



Handout 6.7: Quick Bread Lab Sheet

Name: _____ Date: _____ Period: _____

Station: _____ My role: _____

Print for every student. Bring it both days. Day 1 is pages 1 to 3, Day 2 is pages 4 and 5.

DAY 1

Part 1. How leavening works

Write it in four sentences, in your own words.







Which one needs an acid to work? Circle: baking powder / baking soda

Where does the acid come from in a real recipe? Name three sources:

1. _____ 2. _____ 3. _____

Part 2. The four-cup fizz test

Cup	What is in it	What happened (none, a little, a lot)
1	Baking soda + water	
2	Baking soda + vinegar	
3	Baking powder + water	
4	Baking powder + vinegar	

The rule, in one sentence:

Baking soda needs _____, and baking powder does not because

Part 3. The experiment setup

The four batches

Batch	Leavening treatment	What I predict
A (control)	1 tsp baking powder	
B	none at all	
C	2 tsp baking powder	
D	1 tsp baking soda, no acid	

Variables

Independent variable (the one thing we change on purpose):

Dependent variable (what we measure to see the result). Name all three:

1. _____ 2. _____ 3. _____

Constants (everything we keep exactly the same). List at least four, and go for eight:

1.	5.
2.	6.
3.	7.
4.	8.

Why do we need Batch A at all, if we already know a normal muffin rises?



Part 4. My hypothesis and prediction

My hypothesis (one sentence, in the form “if we change , *then* ”):





My prediction: rank the four batches by how high I think they will rise.

Highest ____ second ____ third ____ lowest ____

Batch D prediction: what will it taste like and why?



Day 1 exit card

The one thing we are changing is _____.

Batch _____ will rise the highest because _____.

DAY 2

Part 5. Data

Measure the batter height in the liner before baking and the muffin height after. Use the ruler.

Batch	Height BEFORE baking	Height AFTER baking	How much it rose	Crumb (none, few, or many holes)	Taste
A (control)					
B (no leavening)					
C (double)					
D (soda, no acid)					

Time the tin went in: ____ **Time it came out:** ____ **Oven temperature:** ____

Actual ranking by height

Highest ____ second ____ third ____ lowest ____

Compare to your prediction

Batch	I predicted	What actually happened	Same or different?
A			
B			
C			
D			

Part 6. Conclusion

Fill in all four parts.

The data showed _____



My hypothesis was (circle one) **supported** / **not supported** / **partly supported**, because



My evidence is _____



One thing that could have gone wrong with our test is _____



One sentence our station can read out loud at the station check:



Station check

Line	Done?
Oven off, tin on the trivet, nothing hot left out	
All four bowls washed, dried, and put away per the drawer map	
Measuring cups and spoons washed and put away	
Counters wiped and sanitized	
Sink empty and rinsed	
Floor swept, trash out	
Leavening jars returned to the teacher's table	

Teacher signature: _____

Grade 8 stretch: Batch E

Batch E: 1 tsp baking soda PLUS 1 tsp white vinegar. Everything else the same.

Batch E	Before	After	How much it rose	Crumb	Taste

Does Batch E behave more like Batch A or more like Batch D? _____

What does that prove? _____



Name one confounding variable in our own test (something we did not control that could have affected the result), **and say how you would control it next time.**

The variable: _____

How to control it: _____

Teacher key

Part 1, how leavening works: (1) Baking powder and baking soda both make carbon dioxide gas when they get wet and hot. (2) The gas makes bubbles inside the batter. (3) The bubbles get trapped and push the batter up. (4) The heat of the oven sets the batter around the bubbles, so the bread stays risen after it cools.

Baking soda needs the acid. Acid sources in real recipes: buttermilk, yogurt, sour cream, vinegar, lemon juice, brown sugar, molasses, honey, cocoa (natural, not Dutch processed), applesauce, cream of tartar. Any three.

Part 2, fizz test results:

Cup	Result	Why
1. Soda + water	a little	Water alone triggers almost nothing. A faint fizz at most
2. Soda + vinegar	a lot	Vinegar is the acid. This is the overflow cup
3. Powder + water	a lot	Baking powder already contains a dry acid, so water is enough
4. Powder + vinegar	a lot	It reacts, but not dramatically more than with water, because it did not need the extra acid

The rule: baking soda needs an acid, and baking powder does not, because baking powder already has its own acid mixed in with it.

Part 3, expected predictions and actual results:

Batch	Expected result	What usually happens
A (control)	Normal rise, even crumb, tastes right	The benchmark. About 1 1/2 to 2 inches tall with a domed top
B (none)	Barely rises, dense, heavy, gummy	Comes out flat and pale, about half the height of A. Edible but tough. Tastes fine, just dense
C (double)	Rises fastest and highest, then often sinks in the middle; large uneven holes; may taste slightly bitter	The best data in the experiment. Too much gas builds a structure that cannot hold itself up
D (soda, no acid)	Rises a little, and tastes soapy, metallic, or bitter;	The unreacted baking soda is what students taste. Tell

	may look slightly yellow or green inside	them before they taste so nobody thinks something is wrong with them
--	--	--

Constants students should list: flour, sugar, salt, milk, oil, egg, how much batter goes in each liner, the bowl, the amount of stirring, the oven, the oven temperature, the bake time, the shelf in the oven, the liners, the room.

Why Batch A exists: without a normal batch baked in the same oven on the same day, there is nothing to compare the other three to. The control is the ruler.

Part 6, a strong conclusion: “The data showed that leavening is what makes a quick bread rise, and that more is not better. Batch A rose about 1 3/4 inches, Batch B rose about 3/4 of an inch, Batch C rose about 2 inches and then sank in the middle, and Batch D rose about 1 inch and tasted soapy. My hypothesis was partly supported, because I predicted C would be the tallest and it was, but I did not predict it would collapse. My evidence is the height column and the crumb column. One thing that could have gone wrong is that our Batch B bowl got stirred longer than the others, which makes any batter tougher.”

Grade 8, Batch E: it behaves like Batch A. It rises well, because the vinegar gave the baking soda the acid it needed. That proves the missing ingredient in Batch D was the acid and not the soda, which is the clean end of the experiment.

Grade 8, confounding variables worth credit: different students stirred different amounts; the four liners did not get exactly the same amount of batter; one side of the oven runs hotter; the liners were not all in the same row; the egg was not divided exactly evenly; one batch sat longer before going in the oven, which matters because baking powder starts working as soon as it gets wet.

Scoring: this lab sheet carries all three lesson objectives and is scored with Rubric 01 - Lab Rubric.md, three objective rows plus the safety and sanitation row, 16 points. Objective 3 is scored from Part 6 of this sheet. Objectives 1 and 2 and safety are scored on the clipboard during Day 2.