History of Wheat
The development of breadmaking wheat

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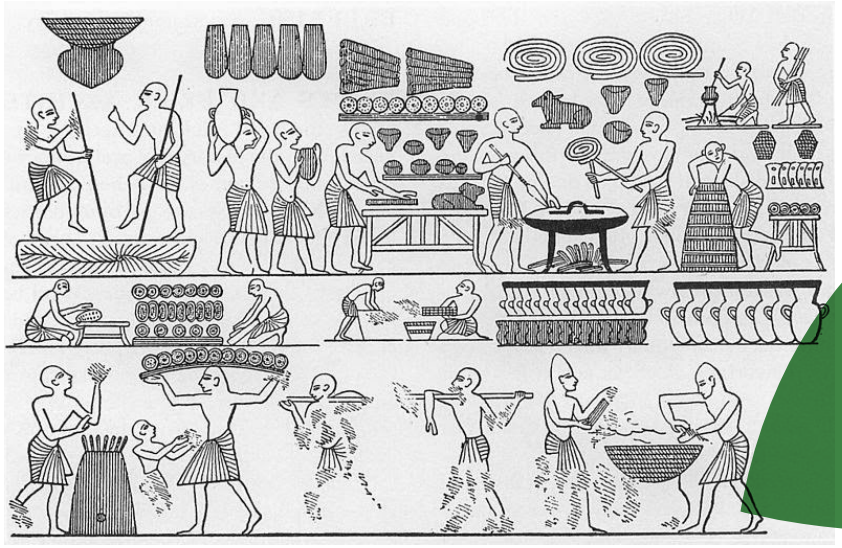
~8,000BC
Wheat first emerged via hybridisation of emmer and wild grass in the "Fertile Crescent" in the Middle East (encompassing modern-day Syria, Jordan and Turkey). For millennia it was cultivated as diverse, locally adapted landraces.

The "Fertile Crescent". Dorling Kindersley.



The court bakery of Ramesses III. The Historical Cooking Project.

~6,000BC
Wheat came to Egypt, where Egyptians are credited with the development of ovens and bread baking.

Mid 18th century
The first selections by plant breeders took place, leading to higher yields but less diversity.

Mid 20th century
The 'Green Revolution' introduces dwarf wheats and chemical inputs for higher yields but at further cost to diversity and the food value of grain for people.

Short-strawed wheat field. Tara Wight.

Today
These 'modern' varieties make up the vast majority of wheat grown globally, primarily in a monoculture using intensive environmentally-damaging farming techniques.

A monoculture field. File photo.

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The Wheat Family Tree

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Wild **einkorn**
(triticum urartu)

Goat grass 1
(aegilops speltoides)

Wild **emmer**
(triticum dicoccoides)

Cultivated **emmer**
(triticum dicoccum)

Goat grass 2
(aegilops tauschii)

Durum
(triticum durum)

Spelt
(triticum spelta)

Common
bread wheat
(triticum aestivum)

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From Grain to Flour
Anatomy of a Grain

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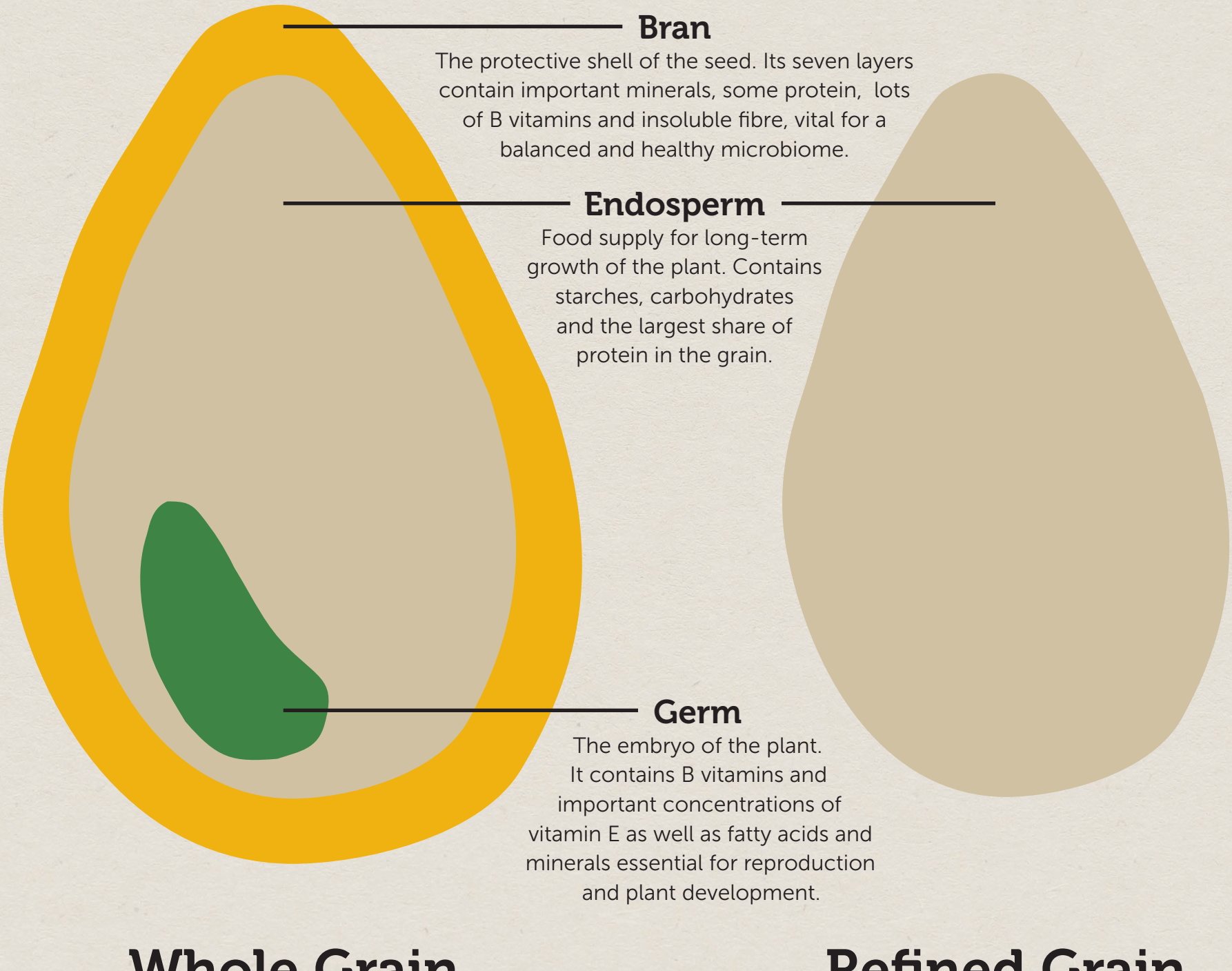

Bran
The protective shell of the seed. Its seven layers contain important minerals, some protein, lots of B vitamins and insoluble fibre, vital for a balanced and healthy microbiome.

Endosperm
Food supply for long-term growth of the plant. Contains starches, carbohydrates and the largest share of protein in the grain.

Germ
The embryo of the plant. It contains B vitamins and important concentrations of vitamin E as well as fatty acids and minerals essential for reproduction and plant development.

Whole Grain

Refined Grain

Wholemeal flour contains all parts of the grain, whereas white flour milling removes all but the endosperm. This means that in a well-fermented wholemeal bread you will benefit from all of the vitamins, minerals and fibre the grain has to offer!

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From Grain to Flour
Milling Methods

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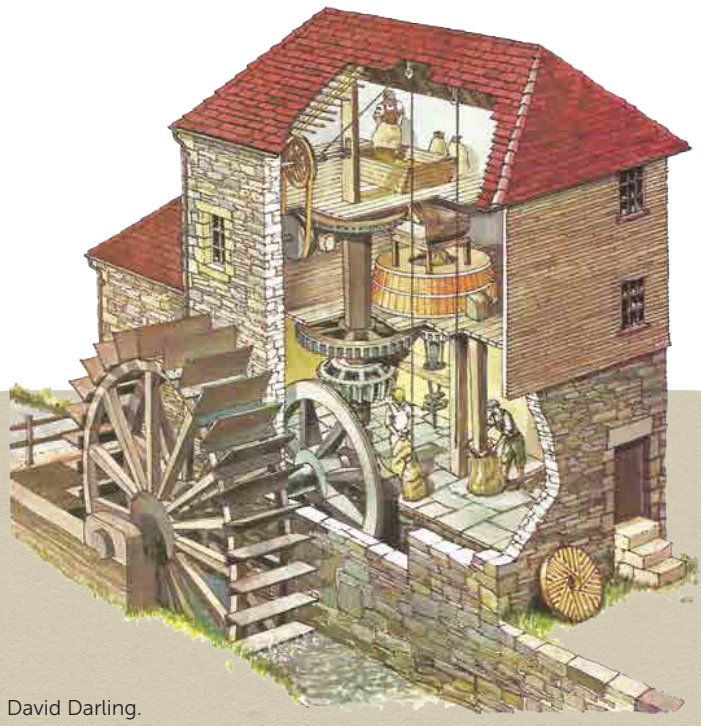
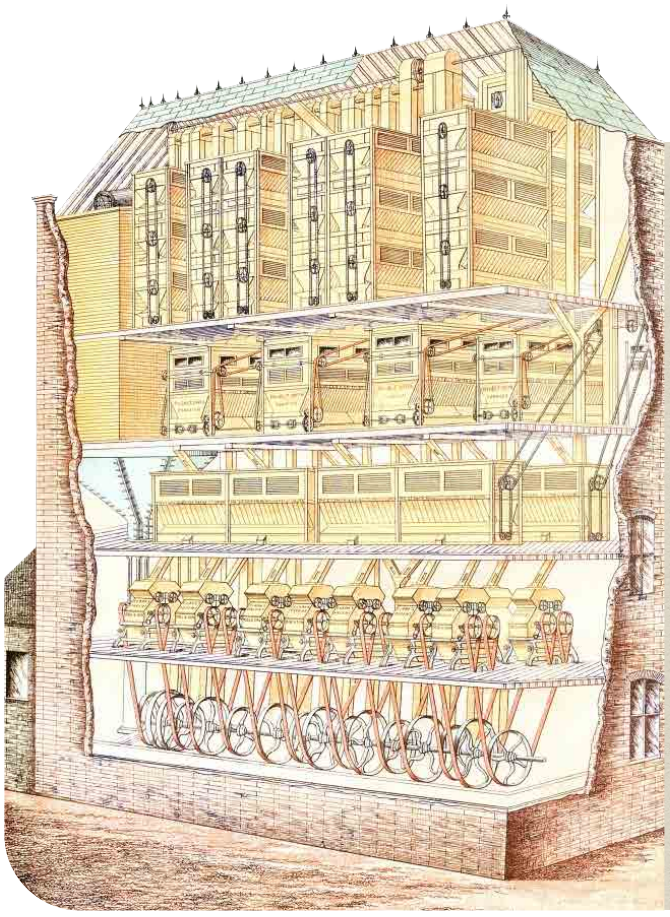
There are several different types of mills used to make flour from wheat. Using different energy sources and milling methods, there are lots of variables which affect the flour produced.



David Darling.

Historically **wind and watermills** use the power of these elements to turn large stones which grind the grains. The flour can then be sifted to remove some of the germ and bran for a lighter result, but these flours normally still contain at least some of the nutrients from these parts of the grain.



Most bread today is made from white flour processed using a **roller mill**. In these, the grain is crushed between rollers and repeatedly sifted to separate the starchy endosperm from the germ and bran.

The Mills Archive.

Scotland The Bread's **Zentrofan mill** uses cyclone technology, blowing the grain around inside a chamber made from volcanic rock until it is fine enough to leave the chamber. Nothing is removed from the grain and it remains cool throughout the process, meaning that it retains more of its important nutrients.

Scan the QR code to learn more.

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Making Bread

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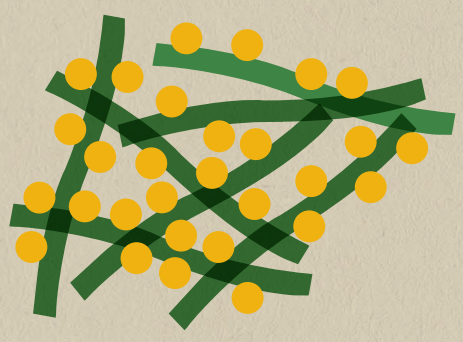
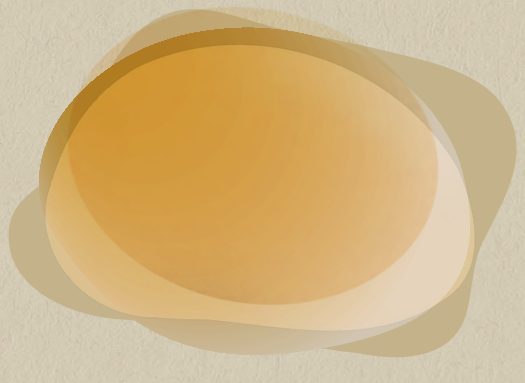
Wheat flour contains the proteins **glutenin** and **gliadin**.

When water is added to flour, these proteins bond together to form **gluten**.

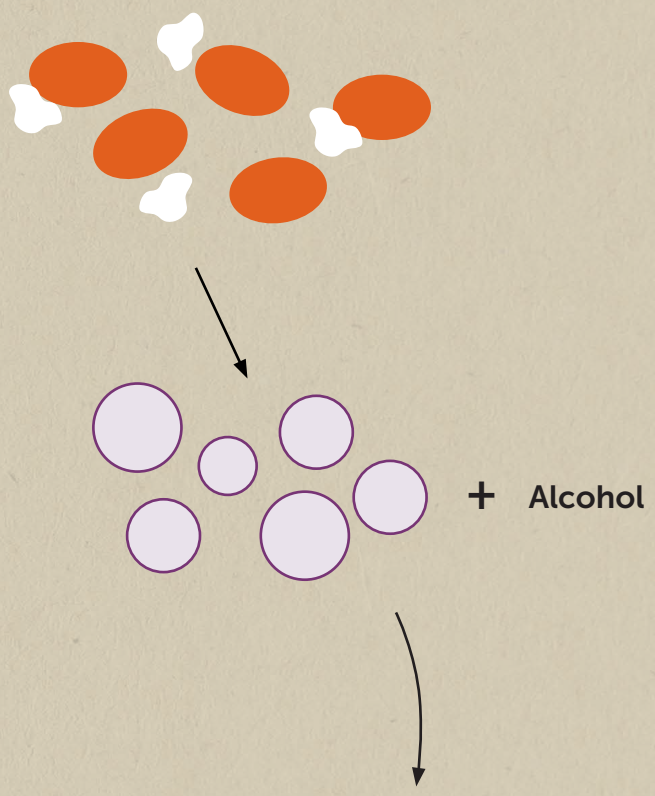


Over time, this gluten will form a stretchy **web-like structure**. This can be strengthened through movement, such as kneading the dough.

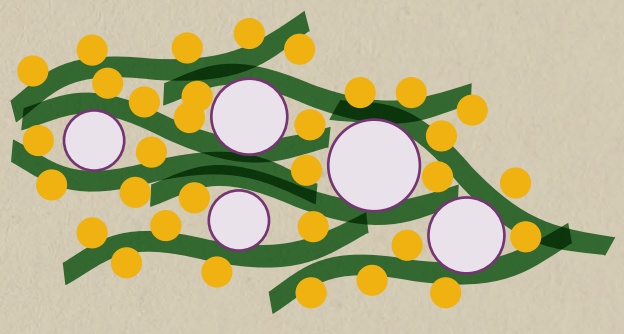
Baking sets the internal structure of the inflated gluten network, while remaining sugars caramelise to create a browned crust on the finished bread.



At the same time, fermentation occurs as **yeasts** feed on the **sugars** present in the flour, producing **alcohol** and **carbon dioxide gas**.



The **gas** is trapped in the **gluten structure** and inflates it, causing the dough to rise.



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Sourdough

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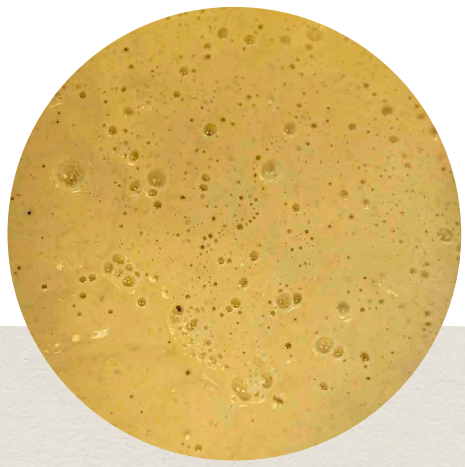
Sourdough is an age-old method for making bread. Yeasts and good bacteria in a flour and water mixture ferment spontaneously. ‘Sourdough’ is also the name given to breads and other baked products made using simple natural fermentation.

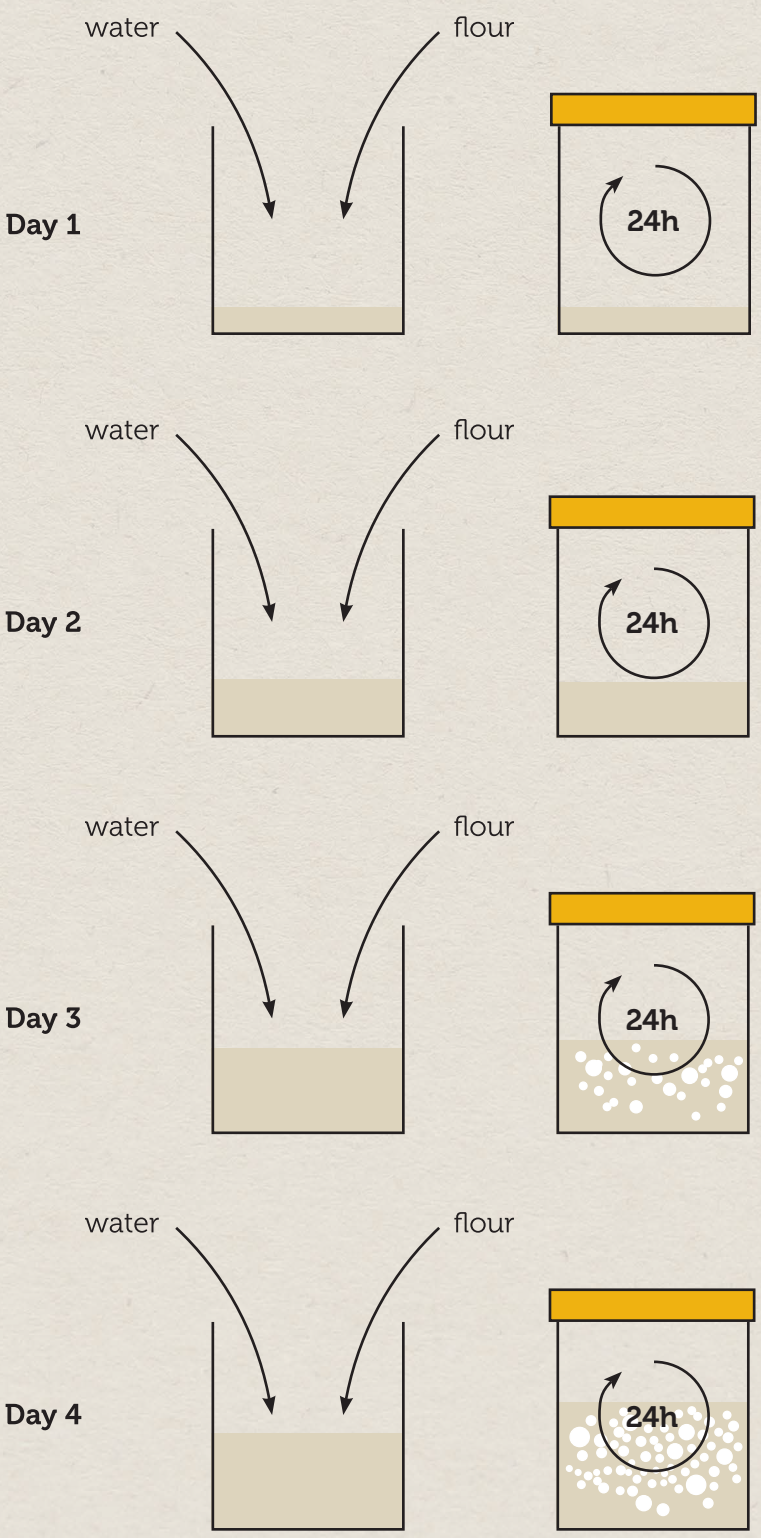
Sourdough Country Bread Recipe
www.scotlandthebread.org/2020/03/27/making-a-starter-from-scratch-sourdough-country-bread-recipe/

Why bake sourdough?
www.scotlandthebread.org/2019/08/07/why-bake-sourdough/



How do I make a sourdough starter?

Real sourdough is very simple, as befits a method that’s thousands of years old.



Day 1
Mix together a small amount of water and flour, cover and leave this mixture somewhere warm for a day. The yeasts and bacteria will work best at 28°C.

Day 2
Add some fresh flour and water to the mixture, cover and leave for another day.

Day 3 & 4
Do the same for another two days or more. It will begin to get bubbly, rise a little and smell slightly acidic.

You can then use your starter to create sourdough bread by adding more flour, water and salt according to your recipe, remembering to keep a tablespoonful back as your starter for the next batch.

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We're using local flour

Today we've used **Scotland The Bread**'s special grains in our...

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Wheat Processing

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To make **one loaf of bread** you only need **a 2.5m²** **plot of wheat…** and an area of **80m²** would provide enough wheat for **one person's bread for a year.**

1

Sowing

Depending on the variety, wheat can be sown in autumn or in spring. After working the soil to a fairly fine tilth, sow the grains either by broadcasting or along several drills. It is a good idea to net the plot for protection from hungry birds!

2

Harvesting*

Your wheat should be ready to harvest towards the beginning of autumn. You can check this by biting into a grain - if hard it is fully ripe. You can use scissors, sickles or scythes to harvest depending on the size of your crop.

3

Threshing*

This process separates the grains from the stalks and hulls by bashing them about in a variety of ways… you can try:

- using a threshing machine
- laying the grains on a sheet on the ground and either hitting them with a couple of sticks attached by a chain (called a flail) or walking across them
- placing some stems together in a pillowcase and bashing them against a wall

Frauke Boesche

4

Winnowing*

Use a winnowing basket or flat tray to toss your threshed grains in the air, letting the wind blow any chaff away.

5

Cleaning

Check through your grains to remove any small stones or other seeds.

Philip Revell

6

Milling

Once the grain is dry enough it can be milled into flour with a table-top mill - or two stones if you are feeling energetic!

Philip Revell

7

Baking

Scan the QR code to try some of our delicious recipes to create your own local loaf!

scotlandthebread.org/our-work/sourdough-baking/recipes/

**A combine harvester will carry out all of these processes at once as it travels across a field*

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