

## Scrambled Eggs – An At-Home Experiment

What makes a “good” scrambled egg? The answer will to some extent depend upon your personal preference, but there are a few factors that can be explored by *SCIENCE!* that impact the properties of a “good” scrambled egg. You can work in groups of UP TO 3, but each individual is responsible for turning in his or her own unique assignment.

You will need:

*Groceries:*

1 dozen eggs (any size will work, fresher is good)

Water

1 pint 2% milk

*Optional groceries:*

Salt, pepper, butter or oil or non-stick spray

*Equipment:*

1 small-to-medium non-stick frying pan

1 medium bowl for mixing

1 graduated measuring cup

1 fork or wire whisk (a whisk is a little better)

1 turner or spatula (a heat-resistant flexible spatula works very well)

1 plate

*Facilities:*

Stove

### NOTES:

1. *Don't use a huge frying pan.* Ideally, you would like the egg(s) to easily cover the whole bottom of the pan with a little depth. If they don't, tilt the pan up a little bit while cooking to give the eggs a little depth in the pan. That doesn't mean you're trying to fill the pan up with eggs, but you also don't want just a very thin skin of egg in the bottom of the pan... that would be more like a crepe and would require a little flour.
2. *Don't use high heat.* Medium to a little over medium is plenty. People often crank the heat up too high and get inconsistent results
3. *The “optional groceries” category...* If you have a reasonably good non-stick pan, you should not need butter or oil in the pan to prevent sticking. If your pan requires a little butter or oil to prevent sticking, try to use the same amount for each trial. Add salt and pepper to taste, but since you're trying to determine the effects of the other variables on flavor and texture, use minimal salt and pepper, try to use the same amount of salt and pepper in each trial, and add it only *after* the eggs are cooked.
4. *This experiment is written assuming 2 eggs per trial.* If you have a small enough pan (or keep it tilted, see NOTE #1), you can prepare each trial with a single egg. If you prefer, you can also use “Extra Large” or “Jumbo” eggs for a little additional volume.
5. *When are eggs “set”?* The term “set” means that the liquid egg has firmed up to something more solid. When cooking eggs, it's usually a good idea to remove them from heat *before* they're completely set with just a little egg liquid left. The mixture will continue to cook/set for a minute or two after being removed from the heat, leaving you with perfect eggs that are (hopefully) not overcooked or rubbery.
6. *Use all your senses.* With any experiment, the more observations you make, the more changes you are likely to notice. One big advantage of this experiment is that you can taste the results and use taste as an experimental observation, but don't stop there! Sight, smell, touch, maybe even hearing can give you some information about the science happening in your eggs.

The experimental procedure is described as a series of trials. Read through them all before you start. If you have multiple bowls, you should be able to get Trials #1-4 all ready to go before you start cooking any of them. Trials #5 & #6 require some info from Trials #1-4, so you'll have to hold off on those. Take very careful and detailed notes on all the Trials and all your observations, taking special care to jot down anything that might seem unusual. Take pictures if you think that's a useful way to document your experiment.

### **Trial #1 – Just the eggs and only the eggs**

1. Crack 2 eggs into your mixing bowl. Observe the components of the eggs, paying special attention to any factors that might indicate freshness.
2. With the fork or wire whisk, lightly beat the eggs. You want to combine the yolk and white, but don't beat the eggs too much. Pay attention to how easily the egg components combine.
3. Pre-heat your pan on medium (or slightly higher) heat. When the pan is hot, add the lightly beaten eggs and immediately begin to stir with the spatula, keeping the eggs gently moving during the entire cooking process. It will only take a minute or two to cook the eggs. Remove from the pan and sample.

### **Trial #2 – Just the eggs and only the eggs – Part 2**

Repeat Trial #1, BUT after you add the eggs to the pan, do not stir. You can shake/jiggle the pan around a little, but do not stir the eggs. Cook until the eggs just set. Remove from the pan and sample.

### **Trial #3 – Increasing volume**

1. Crack 2 eggs into your mixing bowl or measuring cup. Note the total volume of the eggs. Add about half this volume of water to the eggs. For example, if the eggs have a volume of about  $\frac{1}{2}$  a cup, add  $\frac{1}{4}$  cup of water.
2. With the fork or wire whisk, lightly beat the egg-water mixture. You want to combine the components, but don't beat the mixture too much. Pay attention to how easily the components combine.
3. Pre-heat your pan on medium (or slightly higher) heat. When the pan is hot, add the lightly beaten egg mixture. Do not stir for a slow count of 10, then stir gently once. Repeat this count-then-stir-once procedure until the egg mixture is set. Remove from the pan and sample.

### **Trial #4 – Adding a new component**

Repeat the procedure in Trial #3, but instead of adding water to the eggs before mixing, add 2% milk.

### **Trial #5 – Adding a new component – Part 2**

Choose your favorite scrambled egg from Trial #1-4 and repeat its procedure, BUT rather than just gently beating the eggs or egg mixture, beat the eggs or egg mixture quite vigorously until a bit of a froth develops. This is easier to do with a wire whisk or electric mixer, but can be done with a fork; it may be easier if you use a slightly larger bowl. Immediately pour the eggs or egg mixture into the hot pan and cook as before.

### **Trial #6 – How much liquid?**

Repeat either Trial #3 (adding water) or Trial #4 (adding milk), but this time add a volume of liquid (water or milk) that is a little *more* than the total volume of the eggs you are using. Cook as before.