

There is an old proverb that says that all cats look grey in the dark. If it is really dark you cannot see anything, but you may have noticed that colours do not look the same in moonlight as they do in the daytime. Street lights can also make colours look different.

In the UK, most streetlights used to be 'sodium vapour lamps', which gave out orange light. Now many streetlights are being replaced by different kinds of lights that produce white light. These also use less electricity.

Sometimes coloured lights are deliberately used to change the appearance of objects. For example, coloured lights are often used in theatres to change the appearance of actors or objects on the stage.

- 1 Our eyes detect light emitted or reflected from the objects around us.
 - a Which part of the eye changes energy from light into nerve impulses?
 - b Why do we have three different types of cone cells in this part of the eye?
 - c Describe the differences in the way rod cells and cone cells detect light.
- 2 Fran is wearing black trousers with a white T-shirt and a blue coat. Explain why her items of clothing appear these colours in daylight. Use the words 'absorb' and 'reflect' in your answer.
- 3 Fran goes out at night, in a town with sodium streetlights.
 - a Explain why her trousers will still look black.
 - b Explain what colours her T-shirt and coat will appear.
- 4 Indoor light bulbs are not as powerful as streetlights, but their light seems brighter because they are closer to the things they are illuminating. Lower powered streetlights could be used if they were put on shorter poles. Suggest why this is not done.
- 5
 - a Moonlight is white light. Explain where this light comes from.
 - b Explain why things often look grey in moonlight. (Hint: you need to think about how your eyes detect light.)
 - c Not all cats will look grey in moonlight. Describe one colour of cat that will always look the same colour, no matter what kind of lighting it is in, and explain your answer.
- 6 The bulbs used in theatre spotlights produce white light. Explain how these spotlights can be made to produce coloured light.
- 7 A theatre has spotlights that produce red, green and blue light. Explain how some or all of these lights can be used to:
 - a make a white costume appear red.
 - b make a white costume appear yellow.

I can...

- describe the way our eyes detect colours
- explain why coloured objects appear coloured, and why their appearance changes in different coloured light
- explain how coloured light can be made, and the effect of combining light of different colours.