

## Is an Object Always the Same Colour?

### Colour filters

You have been given a set of safety spectacles and some sheets of coloured film. Hold up the coloured film to the light. You can see through the coloured film: it is transparent. Write down what the word *transparent* means:

An object is transparent if:

Using tape, carefully stick some film over each of the lenses in the safety spectacles. Make sure that the tape is only on the edges of the film.

You can use the same colour on each side, or different colours. If you use different colours over the two lenses, then remember to only have one eye open at a time when you wear them!

In the lab there should be some different-coloured lights (not so bright as to hurt your eyes).

Look at the different-coloured lights while wearing your safety spectacles with the film covering. What do you notice? Fill out the table below with your observations. Some rows have been left blank for you to fill in with different observations. You may need to swap spectacles with other students, so that you can try all the colours of film.

Colour of light	Colour of film	What I see
Red	Red	
Blue	Red	
Red	Blue	
Green	Red	
Green	Blue	
White		

What conclusion can you come to at the end of your observations? Write some thoughts in the spaces below:

Red film looks red as it only lets through..... light

If you look at a white light through a blue film, it will look.....

If you look at a white light through a green film, it will look.....

Some light gets through when you hold a red film in front of white light as.....

.....

You cannot see a blue light through a red film as.....

.....

## Reflecting light

You have been provided with some different coloured pieces of card. Do they look the same colour when you view them through your spectacles? Fill in the table with your observations. Make sure that the pieces of card are well illuminated with white light before you look at them through your spectacles.

Colour of card	Colour of film	What I see
White	Red	
White	Blue	
White	Green	
Green	Red	
Green	Blue	
Green	Green	
Red	Red	
Red	Blue	
Red	Green	
Blue	Red	
Blue	Blue	
Blue	Green	
Black	Red	
Black	Blue	
Black	Green	

Last lesson, we learned that:

An object is white if it.....colours

An object is black if it.....colours

Fill in the following:

An object is red if it reflects .....light

An object is blue if it reflects ..... light

An object is green if it reflects ..... light

The spectacles with the coloured films only allow some of the light through. So, by looking at coloured objects through the spectacles, we can start to figure out what colours of light are being reflected by the objects.

Using these ideas, explain your observations:

## Independent observations

In science, it is always important to check your observations by doing an independent experiment. Sometimes this is done by different people to check your observations, but it can also be a different way of making the same observations.

In this experiment, we are going to try lighting up the coloured cards with different colours of light. Before, each card was lit up with white light and we used the coloured films on the spectacles to view the colours being reflected.

The different colours of light have been made by putting coloured films in front of white light. Can you explain why this works?

Now, we are not going to wear the spectacles to look at the cards, but we are going to turn off all the white lights in the lab and view the cards in different-coloured lights.

Once again, write your observations in the table below:

Colour of card	Colour of film	
White	Red	
White	Blue	
White	Green	
Green	Red	
Green	Blue	
Green	Green	
Red	Red	
Red	Blue	
Red	Green	
Blue	Red	
Blue	Blue	
Blue	Green	

Notice that the colour of an object that reflects light depends on the colour of light that is being used to illuminate it. Generally, we see things in white light, which is why we say that they have certain colours.

## Conclusions so far

A red card is red because it reflects ..... light

If we light up a red card with red light it will look .....

If we light up a red card with blue light it will look ..... as there is

.....

## One more colour

The cards that you have been using so far have been white, black, red, green and blue. You may know that the last three are called the *primary colours of light* (there are different primary colours for pigments as we will see in the next lesson).

Now, you have been given some yellow card. Using white light, view the yellow card through the different-coloured films. Record your results:

Colour of card in white light	Colour of film	What I see
Yellow	Red	
Yellow	Green	
Yellow	Blue	

Now try illuminating the yellow card with different-coloured lights and record the results:

Colour of card in white light	Colour of light	What I see
Yellow	Red	
Yellow	Green	
Yellow	Blue	

What does this suggest about the colour yellow on the card?