



Craftsy

THE COMPLETE GUIDE TO
Baking Bread

WITH ZOË FRANÇOIS, MICHAEL KALANTY,
AND RICHARD MISCOVICH

The logo for Craftsy, featuring the word "Craftsy" in a white, cursive font inside a solid orange circle. This circle is positioned at the top center of a larger teal rounded rectangle.

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RICHARD MISCOVICH

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CLASS 1

The Art and Science of Bread

with Michael Kalanty



Michael Kalanty has more than 20 years of baking and cooking experience. He is the author of *How to Bake Bread: The Five Families of Bread* and teaches at the International Culinary School at the Art Institute of California-San Francisco. Michael is also the director of education for the California Culinary Academy.

Formulas

BAGUETTE

FORMULA			
INGREDIENT	BP%	OUNCES	GRAMS
Water (90 F / 32.2 C)	63%	10 oz	285 g
Dry yeast	1.6%	¼ oz	7 g
Flour (all-purpose)	100%	1 lb	450 g
Salt	2.2%	1/3 oz	10 g
Yield		1 lb 11 oz	760 g

PROCEDURE		
Mise en Place	H2O @ 90 F / 32.2 C	ddt = 80 F (26.7 C)
Ingredient Mixing	Direct	
Development	Speed No. 2, 4 m + Speed No. 1, 2 m	
Fermentation	1h00 @ 80 F (26.7 C) (70% hum) 1x de-gas and fold	
Shaping	Divide @ 12- to 13-oz. (340 to 369 g) pieces Form as cylinders Bench rest 30 m in refrigerator	
Proofing	40 m @ 80 F (26.7 C) (60% hum); 10 m outside the proof box	
Décor & Baking	Slash 5 times with lame	

CONVECTION OVEN @ 440°

- Bake with humidity/steam for 2 minutes
- Remove moisture
- Increase oven temp to 460°
- Bake 11-12 minutes more, to desired crust color

STILL OVEN @ 500°

- Bake with humidity/steam for 2 minutes
- Remove moisture
- Decrease oven temp to 450°
- Bake 11-12 minutes more, to desired crust color

References

CRUMB

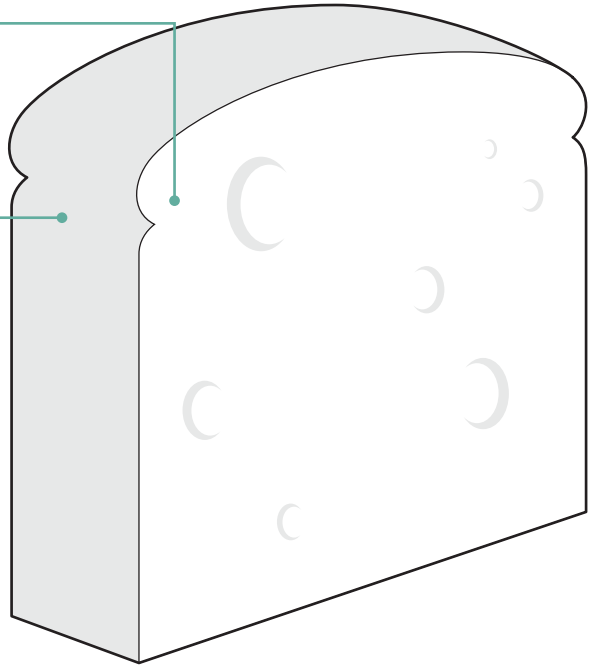
1. Sweet / Dairy
2. Sour / Fruity
3. Sour / Dairy

CRUST

4. Roasted
5. Fruity
6. Resinous
7. Toasty
8. Sweet

GRAIN CHARACTER

9. Simple
10. Moderate
11. Complex
12. Over-Fermented



KEY

1. Milk, Butter, Diacetyl (Popcorn Butter)
2. Green Apple, Grapefruit, Lemon, Vinegar
3. Fresh Cheese, Buttermilk, Plain Yogurt, Aged Cheese
4. Baked Onions, Dark Beer, Baked Chestnut, Cheese Gratin
5. Fig, Raisin, Stewed Fruit
6. French Roast Coffee Beans, Vanilla Bean, Aged Balsamic Vinegar
7. Malty, Popped Grains, Nutty
8. Butterscotch, Toffee, Chocolate, Molasses
9. Raw Starch, Raw Green Beans, Pea Shoots, Straw, Dry Yeast
10. Cooked Spaghetti, Steamed Potatoes, Cooked Oatmeal, Yeasty Champagne
11. Cooked Whole Grains, Cooked Dried Beans, Green Olive, Flint, Slate, Mineral
12. Beer, Grapefruit Pith, "Turned" Red Wine, Sherry

Read the full story of the Bread Flavor Wheel at www.michaelkalanty.com

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CLASS 2

Artisan Bread in Minutes

with Zoë François



Zoë François is a best-selling author, renowned blogger and seasoned baking instructor. She is the co-author of several bread cookbooks, including "The NEW Artisan Bread in Five Minutes a Day" and "Artisan Pizza and Flatbread in Five Minutes a Day," and a frequent contributor to the Cooking Channel, Fine Cooking and Disney. She also runs the successful blog Zoë Bakes.

Recipe Index

RECIPES

All recipes (except pizzas) adapted from The New Artisan Bread in Five Minutes a Day by Jeff Hertzberg and Zoë François (St. Martin's Press, 2013). Pizza recipes adapted from Artisan Pizza and Flatbread in Five Minutes a Day by Jeff Hertzberg and Zoë François (St. Martin's Press, 2011).

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Recipes

NO-KNEAD ARTISAN MASTER RECIPE & BASIC BOULE

YIELD: makes 4 loaves, slightly less than 1 pound (455 g) each

INGREDIENTS

- 3 cups (710 ml) warm water
- 1½ tablespoons granulated yeast
- 1½ tablespoons kosher salt (can decrease to taste)
- 6 ½ cups (910 grams) unbleached all-purpose flour
- Flour, cornmeal or parchment paper, for the peel
- 1 cup (240 ml) hot water (for steam in the oven)

PREPARATION

1. Put the water, yeast, salt and flour into a 5-quart (4.75 l) container or stand mixer bowl. Use a Danish dough whisk, spoon or the stand mixer fitted with the paddle attachment to mix until uniform and no dry bits remain.
2. Cover (not airtight) and allow to rise at room temperature for about 2 hours.
3. The dough can be shaped and baked right away, or refrigerated in a lidded container (not airtight) for up to 14 days. The dough is easier to work with after 5 hours of refrigeration.
4. Prepare a pizza peel with flour, cornmeal or parchment paper. Sprinkle the surface of the dough in the container with flour. Use kitchen shears or a serrated knife to cut off a 1-pound/455 g (grapefruit-size) piece of dough. Cover the remaining dough and refrigerate for baking loaves within 14 days.
5. Sprinkling with more flour to prevent sticking, use your hands to shape a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Shaping should take no more than 20 to 40 seconds.
6. Place the dough on the prepared pizza peel and allow to rest for 60 minutes. You can cover the dough loosely with plastic wrap, but it isn't necessary. The loaf may not rise much during this time.

Recipes

7. At least 20 minutes before baking, set an inverted baking sheet or baking stone near the center of oven and preheat the oven to 450 F (230 C/gas 8). Set a metal broiler pan on a lower rack.
8. When the dough has rested for 60 minutes, dust the top liberally with flour and then use a serrated knife to slash a ½-inch (12 mm) deep cross or four parallel lines of the same depth.
9. Slide the loaf off the peel and onto the hot stone. Immediately pour the hot water into the broiler pan and close the oven door.
10. Bake for about 30 minutes, or until the crust is richly browned and firm to touch. Allow to cool completely on a rack before eating.

Recipes

OLIVE COURONNE

YIELD: makes 1 couronne

INGREDIENTS

- 1 pound/455 g (grapefruit-size piece) Master Recipe
- ½ cup (85 grams) black California olives, pitted and chopped
- Unbleached all-purpose flour, for dusting
- 1 cup (240 ml) hot water or ice cubes

PREPARATION

1. Using your hands, flatten the dough to a thickness of ½ inch (12mm) on a floured work surface. Press the olives into the dough and roll up to seal inside the dough. Dust with more flour and quickly knead to distribute the olives.
2. Shape the dough into a ball by stretching the surface of the dough around to the bottom, rotating the ball a quarter-turn as you go.
3. Place the dough ball into a floured bowl, cover loosely with plastic, and let rest for about 15 minutes.
4. Poke your thumbs through the center of the ball and gradually stretch the hole so that it's nice and wide, large enough to stay open while it rises in the oven. This means that the hole will need to be about three times as wide as the wall of the ring.
5. Transfer the ring to a parchment-lined pizza peel and let rest for 20 minutes.
6. Preheat the oven to 450 F (230C/gas 8), with a baking stone placed on the middle rack. Place an empty broiler tray on any other shelf that won't interfere with the rising bread.
7. Just before baking, dust the couronne with flour and slash radially with a serrated knife, like spokes in a wheel.
8. Slide the loaf directly onto the hot stone. Immediately pour the hot water or ice cubes into the broiler tray, and quickly close the oven door. Bake for about 25 minutes, or until deeply browned and firm. Smaller or larger loaves will require adjustments in baking time.
9. Allow the bread to cool on a wire rack before cutting or eating.

Recipes

CHEESE BREAD

YIELD: makes 1 loaf

INGREDIENTS

- 1 pound/455 g (grapefruit-size piece) Master Recipe
- Unbleached all-purpose flour, for dusting
- $\frac{3}{4}$ cup (120 g) coarsely grated sharp Cheddar, plus a thin slice
- 1 cup (240 ml) hot water or ice cubes (if not using a Dutch oven; follow baking instructions as for the Olive Couronne)

PREPARATION

1. Using your hands, flatten the dough to a thickness of $\frac{1}{2}$ inch (12mm) on a floured work surface. Press the cheese into the dough and roll up to seal inside the dough. Dust with more flour and quickly knead to distribute the cheese.
2. Shape the dough into a ball by stretching the surface of the dough around to the bottom, rotating the ball a quarter-turn as you go.
3. Place the ball on a floured piece of parchment and let it rest, loosely covered with plastic, for $1\frac{1}{2}$ hours.
4. Preheat the oven to 450 F (230C/gas 8) with a baking stone placed on the middle rack. Set a large lidded Dutch oven on the rack to preheat; be sure your Dutch oven has a metal knob on top or one that can withstand the heat of the oven without melting.
5. Just before baking, slash a cross into the loaf with a serrated knife and lay the slice of cheese over the cross.
6. Use the parchment paper to lift the dough and set it into the hot Dutch oven. Cover and return to the oven. Bake for about 25 minutes, or until browned and firm. Uncover and bake until deeply browned, about 10 minutes more. Use a spatula to remove the bread from the Dutch oven and transfer to a wire rack. Remove the parchment and let cool completely.

Recipes

SLOW-COOKER HERB BREAD

YIELD: makes 1 loaf

INGREDIENTS

- 1 pound/455 g (grapefruit-size piece) Master Recipe
- 2 teaspoons chopped fresh rosemary or thyme
- Unbleached all-purpose flour, for dusting

PREPARATION

1. Using your hands, flatten the dough to a thickness of $\frac{1}{2}$ inch (12mm) on a floured work surface. Press the herbs into the dough and roll up to seal inside the dough. Dust with more flour and quickly knead to distribute the herbs.
2. Shape the dough into a ball by stretching the surface of the dough around to the bottom, rotating the ball a quarter-turn as you go.
3. Place the ball on a floured piece of parchment and transfer to the slow cooker.
4. Cover the slow cooker and turn it on high. Bake for 45 minutes, or until the top of the loaf feels firm when you gently press it. The loaf will be very pale at this point.
5. When the loaf has about 20 minutes left in the slow cooker, heat the broiler on high.
6. Remove the bread from the slow cooker, slide it onto a peel, and then slide it directly onto the rack under the broiler. Broil for about 2 minutes or until the crust is browned and crisp.
7. Transfer to a wire rack and let cool completely.

Recipes

BAGUETTE

YIELD: makes one 16-inch (40-cm) baguette

INGREDIENTS

- ½ pound/225 g (orange-size piece) Master Recipe
- 1 egg white mixed with 1 tablespoon water, for egg wash
- Unbleached all-purpose flour, for dusting
- 1 cup (240 ml) hot water

PREPARATION

1. Preheat the oven to 450 F (230°C/gas 8), with a baking stone set on the middle rack. Place an empty broiler tray on any other rack that won't interfere with rising bread.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Shaping should take no more than 20 to 40 seconds.
3. Let the dough ball rest for about 15 minutes. You can cover the dough loosely with plastic wrap, but it isn't necessary.
4. Stretch the dough into a baguette shape that's about 16 inches (40 cm) long, squeezing the ends a bit to taper them. If the dough resists stretching, let it rest for 5 to 10 minutes until it's relaxed and easy to stretch. (To shape the baguette using the three-fold technique, gently stretch the dough into a ½-inch-thick (12 mm) oval. Fold in one of the long sides and gently press it into the center, taking care not to compress the dough too much. Bring up the other side to the center and pinch the seam closed. Flip the dough over and stretch very gently into a log, working the dough until you have a thin baguette shape that's about 1½ inches (36 mm) wide.)
5. Place the dough on a piece of parchment let rest for 15 to 20 minutes.
6. Transfer the dough on its parchment to a pizza peel (or a baguette pan). Using a pastry brush, paint the dough with the egg wash. (You can sprinkle with flour instead of using the egg wash for a more

Recipes

rustic crust.) Use a serrated knife to make two long slashes on a diagonal down the center of the loaf.

7. Slide the loaf off the peel onto the hot baking stone (or set the baguette pan on the stone). Immediately pour the hot water into the broiler tray and quickly close the oven door. Bake for about 25 minutes, or until richly browned and firm.
8. Transfer to a wire rack, remove from the parchment, and let cool completely.

Recipes

MINI BAGUETTES

YIELD: makes six 4-inch (10-cm) baguettes

INGREDIENTS

- ½ pound/225 g (orange-size piece) Master Recipe
- 1 egg white mixed with 1 tablespoon water, for egg wash
- Unbleached all-purpose flour, for dusting
- 1 cup (240 ml) hot water

PREPARATION

1. Preheat the oven to 450 F (230 C/gas 8), with a baking stone set on the middle rack. Place an empty broiler tray on any other rack that won't interfere with rising bread.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Shaping should take no more than 20 to 40 seconds.
3. Let the dough ball rest for about 15 minutes. You can cover the dough loosely with plastic wrap, but it isn't necessary.

Recipes

4. Gently stretch the dough into a ½-inch-thick (12 mm) oval. Fold in one of the long sides and gently press it into the center, taking care not to compress the dough too much. Bring up the other side to the center and pinch the seam closed. Flip the dough over and stretch very gently into an even log that's about 1½ inches (36 mm) wide.)
5. Dust the dough with flour. Using a bench scraper or sharp knife, cut the baguette on a slight diagonal into 6 equal pieces.
6. Transfer the dough to a parchment-lined baking sheet, shaking off excess flour and elongating them a bit as you go. Let rest for about 20 minutes.
7. Using a pastry brush, paint the dough with the egg wash. (You can sprinkle with flour instead of using the egg wash for a more rustic crust.) Use a serrated knife to make a single long slash on a diagonal down the center of each bun.
8. Set the baking sheet onto the hot baking stone. Immediately pour the hot water into the broiler tray and quickly close the oven door. Bake for about 18 minutes, or until richly browned and firm.
9. Transfer to a wire rack, remove from the parchment, and let cool completely.

Recipes

BÂTARD

YIELD: makes one loaf

INGREDIENTS

- 1 pound/455 g (large grapefruit-size piece) Master Recipe
- Unbleached all-purpose flour, for dusting
- 1 cup (240 ml) hot water

PREPARATION

1. Preheat the oven to 450 F (230 C/gas 8), with a baking stone set on the middle rack. Place an empty broiler tray on any other rack that won't interfere with rising bread.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Shaping should take no more than 20 to 40 seconds.
3. Let the dough ball rest for about 15 minutes. You can cover the dough loosely with plastic wrap, but it isn't necessary.
4. Gently stretch the dough into a 1-inch-thick (2.5 cm) oval. Fold in one of the long sides and gently press it into the center, taking care not to compress the dough too much. Bring up the other side to the center and pinch the seam closed. Flip the dough over and stretch very gently into a football shape.
5. Place the dough on a piece of parchment let rest for about an hour.
6. Transfer the dough on its parchment to a pizza peel. Sprinkle with flour and gently smooth the flour over the loaf. Use a serrated knife to make a single long slash down the center of the loaf.
7. Slide the loaf off the peel onto the hot baking stone. Immediately pour the hot water into the broiler tray and quickly close the oven door. Bake for about 30 minutes, or until richly browned and firm.
8. Transfer to a wire rack, remove from the parchment, and let cool completely.

Recipes

PAIN D'EPI

YIELD: makes one 16-inch (40-cm) loaf

INGREDIENTS

- ½ pound/225 g (orange-size piece) Master Recipe
- Unbleached all-purpose flour, for dusting
- 1 cup (240 ml) hot water

PREPARATION

1. Preheat the oven to 450 F (230 C/gas 8), with a baking stone on the middle rack. Place an empty broiler tray on any other rack that won't interfere with the rising bread. Prepare a pizza peel with parchment paper.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Shaping should take no more than 20 to 40 seconds.
3. Let the dough ball rest for about 15 minutes. You can cover the dough loosely with plastic wrap, but it isn't necessary.
4. Gently stretch the dough into a ½-inch-thick (12 mm) oval. Fold in one of the long sides and gently press it into the center, taking care not to compress the dough too much. Bring up the other side to the center and pinch the seam closed. Flip the dough over and stretch very gently into a log, working the dough until you have a thin baguette shape that's about 1½ inches (36 mm) wide.)
5. Place the dough on the edge of the prepared pizza peel and allow to rest for 20 minutes.
6. Dust the dough with flour. Use long-bladed kitchen scissors to snip almost all the way through the dough at a 20-degree angle all the way down the loaf. As you cut, lay each piece over to one side, alternating sides to create a wheat stalk shape. Let rest for 5 minutes.

Recipes

7. Slide the loaf off the peel and onto the hot baking stone. Pour the hot water into the broiler tray and quickly close the oven door.
8. Bake for about 25 minutes, or until richly browned and firm.
9. Transfer to a wire rack, remove from the parchment, and let cool completely.

Recipes

WREATH BREAD

YIELD: makes one wreath loaf

INGREDIENTS

- 1 pound/450 g (grapefruit-size piece) Master Recipe
- Unbleached all-purpose flour, for dusting
- 1 cup (240 ml) hot water

PREPARATION

1. Preheat the oven to 450 F (230 C/gas 8), with a baking stone on the middle rack. Place an empty broiler tray on any other rack that won't interfere with the rising bread.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Shaping should take no more than 20 to 40 seconds.
3. Let the dough ball rest for about 45 minutes. You can cover the dough loosely with plastic wrap, but it isn't necessary.
4. Poke your thumbs through the center of the ball and gradually stretch the hole so that it's nice and wide, large enough to stay open while it rises in the oven. This means that the hole will need to be about three times as wide as the wall of the ring.
5. Transfer the ring to a parchment-lined pizza peel. Dust the dough with flour. Use long-bladed kitchen scissors to snip almost all the way through the dough at a 20-degree angle all the way around the loaf. As you cut, lay each piece over to one side.
6. Slide the loaf directly onto the hot stone. Immediately pour the hot water into the broiler tray, and quickly close the oven door. Bake for about 25 minutes, or until deeply browned and firm.
7. Transfer to a wire rack, remove the parchment, and let cool completely.



Recipes

SANDWICH BREAD

YIELD: makes one 8½ x 4½ -inch (21.5-by-11.5 cm) loaf

INGREDIENTS

- Unsalted butter, for the pan
- 2 pounds/910 g (large cantaloupe-size piece) of Master Recipe
- Unbleached all-purpose flour, for dusting

PREPARATION

1. Butter an 8½ x 4½-inch (21.5-by-11.5 cm) nonstick loaf pan.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Shaping should take no more than 20 to 40 seconds.
3. Put the dough ball into the prepared pan, loosely cover with plastic wrap, and let rest for about 90 minutes.
4. Preheat the oven to 375 F (190 C/gas 5), with a baking stone on the middle rack.
5. Bake for about 45 minutes until deeply browned and firm.
6. Transfer to a wire rack, remove the loaf from the pan, and let cool completely.



Recipes

CINNAMON APPLE SANDWICH BREAD

YIELD: makes one 8½ x 4½-inch (21.5-by-11.5 cm) loaf

INGREDIENTS

- Unsalted butter, for the pan
- 1½ pounds/680 g (small cantaloupe-size piece) of Master Recipe
- Unbleached all-purpose flour, for rolling
- 1 small apple, cored and finely diced
- 6 tablespoons (75 g) sugar
- 2½ teaspoons ground cinnamon
- 1 egg white mixed with 1 tablespoon water, for egg wash

PREPARATION

1. Butter an 8½ x 4½-inch (21.5-by-11.5 cm) nonstick loaf pan.
2. Sprinkle the dough with flour to prevent sticking and let it rest, loosely covered with plastic wrap, for 90 minutes.
3. Sprinkle more flour on top of the dough and, on a floured surface, roll the dough into ¼-inch (6 mm) thick rectangle.
4. Spread the apples over the dough. In a small bowl, mix together the sugar and cinnamon, and sprinkle 5 tablespoons of it over the apples. Stretch the dough into a rectangle one more time, and press the filling into the dough.
5. Tightly roll the dough up into a log, starting at the end nearest you. Pinch the seam together to seal, and then fold the log into a ball as you would fold a letter.
6. Set the loaf in the prepared pan fold side down. Let rest for 90 minutes, loosely covered with plastic wrap.
7. Preheat the oven to 375 F (190 C/gas 5), with a baking stone on the middle rack.
8. Brush the loaf with egg wash, sprinkle with the remaining cinnamon sugar, and use a serrated knife to cut a slash down the center of the loaf.

Recipes

9. Bake for about 45 minutes, until deeply browned and firm.
10. Transfer to a wire rack, remove the loaf from the pan, and let cool completely.

Recipes

PULL-APART DINNER BUNS

YIELD: makes 12 buns

INGREDIENTS

- Melted unsalted butter, for pan and for brushing on buns
- 1½ pounds/680 g (cantaloupe-size piece) Master Recipe
- Unbleached all-purpose flour, for dusting
- 1 egg white mixed with 1 tablespoon water, for egg wash

PREPARATION

1. Generously butter a 9-inch (23 cm) round nonstick cake pan all over.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape the dough into a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Let rest for 15 minutes.
3. Divide the dough into 12 equal pieces and roll each into a ball, pinching the bottom to shut the seam. Place the balls seam side down into the prepared pan, leaving a little space in between the balls. Loosely cover with plastic wrap and let rest for 30 to 45 minutes. (To make crusty rolls, arrange the dough balls on a parchment-lined baking sheet and let them rest and bake that way. Add steam to the oven before baking these rolls, as we've done in other recipes.)
4. Preheat your oven to 350°F (175C/gas 4).
5. Using a pastry brush, lightly paint the tops of the buns with egg wash.
6. Bake for 25-30 minutes or until golden brown.
7. Immediately brush the hot buns with butter to keep the crust soft (and because it tastes great). Then transfer to a wire rack and let cool completely.

Recipes

HERBED CRESCENT ROLLS

YIELD: makes 8 rolls

INGREDIENTS

- ½ pound/225 g (orange-size piece) Master Recipe
- Unbleached all-purpose flour, for rolling
- 3 tablespoons olive oil
- ½ teaspoon kosher salt
- 2 tablespoons finely chopped fresh rosemary or other herbs
- Kosher salt

PREPARATION

1. Sprinkling the dough with flour to prevent sticking, use your hands to shape the dough into a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Let rest for 15 minutes.
2. Sprinkle flour over the dough and roll it out, on a floured work surface, into an ⅛-inch (3 mm) thick round.
3. Using a pizza cutter, cut the dough into 8 equal wedges. Spread the olive oil, salt and rosemary evenly over the dough.
4. Starting at the thicker end, roll each piece up until the point is tucked under the bottom. Curve the ends to create the crescent shape. Transfer to a parchment-lined baking sheet. Brush the tops with olive oil and cover loosely with plastic wrap. Allow to rest about 40 minutes.
5. Preheat oven to 450 F (230 C/gas 8) with a rack in the middle of the oven.
6. Bake about 20-25 minutes, until golden brown and well set in center.
7. Transfer to a wire rack, remove from the parchment, and let cool completely.



Recipes

NAAN

YIELD: makes 1 naan

INGREDIENTS

- ¼ pound/115 g (peach-size piece) Master Recipe
- 1 tablespoon ghee or melted unsalted butter
- Unbleached all-purpose flour, for dusting
- Kosher salt

PREPARATION

1. Sprinkling the dough with flour to prevent sticking, use your hands to shape the dough into a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Let rest for 15 minutes.
2. Sprinkle the dough with more flour, and then dimple the dough with your fingertips to release any air bubbles. Roll it out to about 1/16-inch (1.5 mm) thick.
3. Heat a 12-inch (30-cm) cast-iron skillet over medium-high heat. Add the ghee or butter.
4. Drop the dough into the skillet, decrease the heat to medium, and cover the pan.
5. Check for doneness at about 3 minutes. When the underside is richly browned, flip the naan, sprinkle with salt, and continue cooking for another 2 to 6 minutes.
6. Remove the naan from the pan, sprinkle the second side with salt, and serve warm.

Recipes

STUFFED NAAN

YIELD: makes 1 stuffed naan

INGREDIENTS

- Unbleached all-purpose flour, for the peel and rolling
- 3 tablespoons finely chopped fresh cilantro
- ½ pound/225 g (orange-size piece) Master Recipe
- Ghee or melted unsalted butter, for brushing
- 3 tablespoons finely chopped white onion

PREPARATION

1. Preheat a baking stone 500 F (260 C/gas 10), with a baking stone on the middle rack. Prepare a pizza peel with flour or parchment.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape the dough into a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Let rest for 15 minutes.
3. Sprinkle the dough with more flour, and then dimple the dough with your fingertips to release any air bubbles. Roll it out to about ¼-inch (6 mm) thick.
4. Spread the onions and cilantro over the dough, then pinch the edges shut around it like a purse, to form a ball around the stuffing. Flip the ball over so the seam is facing down, and roll the dough out again on a floured surface to an ⅛-inch (3 mm) thick oval.
5. Slide the stuffed naan onto the pre-heated stone. Check for doneness in 5 to 10 minutes; at this time, turn the naan around in the oven if one side is browning faster than the other.
6. Brush with ghee or butter and transfer to a rack to cool slightly.

Recipes

PITA

YIELD: makes 1 pita

INGREDIENTS

- ½ pound/225 g (orange-sized piece) of Master recipe
- Unbleached all-purpose flour, for the peel and rolling

PREPARATION

1. Preheat a baking stone 500 F (260 C/gas 10), with a baking stone on the middle rack. Prepare a pizza peel with flour or parchment.
2. Sprinkling the dough with flour to prevent sticking, use your hands to shape the dough into a smooth ball by gently stretching the surface of the dough around from the top of the ball to the bottom on all four sides, rotating the ball a quarter turn as you go. Let rest for 15 minutes.
3. Sprinkle the dough with more flour, and then dimple the dough with your fingertips to release any air bubbles. Roll it out to about ⅛-inch (3 mm) thick round. Place the dough on the prepared peel.
4. Slide the dough directly onto the hot stone. Bake for about 5 minutes, until lightly browned and puffed. (To make a cracked pita, bake until golden brown, about 7 minutes, and don't wrap with a towel.)
5. Wrap in a clean dish towel and cool briefly on a rack. Pitas can be eaten warm!



Recipes

MARGHERITA PIZZA

YIELD: makes one 12-inch (30-cm) pizza

INGREDIENTS

- 1/3 cup (85 g) Tomato Sauce (see recipe)
- 3 ounces (85 g) fresh mozzarella, cut into
- 1/2-inch (12-mm) chunks
- Unbleached all-purpose flour or cornmeal for the pizza peel; flour for the surface
- 1/2 pound/225 g (orange-sized piece) Master Recipe
- Olive oil, for drizzling
- Kosher salt
- 4 fresh basil leaves

PREPARATION

1. Prepare and measure the sauce and mozzarella in advance; this will help you get the pizza into the oven before it sticks to the pizza peel.
2. Preheat the oven to 550 F (290 C/gas 10), with a baking stone placed in the bottom third of the oven. Prepare a pizza peel with flour or cornmeal.
3. On a floured work surface, sprinkle the dough with more flour and dimple it with your fingertips. Using your hands or a rolling pin, stretch the dough into a 1/8-inch (3 mm) -thick round that's 12 inches (30 cm) across. Transfer to the prepared peel.
4. Top the dough with the sauce and cheese, being sparing so the dough doesn't stick to the peel. Drizzle with olive oil and sprinkle with salt.
5. Slide the pizza onto the preheated stone. Check for doneness in 8 to 10 minutes and turn the pizza around in the oven if one side is browning too fast.
6. Garnish with the basil and serve.

Recipes

NO-COOK TOMATO SAUCE

YIELD: makes about 4 cups (900 g)

INGREDIENTS

- 2 28-oz. (794-g) cans crushed or diced Italian-style tomatoes
- 2 cloves garlic, minced (optional)
- 1 teaspoon fresh or dried oregano (optional)
- 1 teaspoon fresh or dried basil (optional)
- 2 teaspoons capers (optional)
- ¼ teaspoon crushed red pepper flakes (optional)
- Salt and pepper to taste

PREPARATION

1. Puree all of the ingredients in a blender until as smooth or chunky as you like, and refrigerate. Can be used immediately or allow the flavors to marry by letting it sit for 24 hours. The recipe is easily doubled or halved.

APPLE CRACKER CRUST PIZZA

YIELD: makes one 12-inch (30 cm) cracker crust pizza

INGREDIENTS

- ½ small apple, cored and thinly sliced
- 2 tablespoon pine nuts
- 2 tablespoon honey
- ⅓ cup (48 g) ricotta salata, thinly sliced (or crumbled feta)
- 1 teaspoon crushed red pepper flakes
- Unbleached all-purpose flour or cornmeal for the pizza peel; flour for the surface
- ¼ pound/112g (peach-size piece) Master Recipe
- Olive oil, for drizzling

Recipes

PREPARATION

1. Prepare and measure the topping ingredients in advance; this will help you get the pizza into the oven before it sticks to the pizza peel.
2. Preheat the oven to 550°F (290C/gas 10), with a baking stone placed in the bottom third of the oven. Prepare a pizza peel with flour or cornmeal.
3. On a floured work surface, sprinkle the dough with more flour and dimple it with your fingertips. Using your hands or a rolling pin, stretch the dough into a 1/16-inch (1.5 mm) -thick round that's 12 inches (30 cm) across. Transfer to the prepared peel.
4. Top the dough with the apples, pine nuts and ricotta salata. Drizzle with the honey and sprinkle with the pepper flakes.
5. Slide the pizza onto the preheated stone. Check for doneness in 5 minutes and turn the pizza around in the oven if one side is browning too fast.
6. Drizzle with a bit more honey and olive oil, and serve.

Recipes

SICILIAN PIZZA

YIELD: makes one 18 x 13-inch (45 x 33 cm) pizza

INGREDIENTS

- ¼ cup (40 g) olive oil
- 2 pounds/910 g (large cantaloupe-size piece) Master Recipe
- 8 ounces (226 g) fresh mozzarella, sliced
- ¼ cup (56 g) sliced red onion
- ½ cup (90 g) green castelvetrano olives, halved
- 3 tablespoons chopped capers
- 1 cup (453 g) grape tomatoes, halved
- Kosher salt

PREPARATION

1. Preheat the oven to 550 F (290 C/gas 10), with a baking stone placed in the bottom third of the oven (the stone is optional for this type of pizza). Oil a 18 x 13-inch (45 x 33 cm) baking sheet with 2 tablespoons of the olive oil.
2. Put the dough on the prepared baking sheet and use your fingertips to stretch the dough all the way to the pan's edges. You may need to allow it to rest for about 30 minutes before it will stretch to the edges.
3. Drizzle with the remaining 2 tablespoons of oil. Add the mozzarella, onion, olives, capers, and tomatoes.
4. Slide the pizza onto the preheated stone. Check for doneness in 10 to 15 minutes and turn the pizza around in the oven if one side is browning too fast.
5. Sprinkle lightly with salt and serve.

Recipes

ONION FOCACCIA

YIELD: makes one 9-inch (23 cm) round loaf

INGREDIENTS

- Olive oil, for the pan
- ¾ pound/340 g (large orange-size piece) Master Recipe
- 8 very thin slices (28 g) red onion
- 5 to 7 slices (42 g) sweet white onion
- Pinch dried thyme
- Kosher salt

PREPARATION

1. Oil a 9-inch (23 cm) round nonstick cake pan all over.
2. Put the dough into the prepared pan and use your fingertips to stretch the dough all the way to the pan's edges. You may need to allow it to rest for about 15 minutes before it will stretch to the edges.
3. Drizzle with a bit more olive oil, and then let rest for about 20 minutes.
4. Preheat your oven to 450°F (230 C/gas 8).
5. Drizzle with a bit more olive oil, and top with the onions. Sprinkle with the thyme and a pinch of salt.
6. Use your fingertips to deeply dimple the dough.
7. Bake for 15-20 minutes or until golden brown.
8. Remove the focaccia from the pan, transfer to a wire rack and let cool briefly. You can eat focaccia warm!



Recipes

BRAIDED SPINACH-FETA BREAD

YIELD: makes 1 braided loaf

INGREDIENTS

- Unbleached all-purpose flour, for rolling
- 1 pound/450 g (grapefruit-size piece) Master Recipe
- 1 cup (180 g) sautéed spinach
- 1/3 cup (37 g) crumbled feta
- 1/4 cup (15 g) pine nuts
- 1 whole egg mixed with 1 tablespoon water, for egg wash
- 2 tablespoons sesame seeds

PREPARATION

1. Line a baking sheet with parchment paper.
2. On a floured work surface, roll the dough into a 1/8-inch-(3 mm) thick rectangle. As you roll out the dough, add flour as needed to prevent sticking.
3. Lift the dough onto the lined baking sheet. Working the long way, layer the spinach over the middle third of the dough. Layer the feta on top, then add the pine nuts.
4. Using a pizza cutter, cut 1/2-inch (12mm) wide strips down each side. Brush one side of the strips lightly with egg wash; this will act as glue so this is your top side. Fold the strips, egg washed side over un-egg-washed side, crisscrossing over the filling by about 1 inch (24 mm). Press the strips together as you move down the pastry, creating a braid. Tuck the ends under, brush with egg wash, cover with plastic wrap and let the braided loaf rest for 40 minutes.
5. Preheat the oven to 375 F (190 C/gas 5). Brush the braid with egg wash again and generously sprinkle with sesame seeds.
6. Place the baking sheet in the center of the oven. Bake the braid for 35 to 45 minutes, or until golden brown. Serve warm.

Recipes

FRUIT-FILLED PINWHEELS

YIELD: makes 12

INGREDIENTS

- ¼ cup (56 g) cream cheese, softened
- 1½ teaspoons honey
- ⅛ teaspoon finely grated lemon zest
- ¾ pound (340 g) (apple-sized piece) Master Recipe
- Unbleached all-purpose flour, for rolling
- ¼ cup (60 g) fruit preserves of your choice
- 12 whole raw almonds
- 1 whole egg mixed with 1 tablespoon water, for egg wash
- Sugar, for sprinkling on top

PREPARATION

1. Combine the cream cheese, honey and zest in a small bowl, set aside.
2. Prepare a baking sheet with parchment or a nonstick baking mat.
3. On a floured work surface, roll the dough into a ⅛-inch (3 mm) thick square.
4. Using a pizza cutter, cut the dough into quarters. Working with one square of dough at a time and leaving a 2-inch (5 cm) circle intact in the center of each square, cut a slash at each corner. Transfer the cut squares to the prepared baking sheet as they're done.
5. Fill each of the squares with about 2 teaspoons of the cream cheese filling and then top with 2 teaspoons of the preserves. Brush each point with egg wash, which will act a glue. Lift one of the egg washed points up and to the center, then skip a point, and lift the next one, pressing it into the center to seal. Repeat, lifting and pressing every other point, to create a pinwheel shape. Cover loosely with plastic wrap and allow to rest about 20 minutes
6. Preheat the oven to 350 F (175 C/gas 4) with rack in middle of the oven.

Recipes

7. Brush the entire exterior with egg wash, then press one almond into the center of each pinwheel. Generously sprinkle each with sugar. Bake about 20-25 minutes, until golden brown and well set in center.
8. Let cool briefly on a wire rack.

Recipes

ICED CINNAMON BUNS

YIELD: makes 4 large buns

INGREDIENTS

- Unbleached all-purpose flour, for rolling
- 1½ pounds (680g) (cantaloupe-size piece) Master Recipe
- 2 tablespoons melted butter
- ¾ cup (150 g) packed brown sugar
- 2 tablespoons ground cinnamon
- 6 ounces cream cheese, at room temperature
- ⅓ cup (37 g) confectioners' sugar
- 3 tablespoons heavy cream
- 1 teaspoon vanilla extract
- ½ teaspoon orange zest

PREPARATION

1. Prepare a baking sheet with parchment or a nonstick baking mat.
2. On a floured work surface, roll the dough into a ⅛-inch (3 mm) thick rectangle.
3. Brush the melted butter onto the entire surface of the dough.
4. In a small bowl, mix the brown sugar and cinnamon. Spread the mixture over the butter-topped dough. Use your hands to make sure you have an even coat of the sugar.
5. Starting at the end nearest you, tightly roll up the dough into a log. Pinch the seam to seal.
6. Use scissors to cut the log into 4 equal pieces, or buns. Set the buns on the prepared baking sheet, giving them about 4 inches between them and smashing them down a bit. It is ok if they rise together in the oven. Loosely cover the buns and let them rest about 1½ hours.
7. Preheat the oven to 350 F (175 C/gas 4).

Recipes

8. Bake for about 25 to 30 minutes, just until the centers are set when poked with your finger. They should be caramel-colored. Let them cool for about 5 minutes.
9. Mix together the cream cheese, confectioners' sugar, cream, vanilla and orange zest. Spread over the warm buns. Enjoy!

Recipes

STICKY PECAN CARAMEL ROLLS

YIELD: makes 8 caramel rolls

INGREDIENTS

- $\frac{3}{4}$ cup (1½ sticks/170 g) unsalted butter, melted, plus more for the pan
- 1¼ cup (275 g) packed brown sugar
- $\frac{1}{3}$ cup (113 g) honey
- 1 teaspoon ground cinnamon
- $\frac{1}{4}$ teaspoon ground nutmeg
- $\frac{1}{2}$ teaspoon salt
- Pinch ground pepper
- 2 cups (198 g) whole toasted pecans
- Unbleached all-purpose flour, for rolling
- 1½ pounds/ 680 g (cantaloupe-size piece) Master Recipe

PREPARATION

1. Butter a 9-inch (23-cm) round nonstick cake pan.
2. In a bowl, cream together the $\frac{3}{4}$ cup (1½ sticks/170 g) butter, the sugar, honey, cinnamon, nutmeg, salt and pepper. Spread half of the mixture evenly over the bottom of the cake pan. Scatter half of the pecans over the butter-sugar mixture.
3. On a floured work surface, roll out the dough to a $\frac{1}{8}$ -inch (3 mm) thick rectangle.
4. Chop the remaining pecans. Spread the remaining filling evenly over the rolled-out dough and sprinkle with the chopped nuts. Starting with the long side, tightly roll the dough into a log. Pinch the seam to seal.
5. Cut the log into 8 equal pieces and arrange over the pecans in the pan, with the “swirled” edge facing upward. Cover loosely with plastic wrap and allow to rest for 1 hour.
6. Preheat the oven to 350 F (175 C/gas 4).
7. Put the cake pan onto a baking sheet and bake for about 40 minutes, or until golden brown and well set in center. While still hot, run a knife around the inside of the pan to release the caramel rolls, and invert onto a serving dish.

Craftsy

CLASS 3

Secrets to Whole Grain Bread Baking

with Michael Kalanty



Recipe Index

RECIPES

Note: Michael prefers King Arthur Flour products, if available.

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Recipes

HONEY WHOLE-WHEAT SANDWICH BREAD

From *How to Bake Bread: The Five Families of Bread* by Michael Kalanty © Red Seal Books 2012.

YIELD: makes 2 loaves (1½ lb/680 g each)

INGREDIENTS

- 16 g dry yeast (2⅓ packets, any type)
- 265 g warm water (100 F/38 C)
- 310 g whole-wheat flour, plus more for sifting
- 140 g warm milk (100 F/38 C)
- 140 g warm honey (80 F/27 C)
- 14 g kosher or fine sea salt
- 60 g unsalted butter, softened, plus 30 g, melted and cooled, for décor
- 395 g bread flour

PREPARATION

1. In a large bowl, dissolve the yeast in the warm water for about 5 minutes. Add the 310 g whole-wheat flour. Let stand for 10 minutes.
2. Blend the milk, honey, and salt into the yeast mixture. Add the softened butter and the bread flour and blend into the dough until all the flour is moistened.
3. Develop the dough on the bench with medium pressure for 3 minutes, then develop the dough with low pressure for 3 minutes. Check for windowpane and taste the dough.
4. Let the dough ferment for 1 hour at 80 F/27 C. Punch and fold the dough once after 30 minutes.
5. Divide the dough into 2 pieces. Form each into a gentle round. Cover and let rest for 10 minutes.
6. Form into pan loaves. Place each loaf into a lightly oiled bread pan (8½ x 4½ x 2½ inches/21.5 x 11 x 6 cm). Lightly oil 2 pieces of plastic wrap and drape one over each loaf. Set aside to proof for 40 minutes at 80 F/27 C. Remove the plastic and proof until the dough rises just above the edge of the pan, about 10 to 15 minutes more at 80 F/27 C.

Recipes

7. Position a rack so the loaves bake in the center of the oven and preheat to 400 F/205 C or 340 F/170 C convection.
8. Sift whole-wheat flour over the dough. With a serrated knife, cut a ¼-inch (6-mm) slash down the center of each loaf. Spoon the cooled butter down the slash, dividing it between the loaves.
9. Bake for 10 minutes. Carefully vent any accumulated steam from the oven. Reduce the oven temperature to 365 F/185 C or 325 F/165 C convection, and continue to bake until the bread registers 190 F/88 C on an instant-read thermometer, 24 to 29 minutes more. Only if necessary, rotate the loaves after they have baked 13 minutes at the reduced temperature.
10. Let cool in the pans on a rack for 10 minutes. Remove the loaves from the pans and cool on their sides for 1 hour, flipping them to the other side after 30 minutes.

Recipes

RAISIN WHOLE-WHEAT SWIRL BREAD

YIELD: makes 2 loaves (1½ pounds/680 g each)

INGREDIENTS

- 16 g dry yeast (2 1/3 packets, any type)
- 310 g warm water (100 F/38 C)
- 345 g whole-wheat flour
- 115 g warm milk (100 F/38 C)
- 85 g brown sugar (dark or light)
- 60 g butter, softened, plus 30 g melted and cooled, for décor
- 16 g kosher or fine sea salt
- 335 g all-purpose flour, plus more as needed
- 140 g dark raisins
- 90 g brown sugar combined with 1 level tablespoon + 1 level teaspoon ground cinnamon and 7 g whole-wheat flour

PREPARATION

1. In a large bowl, dissolve the yeast in the water and let stand for 5 minutes. Blend in the whole-wheat flour and let hydrate for 10 minutes.
2. Blend in the milk, brown sugar, butter, and salt. Add the flour and blend until all the flour is moistened.
3. Develop the dough on the bench with medium pressure for 2 minutes. Cover the dough and let rest for 5 minutes.
4. Press the raisins into the dough and gather the assembly into a ball, layering the raisins in the dough as you work. Again develop the dough with medium pressure for 2 minutes, then let rest for 5 minutes. Lastly, develop the dough with low pressure for 3 minutes. Check for windowpane and taste the dough.



Recipes

- In a lightly oiled plastic container with a lid, let the dough ferment for 1 hour at 80 F/27 C. Punch and fold the dough once after 30 minutes.
- Divide the dough into 2 pieces. On a lightly floured surface, press each piece into an approximate 7 x 9 inch/18 x 23 cm rectangle. Pat and press (don't stretch!) the dough to a uniform thickness, stopping when it first becomes elastic. Drape with lightly oiled plastic wrap and let rest for 10 minutes.
- Lightly dust the work surface, uncover the dough pieces, and transfer them atop the floured part of the bench.
- Brush each rectangle with cooled, melted butter. Spread each rectangle with half of the cinnamon/whole-wheat/sugar mixture. Press into the dough by lightly rolling with a rolling pin. Form each rectangle into a snug roll 8 inches/20 cm long. Let the rolls sit, seam down. Orient the rolls so that when you see the swirl on the end, it suggests the number "9".
- Lightly oil 2 bread pans (8½ x 4½ x 2½ inches/21.5 x 11 x 6 cm). Optionally, crease a piece of parchment to fit across the bottom of the pan and up each of the long sides. Lightly oil the parchment. Use a bench scraper to transfer the rolled loaves to the prepared pans. Lightly drape the oiled plastic pieces over the breads. Set aside to proof for one hour at 80 F/27 C. Remove the plastic and proof until the dough rises just above the edge of the pan, about 20 to 30 minutes more at 80 F/27 C.
- Meanwhile, position a rack so the bread bakes in the center of the oven and preheat to 400 F/205 C or 340 F/170 C convection.
- Once more, just before baking, brush the loaves with cooled, melted butter. Bake for 10 minutes. Carefully vent any accumulated steam from the oven. Reduce the oven temperature to 365 F/185 C or 325 F/165 C convection, and continue to bake until the bread registers 190 F/90 C on an instant-read thermometer, 26 to 30 minutes more. Only if necessary, rotate the loaves after they have baked 13 minutes at the reduced temperature.
- Let cool in the pans on a rack for 10 minutes. Remove the loaves from the pans and cool on their sides for 1 hour, turning them to the other side after 30 minutes.

Recipes

RUSTIC WHOLE-WHEAT BOULE WITH WHEATBERRIES

YIELD: makes 2 loaves (1 lb. 6 ounces/623 g each)

INGREDIENTS

- Wheatberry soaker (see note on page 46)
 - Pinch of kosher or fine sea salt
 - 165 g water, boiling [Bring 2 cups of water to the boil, then scale the required 165 g]
 - 100 g red or white whole wheatberries, rinsed under cool water
- 12 g dry yeast (1¾ packets, any type)
- 300 g warm water (100 F/38 C)
- 225 g whole-wheat flour
- 85 g dark brown sugar
- 70 g canola oil
- 17 g kosher or fine sea salt
- 450 g bread flour
- White or brown rice flour or whole-wheat flour, as needed

PREPARATION

1. To make the wheatberry soaker, in a bowl, dissolve the salt in the water. Blend in the wheatberries. Cover and let stand at ambient temperature for 16 to 18 hours. When ready to make bread, strain the soaked wheatberries and reserve their water. Add more warm water to the wheatberry water for a total of 125 grams. Set aside.
2. In a large bowl, rehydrate the yeast in the 300 grams of water and let stand for about 5 minutes. Add the whole-wheat flour and the reserved 125 grams of wheatberry water and let stand for 10 minutes.
3. Blend in the brown sugar, canola oil, and salt.
4. Add the 450 grams bread flour in stages, as follows:
 - After the brown sugar, canola, and salt, add 350 g flour and blend until all the flour is moistened. Develop the dough on the bench with medium pressure for 3 minutes. Cover the dough and let stand for 5 minutes.
 - Spread the soaked wheatberries and any water that clings to them over the dough. Sprinkle 40 g of the remaining bread flour over the berries and press everything into the dough. Gather

Recipes

the dough into a ball and develop of medium pressure for 3 minutes. Cover and let stand 5 minutes.

- Press another 40 grams of the remaining flour into the dough. Gather the dough into a ball and develop on low pressure for 2 more minutes.
 - You'll have about 20 grams of bread flour remaining. Use this when you punch and fold the dough and for dividing and shaping. Don't worry if you don't use it all, or even if you need a little more to manage the dough shaping comfortably.
5. Check for windowpane and taste the dough. In a lightly oiled plastic container with a lid,
 6. Let the dough ferment for 1½ hours at 80 F/27 C. Punch and fold the dough once after 45 minutes.
 7. Divide the dough into 2 pieces. Form each into a gentle round. Cover and let rest for 10 minutes.
 8. Finally, form the dough into round boules. Line proofing baskets with rice flour. Use a bench scraper to transfer the boules to the baskets, placing them navel down. Lightly oil 2 pieces of plastic wrap and drape gently over the breads. Set aside to proof for 1 hour at 80 F/27 C. Carefully remove plastic and proof for 15 minutes more, allowing the top of the dough to dry.
 9. To prepare the oven for hearth baking, position a rack so bread bakes above the center of the oven but below the top third. Place a baking stone on the rack. Position another rack in the lower third of the oven, and place a shallow baking tray on the rack. Preheat



Recipes

the oven to 450 F/232 C or 415 F/213 C convection. Five minutes before baking, carefully fill the baking tray about halfway with warm water.

10. Transfer the boules onto a loading peel. Score decoratively with a baker's lame or serrated knife. Load the boules onto the baking stone. Bake for 7 minutes. Carefully vent the oven and remove the water tray. Reduce the oven temperature to 425 F/220 C or 385 F/200 C convection and continue to bake for 7 minutes.
11. Vent the oven a second time and rotate the loaves only if necessary. Bake for 7 more minutes. Bread is done when it registers 200 F on an instant-read thermometer. Properly baked, the crust is evenly dark brown and the sides of the loaves are firm.
12. If the interior is done, but the crust needs more time, reduce the temperature to 375 F/190 C or 360 F/ 185 C convection and bake until the crust suits your preference, 4 to 7 minutes more.
13. Let cool on a rack for at least one hour before service.

Note: Soaked overnight, the wheatberries bring an al dente, trail-hiking texture to the bread. If you prefer them to have a softer texture, especially for young children, cook the berries once they have been soaked. Here's how: Pour the soaked berries and all their water into a small saucepan. Add 120 grams cool water and bring everything to the boil. Reduce to a bare simmer, place the cover ajar, and cook until tender, about 45 to 55 minutes. Cool everything to 100 F or just below before proceeding. Follow directions for straining and reserving the berry water as given in the recipe, step 1. If you have more than the 125 grams of berry water called for, discard any extra.

Recipes

STONE-BAKED MULTI-SEED BÂTARD

YIELD: makes 3 loaves (15 oz./425 g each)

INGREDIENTS

- Polish
 - 2 g dry yeast (1/4 packet, any type)
 - 170 g lukewarm water (70 F/ 21 C)
 - 170 g bread flour
 - Multi-seed soaker (see note below)
 - 1 g kosher or fine sea salt (a rounded 1/4 teaspoon)
 - 220 g lukewarm water (70 F/ 21 C)
 - 30 g flax seeds, any color
 - 30 g sunflower seeds, raw & unsalted
 - 15 g sesame seeds, black preferred
 - 30 g pumpkin seeds, raw, hulled, & unsalted
 - 60 g meal or flour from seeds, like pumpkin, flax, or sunflower
- Note:** According to your taste or ingredient availability, any single seed or combination can be used.
- 5 g dry yeast (the remaining 3/4 packet, any type)
 - 120 g water at 100 F
 - 30 g walnut oil
 - 45 g agave, amber preferred
 - 16 g kosher or fine sea salt
 - 500 g whole-wheat flour, plus more as needed

PREPARATION

1. To make the polish, in a bowl, dissolve the 2 g yeast in the 170 g water. Thoroughly blend in the 170 g bread flour. Cover and let stand at ambient temperature for 16 to 18 hours.
2. To make the multi-seed soaker, in a bowl, dissolve the 1 g salt in the 230 g water. Add the flax, sunflower, sesame and pumpkin seeds and the meal/flour. Cover and let stand at ambient temperature for 16 to 18 hours.
3. In a large bowl, dissolve the 5 g yeast in the 120 g water and let stand for about 5 minutes. Add the polish and multi-seed soaker. With your hands, break into small chunks. Blend in the walnut oil, agave and salt. Add the 500 g whole-wheat flour and blend until all the flour is moistened.

Recipes

4. Develop the dough on the bench with medium pressure for 3 minutes. Let the dough rest for 5 minutes. Develop the dough with low pressure for 3 minutes. Check for windowpane and taste the dough.
5. In a lightly oiled plastic container with a lid, let the dough ferment for 1½ hours at 80 F (27 C).
6. Punch and fold the dough once after 45 minutes.
7. Divide the dough into 3 pieces. Form each into a gentle round. Cover and let rest for 5 minutes. Form the dough rounds into bâtards. Let rest, seam down, on a work surface dusted with whole-wheat flour.
8. Dust a proofing cloth with whole-wheat flour. Roll the bâtards in whole-wheat flour on the bench to coat. Seam side down, arrange loaves in the proofing cloth so they are snug. Set aside to proof for 50 to 60 minutes at 80 F (27 C). Make sure any exposed dough is covered with proofing cloth or a piece of plastic.
9. To prepare the oven for hearth baking, position a rack so bread bakes above the center of the oven but below the top third. Place a baking stone on the rack. Position another rack in the lower third of the oven, and place a shallow baking tray on the rack. Preheat the oven to 450 F/232 C or 415 F/213 C convection. Five minutes before baking, carefully fill the baking tray about halfway with warm water.
10. Transfer the bâtards onto a loading peel. Score decoratively with a baker's lame or serrated knife. Load the bâtards onto the baking stone. Bake for 7 minutes. Carefully vent the oven and remove the water tray. Reduce the oven temperature to 425 F/220 C or 385 F/200 C convection and continue to bake for 7 minutes.
11. Vent the oven a second time and rotate the loaves only if necessary. Bake for 7 more minutes. Bread is done when it registers 200 F/ 93 C on an instant-read thermometer. Properly baked, the crust is evenly dark brown and the sides of the loaves are firm. If the interior is done, but the crust needs more time, reduce the temperature to 375 F/190 C or 360 F/ 185 C convection and bake until the crust suits your preference, 4 to 7 minutes more.
12. Let cool on a rack for at least one hour before service.

Recipes

MULTI-GRAIN BOULE

YIELD: makes 2 loaves (25 ounces/700 g each) or 3 loaves (1 lb./465 g each)

INGREDIENTS

- Polish
 - 2 g dry yeast (¼ packet, any type)
 - 200 g water at 70 F (21 C)
 - 200 g bread flour
- Multi-Grain Soaker
 - 60 g rolled oats
 - 60 g cornmeal, stone-ground preferred
 - 40 g whole-rye flour or pumpernickel meal (any grind)
 - 40 g rye flakes, or substitute more rye flour
 - 30 g flax seeds (any color), toasted in a small sauté pan just until popping starts, then cooled
 - 14 g wheat germ, toasted (optional)
- 175 g water
- 4 g kosher or fine sea salt
- 5 g dry yeast (the remaining ¾ packet, any type)
- 200 g water at 100 F/ 37 C (see note)
- 15 g honey
- 11 g kosher or fine sea salt
- 15 g canola or walnut oil
- 250 g whole-wheat flour
- 210 g bread flour
- White or brown rice flour or whole-wheat flour, as needed

PREPARATION

1. To make the polish, in a bowl, dissolve the yeast in the water. Thoroughly blend in the flour. Cover and let stand at ambient temperature for 16 to 18 hours.
2. To make the multi-grain soaker, in a bowl, stir together the oats, cornmeal, rye flour, rye flakes, flax seeds, optional wheat germ, salt, and water. Cover and let stand at ambient temperature for 12 to 18 hours. The soaker may be stored for up to 48 hours longer if refrigerated. Bring to 80 F/ 27 C before using to make dough.
3. In a bowl, dissolve the yeast in the 200 g water. Add the polish and multi-grain soaker. Combine gently, by hand, breaking the polish and soaker into small pieces. Blend in the honey, salt, and the oil.

Recipes

Add the whole-wheat flour and blend until all the flour is moistened. Let the dough stand, covered, for 5 minutes.

4. Add the bread flour and blend until all flour is moistened.
5. Develop the dough on the bench with medium pressure for 3 minutes. Let the dough rest for 5 minutes. Develop the dough with low pressure for 3 minutes. Check for windowpane and taste the dough.
6. In a lightly oiled plastic container with a lid, let the dough ferment for 1 hour at 80 F/ 27 C. Punch and fold the dough once after 30 minutes.
7. Divide the dough into 2 pieces. Form each into a gentle round. Cover and let rest for 10 minutes.
8. Finally, form the dough into round boules. Line proofing baskets with rice flour. Use a bench scraper to transfer the boules to the baskets, placing them navel down. Lightly oil 2 pieces of plastic wrap and drape gently over the breads. Set aside to proof for 45 hours at 80 F/ 27 C. Carefully remove plastic and proof for 10 to 15 minutes more, allowing the top of the dough to dry.
9. To prepare the oven for hearth baking, position a rack so bread bakes above the center of the oven but below the top third. Place a baking stone on the rack. Position another rack in the lower third of the oven, and place a shallow baking tray on the rack. Preheat the oven to 450 F/232 C or 415 F/213 C convection. Five minutes before baking, carefully fill the baking tray about halfway with warm water.
10. Transfer the boules onto a loading peel. Score decoratively with a baker's lame or serrated knife. Load the boules onto the baking stone. Bake for 7 minutes. Carefully vent the oven and remove the water tray. Reduce the oven temperature to 425 F/220 C or 385 F/200 C convection and continue to bake for 7 minutes.
11. Vent the oven a second time and rotate the loaves only if necessary. Bake for 7 more minutes. Bread is done when it registers 200 F/ 93 C on an instant-read thermometer. Properly baked, the crust is evenly dark brown and the sides of the loaves are firm.
12. If the interior is done, but the crust needs more time, reduce the temperature to 375 F/190 C or 360 F/ 185 C convection and bake until the crust suits your preference, 4 to 7 minutes more.

Recipes

13. Let cool on a rack for at least one hour before service.

Note: *Up to 100 g additional water may be added to the main dough to increase its hydration. When adding more water to a dough, nothing else needs to be modified. Times and temperatures are not modified. The dough becomes more slack the more that water is added, and this requires a more skilled touch when dividing and shaping.*

Craftsy

CLASS 4

Handmade Sourdough:
From Starter to Baked Loaf

with Richard Miscovich



Richard Miscovich is an expert bread baker and accomplished instructor. Upon graduating from the San Francisco Baking Institute, Richard visited Alan Scott, artisan builder of the modern brick oven. After that trip, he immediately constructed his own wood-fired oven in coastal North Carolina. Richard currently serves as an assistant professor at Johnson & Wales University, where he teaches bread production. He was the recipient of the Baking & Pastry Service Award in 2006 and 2009, and recently authored *From The Wood-Fired Oven*.

Liquid Sourdough Starter From Scratch

DAY 1	WEIGHT	BAKER'S %
Water, 77 F (25 C)	96 g	84
All-purpose flour	57 g	50
Whole rye flour	57 g	50
Molasses	4 g	3.5
Total	214 g	—

Combine all of the ingredients in a stainless mixing bowl or plastic storage container. Mix until incorporated, scrape down the

sides of the container, cover, and let sit in a 77 F (25 C) environment for 24 hours. This begins the fermentation process.

DAY 2	WEIGHT	BAKER'S %
Water, 77 F (25 C)	96 g	84
Day 1 starter	108 g	95
Whole rye flour	57 g	50
All-purpose flour	57 g	50
Total	318 g	—

Remove 108 g from the starter you mixed yesterday and set it aside. Discard the excess starter. Add it back to the container and add the water and flours to the starter, mix until incorporated, scrape

down the sides of the container, cover, and ferment in a 77 F (25 C) environment for 24 hours. This process of adding flour and water to the starter is called feeding the starter.

DAYS 3-6	WEIGHT	BAKER'S %
Water, 77 F (25 C)	140 g	84
Day 2 starter	159 g	95
All-purpose flour	167 g	100
Total	466 g	—

Liquid Sourdough Starter From Scratch

On Day 3, begin feeding the starter every 12 hours—twice a day, instead of only once a day as before. Remember to use 159 g of young starter instead of the full 318 g. Excess starter can be discarded. (I know it sounds wasteful to just dispose of that starter, but it allows you to keep the amount of flour used for

future feedings to a minimum.) After each feeding, scrape down the sides of the container, cover, and ferment at room temperature, 77 F (25 C). Continue feeding the starter every 12 hours until Day 7. By this time, your starter should be healthy, active and ready to use.

CHOOSING A CONTAINER FOR YOUR STARTER

Any non-reactive, 2- to 4-quart, lidded, wide-mouthed container will work fine as a container for your starter. Clear containers are convenient because you can observe the progress of your starter at a glance without opening the lid. When I want to track the growth of the starter over time, I simply mark the level with a dry-erase marker and note the time on the outside of the container.

The volume of the starter changes dramatically based on how many days it has matured and how soon it's fed after reaching maximum volume. I've started starters with this formula and purposefully created inaccuracies as a way of testing the efficiency of this approach. It has always worked, so don't worry if you have to estimate.

CARE AND FEEDING OF A LIQUID SOURDOUGH STARTER

Maintaining Your Starter at Room Temperature Room temperature, roughly 77 F (25 C), is the preferable environment for maintaining an active starter. Feeding it water and flour can be a daily task depending on how much you bake, but it's a simple one, and you might find it less demanding than you'd think. You can always stash the starter

in the fridge when daily feeding isn't convenient, but maintaining it at room temperature with daily feedings for at least a little while is a great way to become familiar with the various stages of your starter's cycle.

After you've established your starter following the formula above, feed it once a day as follows:

Liquid Sourdough Starter From Scratch

Stir the starter well and then take out 100 g (discard the remaining starter). Mix the 100 g starter with 100 g water and 100 g all-purpose flour until smooth. Cover and let ripen for six to eight hours.

GETTING READY TO BAKE

If you plan to use the starter the next day, feed it twice without pouring off any starter. There should be a minimum of six hours between feedings, and the last feeding should be 6 to eight hours before you want to build a levain in order to make a batch of bread.

MAINTAINING YOUR STARTER IN THE FRIDGE

When daily feeding isn't convenient, you can store your starter in the fridge and feed it once a week instead. It's also appropriate to keep your starter in the fridge if your kitchen is very warm—say, over 85 F (29 C). In a hot summer kitchen, a starter left on the counter will ferment like crazy, and you'd have to feed it very frequently to prevent it from becoming overripe.

Feed the starter once a week as follows: Take the starter out of the fridge, stir well, and pour off all but 100 g. Add 100 g of water and 100 g of all-purpose flour, mix until smooth, and cover. Allow the starter to work at room temperature for

at least two hours before putting it back in the refrigerator.

Getting ready to bake with a starter that's been stored in the fridge with weekly feedings: Two to three days before you're planning to bake, you'll need to raise the activity of your starter to a more energetic level. Here's how: Take the starter out of the fridge in the morning, feed it as usual, and let it ferment for 24 hours at room temperature. The next day, feed it twice: once in the morning, then again about 12 hours later. On the third morning, feed the starter early and allow it to ferment until it's ripe, about six hours. It should then be ready to use in your recipe. Pour off what you will need for the recipe, and feed the remaining starter 227 g flour and 227 g of water. Mix until smooth, and allow the starter to work for at least two hours at room temperature before putting it back in the refrigerator.

INCREASING THE QUANTITY OF YOUR STARTER

To increase the quantity of your starter, simply feed the starter as usual without discarding any. You may also increase volume by increasing the amount of flour and water you add at each feeding—just remember to follow the 1:1 ratio of equal parts (by weight) flour and water.

Liquid Sourdough Starter From Scratch

REVIVING A DORMANT OR NEGLECTED STARTER

When a starter has gone too long without a feeding, it will lack the usual bubbles and signs of activity, and it will have a very sharp aroma and a layer of clear, dark liquid (alcohol, a byproduct of yeast that's been deprived of oxygen) on top. Although the starter appears lifeless at this point, the microflora will spring into action again as soon as they get a few good meals. Stir the liquid back into the starter, pour off all but 100 g, and feed it 100 g of water and 100 g of all-purpose

flour twice a day until it's healthy, bubbly and active.

Sourdough starters are hearty and easily resist spoilage due to their acidic nature. The pH of a sourdough starter discourages the proliferation of harmful microorganisms, but if your starter turns ominously pink or red or shows signs of mold growth, discard it and begin again.

*The preceding excerpt is from Richard Miscovich's book *From the Wood-Fired Oven* (Chelsea Green Publishing, 2013) and is reprinted here with permission of the publisher.*

Pain au Levain

YIELD: Two large loaves, 25 percent prefermented flour

LEVAIN	WEIGHT	VOLUME	BAKER'S %
Water, 75 F (23.8 C)	227 g	1 cup	100
Liquid sourdough starter	45 g	3 tablespoons*	20
Bread flour	227 g	2 cups	100
Total	499 g	—	—

**Best measured by weight; volume varies with ripeness.*

Combine water, starter and flour. Mix until smooth. Cover and allow to ferment at 75 F (23.8 C) for eight hours.

You can also mix the levain and allow it to ferment for five to six hours and then retard it in the fridge for an additional 12 hours. It is important to achieve some

visible activity before retarding the levain. If the levain isn't moving before it goes into the fridge it is unlikely it will become active during its tenure under cold storage. Forty degrees fahrenheit is too cold to initiate fermentation. Activation before refrigeration!

FINAL DOUGH	WEIGHT	VOLUME	BAKER'S %
Water	400 g	1¾ cups	69
Bread flour	457 g	3¾ cups	75
Levain	454 g	2½ cups*	—
Whole-wheat flour	228 g	2 cup	25
Salt	17 g	1 tablespoon + 1 teaspoon	1.8
Total	1,556 g	—	—

** Best measured by weight; volume varies with ripeness.*

Desired Dough Temperature:
78 F (25.6 C)

Pain au Levain

AUTOLYSE

Remove 45 g of levain from the levain. Pour the water around the edge of the remaining 409 g levain in order to help release all of the preferment. Add the water-levain mixture and flours to a mixing bowl, but hold back the salt. Mix by hand or mixer until thoroughly

incorporated and homogeneous, about two minutes, but it is not necessary to “develop” the dough at this point. It is OK if the dough is still shaggy. Cover to prevent a skin from forming and allow to autolyse for 20-30 minutes.

MIXING

- **BY HAND:** After the autolyse, add salt and mix the dough with your hand and plastic dough scraper for a minute to incorporate the ingredients. Turn the dough out of the bowl and knead by hand using the techniques demonstrated in Lesson 2.
- **BY MIXER:** After the autolyse, add salt and mix on slow speed for three minutes. Increase the speed to medium and mix for three minutes. Stop occasionally while mixing to scrape dough off the hook.

floured surface and divide into two pieces. Pre-shape each piece into a loose, round ball, and place bottom up on a lightly floured surface. Cover the loaves and allow them to rest for about 20 minutes.

SHAPING

Shape the loaves into boules or batards and place them seam-side up in well-floured proofing basket and allow to proof for approximately two hours. This is a pretty long proof time—you need to make sure the basket is well floured so the dough doesn't stick when it is turned out to score and bake, especially if the dough will be retarded in the baskets overnight. I prefer linen-lined banneton instead of unlined brotform for dough with a long proof time, the dough tends to stick more to the convolutions of the willow basket while the linen-lined wicker gives a nice release.

PRIMARY FERMENTATION

Place dough in a covered container and allow to ferment 2½ hours, folding twice approximately every 45 minutes.

PRE-SHAPING/DIVIDING

Forty-five minutes after the last fold, turn the dough onto a lightly

Pain au Levain

SCORING & BAKING

Preheat oven to 450 F (232 C).

Just before baking, invert the baskets and turn the loaves onto

a lightly floured peel. Score and bake in a steamed 450 F (232 C) oven for about 40 minutes.

VARIATION: OLIVE SOURDOUGH

For this variation, exchange the whole-wheat flour with whole rye flour, which holds up well to the strong flavor of the olives. However, you can also make it with whole-wheat flour with excellent results. Once the dough is developed after kneading, add 400 g of olives and continue mixing until evenly incorporated. (The baker's ratio of olives is 44 percent.) I like whole kalamatas but have also made olive bread with other types of olives, including a mix of black and green olives. I roughly chop about 75 percent of the olives but leave the others whole. Some of

those whole olives will get broken up during the rest of the bread making process (and when the baked loaf is sliced or ripped apart), but it is satisfying to find some whole pieces of olive in the middle of the loaf. The smooth and oily olives tend to slip out of the dough, but just keep tucking them back in as you fold, divide and shape—they'll eventually become incorporated. The addition of the olives will increase the yield of the dough, so you may want to divide this variation into three loaves—or make one into a fougasse.



Pain au Levain

VARIATION: ROSEMARY SOURDOUGH

This is one of my favorite breads. I replace the whole-wheat flour with white flour and add 28 g of fresh rosemary. The baker's percentage of rosemary is 3 percent. However, this percentage may need to be adjusted depending on the pungency of your rosemary. I chop the rosemary during the autolyse

period, as oxidation will cause the herb to turn black if it is chopped too far in advance. Add the rosemary right at the beginning of kneading. That way, the bits of rosemary are evenly incorporated throughout the dough. I place a tip of a rosemary stem under the loaf just before loading.

VARIATION: ROASTED-ONION SOURDOUGH

This is a hearty loaf with nice flavor—a simple and inexpensive levain variation. Keep the whole-wheat flour (from the basic pain au levain formula) but hold back a bit of the water (about 28 g) because the onions will add to the hydration. Add 226 g caramelized onions. Remember that the post-cooking weight will be less, so

start with about 283 g raw onion, about two medium onions. Chop the onions coarsely, toss with olive oil, salt, and pepper. Caramelize until translucent. They should still be pretty wet, not crispy and dark. Add the onions once the dough is toward the end of kneading development, and make sure they are evenly distributed.

Scoring the Loaves

Scoring is generally done just before loaves are loaded into the oven. The score marks allow the loaf to open at a predictable place when expansion starts due to oven spring. If a loaf isn't scored, it might open randomly at the weakest spot or not at all, yielding a dense crumb and a twisted appearance in either case. I prefer to use a traditional French lame (rhymes with "mom") with a changeable blade for scoring loaves. (Avoid lames that have a blade fixed to the handle; these are single-use tools. Once the blade is dull—and it won't take long—all you can do is throw the lame away. A changeable-blade lame is a tool you can have the rest of your life.) It's a simple tool that allows more dexterity and agility when making cuts. Some lame handles are bent, which curves the razor, allowing the baker to easily make an undercut when scoring the loaf. This flap of dough will lift up and create a deeply caramelized ridge of crust. A straight lame is good for making cuts that are perpendicular to the surface of the dough. Use only the tip of the blade to prevent the back edge of the blade (which doesn't have a sharp cutting edge) from bulldozing and snagging the surface of the dough.

Determine your score mark in advance and make quick, confident moves. Even a brand-new blade will drag and snag the dough's surface if you use it in a slow and hesitant manner. Ideally, the motion is continuous, with the moving blade cutting neatly through the dough and continuing on its trajectory—follow-through is important for making confident cuts. If multiple loaves are being scored and loaded, make all the parallel cuts on all the loaves and then go back to finish the pattern. This will save time because you won't have to reposition your arm for each segment of the score mark.

An important adjustment to consider in scoring is the angle of the blade in relation to the surface of the dough. Undercutting the surface of the dough will allow the flap of skin to rise up during the oven spring period, creating an "ear" or ridge of dough. Making a cut with the blade perpendicular to the surface forces the parts of the dough on either side of the cut to migrate away during oven spring.

Finally, the depth of the cut depends on the hydration of the dough and how proofed the loaf is. Very wet dough, like Ciabatta, is not scored because this bread has little surface tension; cutting it would reduce surface tension

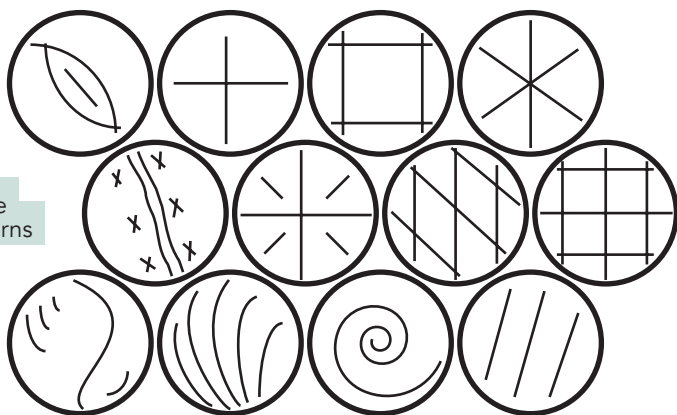
Scoring the Loaves

even more, leading to a loaf that would spread too much. A drier dough needs a deep and decisive cut. If you realize while loading that the dough is still a bit young (slightly underproofed), make the score marks a bit deeper to give some release to the excess force that will be released during oven spring. If the dough seems slightly overproofed or delicate, make the cut a bit shallower.

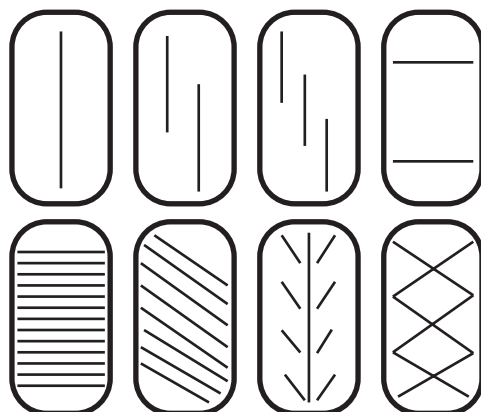
Simple score marks that cover the entire surface of the bread are easiest to execute and allow the loaf to expand in all directions. Complex cuts with lots of curves are difficult to execute; often the detail is lost in the oven spring.

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Boule
Patterns



Batard
Patterns



Sprouted Wheat Berry Sourdough

YIELD: Two large loaves, 35 percent prefermented flour

LEVAIN	WEIGHT	BAKER'S %
High-extraction flour	121 g	50
Sprouted wheat flour	121 g	50
Water	242 g	100
Liquid sourdough starter	36 g	15
Total	520 g	

Combine flours, water and starter. Mix until smooth. Cover and allow to ferment for eight to 10 hours.

SPROUTED SOAKER	WEIGHT	BAKER'S %
Sprouted grains	173 g	100

Soak whole wheatberries for 24 to 36 hours. Drain and rinse. Allow to sprout for another 12-36 hours at room temperature.

FINAL DOUGH	WEIGHT	BAKER'S %
Sprouted wheat flour	328 g	65
High-extraction flour	121 g	35
Water	340 g	98.6
Salt	15 g	2.2
Levain	484 g	—
Sprouted soaker	173 g	25
Total	1,461 g	

Desired Dough Temperature:
78 F (25.6 C)

Sprouted Wheat Berry Sourdough

AUTOLYSE

Pour the water around the edge of the ripe starter in order to help release all of the preferment. Add the water, levain and flours to a mixing bowl, but hold back the salt. Mix by hand or mixer until thoroughly incorporated

and homogeneous, but it is not necessary to develop the dough at this point. It is OK if the dough is still shaggy. Cover to prevent a skin from forming and allow to autolyse for 20-30 minutes.

MIXING

- **BY HAND:** After the autolyse, add salt and mix the dough with your hand and plastic dough scraper for a minute to incorporate the ingredients. Turn the dough out of the bowl and knead by hand using the techniques demonstrated in Lesson 2.
- **BY MIXER:** After the autolyse, add salt and mix on slow speed for 3 minutes. Increase the speed to medium and mix for 3 minutes. Stop occasionally while mixing to scrape dough off the hook.

two pieces. Pre-shape each piece into a loose round ball, and place bottom up on a lightly floured surface. Cover the loaves, and allow them to rest for about 20 minutes.

SHAPING

Shape the loaves into boules or batards and place them seam-side up in well-floured proofing baskets, cover and allow to proof at room temperature for approximately an hour. Place the baskets in the refrigerator overnight, making sure the dough is well protected so it doesn't dry out.

PRIMARY FERMENTATION

Place dough in a covered container and allow to ferment 2½ hours, folding twice approximately every 45 minutes.

PRE-SHAPING/DIVIDING

Forty-five minutes after the last fold, turn the dough onto a lightly floured surface and divide into

SCORING & BAKING

Preheat oven to 450 F (232 C). Just before baking, invert the baskets and turn the loaves onto a lightly floured peel. Score and bake in a steamed 450 F

(232 C) oven for about 40 minutes.

Rye Formula

YIELD: Two 750-g loaves, 27 percent prefermented flour

RYE SOUR	WEIGHT	VOLUME	BAKER'S %
Water 75 F (23.8 C)	182 g	$\frac{3}{4}$ cup + 2 tablespoons	81
Liquid sourdough starter	14 g	1½ tablespoons*	6
Rye flour, whole	225 g	2⅓ cups	100
Total	421 g	—	—

* Best measured by weight; volume varies with ripeness.

Combine water, starter and flour. Mix by hand or mixer until all flour is incorporated. Be patient and mix until the starter is the

consistency of wet concrete. Cover and allow to ferment at 75 F (23.8 C) for 12-15 hours.

FINAL DOUGH	WEIGHT	VOLUME	BAKER'S %
Rye flour, whole	340 g	3⅓ cups + ⅓ cups	67
High-gluten flour	280 g	2⅓ cups	33
Instant active yeast	3 g	$\frac{3}{4}$ teaspoon	0.35
Salt	17 g	1 tablespoon	2
Water 75 F (23.8 C)	468 g	2 cups	77
Rye sour	421 g	All from above	—
Total	1,584 g	—	—

* Best measured by weight; volume varies with ripeness.

Desired Dough Temperature:
82 F (27.8 C)

Rye Formula

MIXING

- **BY MIXER:** Combine all ingredients in the bowl of a mixer. Mix on slow speed for three minutes. Increase the speed to medium and mix for two to three minutes. The dough will probably stick against the sides of the bowl in a thick layer. You will need to scrape down the bowl more often than with wheat-based breads. The dough will be sticky, but gluten strands should be visible. The surface of the dough will have a slight sheen and will tug back when gently pulled.

PRIMARY FERMENTATION

Place dough in a covered container and allow to ferment, for 45 minutes. There are no folds for this dough.

PRE-SHAPING/DIVIDING

Turn the dough onto a lightly floured surface and divide into

two or three pieces. Pre-shape each piece into a loose round ball, and place bottom up on a lightly floured surface. Cover the loaves, and allow them to rest for about 10 minutes.

SHAPING

Shape into slender batards and place them seam-side up in well-floured round, proofing basket. Proof for approximately 45 minutes to one hour. The seam will begin to rip open when the loaf is ready to bake.

SCORING & BAKING

Preheat oven to 450 F (232 C). Just before baking, invert the baskets and turn the loaves onto a lightly floured peel and score across the batard, about 25 percent in from each end. Bake in a steamed oven. Bake for approximately 45 minutes.

Rugbrød

YIELD: One 13" (33 cm) pullman loaf, 55 percent prefermented flour

RYE SOUR	WEIGHT	VOLUME	BAKER'S %
Water 75 F (23.8 C)	245 g	1 cup + 1 tablespoons + 1 teaspoon	81
Liquid sourdough starter	55 g	¼ tablespoons*	6
Rye flour, whole	300 g	3⅓ cups	100
Total	600 g	—	—

* Best measured by weight; volume varies with ripeness.

Combine water, starter and flour. Mix by hand or mixer until all flour is incorporated. Be patient and mix until the starter is the

consistency of wet concrete. Cover and allow to ferment at 75 F (23.8 C) for 12-15 hours.

LEVAIN	WEIGHT	VOLUME	BAKER'S %
Water	103 g	Scant ½ cup	100
Liquid sourdough starter	14 g	1½ tablespoon*	14
High-gluten flour	103 g	1 cup	100
Total	220 g	—	—

* Best measured by weight; volume varies with ripeness.

Combine water, yeast and flour and mix until smooth. Cover and allow to ferment at 77 F (25 C) for eight to 10 hours. You can

also mix the levain and allow it to ferment for four to six hours at 77 F (25 C) and then retard it in the fridge for an additional 12 hours.

Rugbrød

SOAKER	WEIGHT	VOLUME	BAKER'S %
Rye chops	75 g	⅓ cups + 3 tablespoons	100
Water	150 g	½ cup + 2 tablespoons	200
Total	220 g	—	—

Combine all ingredients and soak overnight at approximately 77° (25 °C).

FINAL DOUGH	WEIGHT	VOLUME	BAKER'S %
High-gluten flour	130 g	1 cups + 3 tablespoons	32
Whole-rye flour	200 g	2⅓ cups	68
Water	180 g	¾ cup	92
Instant dry yeast	25 g	½ teaspoon	0.3
Salt	16 g	1 tablespoon	2.2
Soaker	225 g	All from above	—
Rye sour	600 g	All from above	—
Levain	220 g	All from above	—
Blackstrap molasses	15 g	1 tablespoon	6
Whole fennel seeds, coarsely ground	—	1 tablespoon + ½ teaspoon	0.6
Rye chops	—	—	10
Total	1,588.5 g	—	—

* Best measured by weight; volume varies with ripeness.

Desired Dough Temperature:
82 °F (27 °C)

Rugbrød

Spray a 13" (33 cm) Pullman pan and coat the inside with the same whole rye flour you used in the rye sour. Tilt the pan all around

so the flour sticks to the sprayed interior of the pan like you do when you prep a cake pan.

MIXING

- **BY MIXER:** Combine all ingredients in the bowl of a mixer. Mix on slow speed for four minutes. Increase the speed to medium and mix for three to four minutes. The dough will probably stick against the sides of the bowl in a thick layer. You will need to scrape down the bowl more often than with wheat based breads. The dough will be sticky, but gluten strands should be visible.

SHAPING

There is no primary fermentation and no pre-shape for this dough. After mixing is complete, immediately transfer the dough into the greased and floured Pull-man pan. Distribute the dough down the length of the pan, and roughly smooth the top. Dust the surface of the loaf with a generous coating of rye flour, slide the lid onto the Pullman pan, and let it proof for about 45 to 60

minutes. The loaf will be puffy and will have risen to within an inch of the top of the pan.

SCORING & BAKING

Heat oven to 500 F (260 C). Put the covered pan into the oven and bake for 15 minutes at 500 F (260 C). Reduce the temperature to 400 F (204 C) and bake for an additional 15 minutes. Remove the cover and lower the temperature to 325 F (163 C) and bake for an additional 45 minutes until the bread is done. If the bread is not done at this point, remove it from the pan and continue baking it on a sheet pan until the sides of the loaf are firm and the loaf has good color development.

Once removed from the oven and cooled, let it sit at room temperature covered with a cloth for least 24-48 hours before cutting the loaf. This will prevent the dough from having a gummy interior.

Process & Formulas

IMPORTANCE OF THE THERMOMETER & TIMER

Dough temperature is an important variable to control when baking bread. You should always check your dough temperature when you are done mixing. Ideally, it will be about 75-78 F (24-26 C). Dough temperatures for rye breads might be slightly warmer, 80-82 F (27-28 C). There's no need to buy a fancy digital thermometer, although it's faster and sometimes easier to see a digital readout than one on a standard, analog instant-read thermometer. The problem with digital thermometers is that they're often inaccurate and have batteries that eventually will need to be changed. An analog instant-read thermometer can be calibrated by putting it into a bath of half ice and half water and waiting a minute

or so. If the dial does not read 32 F (0 C), hold on to the nut on the back of the dial with a wrench and turn the dial until it reads 32 F. No batteries required.

The pace of production baking—and for a home baker, simply the interruptions of everyday life—make a timer a valuable tool for keeping things on schedule. Anything will work—an analog windup, a digital kitchen timer with multiple functions, your cell phone. Once the bread-baking process seeps into your soul, don't be surprised if at some point you think, It must be about time to fold that dough, only to check the timer and see that the alarm is due to sound in just a few seconds.

WHY METRIC?

The straightforward answer is that the metric system of weights, volumes, and measures is simply superior in terms of accuracy, precision, resolution, and efficiency of the user's time. Other benefits are that the metric system is understood by a worldwide community of users, it's easier to learn than non-metric systems, and its use greatly reduces errors. I use the metric system for mass but maintain the use of Fahrenheit

temperatures, although all Celsius temperature equivalents are included in the text and formulas.

If you still haven't bought a scale, I hope you will put down this document right now and do it. It will make all of your breadmaking processes easier and your finished loaves more admirable.

Process & Formulas

SALT STANDARD

All the recipes in this Craftsy course were made with Morton's kosher salt, which is widely available in North American grocery stores. Some people prefer another popular brand, Diamond Crystal, because it does not contain the one percent calcium silicate anti-caking agent found in Morton's. Diamond Crystal has much lighter, crystalline granules,

so a given volume of Diamond Crystal will contain less than half the weight of salt as the same volume of Morton's.

(Another reason to measure by weight, not volume!) If you do use Diamond Crystal and measure by volume, however, just be aware that you will need to adjust the salt accordingly.

STARTER VERSUS LEVAIN

In this Craftsy course, I call stored naturally leavened starter simply a "starter." It's called a "levain" once

it's elaborated into a preferment for use in a batch of baked bread.

WATER TEMPERATURE FORMULA

The water temperature formula is used to achieve a desired final dough temperature. It is one of the fundamental techniques that help ensure consistently good bread.

I run the water temperature formula every time I mix. Dough temperature is affected by the temperature of each ingredient (water, flour, and preferment), the room temperature, and the friction factor (the amount of heat added to the dough through friction during the mixing process). In general, aim for a dough temperature

between 75 F and 78 F (24–26 C). Breads with commercial yeast are usually about 75 F, while naturally leavened breads like to be a bit warmer, around 78 F. Rye breads are aided by a final dough temperature of 78 F to 84 F (26–29 C) depending on the percentage of rye. The desired dough temperature for each bread is given in the formula.

Is it really a big deal to have dough temperature that is drastically out of the optimum range? It's not uncommon to be several degrees out, but a

Process & Formulas

5 F (3 C) difference will bring about very slow or very fast fermentation activity. Imagine if our body temperature was raised 10 F (6 C), from 98.7 to 108.7. You'd be approaching death. Luckily, having doughs with high temperatures is not as dire a situation as having a feverish family member, but this is an important factor in the health of your dough.

Here's how to calculate the water temperature to use in order to finish the kneading step with the desired final dough temperature.

FOR A BREAD THAT USES A PREFERMENT

Multiply the desired dough temperature by 4, then subtract the flour temperature, preferment temperature, room temperature, and friction factor. The result is the water temperature you should use. Or:

$$\text{water temp} = (4 \times \text{desired dough temp}) - (\text{flour temp} + \text{room temp} + \text{preferment temp} + \text{friction factor})$$

The friction factor will vary depending on hydration of the dough and whether you mix by hand. Most mixers add approximately 30 F (17 C) to a properly mixed hearth bread, while hand mixing might add about 10 F. A very wet dough (above 80 percent hydration)

might not generate any friction heat, while a drier dough in a mixer will create more friction. Also, a fast mixer will add more heat to the dough than a slower mixer, given the same mixing time.

Don't know the friction factor for your mixing method? Take the temperature of the dough when it first becomes homogeneous during the final dough mixing process and again when kneading is complete. Subtract the first value from the second; the difference in those quantities is the friction factor.

Here is an example, calculated in Fahrenheit. You are mixing Pain au Levain. It's a cool day, and you want the temperature to be on the warmer side of the

75 F to 78 F desired dough temperature. The room temperature is 69 F, the flour is 68 F, and the levain preferment is 75 F. You are mixing by hand, which you have determined adds 10 F to the dough.

$$\text{water temp} = (4 \times 78) - (69 + 68 + 75 + 10)$$

$$\text{water temp} = 312 - 222$$

$$\text{water temp} = 90 \text{ F}$$

Process & Formulas

If the environment is warmer than in this example, the calculated water temperature will be cooler; if it's cooler, the water temp will be warmer.

FOR A BREAD WITHOUT A PREFERMENT

Multiply the desired dough temperature by 3 instead of 4, because there is no preferment temperature to take into account when determining the desired water temperature.

Calculating the proper water temperature to start your bread's

fermentation cycle at the optimal point is necessary to creating a beautiful and delicious loaf of bread that follows a specific production schedule. Controlling water temperature is a way to control an important variable and is required to get properly proofed dough into a wood-fired oven that is at the proper baking temperature.

The desired-dough temperature for each bread is included in the formula.

Baker's Percentage

The baker's percentage compares the ratio of ingredients, by weight, in a bread formula. Bread bakers find it helpful to examine the relative proportions of flour, water, salt, yeast and other ingredients when developing or troubleshooting a formula, developing a new product or getting some insight into the rate of fermentation. This system is also known as baker's math. Ingredient weight compared with the total weight of flour in a formula is commonly referred in the baking world as a percentage.

The baker's percentage of each ingredient is expressed as a

percentage of total flour weight, and the flour percentage is always 100. Therefore, the total percentage of a bread formula has to be over 100 percent. To determine the baker's percentage of any ingredient, divide the weight of that ingredient by total flour weight and multiply by 100.

If bakers say their formula is 75 percent hydrated, they mean there are 75 units of water for every 100 units of flour. I prefer to use the metric system when using baker's percentage. US Standard Measure can be used, but all weights must be expressed in the same units.

BAKER'S PERCENTAGE FOR A STRAIGHT DOUGH FORMULA

INGREDIENT	QUANTITY	BAKER'S % COMPUTATION	%
All-purpose flour	1,000 g	$1,000 \text{ g} \div 1,000 \text{ g} \times 100 =$	100
Water	690 g	$690 \text{ g} \div 1,000 \text{ g} \times 100 =$	69
Instant active yeast	3 g	$3 \text{ g} \div 1,000 \text{ g} \times 100 =$	0.3
Salt	20 g	$20 \text{ g} \div 1,000 \text{ g} \times 100 =$	2

Baker's Percentage

FLOUR

The baker's percentage of flour in a formula is always 100 percent. If more than one type of flour

is used, add all flour weights together and divide by that quantity. Here's an example:

TWO-FLOUR FORMULA			
INGREDIENT	QUANTITY	BAKER'S % COMPUTATION	%
All-purpose flour	750 g	$750\text{g} \div 1,000 \times 100 =$	75
Whole-wheat flour	250 g	$250\text{g} \div 1,000\text{g} \times 100 =$	25
Water	690 g	$690\text{g} \div 1,000 \text{ g} \times 100 =$	69
Instant active yeast	3 g	$3\text{g} \div 1,000\text{g} \times 100 =$	0.3
Salt	20 g	$20\text{g} \div 1,000\text{g} \times 100 =$	2

WATER

The percentage of water in a formula is referred to as the hydration. Fermentation rate, volume and interior crumb

structure are all affected by hydration. Hearth bread formulas often strive for the highest manageable hydration.

HYDRATION RANGE IN VARIOUS TYPES OF BREAD MADE WITH WHITE FLOUR

HYDRATION RANGE	DOUGH CONSISTENCY
65% or lower	Firm
66–70%	Soft
71% and higher	Wet and sticky

Baker's Percentage

YEAST

The percentage of commercial yeast to flour varies depending on whether you're using fresh, active dry, instant active, or osmotolerant. They are manufactured differently—fresh

yeast contains more water while instant active has been dehydrated, for example—and the resulting products vary in strength per unit weight.

SALT

The baker's percentage of salt in hearth bread is almost always 1.8 to 2. Enriched dough formulas, or

bread with a salty ingredient like olives, may have a salt percentage outside this range.

TYPE OF YEAST	TYPICAL PERCENTAGE FOUND IN HEARTH BREAD FORMULAS
Fresh yeast	1
Active dry yeast	0.4
Instant active yeast	0.3
Osmotolerant	0.4

BAKER'S PERCENTAGE FOR A BREAD FORMULA WITH A PREFERMENT OR SOAKER

Preferments and soakers used in a bread formula are also expressed as percentage, and the percentage of each ingredient expressed as a percentage of total flour weight in the preferment or soaker. A formula can have a preferment that is 69 percent hydrated (for every 100 units of flour, there are 69 units of water) and still have an overall hydration (the percentage of all the water in the formula, including

water in the preferment or soaker) of 75 percent, for example. The overall percentages are most important because they take into account all the ingredients—whether those ingredients were incorporated into the preferment(s), soaker, or final dough.

To determine overall baker's percentages add all quantities of the same ingredient, divide by

Baker's Percentage

the total quantity of flour in the formula (including the flour, water, et cetera in the preferment or

soaker), and multiply by 100 to express as a percentage.

SAMPLE BREAD FORMULA WITH SOAKER AND PREFERMENT: PAIN AU LEVAIN

LIQUID SOURDOUGH STARTER		
INGREDIENT	METRIC	BAKER'S %
All-purpose flour	227 g	100
Water	227 g	100
Ripe, liquid sourdough starter	113 g	50

FINAL DOUGH		
INGREDIENT	METRIC	BAKER'S %
All-purpose flour	750 g	90
Whole-wheat flour	250 g	10
Water	690 g	75
Medium sea salt	3 g	18
Liquid sourdough starter	20 g	—

The baker's percentage of water — or overall hydration — is computed by adding the water

in the starter and final dough and dividing by the flour in the starter and final dough:

$$\begin{array}{r} \text{Water in starter} \\ + \text{Water in final dough} \\ \hline \text{Total water} \end{array} \quad \begin{array}{r} 227 \text{ g} \\ + 454 \text{ g} \\ \hline 681 \text{ g} \end{array}$$

$$\begin{array}{r} \text{All-purpose flour in starter} \\ \text{All-purpose flour in final dough} \\ + \text{Whole-wheat flour} \\ \text{in final dough} \\ \hline \text{Total flour} \end{array} \quad \begin{array}{r} 227 \text{ g} \\ + 600 \text{ g} \\ + 85 \text{ g} \\ \hline 912 \text{ g} \end{array}$$

$$\text{So overall hydration} = 681 \text{ g} \div 912 \text{ g} \times 100 = 75 \text{ percent}$$

Baker's Percentage

SAMPLE BREAD FORMULA WITH SOAKER AND PREFERMENT: SEVEN GRAIN

LIQUID SOURDOUGH STARTER		
INGREDIENT	METRIC	BAKER'S %
All-purpose flour	250 g	100
Water	250 g	100
Sourdough starter	15 g	12
Total	515 g	—

SOAKER		
INGREDIENT	METRIC	BAKER'S %
Grains	180 g	100
Water	206 g	114
Honey	58 g	32
Total	444 g	—

FINAL DOUGH		
INGREDIENT	METRIC	BAKER'S %
All-purpose flour	250 g	50
Whole-wheat flour	500 g	50
Water	454 g	91
Instant active yeast (optional)	2 g	0.2
Salt	22 g	22
Honey	—	5.8
Soaker	444 g	—
Grains	—	18
Starter	500 g	—
Liquid sourdough starter	2,170 g	—

Baker's Percentage

The baker's percentage of water — or overall hydration — is computed by adding the water

in the starter, the soaker and final dough and dividing by the total flour in the starter and final dough:

Water in starter	250 g
+ Water in final dough	+ 206 g
<hr/>	
Total water	454 g

All-purpose flour in starter	250 g
All-purpose flour in final dough	+ 250 g
+ Whole-wheat flour in final dough	+ 500 g
<hr/>	
Total flour	1,000 g

So overall hydration = $454 \text{ g} \div 1,000 \text{ g} \times 100 = 45.4$ percent

*The preceding excerpt is from Richard Miscovich's book *From the Wood-Fired Oven* (Chelsea Green*

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