

Name _____

Date _____

Gluten-Free Baking

A new fad is sweeping the nation's fancier food stores: gluten-free baking. Most people have never heard of gluten unless they've gotten wind of this trend. However, for those who are allergic to gluten, it's much more than a trend.

People who are allergic to gluten abstain from eating it; they don't want it in their food. Yet they still like the taste of regular baked goods. So they turn to gluten-free baked goods, which look just like regular ones. Then what makes them different? In order to understand the nature of gluten-free baked goods, it is necessary to examine the nature of gluten itself.



Gluten, often thought of as a matrix or scaffolding, is a protein present in wheat. In order to make flour, a necessary ingredient in almost any type of baking, one must grind up wheat. But when wheat is ground into flour, the gluten doesn't disappear. It's still there. So, the challenge lies in the removal of gluten from wheat flour.

Unfortunately, it's impossible to remove gluten from wheat. But don't despair! Many substitutes for flour exist, and since these aren't made of wheat, they don't contain gluten. These substitutes include rice, maize, tapioca, and more. Flax meal, a very nutritious grain, can be used in a similar way as flour, though it has larger particles. Even beans can be ground up to make bean flour, also known as soy flour. Oats are yet another grain that can be ground into flour. These flours do not contain gluten, and are therefore suitable to make gluten-free flour. But while there are many good substitutes, it is still important to be cautious; some grains are closely related to wheat and therefore also contain gluten. Rye is an example of a grain which, genetically speaking, is too similar to wheat to be used in gluten-free baking.

So that was easy, right? With so many available substitutes, who needs *wheat* flour anyway? But wait...not so fast. Remember that gluten is like a matrix, similar to a three-dimensional grid. Without gluten, a cake will not have any structure and will not rise. Its ingredients—sugar, eggs, butter, chocolate—will sit in a sad heap at the bottom of the pan. You'll be left with puddle, and you might as well have cooked a Mars bar in the oven. A baked good needs gluten for the ingredients to cling to, like vines on an arbor, so it will assume the desired shape and structure. So, even though we can find many good substitutes for wheat flour (that don't have gluten in them), we still need to find something that will replace the *function* of gluten. We need a new matrix.

When searching for a new matrix, though, it is important to consider how it will expand during the course of baking. How does a cake become big and fluffy? Flour certainly isn't big and fluffy—it sits packed densely in a heavy sack. A cake only rises because a leavening agent is present in the batter. A leavening agent is any substance that leavens something, or makes it rise by producing bubbles. Yeast and sodium bicarbonate (baking soda) are examples of leavening agents. They produce bubbles that get caught in the gluten matrix while the cake bakes. So, similar to the inflation of a fancy air mattress, the air fills the first section quickly.

When that section is full, the air continues on to fill the next section. This process continues until the mattress is full. The new matrix must be able to trap air in a way similar to the fancy mattress. This is the only way to make the cake rise.

To form a matrix, we need the ingredients to stick together. This will ensure that they are leavened properly by the leavening agent. Certain ingredients, called binders, work like glue, similar to gluten. (And since glue sounds like gluten, it is also a very good way to think about gluten.) Eggs are binders, because a broken egg is sticky. Fruit is also often a binder. A very expensive powder called xanthan gum is a binder. (You could guess that because chewing gum is sticky.) Other kinds of gums exist as well, such as guar gum and acacia gum. These binders stick to each other and won't come apart when bubbles rise up through the batter. This means the batter will retain its shape. It won't cave in on itself (like the Mars bar) and it won't fall apart.

With so many binders, no one needs boring old gluten. You'll have invented a new and exciting matrix all on your own, and you'll be a friend to lovers of gluten-free baking!

1) As used in paragraph 2, which is the best definition for **abstain**?

- A. refrain
- B. detest
- C. stop
- D. ignore
- E. decelerate

2) Over the course of the passage, the author compares gluten to

- I. scaffolding
 - II. glue
 - III. a building
- A. I only
 - B. II only
 - C. I and II only
 - D. II and III only
 - E. I , II, and III

3) According to the author, gluten is

- A. protein
- B. flour
- C. leavening agent
- D. chamber
- E. vessel

- 4) In paragraph 6, the author tells us that “Flour certainly isn’t big and fluffy—it sits packed densely in a heavy sack.” This statement is intended to
- I. illustrate the difficulties involved in handling large quantities of flour
 - II. emphasize the idea that flour needs something extra to make it expand
 - III. clarify the notion that baked goods that lack a leavening agent will not rise
- A. I only
B. I and II only
C. II and III only
D. I , II, and III
- 5) In paragraph 6, the author compares filling an air mattress to the
- A. flour in a cake
B. bubbles in a cake
C. gluten in a baked good
D. ingredients in a baked good
E. flour in a baked good
- 6) Based on information in paragraph 6, which of the following could be used as a leavening agent?
- A. water
B. Coca-Cola
C. orange juice
D. milk
E. iced tea
- 7) The author's tone can best be described as
- A. matter-of-fact
B. enthusiastic
C. sarcastic
D. annoyed
E. fanatical

8) Using the passage as a guide, which of the following recipes would make a successful gluten-free carrot cake?

- A. all-purpose flour, eggs, baking soda, sugar, chopped pineapple, carrots
- B. tapioca and rye flour, eggs, sugar, applesauce, carrots
- C. soy and flax meal flour, eggs, sugar, applesauce, carrots
- D. soy and oat flour, eggs, baking soda, sugar, applesauce, carrots
- E. wheat flour, eggs, sugar, butter, sugar, carrots

9) Using your own words, explain how gluten-free baking substitutes work.
