Why is gluten so important? Without it, there would be nothing to hold the gas that makes bread rise.

Think of gluten as the rubber of a balloon: The stronger it is, the more gas it can hold. But stronger isn’t always better. For many baked goods, like pastries and pie crusts, it’s important to avoid gluten development.

That’s why different flours contain different amounts of protein, depending on how they are meant to be used. A high-protein flour will make a dough with strong gluten, good for hearty yeast breads. Pastry chefs, on the other hand, prefer low-protein flours that yield delicate, tender doughs.

The following activity is a great way to get a feel for gluten, and to find out why using different flours can lead to such different results.

**CAUTION**
Kids, please don’t try this at home without the help of an adult.
What Do I Need?
• Any combination of the following flours:
  whole wheat flour
  all-purpose flour
  pastry flour
  gluten flour
  instant flour
  water (1/2 to 3/4 cup for each flour you’ll be using)
  bowls (one for each flour you’ll be using)

Did You Know?
Shortening—whether it’s butter, margarine, or lard—interferes with the way the gluten-forming proteins in flour interact with water. This makes for short strands of gluten, which is the key to flaky pastries and crusts.

Did You Know?
Whole wheat flour contains about 14% protein, while pastry flour might contain half as much. You can find out how much protein is in a flour by looking at the nutritional information on the package.

What Do I Do?
1. Into separate bowls, measure out 1 cup of each of your flours. If your bowls look different, remember which one contains which type of flour. If not, label them.

2. Slowly add about 1/2 to 3/4 cup water to the flour in each bowl, and knead each mixture until it forms a soft, rubbery ball of dough. Let the dough balls sit for about 10 minutes.

3. In the sink, run cold water over one of the dough balls. Be careful not to let the dough disintegrate; try cupping your hands around the ball and squeezing
gently to remove the starch. With low-gluten cake or pastry flours, you may want to put the dough in cheesecloth in order to hold it together.

4. You’ll notice the water turning milky as it washes away the starch in the dough. Keep pouring out the cloudy water that collects in the bottom of the bowl. Slowly, your dough ball will become a gummy, slimy network of gluten strands.

5. When the water no longer becomes milky, you know there’s no more starch in the dough, leaving nearly pure gluten. Notice how much smaller your ball has become—and how much more stretchy!

6. Repeat steps 3 to 5 for each of your flour types. How does the texture of each one differ as you wash away the starch? Does it take the same amount of time for each one? Are the gluten balls all the same size, or are some larger than others?

7. Now try baking your gluten balls in the oven for about 15–30 minutes at 450° F. When you take them out of the oven, you’ll notice they’ve puffed up and hardened, which is exactly what happens to the gluten in a loaf of bread as it bakes.

Did You Know?
Gluten is both plastic—able to change shape—and elastic—able to spring back into place.
What’s Going On?

When you knead dough, you help two proteins in wheat flour, gliadin and glutenin, form gluten. But flour also contains many other components—starch, lipids, sugars, and enzymes—that contribute to the consistency and nutritional value of bread. When you run water over dough in this activity, you wash away most of these other substances, isolating the gluten in the dough. In the oven, the steam produced as the gluten heats up expands the ball. Finally, the gluten hardens, and you have a finished gluten ball.

Did You Know?

Gluten is not only used in baking. It’s also great for “beefing up” vegetarian cooking.

What Else Can I Try?

In baking, gluten is mainly used for the light texture and distinct taste it gives bread. But it’s also nutritious in its own right. It is, after all, almost pure protein. And because of its chewy texture, many people—especially vegetarians—find it to be an excellent addition to stir-fries and stews.

The gluten you extracted in the previous activity is technically edible. But you can make it much more palatable by flavoring it with soy sauce, ginger, garlic, and seaweed. The finished product, known as seitan, is a great source of texture and protein.

Did You Know?

Recipes for cornbread and pancakes often warn you not to mix the batter too much. For these breads, overmixing can make the gluten too strong, which makes for a tough, chewy finished product.

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