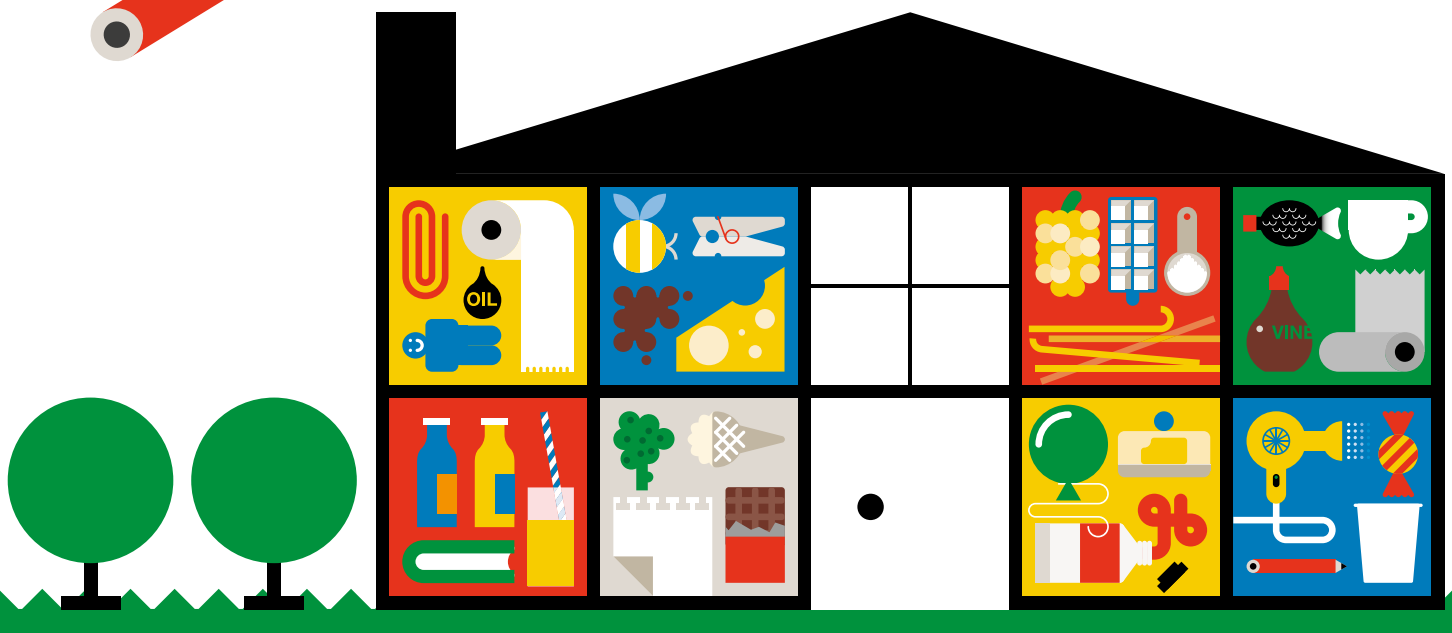
Making butter

The activity

Make your own butter from double cream.

ExpeRiment to see how doing different things to the cream results in different products.

Learn about the science of how cream turns into butter.



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What you'll need

- 1 small carton of double cream which has been left out at room temperature for between 12 and 24 hours.
- 1 small carton of double cream which has been kept cold in the fridge (if you also want to make whipped cream)
- Small jam jar. Make sure it is thoroughly clean before use
- Whisk
- 1 bowl to whisk cream in (ideally kept refrigerated before doing activity)

What to do

To make butter

Half fill the jam jar with cream which has been at room temperature for at least 12 hours (not more than 24).

Screw the lid on securely and turn upside down to ensure no cream leaks.

Shake the jar vigorously for a few minutes. You should notice that the cream coats the sides of the jar at first.

After a while, you should notice a change in the jar feels as you shake it. Also, the cream will not stick to the sides of the jar so much. At this point, stop shaking and open the lid to look inside the jar. If you have a big lump of yellow butter, you are ready to move onto the next stage. If not, put the lid back on the jar and carry on shaking it.

Once you've shaken the jar for several minutes, you should be left with a bright yellow solid in a pale white liquid. Carefully pour the liquid away or into another container (this liquid is called buttermilk and you can use it for cooking).

Pour some cold water into the jar and swirl it gently around to "wash" the butter.

Pour the water away and repeat this.

The butter is now ready to eat. You can spread it onto bread or whatever else you choose.

Special materials

Bread or something else to spread your butter on if you plan to eat it. Fruit to have with your whipped cream.

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What to do (continued)

Being safe

There are no specific risks with this activity but we always recommend that you use common sense and take general care. The butter should be edible but we recommend that you start with a thoroughly clean jar – wash it with soapy water and rinse it with hot water before use. "Wash" the butter carefully by rinsing it with cold water to remove all traces of milk and avoid touching it with your hands. If you plan to keep the butter to eat, store it in a refrigerator.

If you plan to keep the butter, you should take it out of the jar and use the back of a spoon to press it down into a new container. Pour away any liquid that comes out when you press it down. You can add a little salt and stir it into the butter before you press it down.

Store in a refrigerator.

To make whipped cream

Pour cold cream into the bowl (it should not fill the bowl up more than half way up).

Gently start to whisk the cream, increasing your speed as you feel the texture of the cream start to change from being runny and foamy to being more like a mousse.

Whisk the cream more vigorously. In a little while, the cream should start to take up more space in the bowl and get "thicker". Carry on doing this until the whisked cream holds its shape when you lift the whisk up, making 'soft peaks' of cream.

At this stage you can eat the whipped cream by putting it onto cake or fruit.

If you carry on whisking the cream, it will become firmer and make "firm peaks" when you lift the whisk out of the bowl.

If you carry on whisking it beyond this point, the cream will turn into butter.

Questions to ask children

What do you see happening?

Does it feel different as you shake it for longer?

Does it look different in the jar?

What do you think has happened to the cream?

Where has the butter come from? (We haven't added anything to the cream so the stuff the butter is made of must have been already in the cream)

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Questions to ask children (continued)

Do you think we can turn the butter back into cream?

Once butter/whipped cream has formed: in what ways is the butter/whipped cream different to the cream you started with?

The science

It's surprisingly easy to make your own butter and it's a brilliant way to get children to think about the science of how one substance can be changed into another.

Milk and cream are composed mainly from water and fat. The fat is in the form of microscopic globules, which are like tiny balloons filled with fat molecules. Cream has more of these fat globules than milk, which is why it's thicker.

When we shake the cream in a jar, the globules bash against each other. This makes their skins break, so the fat molecules spill out. As we keep shaking, the freed fat molecules join together making one big lump of fat which separates out from the water. This is how butter is formed.

Whisking the cream adds air to it and breaks apart the fat globules in it. The fat forms protective bubbles around tiny pockets of air and changes the cream from a liquid into a foam, which we call whipped cream.

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Going further

Instead of leaving the butter in the fridge, leave it out at room temperature and see what happens over a few days (don't eat it!)

Make "plastic" from milk: http://bit.ly/PlasticMilk

Make yoghurt from milk: http://bit.ly/YoghurtMilk