Teacher and Technician Sheet

In this practical students will:

- Carefully observe and record what happens when multicoloured discs spin.
- Use scientific evidence to answer questions and explain their observations.
- Test what happens when different combinations of colours are used on the discs.

Introduction for Teachers:

(This topic could start with a group discussion about colour around us and about the rainbow, during which the teachers introduce the following ideas especially the words in bold. This practical is best done after the Making a Rainbow experiment (A), in which case it is useful to get the children to recall what they learnt in the rainbow experiment.)

When we see it is because our eyes have received **stimulation** from **light** and the **brain** has **translated** that stimulation into **information**. Important information is that of **colour, shape** and **lines** discriminating the object. The eye can respond to stimulation from light to give colour and shape to an object.

In art, colour is very important for perception of shape. The **colour wheel** is often used by artists to explain relationships between different colours. Artists use this approach to determine which colours look good with each other. They also use the colour wheel to determine how to mix paint to produce more colours.

All colour combinations can be made by mixing three **primary colours** with white and black. The three primary colours of red, yellow and blue can be mixed to create the **secondary colours** of orange, green and violet. Using these secondary colours with the primary colours it is possible to create the **tertiary colours,** such as blue-green and the other in-between colours.

If we split **white light** into its component parts known as the **spectrum** we get seven colours that form the colours of the rainbow. They are Red, Orange, Yellow, Green, Blue, Indigo and Violet (ROYGBIV which can be remembered as a mnemonic '**R**ichard **O**f **Y**ork **G**ave **B**attle **I**n **V**ain'). Try making up your own.

In this experiment the pupils discover what happens when colours are mixed in a physical way, by spinning a disk with the seven colours on it and a disk with just two colours on it. Pupils can work individually then come together in groups of four to discuss their results and ideas.

Curriculum range:

All ages can take part in this activity but it is probably best done with upper juniors. The aim is to gain some understanding of the thinking of the scientist and artist with respect to colour and colour mixing. It links with:

- setting up simple practical enquiries, comparative and fair tests;
- reporting on findings from enquiries and observations, including oral and written explanations, displays or presentations of results and conclusions;
- using straightforward scientific evidence to answer questions or to support their findings;
- building a more systematic understanding of light and colour by exploring and comparing the properties of light as it interacts as different colours;
- asking questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience;
- using appropriate techniques, apparatus, and materials during laboratory work, paying attention to health and safety;
- presenting reasoned explanations, including explaining data in relation to predictions and hypotheses; and
- learning about the concept of primary, secondary colours in relation to light and pigments.

Hazard warnings:

The only hazard is the use of the hole punch but this can be overcome by asking students to bring their disks to an adult who will punch the hole for them. Alternatively a hole can be made using a pencil.

Equipment:

- 1 coloured pencil
- 1 round small plate or paper plate
- 1 protractor
- 1 hole punch
- 1 set of felt tip pens (red, orange, yellow, green, blue, indigo, violet)
- 1 pair scissors
- 1 long pencil
- Transparent sticky tape
- Posterboard or stiff cardboard (about A4)
- Blue tack

- Ruler
- Rubber bands

Technical notes:

Below is a colour wheel that could be used if children find it hard to make their own disk. It can be printed using a colour printer.

This experiment is best done in daylight or in a room with white fluorescent lights.

An alternative method is to glue the coloured disk on to a dowel rod, hold the dowel in an electric drill, and use the drill to spin the disk. The disk can be secured using Blutack

Going further:

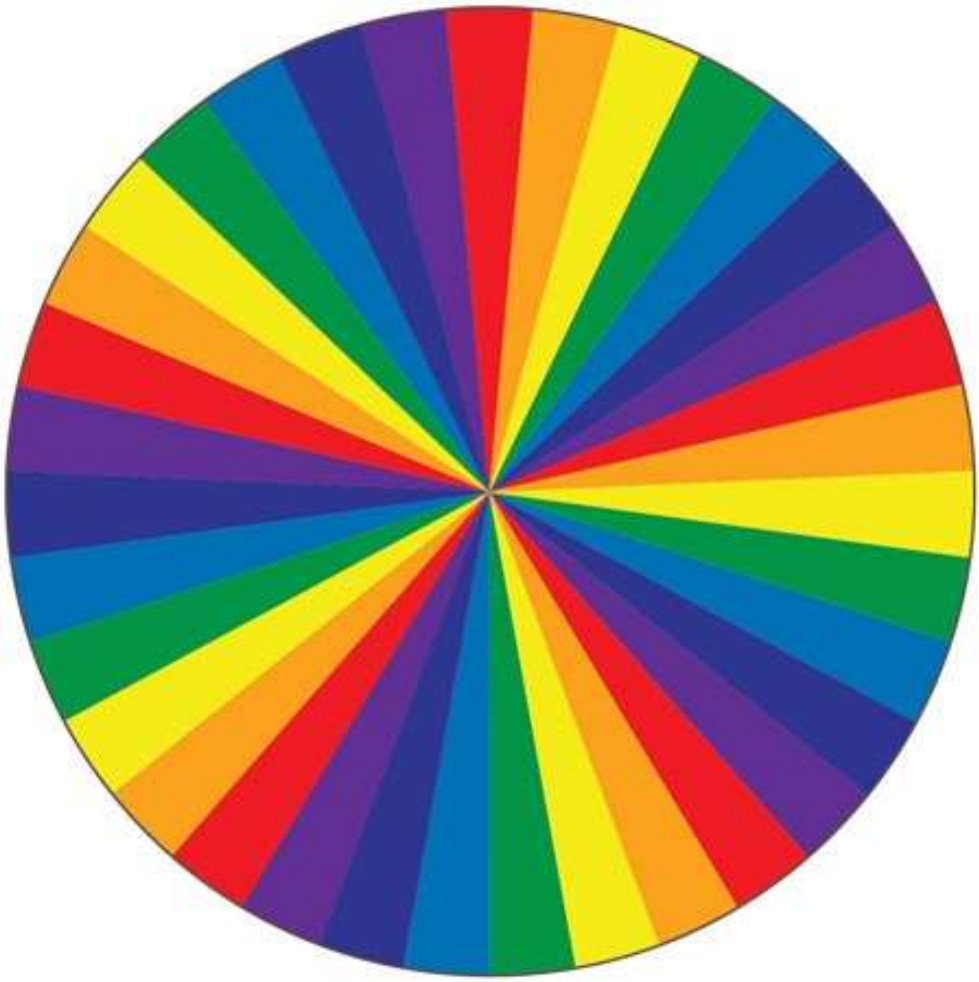
Use the spinner you first used but with different colour combinations and spin the disks at different speeds.

What different effects can you create with the different speed of spinning and different combinations of colours?

Results:

When the disk is spun at high speed the colours disappear and the disk appears white. The faster the spinning the better the result is and the clearer the effect.

Good results can also be obtained by attaching the disk to rubber bands that are wound up and then released, or by attaching the disk to a hand held fan with blue tack.



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