



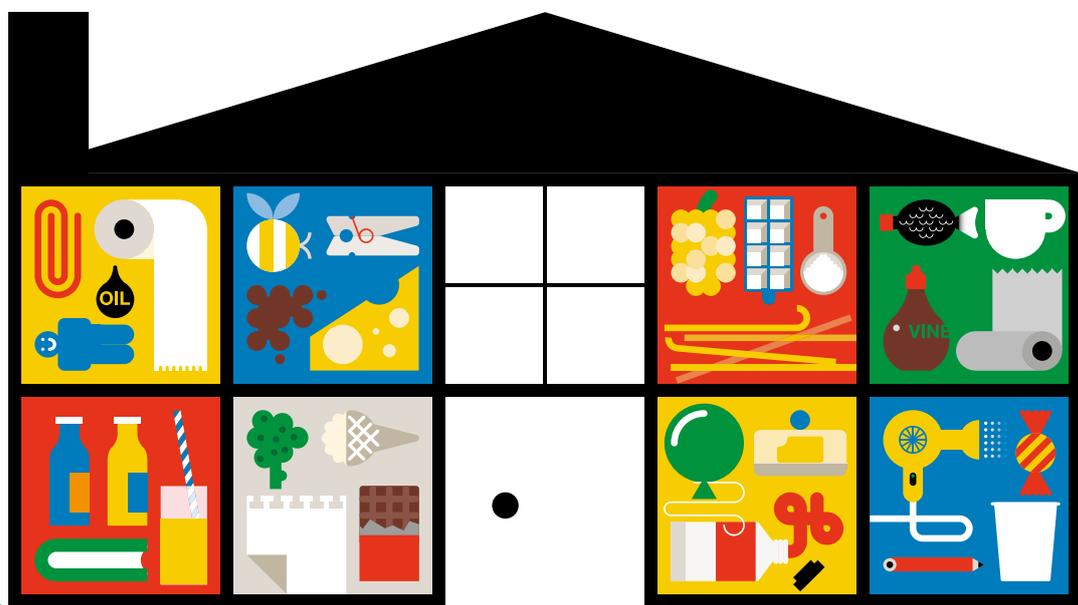
# Playing with play dough

## The activity

Make your own play dough from simple ingredients.

ExpeRiment to see how the different ingredients combine with each other.

Learn about the science of mixtures, solutions and chemical reactions.





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### What you'll need

- 500ml of plain flour
- 250ml of cooking salt
- 250ml of warm water (from the hot water tap)
- 1 tablespoon of vegetable oil
- Some liquid food colouring.
- Note: you don't have to have exactly these amounts of the above ingredients, there's plenty of wiggle room for when you or your children are measuring them out.
- Spoon for stirring
- Mixing bowl
- Wooden spoon or spatula for mixing
- Chopping board (optional)

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### What to do

Put the flour in the mixing bowl. Add the salt and stir. Ask your child questions about what's happened so far.

Pour a few drops of the food colouring into the water.

Add the oil to the water and food coloring. Give it a good stir. Wait to see what happens.

Pour the water, food colouring and oil mixture into the flour and salt mixture and stir it all together. Once all the water has been absorbed, use your hands to knead the mixture. When it starts to turn into a dough, take it out of the bowl and knead on the chopping board or kitchen table.

After a few minutes of kneading, you should have made your own play dough.

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### Questions to ask children

#### **When mixing salt and flour:**

In what ways is the flour similar to the salt?

In what ways are the salt and flour different?

What do you think will happen if we mix the salt and the flour?

What's happened to the salt and flour? Is the salt still there?

Do you think we can get the salt back out?



### Questions to ask children (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 play dough is made from edible ingredients but will not be pleasant to taste and has a lot of salt in it. It's best to avoid eating it.

#### When mixing food colouring and water:

In what ways is the food colouring similar to the water?

In what ways are food colouring and water different?

What do you think will happen if we mix them together?

What's happened to the food colouring?

Do you think we can separate the food colouring from the water again?

#### When adding oil to the coloured water:

In what ways is the oil similar to the water?

In what ways are oil and water different?

What do you think will happen if we mix them together?

What's happened to the oil?

Do you think we can separate the oil from the water again?

### The science

Putting salt and flour together produces a 'mixture'. In chemistry, this is when two substances are physically combined but no reaction has taken place. The salt and flour are still there in their original form and, in theory, they could be separated again using a very fine sieve.

When two liquids, like water and food colouring, mix completely, we call the resulting mixture a 'solution'.

Oil and water do not mix. We say that they are 'immiscible'. The particles in the oil are held together very tightly, so they do not mix with the water. Oil is also less dense than water, so it floats on top.

When you put all the ingredients for the play dough together and knead them, you get something very different to the things you started with. The new substance is formed because chemical reactions have taken place. It would be very difficult to turn the play dough back into the original ingredients.



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The science  
(continued)

Adding water to the flour allows long chain like molecules in the flour (called proteins) to stick together. This helps to hold the water in place and keep the dough together. Salt helps in this process by letting the proteins stick together more strongly (it also helps to stop your dough going bad). The oil coats the other ingredients and helps keep the play dough from drying out. The molecules from the food dye spread out throughout the dough and give it a colour.

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**Going further**

You can see what happens to the dough if you try leaving out some of the ingredients, for example the oil or the salt. How does leaving these ingredients out affect the play dough you make?

There are other recipes for making play dough, including one that involves slightly different ingredients and requires heating. Try these out and see whether the play dough you make is better or worse: <http://bit.ly/PlaydoughRecipes>

Try making oobleck – this uses similar ingredients but you end up with a very different substance to play dough: <http://bit.ly/Makingoobleck>

