



Colour changing cabbage juice

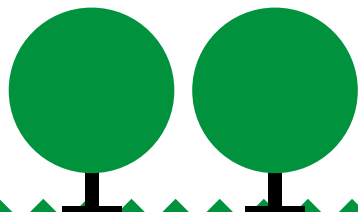
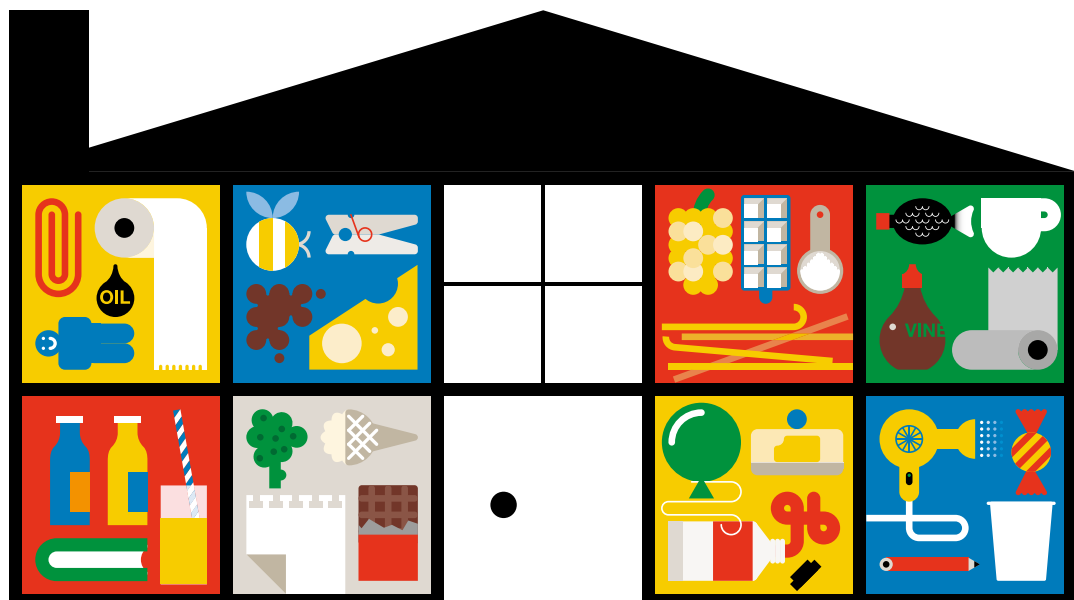


The activity

Make a liquid that changes colour.

ExpeRiment to see how the different substances change the colour of cabbage juice.

Learn about the science of indicator solutions and chemical reactions.





What you'll need

- A quarter or so of a red cabbage
- A sieve
- Water and other liquids to test such as vinegar, orange juice, lemon juice, fizzy water, soft drinks, washing up liquid, liquid soap.
- An egg (optional)
- Bicarbonate of soda solution (put a few teaspoons into a glass, add water and stir well)
- Clear glasses and a jug to pour liquids into.
- Blender (optional - see below)

Special materials

- Blender: this makes it quicker to do the activity but is not necessary. If you don't have a blender, you can extract the cabbage juice (indicator solution) by simply chopping or tearing up the cabbage leaves and soaking them in hot water. Wait for the liquid to cool, then use it as described below.
- An egg is a good thing to test because it gives an interesting (and perhaps unexpected) colour change when mixed with the cabbage juice.

What to do

Chop or tear up a couple of cabbage leaves and put them into a glass of cold water. Stir them around. Ask your child or children questions about what's happened so far.

Explain to the children that you need lots of the purple colouring from the cabbage to do the next stage of the experiment and that you can extract it more efficiently using a blender.

Place a handful of chopped or torn up raw cabbage leaves into the blender. Add some cold water to cover the cabbage.

Blitz the cabbage and water together until you can see that the water has gone dark purple.

Pour the contents of the blender into a jug through a sieve



Being safe

There are no specific risks with this activity but we always recommend that you use common sense and take general care.

Continues >>



What to do (continued)

so that you separate any remaining bits of cabbage leaves from the purple liquid.

Add the same amount of water to the purple liquid, so you get twice the amount of liquid in your jug. Now you're ready to experiment:

Pour a little bit of this purple liquid into a glass (fill the glass a quarter or a half full at most).

Slowly pour a little bit of vinegar into the purple liquid. Add more if there is not an immediate or obvious change.

Repeat this with other liquids, testing to see what effect they have on the cabbage juice.

Try an egg and the bicarbonate of soda solution if you have some.

Questions to ask children

When first adding cabbage to water:

What do you think will happen?

Why do you think the water is turning purple?

When adding other liquids to the cabbage juice:

What do you think will happen if add this to the cabbage juice?

What do you notice about the liquids that make the cabbage juice turn reddish? Do they have anything in common?

What do you notice about the liquids that make the cabbage juice turn blue or greenish? Do they have anything in common?

The science

When you put cabbage in water, some of the chemicals which make it red (or purple) dissolve in the water. These chemicals are called anthocyanins. Blitzing the cabbage, or soaking it in hot water, are simple ways to extract these chemicals and use it for our experiments.

When the cabbage juice is mixed with different liquids, it changes colour because a chemical reaction takes place.

Continues >>



The science
(continued)

The colour change we see depends on the properties of the liquid we test.

We call liquids like cabbage juice indicator solutions, because they tell us something about the chemical composition of other substances. In this case, substances which make the cabbage juice go red have properties which scientists categorise as acidic and ones that make the cabbage juice go blue or green are known as alkaline. At home, substances like orange juice and vinegar which taste sharp, tend to be acidic.

It's fun to just look at the colour changes you can get with cabbage juice but this activity is a great way to introduce children to the idea that we can use chemical reactions to learn about the properties of substances.

Going further

Once you've identified liquids and other substances in your home which make the cabbage juice go red and ones that make it go blue, see what happens when you mix them together and whether it's possible to make the cabbage juice go back to its original colour.

Try to make a rainbow of glasses using cabbage juice with different substances put in it.

Watch this video that uses indicators to show some very important science:
<http://bit.ly/IndicatingScience>