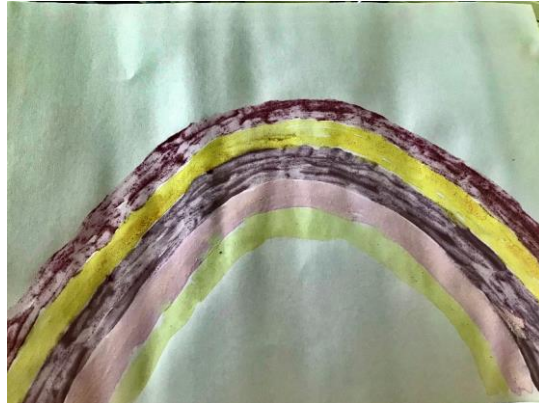


Paint a fruity rainbow using homemade paints



You can make your own watercolour paints using a variety of different things that you can find in your kitchen cupboards, freezer or in the garden. In order to extract the pigments or colours from them you need to process the materials.

Where do we get pigments from?

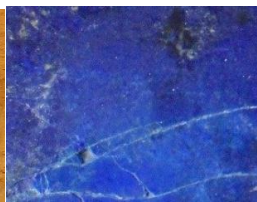
If we want to make an object a particular colour, we need to find the right coloured pigment.

Historically we have used:

- dry materials from mineral sources like types of stones or rocks which are ground down into a powder, for example ochre which is yellow, orange or brown and lapis lazuli, which is blue.
- biological sources like plants or insects, for example woad, a plant whose leaves produce a blue dye and cochineal a type of beetle which can be processed to produce a red dye called carmine.



OCHRE



LAPIZ LAZULI



WOAD



CARMINE

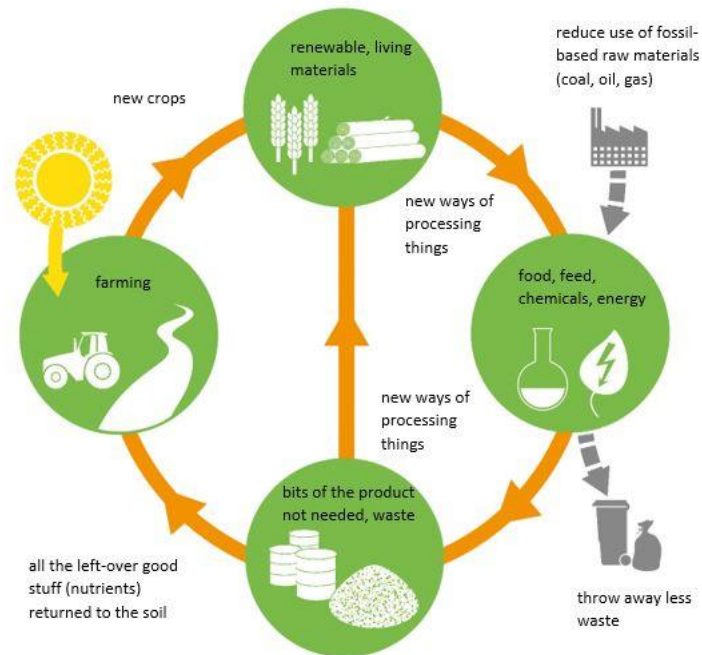
Some colours e.g. purple and bright blue are hard to extract making them rare and expensive. This changed in the 18th and 19th Centuries when we discovered how to make pigments from industrial processes. For example, bright blue was very difficult to make and expensive until in 1706 Prussian blue was discovered. Most of the pigments we use are now made from industrial processes on a large scale.

Often these older pigments contained quite toxic materials such as cyanide and lead.

Because the materials we're going to be extracting the pigments from today are grown in nature, we would say that they are part of the bioeconomy.

What is the bioeconomy?

The bioeconomy is part of our everyday lives. It involves using renewable living things such as plants, animals and microbes to produce food, energy and other materials to reduce our need for non-renewable resources like oil and coal as well as cutting the amount of waste we produce, and so having a positive effect on the health of our planet.



At the Biorenewables Development Centre our work is focussed on converting these naturally occurring materials including plants, microbes and wastes into useful things.

One example of a company working in the bioeconomy is Keracool in Leeds. They have created a natural hair dye and purple hair serum using blackcurrant waste from the production of Ribena. The dyes use waste created after the berries have been pressed for juice: <https://drcraft.co.uk/>



Now make your own!:

- A pestle and mortar (or a bowl and spoon)
 - A sieve
 - A jug of water
 - Flour or cornflour
 - A selection of coloured flowers, leaves, berries or spices (e.g. dandelions, green leaves, grass, frozen or fresh blackberries/red currants, turmeric powder)
 - Paper
 - Paintbrush
 - Teaspoons for mixing
1. Put each of the materials in your mortar and grind them with a little water as hard as you can to make a kind of paste.
 2. Use the sieve to filter out all the bits so you have a nice smooth liquid.
 3. Some of the materials (e.g. leaves) release their colour more easily when they are boiled for a few minutes.
 4. If your final liquid is too runny, you can add flour to thicken it, or if it's too thick you can add some more water.
 5. Have fun experimenting with different colour combinations.

The processes you have followed to create your paints are similar to those we use in our labs. In the lab we **pre-process** materials to make the next step work better. Examples of pre-processing can be chopping, heating or exploding materials like straw or using enzymes to break open difficult materials.

When you used your sieve to separate the stuff you didn't want from your liquid, we do something similar with liquid or gases in the lab to extract materials on a bigger scale. By sieving or **filtering** out materials we might be able to still use these materials for something: for compost, or to feed microbes to make useful things or energy.

Health and Safety:

- Care should be taken if picking plants/flowers as they may have thorns, may be poisonous, or may cause a rash. We recommend wearing gardening gloves. Children should be supervised.
- Paints and their ingredients should not be eaten
- Children should be supervised if boiling any ingredients in order to make the paint

<http://yorkfestivalofideas.com/2020-online/discovery-zone/fruity-rainbow/>