



Colours in light

Light

time

60 minutes

learning outcomes

To:

- know what a spectroscope is
- know that white light is made up from several colours
- know that each of the colours in white light has a different wavelength

end product

- a spectroscope

materials needed

- 24 CDs
- 24 toilet paper rolls
- scissors
- rulers
- thick black paper
- sticky tape
- a range of light sources
- coloured filter
- or coloured light bulb
- coloured chalks to draw the visible colours of light
- colouring pencils



Different colours 5 min.

Explain briefly that a light source emits light. Encourage the children to name some sources of light. The children complete [Task 1](#) on the worksheet. They are asked to think about what colours make up white light.



The children make an instrument that splits light into different colours.



Make a spectroscope 25 min.

A spectroscope is an instrument that can split sunlight into all the colours of the rainbow. Make sure all the children have the items they need to make a spectroscope. They will make a spectroscope using the instructions in [Task 2](#) on the worksheet.



For the spectroscope to work properly, it is important that the slit is very thin (see steps 5 and 6). The slit should be so thin that you can hardly see it. Check with the children that enough light can pass through by looking at a light source (not the Sun) through the base of the toilet paper roll.

Also make sure that the slit in the base of the toilet paper roll is at right angles to the slit on the top (see step 8).



What can you see? 15 min.

The children test their spectroscope. Encourage them to look at three different light sources, such as a strip light, an incandescent light bulb, an energy-saving bulb, or even sunlight. Important: make sure the children know they should never look directly into the Sun through their spectroscope. If possible get the children to look at a light source with a coloured filter or a coloured light bulb. What colours can the children see in the light sources? Next they should complete [Task 3](#) on the worksheet.



Colour spectrum 15 min.

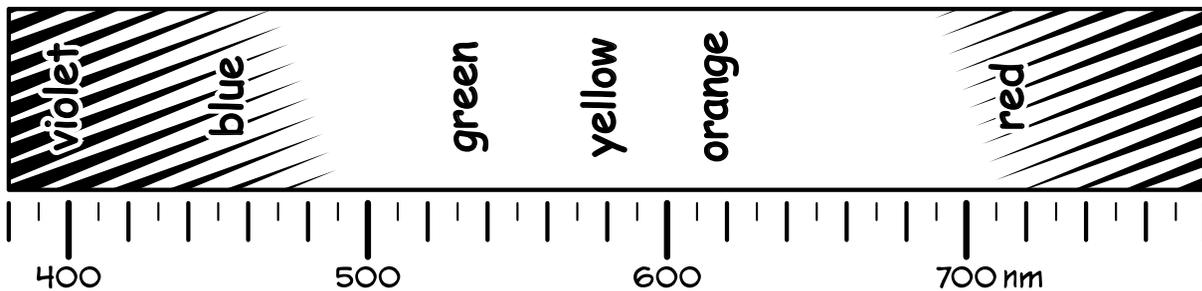
Discuss Tasks 1 to 3 on the worksheet. What colours did the children see in the various light sources? Did these match their predictions?

Explain that white light is made up from several colours. You can separate these colours

by passing the light through an object which reflects and refracts the colours at a different angle for each colour (thus changing their direction). Draw the colour spectrum on the board, using the drawing below. What colours can they see? Did the children see these colours through their spectroscope?

Explain that a spectroscope splits white light into its component colours enabling them to be seen. Ask the children if they know of any other instances where light is broken up into its individual colours. Come to the conclusion together that you can see various colours of light in a rainbow, in a puddle of oil on the ground, and in the reflection from a CD.

Tip. Search the internet to find a photograph showing the exact colours of the spectrum for white light.





Colours in light



You are going to make a spectroscope. This is an instrument you can use to investigate the different colours that make up white light.

1 Different colours

What colours do you think white light is made from?

2 Make a spectroscope



What do you need?

- a CD
- a toilet paper roll
- a pencil
- scissors
- thick black paper
- sticky tape
- a ruler

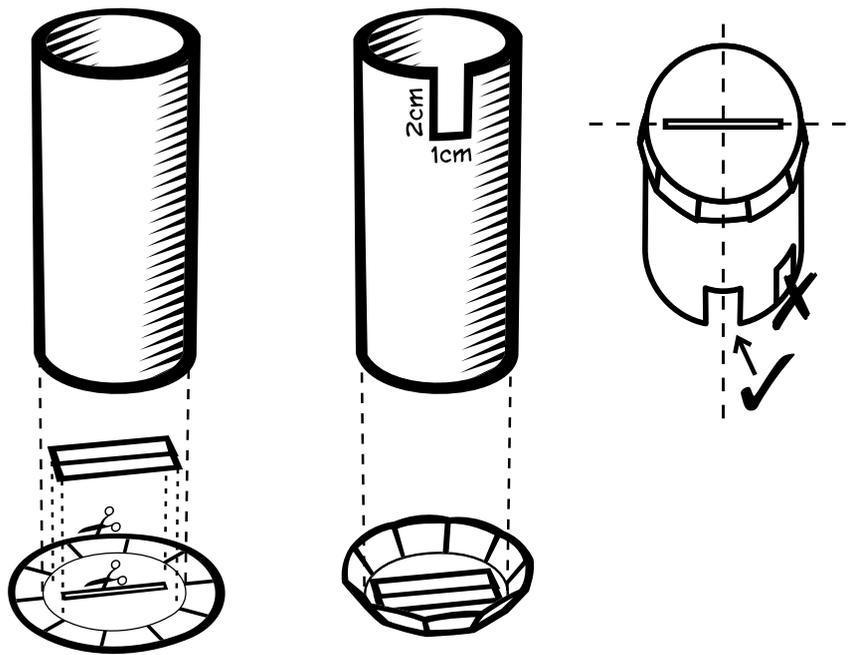


What do you need to do?

- 1 Put the toilet paper roll on the black paper. Make sure you have plenty of room all the way round. Use the pencil to draw a circle round the toilet paper roll.
- 2 Remove the toilet paper roll from the paper. Draw another circle 1 cm larger around the first circle, as shown in the drawing on the next page.
- 3 Cut out the circle. Make flaps in the outer circle by making 10 cuts as far as the inner circle, at equal intervals.

write your answer
HERE

- 4 In the centre of the circle with flaps, draw a rectangle measuring 1 x 2.5 centimetres. Use your scissors to carefully make a hole in the middle of this rectangle. Cut out the rectangle very carefully, so that you do not break the circle.



- 5 The slit needs to be very narrow, so you now need to cut a strip of black paper measuring 1 x 6 centimetres. Cut this from the edge of the sheet, so you know you will have a perfectly straight edge. Cut this strip in half, and place the two halves on the slit in the circle. Make sure that the two straight edges meet exactly in the middle.
- 6 Stick each half in place using sticky tape.
- 7 Cut a slit out of the top of the toilet paper roll. This slit should be around 2 centimetres long and 1 centimetre wide. Take a good look at the drawing to see where it should be. It is important that it is in the middle, under the slit in the circle!

8 Put the toilet paper roll on the circle with flaps and attach the flaps to the roll using glue or sticky tape.

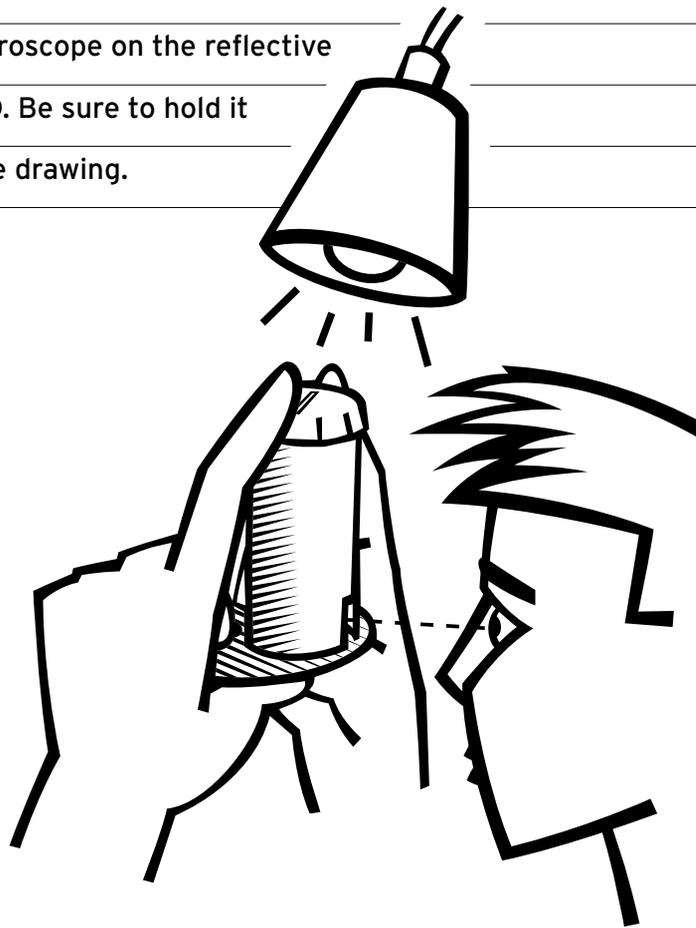
Your spectroscope is ready!

3 *What can you see?*



You are now going to investigate what colours you can see in a range of light sources.

1 Put your spectroscope on the reflective side of your CD. Be sure to hold it as shown in the drawing.



2 What colours of light can you see on your CD?

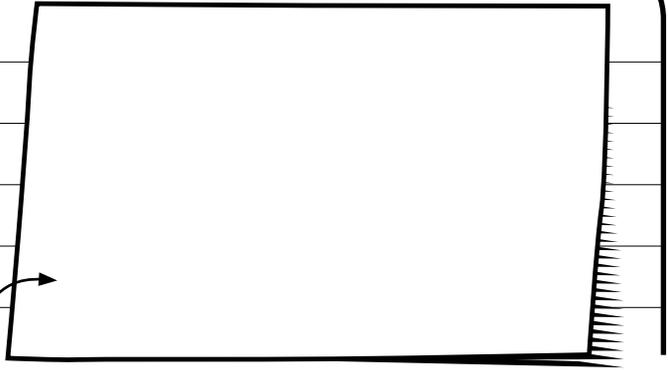
3 Repeat this experiment using at least three light sources. Write down on the following page what each light source is and make an accurate drawing of what you can see.

Use colouring pencils to draw the colours.

Light source 1 is a:

write the colour(s) you saw HERE

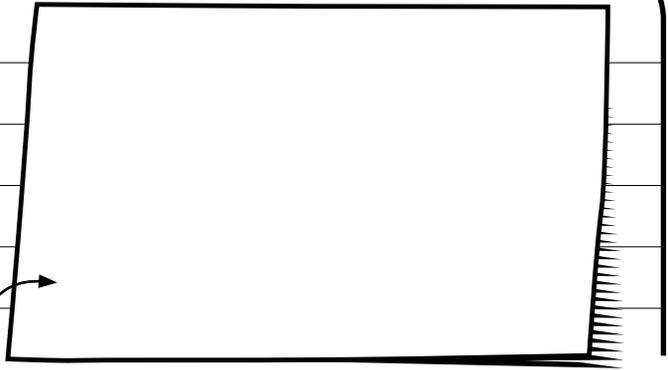
colour in the colours you saw HERE



Light source 2 is a:

write the colour(s) you saw HERE

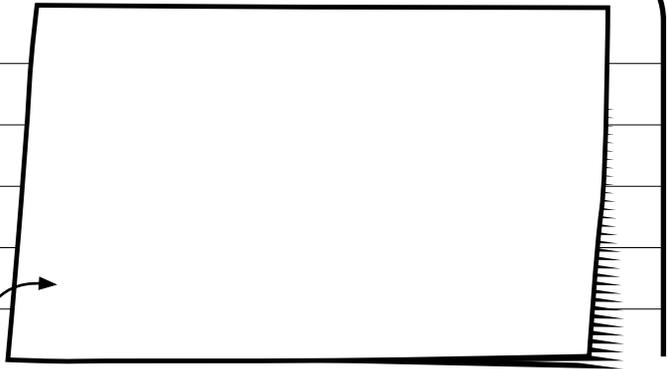
colour in the colours you saw HERE



Light source 3 is a:

write the colour(s) you saw HERE

colour in the colours you saw HERE



Light source 4 is a:

write the colour(s) you saw HERE

colour in the colours you saw HERE

