NCS system is based on; it is what separates NCS from other systems which deal with pigment mixing or light energy mixing.

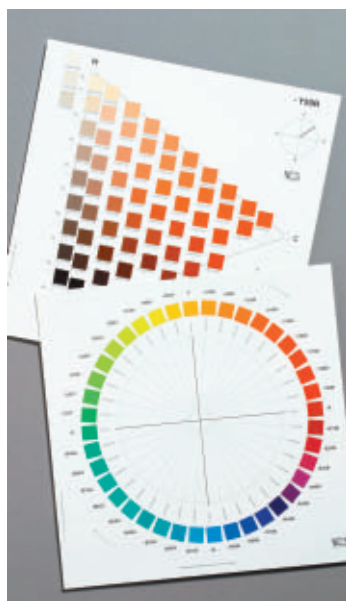
With NCS we can describe the colours we can see, and one of the aims of the study material is to show how colours can be described in a completely unambiguous way.

The NCS study material



NCS Demo posters

Posters for NCS - Colour Space, Colour Circle and Colour Triangle with separate colour samples to fit. Format 50 x 70cm.



D6 Grey scale

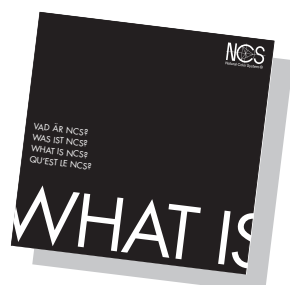
Demonstration material for lightness comparison, 11 colour samples (only for demo 50 x 50mm).

NCS Demo atlas pages

NCS Colour Circle and Colour Triangle.

What is NCS?

15 different images which explain the basics of the NCS colour system and show in a clear way how you can arrange and give notations to colours using the NCS. Available on CD for projecting.



A complete range of colour training material

The NCS study material offers a unique opportunity to work with precise colour samples.

In a carefully planned sequence of interesting processes, the study material trains the eye to recognize similarities and differences among colours. This develops the skills needed to systematically arrange, describe and communicate the properties of colours using words and symbols where the eye becomes the 'sorting machine'.

The emphasis is on observing the colour and being able to describe what you see, rather than the skill of mixing pigments.

When it comes to learning more about colour mixing with pigments or mixing digital colour on screen, the knowledge gained from the NCS exercises will provide a basis of understanding and communication of the properties of colour.

Regardless of all the different systems, which may exist, colours will always retain secrets to wonder over and try to understand - even in the future. NCS doesn't take away the mystery or fascination of colour. It provides a greater understanding of what we see and how we can describe what we see

An understanding of the NCS system, enables us to learn from historical work on colour and gradually assimilate new knowledge.

And by focusing on what we see and documenting these experiences, a whole range of new knowledge about colour may develop.

Greater knowledge and a deeper understanding of colour

The study material has been created to be relevant to a wide range of colour users - whether at student or professional level. The exercises will be of benefit to both creative and scientific disciplines.

The exercises are available individually or as a complete set in a binder. The teacher's manual gives a detailed description of how the exercises can be used and suggests possible alternatives. Demonstration material is also available.

How the study material works

The exercises comprise a bag of colour samples and an A4 sheet on which brief instructions are given. Each exercise has its clear place in the development of understanding, and we have grouped the exercises into five levels from the simple to the more difficult, and the most demanding.

There is a correct solution to each exercise, but the strategy in several of the exercises is such that it is easy to find alternative ways of arranging the colours. The investigation of alternatives is part of the experience. The aim is not to 'be successful' but to train the eye and develop the ability to see similarities and differences among the colours.

The colour exercises stimulate curiosity and interest in colour

When the colour samples are first spread out, the immediate reaction is one of curiosity and the desire to create order out of the chaos - particularly if the first stage of sorting is done without the A4 sheet. After that comes the task of placing the colours 'correctly'.

It is the learning process that goes on at this stage which is so valuable; and it is only when it has become clear what one is looking for, that the placing of the samples on the diagram makes sense.

1 Exercises for elementary attributes

These exercises provide an understanding of the elementary attributes of a colour and the difference between hue and nuance.

These exercises are a foundation for all the other exercises.



D7 Hue differences

Trains the ability to see and analyse small differences in hue and to identify the four elementary properties: yellow, red, blue and green. 20 colour samples (23 x 37mm for the exercise, 30 x 65mm for the demo).



D8 Nuance differences

Trains the ability to see and analyse small differences in nuance and to identify the different elementary attributes of whiteness, blackness and chromaticness. 17 colour samples (12 x 37mm for the exercises, 30 x 65mm for the demo).

Demonstration material (demo)

Most exercises are available in a larger demonstration size for use with a group. Packs of the larger colour samples are supplied with instructions and are suitable for mounting on a wall chart format of 50 x 70cm based on the A4 sheet.



D8 Nuance differences

Available in Red or Green.



E1 Elementary colours and attributes

Trains the ability to judge the main and subsidiary attributes of colours. 32 colour samples (23 x 23mm for the exercise, 50 x 50mm for the demo).

2 Exercises in understanding the NCS symbols

Exercises which train the ability to judge the hue and nuance of colours and to order them in colour triangles and the colour circle.

These exercises create an understanding of the way colours are ordered in the NCS circle and triangles. The relationship between words and symbols and colours becomes better defined and that helps to create a deeper understanding of how to describe visual phenomena using NCS.



D4 Colour circle

Trains the ability to judge the hue of colours and to arrange the samples in a colour circle (x3). 48 colour samples (23 x 23mm for the exercises, 50 x 50mm for the demo).



E2 Colour triangle

Trains the ability to judge the nuance of colours and to arrange them in a colour triangle. Yellow, Red, Blue or Green. 24 colour samples (23 x 23mm for the exercises, 50 x 50mm for the demo).

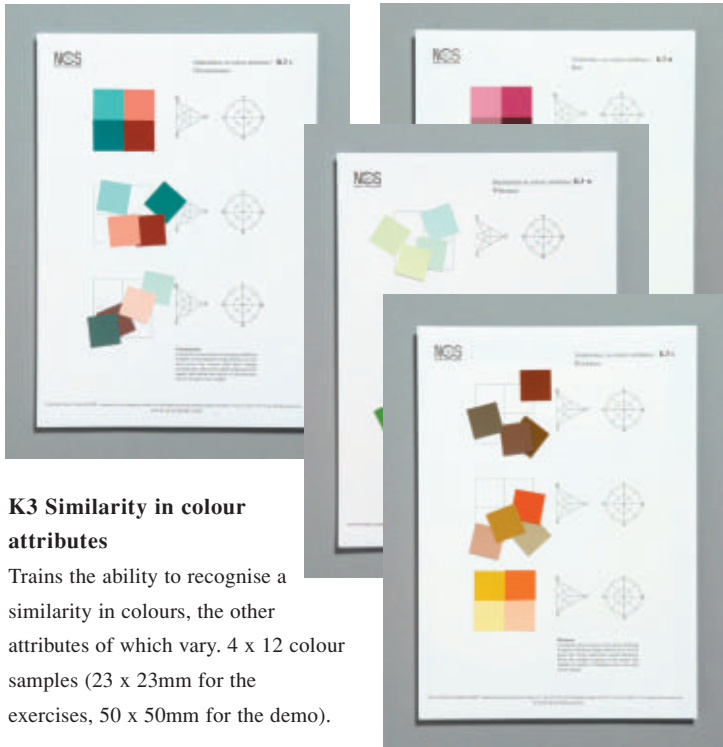


E3 Colour areas

Trains the ability to judge both hue and nuance. Can be used for analysing a colour assortment. 56 colour samples (23 x 23mm for the exercise, 50 x 50mm for the demo).

3 Exercises with degree and relationship similarities

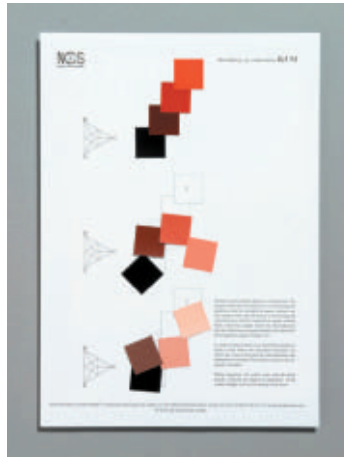
Exercises which train the ability to recognize similarities and differences between colours and to understand and to be able to use the symbols to record these similarities and differences.



K3 Similarity in colour attributes

Trains the ability to recognise a similarity in colours, the other attributes of which vary. 4 x 12 colour samples (23 x 23mm for the exercises, 50 x 50mm for the demo).

6 Advanced similarity exercises (See the last page of the brochure)



K3M Similarity in saturation

Three sets of colour samples with similar degrees of saturation. 12 colour samples (23 x 23mm for the exercise, 50 x 50mm for the demo).



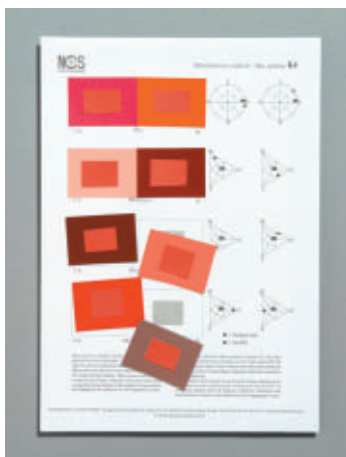
K5 Similarity in nuance

Shows colours with the same whiteness, blackness and chromaticness but in different hues. 12 colour samples (23 x 23mm for the exercise, 50 x 50mm for the demo).

4 Exercises to demonstrate colour phenomena and how colours are influenced

Exercises which train the ability to record and explain different colour phenomena and how colours are influenced by each other.

These exercises give a deeper understanding of the similarities and differences between colours and clarify the different colour phenomena, which arise in certain situations.



K4 Simultaneous contrast - hue, nuance

Shows how colours are changed by different backgrounds. 10 colour samples (36 x 52mm for the exercise, 84 x 118mm for the demo).



K2 Simultaneous contrast - lightness

Shows, on a grey scale, how the lightness of a colour sample is changed through the influence of the background. 13 colour samples (23 x 23mm for the exercise, 50 x 50mm for the demo).



K1 Similarity in lightness

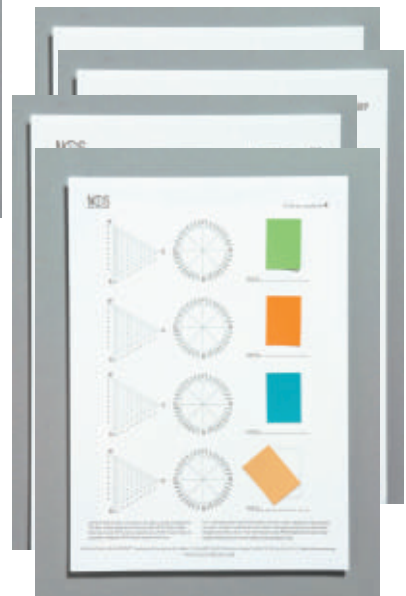
Trains the ability to judge the lightness of chromatic colours. 24 colour samples (23 x 23mm for the exercise, 50 x 50mm for the demo).

5 Exercises for description and communication

Exercises which train the ability to describe colours with the help of the NCS system.

NCS 1, 2, 3, 4 training in colour analysis

A training in the use of NCS colour notations and how it is possible to describe the colour with the help of a colour triangle and the colour circle. 4 x 4 colour samples (only for the exercises 26 x 28mm).



Why use a colour system?

Colour is an essential part of architecture and design. Colour informs us and stimulates us; it defines where we walk or sit; and it allows us to express our emotions and our individuality. It provides cultural as well as practical and commercial frameworks. Modern society makes great demands on our ability to recognize and communicate colour precisely.

Everybody who has normal colour vision can see about 10 million colours

But without a system for defining these, precise communication is impossible. We need a system which can be used from an idea or concept, through visualization, specification and production to the final realization.

Ideally, this system will be based on how we see colours, since everybody with normal colour vision sees colours in the same way. It should also be product and language independent, so that it can be used within different fields of activity and internationally.

The development of NCS

NCS is built on decades of scientific research and development, carried out by architects, designers, psychologists and physicists. It is based on the use of colour in our environment and on how we see colour, and it has been produced by the Scandinavian Colour Institute AB. This is why hundreds of man years of scientific research were spent in developing NCS.

An international colour standard

NCS is recognized by world-leading authorities as one of the few available systems which is scientifically based and documented, maintains high quality in production and has proven practical value, and deserves to be classified as an international standard for colour description.

It is also integrated with recognized colorimetric systems such as the CIE and it is used to a great extent in education, science and colour research all over the world.

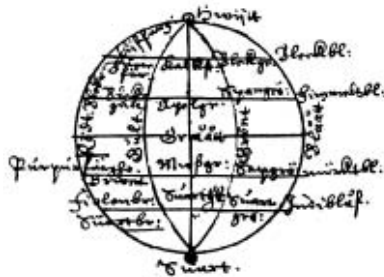
Quality

Modern society demands a high accuracy in colour standards. The colourist's design may need to be produced in several different stages and to be linked with other products. The eye is able to see very small colour differences, so extreme colour accuracy is essential in order to guarantee that the final result will be correct.

NCS Colour Sample Collections are certified to ISO 9001 quality and are produced according to a world-leading Quality Management System.

How NCS was developed

In 1611, the scientist A S Forsius published the embryo to NCS in his book 'Physica' in which he stated: *'...among the colours there are two basic colours, white and black...the four intermediate colours are red, blue, green and yellow - and grey from white to black - and these increase in intensity by degrees...changing from white by paling or to black by darkening...'*



In the 1930s the research physicist Trygve Johansson became interested in the theories of Ewald Hering, the late 19th century German physiologist, regarding colour and colour perception.

'Theories should not bind the artist to any doctrines of taste, but give him the freedom of great knowledge and a means of expression.'

Johansson's development of Hering's theories was later complemented by other scientists.

Hesselgren's colour atlas

These scientists included Sven Hesselgren, Professor of Architecture, who together with other leading Scandinavian architects and designers

of that time devoted himself to working with colour and form as visual phenomena. His work resulted in the Hesselgren Colour Atlas, a forerunner of NCS.

By now the requirement for a permanent and generally applicable colour system was acknowledged by architects, designers, artists, educators and manufacturers of coloured products, as well as by scientific institutions.

The NCS system

Dr Anders Hård is the originator of the Natural Color System. He led 100 man-years of research work together with Dr Lars Sivik (psychology) and Prof Gunnar Tonnquist (physics) and a number of leading designers and architects. The value of this work has been recognized by the AIC (Association International de la Couleur).

The NCS system was introduced in 1979. The system, which can describe all colours, is complemented with a colour atlas which today contains 1,950 specified and high-quality colour samples.

The Colour Centre Foundation and the Colour School

In the early 1960s the Colour Centre Foundation was founded as an independent R&D institute, on the initiative of both the Swedish Academy of Engineering Sciences (IVA) and Swedish Society of Crafts and Design (Svensk Form). The results of the Colour Centre's research work encouraged the Swedish Standards Institute (SIS) to develop and publish NCS as a Swedish Standard.

The Swedish Society of Crafts and Design also arranged the 'Colour School' summer course which was started for architects, designers, artists, teachers and technicians during the 1940's.

The teaching methods developed in courses at this school form the basis for the exercise material presented in this brochure.

NCS today

The system and its colour samples are used throughout the world in architecture, design, production, control, education and research. NCS has become one of the world's most widely used colour notation systems and it has been written about in a large number of international research reports.

NCS courses

The Colour School in Stockholm offers courses such as: colour in architecture and design, colour measurement, colour control, colour in digital media and print.

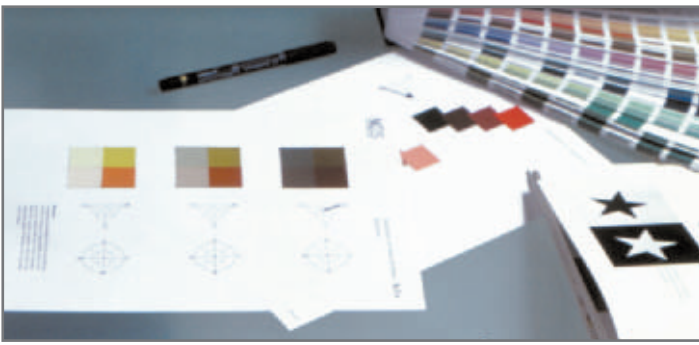
NCS Colour Centres

Colour courses and advice about the NCS study material are available through a network of NCS Colour Centres and retailers in 25 countries.

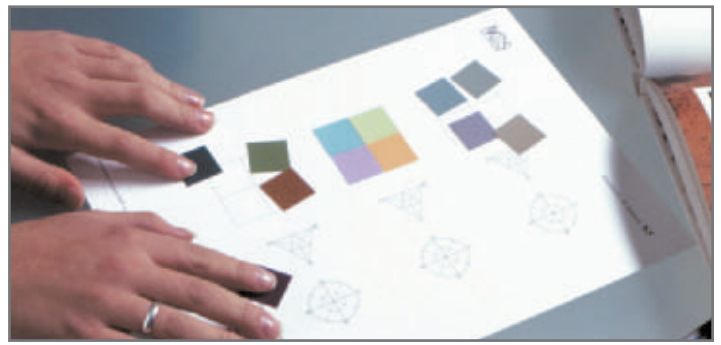
For further information, please contact the NCS Head Office in Sweden by phone, fax or e-mail, or contact your local NCS Colour Centre.

NCS study material in use at FÁS Training Centre - Cork, Ireland.





NCS exercises with degree and relationship similarities: K3, K3M, K5



NCS exercises in building up the NCS symbols: D4, E2, E3



NCS exercises for elementary attributes: D7, D8, E1

The advantages of using NCS in education:

- A range of tested and practical material with a high learning value for both pupils and teachers.
- Well-developed teaching methods for colour training, which provide a basis for further study.
- The NCS study material trains the eye to see similarities and differences among colours and provides an understanding of how to systematically arrange, describe and discuss colours.
- An international colour language based on how human beings see colour, which can be used as a cross reference between many different products and visual experiences.
- A scientific system based on many years of interdisciplinary research within architecture, design, psychology, education and physics.
- 1950 NCS Edition 2 colours distributed logically through the colour space by hue and nuance to provide a comprehensive, practical and well-designed range of products for design and specification.

NCS Teacher's Guide

A complete, new binder for teachers. Contains 56 pages with a complete set of all the 31 NCS exercises and instructions and a glossary on CD. Available in English, German and French.

The NCS Teacher's Guide consists of an educational text with instructions on how to use NCS, with background information and help for all 31 NCS exercises, created by Grete Smedal, Professor in Colour Design at the Bergen National Academy of the Arts. The text also contains basic colour theory and suggestions for teaching activities and creative tasks, as well as a glossary defining important colour terminology. The text is found in PDF format on a CD, which also contains an illustrated key to all the exercises and guides to the NCS system and which can be distributed to students. The binder is complete with all the 31 NCS colour exercises of varying difficulty levels – including the latest group exercises. We recommend that you use the exercises together with the educational text.



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The six elementary colours

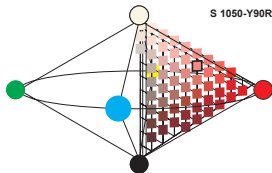
The six pure colours: White, Black, Yellow, Red, Blue and Green, correspond with the perception of colour in our brain..



NCS notations describe how we see a colour in relation to these six elementary colours.

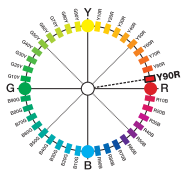
S 1050-Y90R

In this NCS notation 1050 describes the *nuance*, i.e. the degree of resemblance we see to black (10%) and to the maximum chromaticness (50%). The *hue* Y90R describes the degree of resemblance we see between Yellow and Red (Y and R). Y90R describes yellow with 90% redness and 10% yellowness.



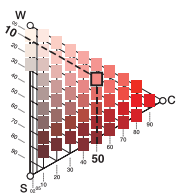
The NCS Colour Space

Within this 3-dimensional model all surface colours can be plotted and given an NCS notation.



The NCS Colour Circle

The 10% steps here represent the pages of the NCS Atlas and show the colour hues.



The NCS Colour Triangle

This illustration of the NCS Atlas page shows all the colours of the hue Y90R within White (W), Black (S) and the full chromatic colour (C). S 1050-Y90R has been highlighted. Pure grey colours have no hue and are given nuance notations followed by -N to describe Neutral. There is a scale from 0300-N, which is white, to 9000-N, which is black. The letter S, which precedes the NCS notation, means that this is a standardized sample based on NCS Edition 2.

6. Advanced exercises, with degree and relationship similarities

Exercises which train the ability to recognize similarities and differences between colours and to understand and to be able to use the symbols to record these similarities and differences. These exercises are advanced tasks in analysing and grouping colours according to visual similarities within a certain group. The degree of difficulty in these exercises is considerably greater than in the previous exercises, Suitable for group study.



K6 Similarities in colour attributes

Trains the ability to recognize and analyse a specific similarity in colours, the other attributes of which vary. Similarities in hue, blackness, whiteness and chromaticness, 4 x 27 colour samples (23 x 23mm).

K7 Similarity in nuance

Three groups of colours with varying nuances. 27 colour samples (23 x 23mm).

D5 Group exercise Quadrat in a square

The exercise includes a total of 121 different NCS colour samples with an exercise sheet in A3 format. It is the largest and most exacting exercise, which even a trained eye may have difficulty with. A very absorbing exercise, it may favourably be solved in small groups, where the students can discuss and help each other.



NCS is represented in more than 25 countries all over the world through NCS Colour Centres. To find your closest NCS Colour Centre visit: www.ncscolour.com

For any other countries, please contact the NCS Head Office in Sweden.

www.ncscolour.com

Information on the full range of NCS products and services and how to refer to the NCS copyright is available on our website.

The NCS Head Office

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