



Culinary Institute
of America

Baking and Pastry

Best of Boot Camp



Learning Objectives

- State the five basic ingredients found in the bakeshop.
- Identify which ingredients are liquefiers and which are stabilizers.
- List and describe the basic mixing methods.
- Differentiate between biological, physical, and chemical leaveners.
- Discuss the significance of ratios and how they can be used to determine ingredient quantities.
- Explain the difference between a dough and a batter.
- Prepare a variety of breads, baked goods, and desserts.

Common Baking Ingredients

The building blocks of every great bake

Fat/Oil

Sugar/Sweeteners

Eggs

Flour

Liquids

Liquefiers: fat/oil, sugar, liquids

Stabilizers: eggs, flour

Fats and Oils

- Natural part of many animal & plant-based foods
- Provides flavor, tenderness, mouthfeel, nutrition

Types:

- **Saturated fats:** solid at room temp. (butter, lard, coconut oil)
- **Unsaturated fats:** liquid at room temp. (olive oil, vegetable oil, canola oil)
- **Trans fats:** artificially created through hydrogenation (some margarines, processed snacks)

Common fats:

- Lard
- Shortening
- Oils
- Butter
- Clarified butter
- Margarine
- Cocoa butter



Functions of Fats

Tenderizes:

coats flour particles, inhibits gluten formation to create a softer, more tender crumb (cakes, cookies)

Enhances flavor & texture:

adds a rich flavor; provides smooth, rich mouthfeel

Creates flakiness:
solid fats help create layers (pastries, pie crust)

Helps with leavening:

traps air when creamed with sugar, helps rising (cakes)

Leavening partner:
when created with fat, it traps air and helps rise

Provides moisture & improves shelf-life:

retains moisture, slows staling

Types of Sugars

- **Granulated (white):** most common
- **Brown:** molasses, moisture & flavor
- **Powdered (10x sugar):** frostings, glazes
- **Raw:** minimally processed, coarse
- **Natural liquid sweeteners:** honey, maple syrup, molasses, agave
- **Aspartame, Sucralose (Splenda), Saccharin:** zero-calorie, "sugar-free"
- **Sugar alcohols:** lower calories
- **Stevia & monk fruit:** plant-based, calorie-free



Functions of Sugar

Adds sweetness:
the main purpose –
adds pleasant flavor

Adds moisture:
helps keep baked
goods soft and
fresh

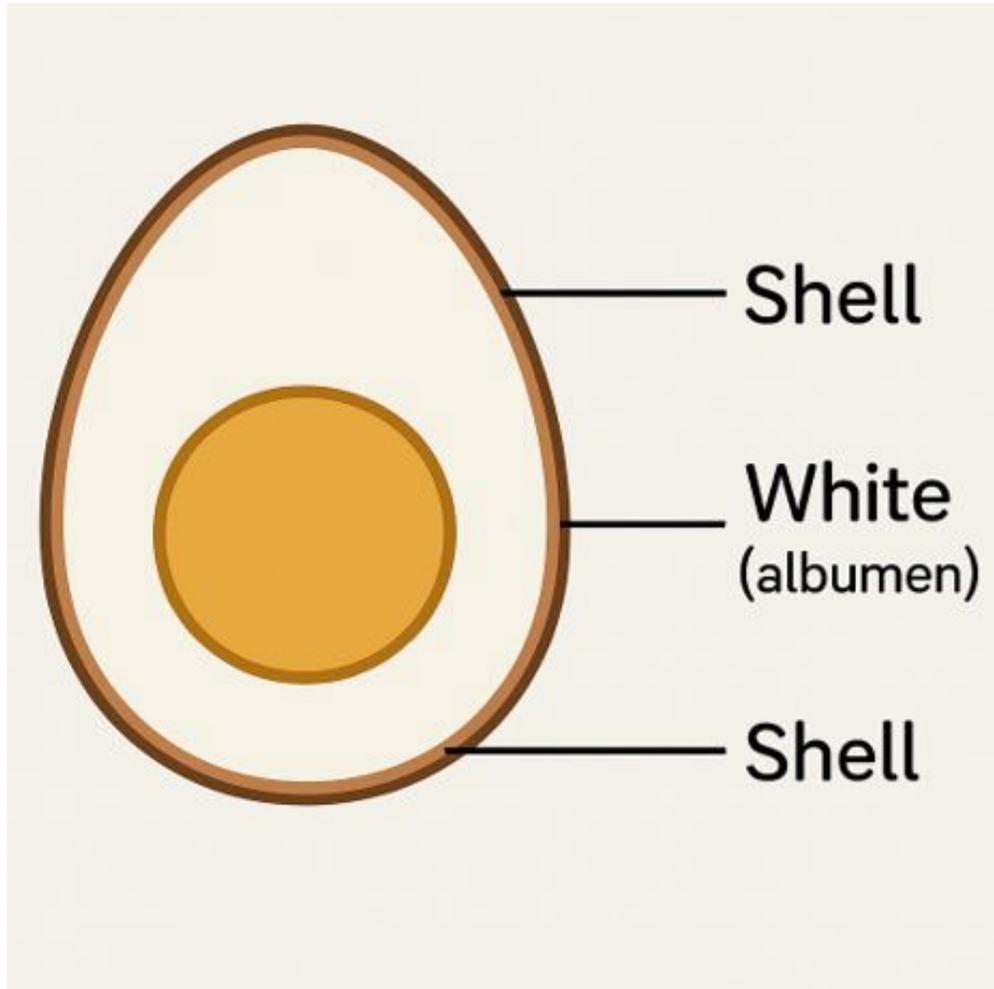
Aids in browning:
through
caramelization,
makes crust golden
& flavorful

Provides structure:
helps with texture,
volume

Aids leavening:
when created with
fat, it traps air and
helps rise

Stabilizes:
helps stabilizes egg
foams (meringues,
soufflés)

Eggs



Eggs are a versatile ingredient that play many essential roles in baking

Parts of Eggs:

- **Yolk:** Fat and nutrient, adds richness, 50% water
- **White (albumen):** Mostly protein, helps with structure and leavening, 90% water
- **Shell:** Protective layer (not used in recipes, of course!)

Functions of Eggs

Structure & binding:

proteins help to set and hold the ingredients/shape of baked goods as they cook

Leavening:

traps air during mixing and expands when heated; helps rising

Moisture:

adds liquid to batter, contributes to moisture & tenderness

Emulsifying:

yolks contain lecithin, helps mix fat & water-based ingredients smoothly

Color & flavor:

adds richness, a golden color, enhances taste

Gloss & shine:

egg washes brushed on doughs to give shiny, golden-brown finish

Types of Flour

- **All-purpose:** most common
- **Cake:** lower protein, gives soft, tender texture
- **Bread:** higher protein, gives more gluten and chewy texture
- **Whole wheat:** made from whole grains, add fiber and a nuttier flavor
- **Self-rising:** contains added baking powder and salt
- **Gluten-free:** made from rice, almonds, or coconut



Functions of Flour

Provides structure:

gluten (in wheat flours) forms a network that holds baked goods together

Affects textures:

type of flour influences whether the final product is chewy, soft, dense or light

Thickens mixtures:

used in sauces, custards, and fillings

Helps with absorption:

soaks up liquids, balancing moisture in batters & doughs

Liquids

- An essential component of baking
- Accurate measurement is important: too much or too little can affect the outcome



Why use one over the other?

- **Water:** versatile
- **Milk:** contributes to a tender crumb; provides fat & protein
- **Buttermilk:** tangy flavor; reacts with baking soda to create a soft texture
- **Cream:** high fat content; richness in flavor & texture
- **Juice or coffee:** adds flavor

Functions of Liquids

Activates gluten:
hydrates flour so
gluten can develop

**Activates
leavening agents:**
helps baking
powder, baking
soda, yeast activate

Creates steam:
steam produced
during baking helps
baked goods rise
and become fluffy

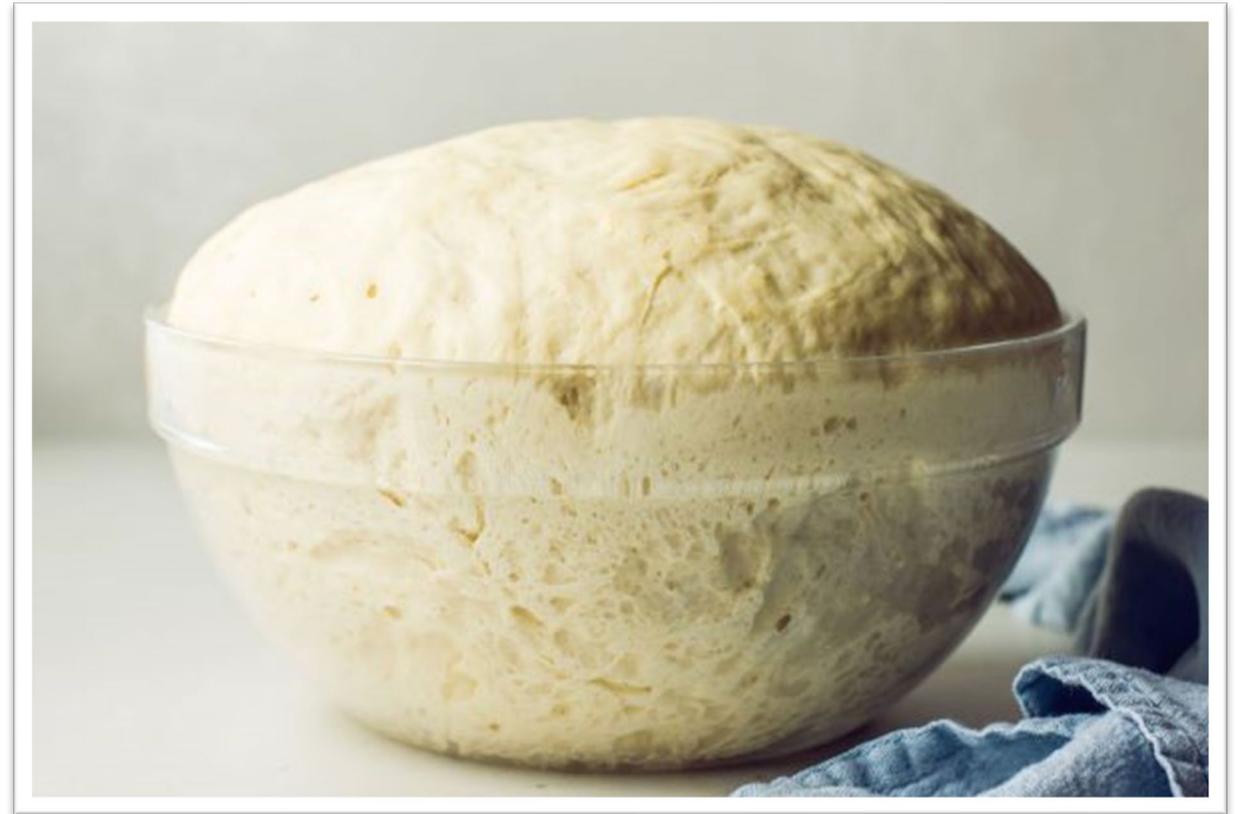
**Dissolves
ingredients:**
helps combine dry
ingredients like sugar
and salt smoothly

Adds moisture:
keeps cakes,
muffins, and breads
from being dry

**Influences texture
& flavor:**
different liquids (milk
vs. juice) affect flavor,
richness, and color

Leaveners

- **Biological/Organic:** CO₂-emitting organisms, ex. yeast
- **Chemical:** Baking powder, baking soda
- **Physical/Mechanical:** mixing methods used to create structure, ex. steam with puff pastry



Chemical Leavening

Chemical leavening:

- Use of chemical agents to produce gas (usually carbon dioxide)
- Causes dough or batter to rise, creates light, airy textures

Chemical leavening agents:

- **Baking soda:** requires an acid (like vinegar or buttermilk) to activate and release gas
- **Baking powder:** contains an acid (cream of tartar) and a base (baking soda)
 - It works in **2 stages:** when mixed with liquids and when exposed to heat



Ratios

- Memorizing basic recipes
- Scaling recipes up/down
- Blueprint for flavor alteration
- **Pound cake**
 - 1 pt flour : 1 pt sugar : 1 pt egg : 1 pt butter
- **Cookie dough**
 - 1 pt sugar : 2 pts fat : 3 pts flour

BAKING RATIOS

FLOUR LIQUID EGG FAT SUGAR



Dough vs. Batter

- **Dough:** main ingredient is flour
 - Kneaded, malleable
 - Yeast-leavened
- **Batter:** eggs, high amount of fat, sugar
 - Whipped, creamed, or blended, pourable
 - Physical or chemical leavener



Straight/ Blending Method



- Wet ingredients are mixed separately from dry, then combined briefly
- Minimal mixing = moist, soft crumb
- Used for muffins, pancakes, quick breads

Blending Method Steps

- 1. Preheat oven:** so it is to temperature when the batter is ready to bake
- 2. Prepare pans:** grease or line pans/ muffin tins as needed
- 3. Mix dry ingredients:** whisk together your dry ingredients (e.g., flour, sugar, baking powder/soda, salt)



Blending Method Steps



- 4. Wet ingredients:** in a separate bowl, combine wet ingredients
- 5. Make a well in the dry ingredients:** push the dry ingredients to the sides, forming a *“well”* in the center
- 6. Add wet to dry:** pour the wet mixture into the well of the dry ingredients, gently mix (do not overmix, should be lumpy)
- 8. Pour and bake immediately**

Creaming Method

- Fat (usually butter) beaten with sugar
- Incorporates pockets of air into the fat around each sugar granule
- Air pockets expand in heat of oven, keeping final bake light & airy
- Used for: cookies, cakes, cupcakes



Creaming Method Steps

- 1. Soften the butter:** let it reach room temperature for optimal mixing
- 2. Mix butter & sugar:** beat together on medium speed with the paddle attachment until light and fluffy
- 3. Scrape the bowl:** stop the mixer and scrape the sides and bottom of the bowl as needed
- 4. Add liquid gradually:** slowly add the liquid, mixing for a minute after each addition



Creaming Method Steps

- 5. Scrape the bowl again:** scrape the sides and bottom of the bowl after each liquid addition
- 6. Add flour:** add all the flour at once and mix on low speed until just incorporated
- 7. Final scrape:** scrape the bowl one last time to ensure everything is mixed well



Whipping/ Foaming Method

- Eggs or egg whites are whipped to trap air and create volume
- No leavening agents needed = light, airy bakes
- Used for meringues, sponge cakes, angel food cake
- Light, fluffy, holds shape



Whipping Method Step by Step

- 1. Prepare equipment:** ensure all equipment is clean and dry
- 2. Heat the eggs:** combine eggs and sugar in a mixer bowl, place over a double boiler, and lightly whip eggs until 110°
- 3. Beat the eggs:** whip eggs on high speed whipping to incorporate
- 4. Foam formation:** slowly add sugar while continuing to beat until it reaches stiff peaks



Whipping Method Step by Step



Handle carefully to maintain foam structure and avoid deflation

- 4. Fold in dry ingredients:** gently fold in sifted dry ingredients using spatula
- 5. Add melted fat:** gently fold into the batter without deflating the foam
- 6. Bake immediately:** pour into pans and bake immediately to maintain volume created by the whipped eggs

Biscuit (Cutting-in) Method

Also known as the
“Rubbed Dough Method”

- Cold fat is cut into flour until crumbly before adding liquid
- Creates flakey layers and tender texture
- Used for biscuits, scones, pie crusts



Biscuit Method Step by Step

- 1. Preheat oven:** get it hot and ready- usually 400°-450°F
- 2. Mix dry ingredients:** whisk together flour, baking powder/soda, salt etc.
- 3. Cut in cold fat:** add cold butter, shortening, or lard to the dry mixture

Use a pastry cutter, fork, or your fingers to “cut in” the fat until the mixture looks like coarse crumbs or pea-sized pieces



Biscuit Method Step by Step

- 4. Add cold liquid:** gradually add cold liquid and stir gently until the dough just comes together
- 5. Roll out, fold + cut:** roll the dough out, fold it over a few few times to create layers and then cut straight down
- 6. Bake:** place on lined baking sheet and bake until golden brown

Always chill dough before using





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Any Questions?