

Read the numbers you already have.

A bread recipe comes with a few numbers: this much flour, this much water, some salt, perhaps yeast or starter. You use them as instructions. You may also have wished you could bend them: six rolls instead of twelve, some whole wheat in a white loaf, a loaf a little less salty, a rise that fits your day, a starter that seems to make the water come out wrong. This book asks you to read those numbers a second way, as a description of the recipe's ingredient balance.

The idea at the center is small. Instead of asking how much water a recipe uses, ask how much water it uses *compared with its flour*. That one shift lets you compare a recipe for two loaves with a recipe for one, separate a change in size from a change in balance, and see exactly what you are changing when you adapt. The arithmetic is familiar: adding, subtracting, multiplying and dividing.

What you will be able to do.

Read a complete ingredient list as a set of relationships and place it against published reference points for water and salt. Know what raising or lowering water, salt, yeast and the other lines usually changes, and what you might give up, so that you can choose a change for a reason. Make the amount you need without disturbing the balance. Change the water or the flour on purpose and see what else moves with it. Count a starter's flour and water once and only once. Check a new list before you mix, then check the dough at the stage you named.

Numbers, predictions and observations.

The numbers describe what goes into a dough. Published reference points, and the usual effects of moving each line, suggest what a dough like it is likely to do. Only your own observation, made at a named point in the method, tells you what your dough actually did. This book keeps the three apart: a calculation is exact, a prediction is labeled as one, and the worksheets leave room for what you notice.

Read the dough before you mix.

1 Relationships	2 Common language	3 Reading the dough	4 The amount	5 Changes	6 Starters	7 Putting it to work
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WHERE THIS FITS

Chapters 1 and 2 turned a recipe into a formula. That tells you exactly what goes into the bowl, not what the dough will do. This chapter gives the numbers meaning: it sets them beside published reference points, shows what raising or lowering each line usually changes, and ends with a plan you can check against your own dough. Chapter 5 uses the same knowledge to choose changes of your own.

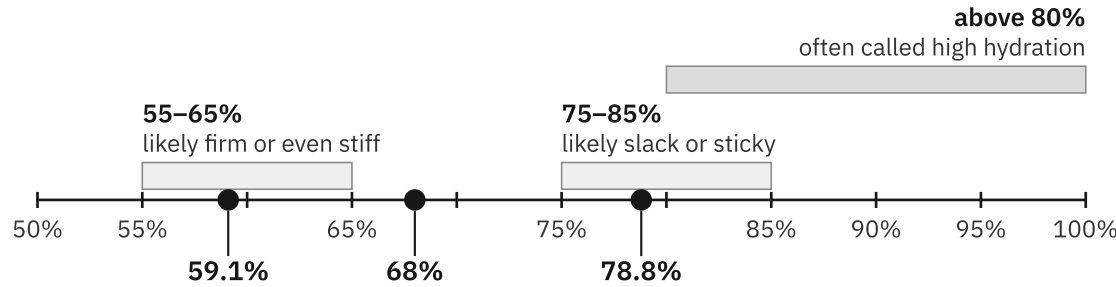
01	Read one formula A lean loaf, line by line: where its water and salt sit among published reference points. → A first reading of the dough the recipe expects.	pages 32–34
02	More or less What raising or lowering water, salt or yeast usually does, why a baker might choose it, and what to watch; then how to size a change before you make it. → A direction and a tradeoff for each line.	pages 35–39
03	One change at a time The 70% loaf and a 75% trial on the same all-purpose flour; then a separate bread-flour loaf at the same 70%, with half its flour replaced by whole wheat. → A comparison that teaches you something.	pages 40–43
04	The method and enriched doughs Time and temperature; then milk, eggs, butter and sugar, first in the account and then as choices. → The lines a lean-loaf reading leaves out.	pages 44–48
05	Practice and answers Including a salt choice for a loaf you would like a little less salty.	pages 49–57

BY THE END YOU CAN

- Read a new recipe beside one you know and say which way its dough is likely to differ.
- Choose which line to move for a purpose, and name what you might give up.
- Write that choice as one sentence you can check at a named stage.

Where does the water sit?

Martin Philip of King Arthur Baking describes hydration ranges by how a dough made with all-purpose flour is likely to feel.¹ Placed on one scale, his statements give a formula’s water number a first meaning.



Bands paraphrase Philip’s article (all-purpose flour). It gives no description for 65–75%; a dough there sits between the two descriptions, on the same continuum. Markers: the lean loaf on page 32 (68%, bread flour) and the two readings of one recipe card from page 25 (59.1% and 78.8%).

What the scale can do

Tell you, before mixing, whether a recipe expects a firmer or a slacker dough than the one you know, and so which instructions to read closely: how the method builds strength, how the dough is handled at shaping.

What it cannot do

Predict your dough. The same article notes that whole-grain flours are “thirstier”: at 75%, an all-purpose dough will feel significantly softer than an equally hydrated whole-wheat dough.¹ Flour and method move the bands.

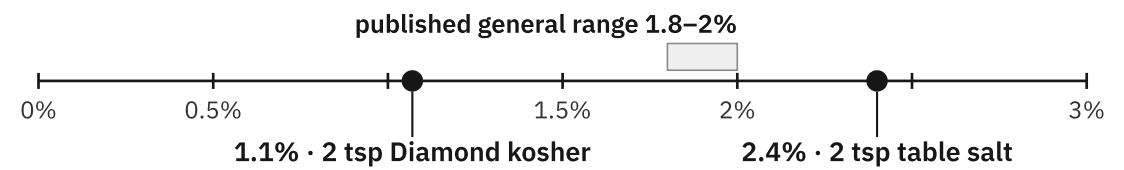
A PREDICTION, WRITTEN AS ONE

“At 78.8% with all-purpose flour, the published description suggests a slack or sticky dough. I will read the folding instructions before I mix.” That sentence is useful precisely because it can turn out wrong.

Salt, preferments and temperature.

SALT

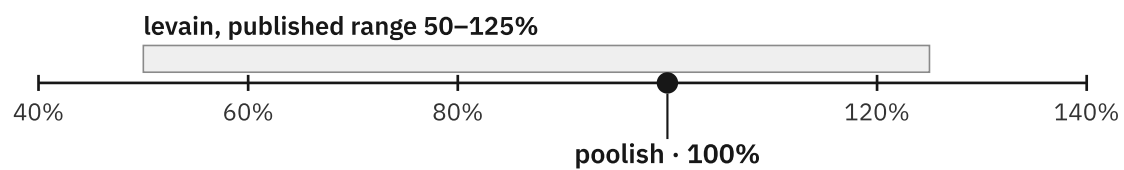
King Arthur Baking’s professional reference: “Generally, the correct amount of salt in bread dough is 1.8 to 2% of salt based on flour weight.”⁵



Markers: two teaspoons of salt with 500 g flour (page 26). A general range describes common practice; a recipe may choose otherwise. What moving salt usually changes: page 37.

PREFERMENTS · HYDRATION INSIDE THE STARTER

The same company’s preferment reference describes a poolish as equal weights of flour and water (100% hydration), a biga as stiff or loose with yeast as little as 0.1% of the biga flour, and a levain as ranging from 50% to 125% hydration.⁹



TEMPERATURE AT THE END OF MIXING

King Arthur gives 75–78°F (about 24–26°C) for wheat doughs at the end of mixing. Its exceptions include cooler targets for some naturally leavened breads headed for cold fermentation, and the low to mid 80s °F for sourdoughs high in rye.⁸ Optional tools for aiming at a target: page 135.

No yeast number here, on purpose. How much yeast suits a dough depends on the time and temperature the method plans for. Read both in your recipe, and record what you observe. What changing the amount usually does: page 38.

More or less.

Every line in a formula can move up or down. The next three pages show what raising or lowering water, salt and yeast usually changes, why a baker might choose each direction, and what to watch for. The page after them shows how to size a change.

DIRECTION FIRST, SIZE SECOND

These pages give the direction; your dough supplies the size.

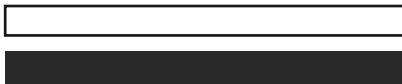
COMPARE LIKE WITH LIKE

Each page moves one line and keeps the flour, the other lines and the method comparable. The pages describe conventional yeast-raised wheat doughs at ordinary amounts and temperatures; gluten-free breads and extreme salt, sugar or temperatures fall outside them. Judge the two doughs at the same stage, not after the same number of minutes: a faster dough and a slower one can be at different points after an hour.

THE SAME 0.4 POINTS, THREE SIZES OF CHANGE

Water

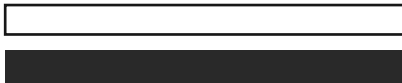
70% → 70.4%



≈ +0.6%

Salt

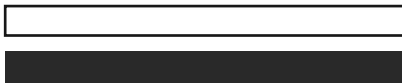
2% → 2.4%



+20%

Yeast

0.5% → 0.9%



+80%

For each line, the outlined bar is the original amount, set to 100% of that ingredient; the solid bar is the amount after adding 0.4 percentage points. The bars show relative change only, not grams or dough behavior. Arithmetic only: these are not suggested changes. For small lines, check the relative change as well as the points (page 23).

WRITE THE CHOICE IN ONE SENTENCE

“I want ___, so I’ll move ___ from ___ to ___, keeping ___ fixed. I expect ___; I’ll look at ___ for ___.”

Chapter 1 began this sentence (page 11); each page that follows supplies its middle. Seeds, soakers, malt and added gluten follow the same accounting, but their effects are outside this book.

Water: firmer or softer.

Water sets how firm or soft a dough is. It is where gluten forms and yeast works, and it carries salt and sugar through the dough.⁴

SAME FLOUR · OTHER LINES UNCHANGED · COMPARED AT THE SAME STAGE

LESS WATER		MORE WATER
firmer, holds its shape	← →	softer, stretches further

Where a number sits on a published scale for all-purpose flour: page 33.

	Less water	More water
Usually	The dough feels firmer and holds its shape more readily. ^{1, 13}	The dough feels softer, stretches more easily and is stickier. Without enough strength, it spreads. ^{1, 13}
Why choose it	Your dough has been too slack or sticky to shape. You want a braid or a free-standing loaf to keep its definition, or a closer, chewier crumb, as in bagels and pretzels. ¹³	Your dough has been stiff or hard to stretch. You want a softer, moister loaf, and perhaps a more open crumb.
Watch for	Taken too far, a dough that is hard to work and bread that is denser or drier than you want. A firmer dough can also take longer to reach the recipe's cues. ^{4, 13}	Stickiness and spreading. An open crumb also needs strength, built by mixing, folds or time, and active fermentation; water alone doesn't supply it. A softer dough can reach the recipe's cues sooner. ^{4, 13}
Where to look	At the end of mixing and at shaping: how the dough feels, stretches and holds its shape. After baking: the crumb, once the loaf has cooled.	

How large a water change is, and two checks before you make one: page 39.

Salt: seasoning, strength and pace.

Salt seasons the bread. It also tightens the gluten network and slows yeast activity.⁵

SAME FLOUR, WATER AND YEAST · SIMILAR DOUGH TEMPERATURE · COMPARED AT THE SAME STAGE



The shaded band is a published general range for common practice, not a pass-or-fail test (page 34).

	Less salt	More salt
Usually	The bread tastes less salty. The dough can ferment faster and feel slacker or stickier. ^{5, 16}	The bread tastes saltier. The dough feels tighter and resists stretching more, and fermentation slows. ^{5, 16}
Why choose it	The loaf tastes saltier than you like, or it will be eaten with salty food.	The loaf tastes underseasoned to you.
Watch for	A dough that reaches the recipe’s cues sooner and is harder to handle. A faster rise is not necessarily a bigger loaf: with less salt, the dough can hold its gas less well. Taken far enough, the bread tastes flat. ^{5, 16}	A slower rise and a dough that resists shaping. Too much can taste unpleasantly salty and hold back the loaf’s expansion. ^{5, 16}
Where to look	The rise, by the recipe’s cues rather than its clock; the dough’s stretch and hold at shaping; the flavor of the bread once it has cooled.	

How large a salt change is, and why salt is not the tool for a schedule: page 39.

Yeast: the pace of the rise.

Commercial yeast makes the gas that raises the dough. How fast it works depends on how much there is, how warm the dough is, and other lines such as salt and sugar.^{6, 17}

SAME YEAST PRODUCT · SAME FLOUR AND OTHER LINES · SIMILAR DOUGH TEMPERATURE



No amount is marked on this scale. The right amount depends on the time and temperature the method plans for.

	Less yeast	More yeast
Usually	The dough rises more slowly, in the bowl and again after shaping. ¹⁵	The dough makes gas sooner and rises faster. ¹⁵
Why choose it	To fit a longer schedule, such as an all-day or overnight rise, or to give the dough more time to develop flavor. ^{14, 15}	To fit a shorter schedule.
Watch for	Keeping the recipe’s old times can leave the dough underproofed. Longer is not always better: a rise that runs too long can weaken the dough or overshoot the flavor you want. Rich, sweet doughs don’t take the same approach unchanged. ¹⁴	A dough that outpaces your shaping and baking, with less time for flavor to develop. If you suspect the yeast itself is weak or old, test it before adding more: a little yeast stirred into lukewarm water with a pinch of sugar should turn foamy within about 10 minutes. ^{14, 15}
Where to look	Both rises, by the recipe’s cues: how much the dough has grown and how it feels, not how long it has taken. Note the dough temperature, and taste the bread once it has cooled.	

Change the yeast, change the clock. No dependable rule turns a new yeast amount into a new rise time, so judge both rises by their cues.^{14, 17} Sizing the change: page 39.

Size the change.

A change can be small in grams and large for its ingredient. Before you move a line, put the change in numbers, and check what else could make the comparison unfair.

Water

Water changes are clearest in percentage points of the same flour. With 600 g flour, each point is 6 g of water, so 70% to 75% is 30 g. Write down both the grams and the points.

If the recipe was converted from cups, check the flour weight first: one recipe card reads about 59% or 79% depending on how its cups were filled (page 25). Adding flour to a sticky dough is a different edit, because it lowers every other percentage too (page 79).

Salt

Salt changes are small in grams and larger than they look. With 500 g flour, 2.0% is 10 g and 1.8% is 9 g: 0.2 points, 1 g, and a tenth less salt. Whether your scale can weigh that difference depends on its stated accuracy, not only its display (page 65).

Salt does slow fermentation, but it is chosen for flavor and strength. To change a schedule, change the yeast, the dough temperature or the preferment instead (page 38).⁵ And before changing a recipe's salt, know which salt it meant: two teaspoons can weigh 5.3 g or 12 g (page 26).

Yeast

Yeast is a small line, so describe a change relatively as well as in points. With 500 g flour, 0.5% is 2.5 g; halving it gives 0.25%, or 1.25 g. Check what your scale can weigh at that size (page 65).

Warmth is the other main dial: a warmer dough usually rises faster, a cooler one more slowly (page 44).⁶ Changing the type of yeast is a different edit, with its own conversion (page 26).

No dependable rule turns a yeast amount into a rise time: doubling the yeast does not reliably halve the rise.^{14, 17} Treat the recipe's times as a guide and its cues as the test.¹⁵

Choose a salt change.

3.6 Your usual loaf is a lean one you bake often: 500 g flour, 350 g water, 10 g salt and 2.5 g instant yeast. You like it, but it tastes a little saltier than you want, so you decide to try 1.8% salt. Everything else stays the same.

Line	Usual loaf	Baker's %	Trial
Flour	500 g	100%	500 g
Water	350 g	70%	350 g
Salt	10 g	2.0% → 1.8%	_____ g
Instant yeast	2.5 g	0.5%	2.5 g
Total	862.5 g		_____ g

Size the change.

Salt removed: _____ g

Change in percentage points: _____

Change relative to the original salt: _____%

Read the change, then write the choice.

Using the salt page (page 37), write one thing you might notice in the flavor, one in the rise and one in the handling, and where in the method you will look for each. Then write the choice in one sentence.

ANSWER 3.6

page 56. The arithmetic is exact; the rest is a plan to check against your own bread.

Name the convention.

Size the change.

From page 51 • A roll formula with 400 g flour, 200 g whole milk and one 50 g egg, and no water line.

3.5 • Two conventions for a dough without water.

Milk counted as water: $200 \div 400 \times 100 = 50\%$. Estimated water from the milk and egg: $200 \times 0.881 \approx 176.2$ g from the milk, plus $50 \times 0.762 \approx 38.1$ g from the egg, ≈ 214.3 g in all, and $214.3 \div 400 \times 100 \approx 53.6\%$. Neither figure counts the flour’s own moisture. Both are honest if labeled; they answer different questions.

From page 52 • Your usual loaf (500 g flour, 350 g water, 10 g salt, 2.5 g instant yeast) tastes a little saltier than you like; the trial uses 1.8% salt.

3.6 • One gram is a tenth of the salt.

Line	Usual loaf	Trial
Salt	10 g · 2.0%	$500 \times 0.018 = 9$ g · 1.8%
Total	862.5 g	861.5 g

The change is 1 g: $2.0 - 1.8 = 0.2$ percentage points, and $1 \div 10 \times 100 = 10\%$ less salt. Flour, water and yeast keep their weights, so hydration stays 70% and yeast 0.5%; the total falls by the same 1 g.

What you might notice. The change is chosen for flavor. The batch contains a tenth less salt. Whether you can taste the difference in the cooled bread is part of what this bake tests. Less salt can also let the dough ferment a little faster and feel slightly slacker, although a change this small may show little of either (page 37).

One plan, in one sentence: “I want a slightly less salty loaf, so I’ll move salt from 2.0% to 1.8%, 10 g to 9 g, keeping flour, water and yeast fixed. I expect less saltiness, and perhaps a slightly quicker, softer dough; I’ll look at the first rise by its cue, at the dough’s hold at shaping, and at the flavor once the bread has cooled.”

If what you really wanted was a different schedule, leave the salt as it was and change the yeast or the dough temperature instead (page 38).

Before you mix.

Read	Ask	See
Every line in grams	Which conversions did I assume?	page 25
Water ÷ total flour	Where does it sit on the published reading scale, for this flour?	page 33
Salt ÷ total flour	How does it compare with the published general range, and with the salt I like?	page 34
Any line that differs from a recipe I know	Which way does it move the dough, and what might it cost?	page 35
Flour names	Is any of it whole grain, and does the whole-grain advice apply to this swap?	page 43
Milk, eggs, butter, sugar	Which hydration convention am I using, and what else does each line bring?	page 47
The method	How is strength built, at what temperature, and judged by which cue?	page 44

Then write your choice in one sentence, and leave room to record what you observe at the stage you named.

CARRY THIS FORWARD

Use the numbers to ask a better question of your dough, and to choose a change for a reason.

CHAPTER SOURCES

1. M. Philip, Hydration in bread dough, explained, King Arthur Baking, 2023. 2. King Arthur Baking, Baker’s Percentage. 3. King Arthur Baking, Baking with Whole Grains. 4–6. King Arthur Baking professional references: Water; Salt; Yeast. 7. M. Philip, Why kneading isn’t always the best way to develop bread dough, 2021. 8. King Arthur Baking, Dough Temperature. 9. King Arthur Baking, Preferment. 10. King Arthur Baking, Ingredient Weight Chart. 11. USDA FoodData Central, SR Legacy: whole milk (FDC 171265), whole raw egg (171287), unsalted butter (173430). 12. King Arthur Baking School, Bread 101, 2025, ingredient notes. 13. M. Philip, When it comes to bread dough, is wetter really better?, King Arthur Baking, 2021. 14. P. Hamel, How to bake bread using less yeast, King Arthur Baking, 2020. 15. P. Hamel, The comprehensive guide to baking with yeast, King Arthur Baking, 2023. 16. M. Carcea, V. Narducci, V. Turfani and F. Mellara, A comprehensive study on the influence of sodium chloride on the technological quality parameters of soft wheat dough, *Foods* 9 (2020), 952. 17. Red Star Yeast, Frequently asked questions. 18–21. ChainBaker, baker-reported comparisons: What effect does egg have on bread dough?; How much fat should you add to bread dough?; How different fats affect bread dough; How much sugar should you add to bread dough? Full notes: page 157.