

Why do marshmallows expand in the microwave?

From the sweeties.net wiki

A marshmallow looks solid, but it is mostly bubbles. That is the secret of the trick: see [how are marshmallows made?](#)

What a marshmallow is made of

Marshmallows have four basic ingredients: sugar, water, air and a whipping agent, usually a protein such as gelatine. The mixture is whipped into a foam, a liquid with gas bubbles spread all through it, and a marshmallow is about 50% air.

Gelatine does two jobs. It helps trap the air, and it forms a tangled, three dimensional network of long protein chains, which is what makes a marshmallow chewy and springy. That network can stretch: see [gelatine in sweets explained](#)

What the microwave does

According to Science Buddies, two things happen at once when a marshmallow is heated in a microwave:

1. **Water turns to vapour.** Some of the moisture inside the marshmallow evaporates, adding extra gas to the bubbles.
2. **The gas gets hotter.** Warm gas pushes outward with more force than cold gas, so each bubble presses harder on its walls.

Because the gelatine network is stretchy, the bubbles can grow, and the whole marshmallow swells.

Why it shrinks back

Take it out and it starts to slump. As the marshmallow cools, the gas inside the bubbles cools and contracts, and the gelatine firms up again, so the marshmallow shrinks back towards its original size.

Try it safely

This makes a good kitchen experiment, but a microwaved marshmallow gets very hot. Let it cool before anyone touches or eats it, and keep an eye on children. For melting marshmallows on purpose, for rocky road or hot chocolate, see [how to melt marshmallows](#). And for what happens when marshmallows meet an open flame instead, see [why do marshmallows catch fire so easily?](#)

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