

## 1 Brightness and colour

## Reading

Put the sentences in the correct order.

**Colour vision**

- \_\_\_ In the retina there are two types of light sensitive cells known as receptors.
- \_\_\_ When there is not enough light falling on the retina they are not stimulated and you cannot see colours.
- \_\_\_ The ones that perceive only black and white are called rods, and the ones responsible for colour vision are called cones.
- \_\_\_ We see colours due to the combined stimulation of these three pigments.
- \_\_\_ Some of them are sensitive to black and white, others to colour.
- \_\_\_ Cones contain three different colour-sensitive pigments – red, green and blue.
- \_\_\_ However, because the rods are more sensitive you might still be able to see in black and white!

Add punctuation to this text.

You will need:

12 capital letters	C D D D E I I J S T T T
8 full stops	. . . . .
1 comma	,
1 colon	:
1 apostrophe	'
2 sets of inverted commas	“ ”
1 set of brackets	( )
1 hyphen	-
1 dash	—
1 slash	/

there are people who cannot see colours colour blind people lack the receptors in the retina that would enable them to distinguish between certain colours usually red and green such people otherwise have normal vision this is a congenital defect which is inherited

the term daltonism is derived from the name of the chemist and physicist john dalton 1766-1844 dalton described his and his brothers affliction of colour blindness with defective perception of red and green in the first scientific paper he published in 1798 it was entitled extraordinary facts relating to the vision of colours with observations it is the first recognized account of red green colour blindness

## Teacher's Notes and Answer Key

This worksheet is designed for one lesson and will take up to 45 minutes to complete. The activities are suitable for secondary school students of general science, biology or physics, and could follow on from a general introduction to light and vision.

### 1 Brightness and colour

### Reading

#### Aims

- to present the principles of colour vision
- to raise awareness of linkers and cohesion devices in a simple text

Students can try this activity alone. They should then check in pairs, and be encouraged to discuss the reasons for their choices if they disagree.

#### Key

1, 5, 3, 6, 4, 2, 7

(1) In the retina there are two types of light sensitive cells known as receptors. (5) Some of them are sensitive to black and white, others to colour. (3) The ones that perceive black and white are called rods, and the ones responsible for colour vision are called cones. (6) Cones contain three different colour-sensitive pigments – red, green and blue. (4) We see colours due to the combined stimulation of these three pigments. (2) When there is not enough light falling on the retina they are not stimulated and you cannot see colours. (7) However, because the rods are more sensitive you might still be able to see in black and white!

### 2 Daltonism

### Writing

#### Aims

- to introduce the notion of colour blindness
- to practise English punctuation

Students should be allowed to work on this in pairs or small groups. There is room for some disagreement about the answers. The key given here includes an explanation of the rules applied.

#### Key

There are people who cannot see colours. Colour-blind people lack the receptors in the retina that would enable them to distinguish between certain colours – usually

red and green. Such people otherwise have normal vision. This is a congenital defect which is inherited.

The term 'Daltonism' is derived from the name of the chemist and physicist John Dalton (1766–1844). Dalton described his and his brother's affliction of colour blindness with defective perception of red and green in the first scientific paper he published, in 1798. It was entitled 'Extraordinary facts relating to the vision of colours: with observations'. It is the first recognized account of red/green colour blindness.

### Explanation

Capital letters are required for the beginning of a sentence, for proper names (*John*) and for titles (*Extraordinary*).

Full stops mark the end of a sentence. They are usually required by the grammar and syntax: sometimes it is possible to join two sentences with a semi-colon or a colon instead if they are very closely related in sense.

The only comma required here is before 'in 1798', and it is needed to give the sense that this was the first paper he published at all, rather than just the first paper he published in 1798. It would be possible to use a comma instead of the dash in line 3, although the dash is preferable because it adds a comment that is not grammatically complete in itself or syntactically linked to the sentence. It would be possible to separate off the word 'otherwise' with a comma before and after it. You could put a comma after 'defect' (you could equally well put 'which is inherited' in brackets, as it only explains the meaning of 'congenital'). No comma should be used before John Dalton's name, which forms part of the noun phrase introduced by 'the chemist...'. It would be possible to separate off the phrase 'and his brother's' with commas, although it would then imply that he gave a separate description of his brother's affliction.

The colon in the title of Dalton's paper could have been a comma. The colon shows that the subtitle 'with observations' is quite separate from the main title.

The apostrophe in 'brother's' is needed to make it possessive.

Inverted commas around 'Daltonism' show that the word is mentioned rather than used. The second set is required for giving the exact words of the title.

The brackets are a conventional way of giving a person's dates.

The hyphen in colour-blind is required only because it is a compound attributive adjective (it comes before a noun). 'I am colour blind' and 'colour blindness' need no hyphens.

The dash shows that a few further words of comment, explanation or clarification follow.

The slash is conventional in putting together two alternatives to show the possibilities in the form of an adjective (red/green).