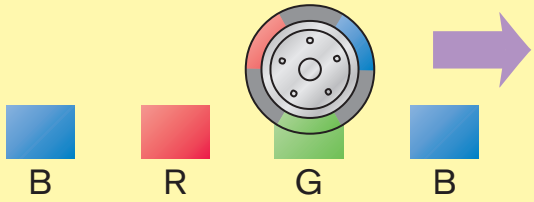
Colour wheels

Generalising from patterns

Imagine a wheel with different markings – red, green and blue – painted on it at regular intervals.

As the wheel goes round, a trail is painted on the ground:
BRGBRGBRGBRGBRGBRGB...



Make sure that you can predict where the blues will appear.
Can you predict where the red and green marks will appear?

Can you predict the colour of the 18th mark?
The 19th? The 31st? The 59th? The 299th?
The 3311th? The 96 312th?

How did you work it out?

Now consider wheels that produce:

- BBYGBBYGBBYG...
- BYBRBYBRBYBRBYBR...
- RRRBBYRRRBBYRRRBBYRRRBBYRRRBBY...
- RRBRRRRBRRRRBRRRRBRRRRBRR...

What will the 24th colour be in each case? The 49th colour?
The 100th?

How did you work it out?

What if ... ?

- Suppose a wheel has 6 markings. Where must red be painted on it so that the 100th mark made is red?
- Consider other wheels (with more or fewer markings) that would give you a red in the 100th position.
- The 3rd mark on a wheel is the only red mark and the 100th mark made by the wheel is also red. How many marks are there on the wheel altogether? How many marks could there be on the wheel if more than one of them is red?