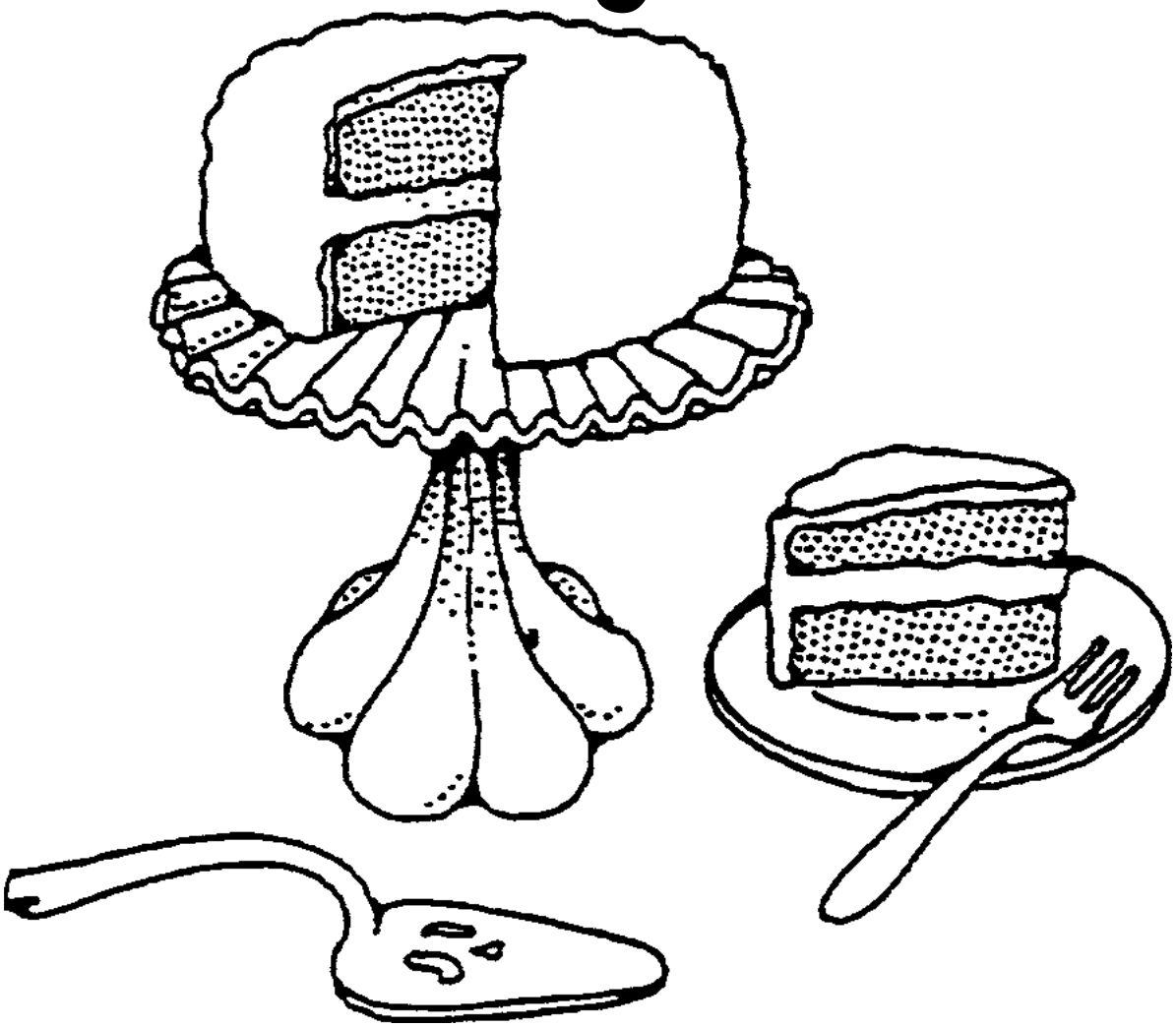
EC114

18 U.S.C. 707

Baking 4



NDSU EXTENSION SERVICE

North Dakota State University, Fargo, North Dakota

OCTOBER 2005

Revised July 2012

Cakes, Pies and Pastries

By *Louise Garrett,* Extension nutrition specialist
Revised by Martha Anderson, Extension specialist, 4-H
New Mexico State University

Adapted in North Dakota by the 4-H Healthy Livestyles Programming Commitee:
Marcia Hellendsaas, McKenzie and Dunn County Extension Agent - Nutrition, Food Safety and Health
Gail Slinde, Ward County Extension Agent - 4-H Youth Development
Kaylyn Anderson, LaMoure County Extension Agent - 4-H Youth Development/Nutrition Education
Macine Lukach, Cavalier County Extension Agent - Nutrition, Food Safety and Health
Heather Hagen, Former Cass County 4-H Member
Deb Hagen, Cass County 4-H Volunteer Leader
Jane Edwards, Extension Nutrition Specialist, NDSU Department of Health, Nutrition and Exercise Sciences
Julie Garden-Robinson, Extension Food and Nutrition Specialist, NDSU Department of Health, Nutrition and Exercise Sciences
Carrie Stark, 4-H Youth Development Specialist, NDSU Extension Service, Center for 4-H Youth Development

Revised June 2012 by *Julie Garden-Robinson,* Extension Food and Nutrition Specialist

References

Better Homes and Gardens New Baking Book (1999). Des Moines, Iowa: Meredith Books.

Betty Crocker's Picture Cook Book (1956). New York: McGraw-Hill.

Cocinas de New Mexico (1976). Albuquerque, N.M.: Public Service Company of New Mexico.

Dickson, Darlene (April 5, 1992). "A Tasty Recipe for Meringue Pie," *Clovis News Journal,* p. 4D.

Favorite Brand Name Pie Collection (1993). Lincolnwood, Ill.: Publications International Limited.

Foodworks (1993). West Lafayette, Ind.: Purdue University Cooperative Extension Service.

How to Master the Art of Pastry Making. (No date available.) General Mills booklet.

Nusom, Lynn (1991). *Christmas In New Mexico.* Phoenix, Ariz.: Golden West Publications.

Nusom, Lynn (March 7, 2000). *"Round Out Your Pie-Making Skills,"* Las Cruces–Sun News, p. A10.

Contents

Introduction

About Cakes

Cakes are sweetened breads. Because of the extra amount of sugar and fat, you can mix cake batter until it is smooth and the cake will not be tough. Sugar and fat condition the gluten in the flour to make a tender product. (Overhandling bread dough causes toughness.)

Baking powder and eggs make cakes light. When you beat eggs separately and fold them into the cake batter, the air you beat into the eggs, plus the carbon dioxide gas from baking powder, can result in a cake that has a delicate, fine grain and is tender and moist.

To make a good cake, you must measure carefully and follow the directions for mixing and baking exactly.

Two types of cakes

Cakes come in two types — butter and sponge. Butter cakes are made with fat; sponge cakes are made without fat.

As the name tells you, butter was used most often as the fat in cakes at one time. You also can use any vegetable shortening in these cakes. Many people prefer butter for the delicacy of flavor, but the cost may be too high for the average family.

True sponge and angel cakes are made without fat or baking powder. Air and steam are the leavening agents. You beat the egg whites so they hold as much air as possible, and then fold them carefully into the cake batter. As the cake bakes, the heat makes imprisoned air expand, and this causes the cake to rise. As the liquid in the batter heats, steam forms. This steam expands like the trapped air and also helps leaven the cake.

Angel or white sponge cakes are made with egg whites only. Yellow sponge cake is made with the whole egg.

Pastry and Pies

"As American as apple pie" — that's an expression we've often heard. Americans like pie whether it's apple, lemon, cherry, chocolate, pumpkin, pecan or mince. Pie is America's favorite dessert; a homemade pie is the crowning touch to a wonderful meal.

We use the word "pie" in many common expressions in our everyday speech, such as "sweet as pie," "pie in the sky," "eating humble pie" and "easy as pie." A flaky pastry filled with flavorful fruit; a delicious, cream filling; or meat and cheese is a delight! No wonder some people say they like only two kinds of pie — hot and cold!

In this project, you will learn to make:

- Tender, flaky pastry that has good flavor
- Flavorful cream, custard and fruit fillings
- Attractive meringue
- Pastries such as turnovers, empanadas and quiche

You will do the following to complete the project:

- Make pastry using several different mixing methods
- Experiment with various fats used in making pastry
- Perform viscosity experiments
- Prepare cream fillings thickened with various products
- Prepare attractive meringue for cream pies
- Prepare custard fillings
- Prepare fruit fillings using fresh and canned fruits
- Experiment with pastry/pie variations

Suggested Exhibits:

1. One 8-inch or 9-inch fruit pie with double crust
2. Two fruit-filled turnovers or empanadas
3. A viscosity display including experiment result sheets and line spread viscometer, laminated or enclosed in plastic cover
4. Sponge Cake
5. Butter Cake

Eating Well

"MyPyramid" has been rebuilt and it's now a plate! Here's what the colors stand for:

orange - grains
green - vegetables
red - fruits
blue - dairy foods
purple - protein foods

The U.S. Department of Agriculture (USDA) wanted an easier way to remind people to eat healthfully. MyPlate shows the five food groups using a familiar picture: a place setting with a plate, cup and fork.

MyPlate Speaks

Let's look at some of the other messages this new symbol is trying to send:

Balancing Calories

- Enjoy your food, but eat less.
- Avoid oversized portions.

Foods to Increase

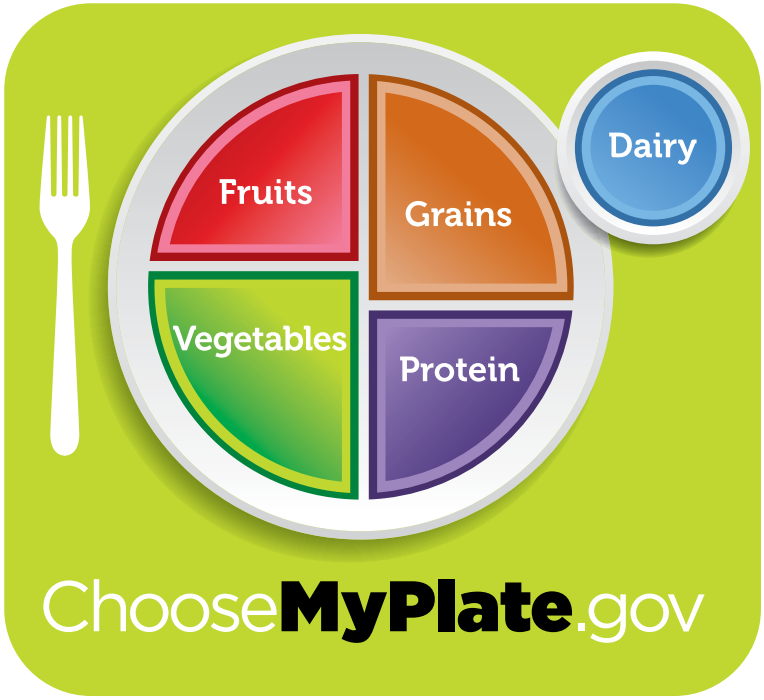
- Make half your plate fruits and vegetables.
- Make at least half your grains whole grains.
- Switch to fat-free or low-fat (1%) milk.

Foods to Reduce

- Compare sodium in foods such as soup, bread and frozen meals. Choose foods with lower numbers.
- Drink water instead of sugary drinks.

Make it personal.

Through the USDA's MyPlate website (www.choosemyplate.gov), you can get personalized recommendations about the mix of foods you need to eat and how much you should be eating.



How Much Do I Need to Eat?

Everyone wants to know how much he or she should eat to stay healthy. That's a tricky question, though. It depends on your age, whether you're a girl or boy, and how active you are. Kids who are more active burn more calories, so they need more calories. But we can give you some estimates for how much you need of each food group.

Grains

Grains are measured in ounce equivalents. What are they? Ounce equivalents are just another way of showing a serving size.

Here are ounce equivalents for common grain foods. An ounce equivalent equals:

1 piece of bread
½ cup of cooked cereal, such as oatmeal
½ cup of rice or pasta
1 cup of cold cereal

- 4- to 8-year-olds need 4 to 5 ounce equivalents each day.
- 9- to 13-year-old girls need 5 ounce equivalents each day.
- 9- to 13-year-old boys need 6 ounce equivalents each day.

And one last thing about grains: Make at least half your grain food choices whole grains, such as 100 percent wheat bread, brown rice and oatmeal.

Vegetables

Of course, you need your vegetables, especially those dark green and orange ones. But how much is enough? Vegetable servings are measured in cups.

- 4- to 8-year-olds need 1½ cups of veggies each day.
- 9- to 13-year-old girls need 2 cups of veggies each day.
- 9- to 13-year-old boys need 2½ cups of veggies each day.

Fruits

Sweet, juicy fruit definitely is part of a healthy diet. Here's how much you need:

- 4- to 8-year-olds need 1 cup to 1½ cups of fruit each day.
- 9- to 13-year-old girls need 1½ cups of fruit each day.
- 9- to 13-year-old boys need 1½ cups of fruit each day.

Dairy Foods

Dairy foods are rich in calcium to build strong bones to last a lifetime.

- 4- to 8-year-olds need 1 to 2 cups of milk (or other calcium-rich food) each day.
- 9- to 13-year-old girls need 3 cups of milk (or other calcium-rich foods) each day.
- 9- to 13-year-old boys need 3 cups of milk (or other calcium-rich foods) each day.

If you want something other than milk, you can substitute yogurt, cheese or calcium-fortified orange juice — just to name a few.

Protein Foods

These foods contain iron and lots of other important nutrients. Like grains, these foods are measured in ounce equivalents.

An ounce equivalent of this group would be:

1 ounce of meat, poultry or fish
¼ cup cooked dry beans
1 egg
1 tablespoon of peanut butter
a small handful of nuts or seeds

- 4- to 8-year-olds need 3 to 4 ounce equivalents each day.
- 9- to 13-year-old girls need 5 ounce equivalents each day.
- 9- to 13-year-old boys need 5 ounce equivalents each day.

Whoa! That's a lot to swallow. The good news is that your mom, dad and the other grownups in your life will help you eat what you need to stay healthy. Here's more good news: You don't have to become a perfect eater overnight.

Adapted with permission from
http://kidshealth.org/kid/stay_healthy/food/pyramid.html

10 tips
Nutrition Education Series

choose MyPlate

10 tips to a great plate

Making food choices for a healthy lifestyle can be as simple as using these 10 Tips.
Use the ideas in this list to *balance your calories*, to choose foods to *eat more often*, and to cut back on foods to *eat less often*.

1 balance calories

Find out how many calories YOU need for a day as a first step in managing your weight. Go to www.ChooseMyPlate.gov to find your calorie level. Being physically active also helps you balance calories.

2 enjoy your food, but eat less

Take the time to fully enjoy your food as you eat it. Eating too fast or when your attention is elsewhere may lead to eating too many calories. Pay attention to hunger and fullness cues before, during, and after meals. Use them to recognize when to eat and when you've had enough.

3 avoid oversized portions

Use a smaller plate, bowl, and glass. Portion out foods before you eat. When eating out, choose a smaller size option, share a dish, or take home part of your meal.

4 foods to eat more often

Eat more vegetables, fruits, whole grains, and fat-free or 1% milk and dairy products. These foods have the nutrients you need for health—including potassium, calcium, vitamin D, and fiber. Make them the basis for meals and snacks.

5 make half your plate fruits and vegetables

Choose red, orange, and dark-green vegetables like tomatoes, sweet potatoes, and broccoli, along with other vegetables for your meals. Add fruit to meals as part of main or side dishes or as dessert.

6 switch to fat-free or low-fat (1%) milk

They have the same amount of calcium and other essential nutrients as whole milk, but fewer calories and less saturated fat.

7 make half your grains whole grains

To eat more whole grains, substitute a whole-grain product for a refined product—such as eating whole-wheat bread instead of white bread or brown rice instead of white rice.

8 foods to eat less often

Cut back on foods high in solid fats, added sugars, and salt. They include cakes, cookies, ice cream, candies, sweetened drinks, pizza, and fatty meats like ribs, sausages, bacon, and hot dogs. Use these foods as occasional treats, not everyday foods.

9 compare sodium in foods

Use the Nutrition Facts label to choose lower sodium versions of foods like soup, bread, and frozen meals. Select canned foods labeled "low sodium," "reduced sodium," or "no salt added."

10 drink water instead of sugary drinks

Cut calories by drinking water or unsweetened beverages. Soda, energy drinks, and sports drinks are a major source of added sugar, and calories, in American diets.

USDA United States Department of Agriculture
Center for Nutrition Policy and Promotion

Go to www.ChooseMyPlate.gov for more information.

DG TipSheet No. 1
June 2011
USDA is an equal opportunity provider and employer.

10 tips
Nutrition Education Series

make half your grains whole

10 tips to help you eat whole grains

Any food made from wheat, rice, oats, cornmeal, barley, or another cereal grain is a grain product. Bread, pasta, oatmeal, breakfast cereals, tortillas, and grits are examples. Grains are divided into two subgroups, **whole grains** and **refined grains**. Whole grains contain the entire grain kernel—the bran, germ, and endosperm. People who eat whole grains as part of a healthy diet have a reduced risk of some chronic diseases.

1 make simple switches

To make half your grains whole grains, substitute a whole-grain product for a refined-grain product. For example, eat 100% whole-wheat bread or bagels instead of white bread or bagels, or brown rice instead of white rice.

2 whole grains can be healthy snacks

Popcorn, a whole grain, can be a healthy snack. Make it with little or no added salt or butter. Also, try 100% whole-wheat or rye crackers.

3 save some time

Cook extra bulgur or barley when you have time. Freeze half to heat and serve later as a quick side dish.

4 mix it up with whole grains

Use whole grains in mixed dishes, such as barley in vegetable soups or stews and bulgur wheat in casseroles or stir-fries. Try a quinoa salad or pilaf.

5 try whole-wheat versions

For a change, try brown rice or whole-wheat pasta. Try brown rice stuffing in baked green peppers or tomatoes, and whole-wheat macaroni in macaroni and cheese.

6 bake up some whole-grain goodness

Experiment by substituting buckwheat, millet, or oat flour for up to half of the flour in pancake, waffle, muffin, or other flour-based recipes. They may need a bit more leavening in order to rise.

7 be a good role model for children

Set a good example for children by serving and eating whole grains every day with meals or as snacks.

8 check the label for fiber

Use the Nutrition Facts label to check the fiber content of whole-grain foods. Good sources of fiber contain 10% to 19% of the Daily Value; excellent sources contain 20% or more.

9 know what to look for on the ingredients list

Read the ingredients list and choose products that name a whole-grain ingredient ***first*** on the list. Look for "whole wheat," "brown rice," "bulgur," "buckwheat," "oatmeal," "whole-grain cornmeal," "whole oats," "whole rye," or "wild rice."

10 be a smart shopper

The color of a food is not an indication that it is a whole-grain food. Foods labeled as "multi-grain," "stone-ground," "100% wheat," "cracked wheat," "seven-grain," or "bran" are usually not 100% whole-grain products, and may not contain **any** whole grain.

USDA United States Department of Agriculture
Center for Nutrition Policy and Promotion

Go to www.ChooseMyPlate.gov for more information.

DG TipSheet No. 4
June 2011
USDA is an equal opportunity provider and employer.

Why Do We Eat?

We know everyone needs food to live. But why?

Food gives you two things:

- Energy to move and to do things
- Stuff to help you grow and stay healthy

Just like a car needs fuel to run, your body needs food for energy. Without energy, you couldn't run or play.

Besides giving you energy, food helps you grow and heal. When you skin a knee or an elbow, your body needs to fix or replace the skin you scraped off. If you get sick, your body needs to fight the infection, rebuild weak body parts and get well. Your body also keeps you from getting too hot or cold. Nutrients are the things in food that help your body perform all these functions. So your body doesn't need just the food, it needs the nutrients in the food.

Nutrients — Who Needs Them?

Nutrients are chemical substances that your body gets from the food you eat. Each nutrient has a different job to do. They all are necessary in specific amounts, but your body knows how to handle it all! You're an amazing machine!

- Vitamin A helps you see in the dark.
- Water regulates body temperature.
- Calcium builds strong bones and teeth.
- Fat gives you energy and carries some vitamins to where the body needs them.
- Iron helps your blood carry oxygen to all parts of your body — even your toes!
- Protein builds and repairs muscles and other parts of your body.
- Vitamin C helps heal cuts.
- Carbohydrates give you energy to grow, move and do things.

Cake Science

Let's Experiment!

Does the pan make a difference in baking food?

Cakes and cookies are similar in that they are delicate in flavor and texture. (You can do this experiment with cookies and note the results for both kinds of baked products.)

Materials Needed _____

1 roll of sugar-cookie dough bought at store
1 sharp slicing knife
1 shiny baking sheet (pie pans can be used)
1 dark-dull baking sheet

Procedure

1. Place oven rack in the center position of the oven.
2. Preheat oven to the temperature stated on the cookie package.
3. Open cookie dough and slice eight cookies off the roll. Try to make slices as much alike as possible.
4. Place four cookies on the shiny pan and four cookies on the dark-dull pan.
5. Bake only one pan of cookies at a time. Start with the shiny pan. Check the time. Place the cookies near the center of the oven. Bake until light brown and done. Write down the exact number of minutes they bake. Remove cookies from pan to cool. Bake cookies on the dark-dull pan. Bake them in the same spot in the oven and for exactly the same number of minutes as you used for the cookies on the shiny pan. Remove cookies from pan to cool.

Observation

After cookies cool, compare the color and texture.

Questions

What difference can you see in color, especially on the bottom of the cookies?

Break cookies in half. What is the difference in the texture of the cookies?

Which pan absorbed more heat?

What kind of pan should be used for a delicate white cake?

Let's Experiment! What are some differences between all-purpose flour and cake flour?

Materials Needed

All-purpose flour
Cake flour
Sheet of blue or white paper
Waxed paper
Flour sifter
1/2 cup measuring cup
2 small bowls, same size and shape
Liquid measuring cup
Two metal mixing spoons, both alike

Procedure and Observations

Place 1 Tbsp. all-purpose flour and 1 Tbsp. cake flour side by side on a piece of blue or white paper. Describe any difference you observe. Rub a pinch of each flour between your thumb and finger. (Be sure your fingers are dry.) If you feel any difference, describe it.

In this part of the experiment, you will mix two simple flour and water pastes, one with all-purpose flour and the other with cake flour. Follow these steps:

1. Place two small bowls side by side on the table. Sift and measure 1/2 cup all-purpose flour. Put in one bowl. Sift and measure 1/2 cup cake flour. Put in other bowl. Label bowls.
2. Measure 1/4 cup cold water and pour into the all-purpose flour. Stir until all flour is dampened.
3. Measure another 1/4 cup cold water and pour into the cake flour. Stir until all flour is dampened.
4. Stir the mixture in each bowl 50 strokes.

Questions

Which flour absorbed more liquid?

What difference did you notice between the two flour-water mixtures?

If a recipe calls for 1 cup of cake flour, but you use 1 cup of all-purpose flour instead, what might be the result with the baked cake?

Why do directions sometimes tell you to use 7/8 cup of all-purpose flour in place of 1 cup cake flour?

Why is following the directions given in a recipe for mixing so important?

Let's Bake a Cake

Yellow Cake

Everyday and Sunday, too, it's that kind of cake. If you can keep hands off, it will stay moist for several days. Frost and fill it with yummy fudge frosting.

Preheat oven to 375 F.

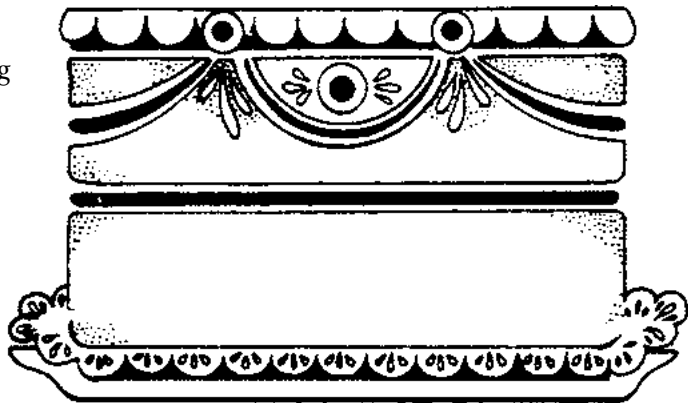
Use three 8-by-1½-inch round layer pans. Cut waxed papers to fit bottoms of pans. Be sure these papers lie flat and do not wrinkle at sides. Grease tops of papers and place in pans. Do not grease sides of pans.

Ingredients

3 cups sifted cake flour
2¼ tsp. double-acting baking powder
(at elevations of 7,000 feet or more, use only 1¾ tsp. baking powder)
1 cup butter*
1½ cups sugar
2 tsp. vanilla
4 egg yolks
1¾ cups milk
4 egg whites

* You can use hydrogenated vegetable shortening in place of butter if you add 1/2 tsp. salt, sifted with flour and baking powder.

1. Sift flour, then measure. Add baking powder to flour and sift together three times. Set aside.
2. Stir butter to soften. Add sugar gradually and cream together thoroughly.
3. Blend in vanilla.
4. Add egg yolks, one at a time, blending thoroughly after each.
5. Add flour and milk alternately, beginning and ending with flour. Add flour in four portions, milk in three. Mix after each addition at lowest speed until just blended. Beat one minute at a medium speed after last addition of flour. (If mixing by hand, stir each addition until just blended. Beat 35 strokes after first three additions of flour. After last addition of flour, beat 70 strokes.)
6. Beat egg whites until they begin to hold a peak that stands straight up when you gently lift the beater. With a mixing spoon, fold egg whites into mixture; use 30 to 40 strokes.
7. Pour batter into pans lined with waxed paper. Spread from center so batter is slightly higher at edges.
8. Bake in 375 F oven about 30 minutes, or until cake springs back when lightly pressed.
9. Remove from oven. Immediately loosen layers from pans by running a thin spatula around the edges. Turn layers onto wire racks to cool and immediately lift off waxed paper.
10. Cover tightly or wrap the cooled cake to prevent drying.



Sponge Cake

Whether you call this a sponge cake or yellow angel food cake makes no difference. It's plain golden, delicious eating. What's it like outside and in?

Outside it is golden brown from top to bottom and about 3 inches high. Inside it's tender and light, with small, slightly irregular air spaces.

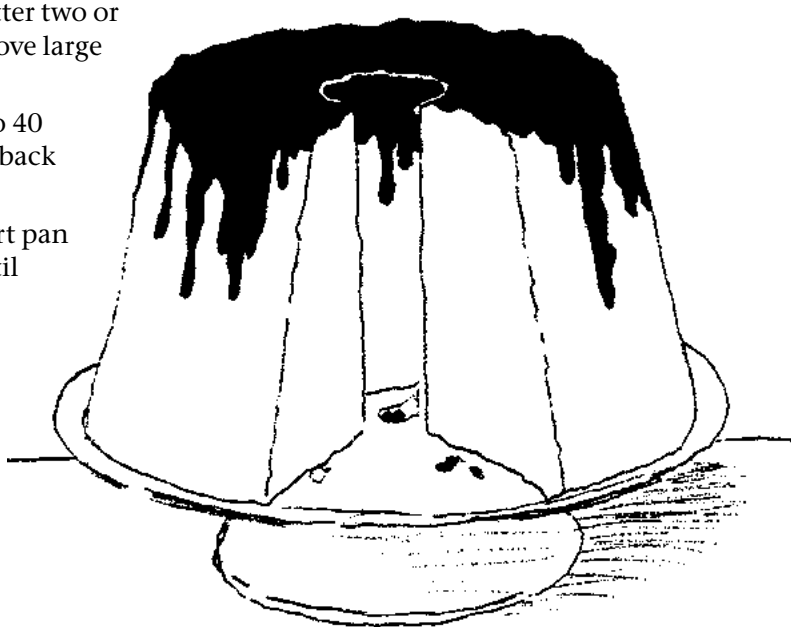
Preheat oven to 375 F.

Use ungreased 10-inch tube pan.

Ingredients

1¼ cups sifted cake flour
1/2 tsp. salt
1/4 tsp. double-acting baking powder
1 cup sugar
(at elevations of 7,000 feet or more, take out 2 Tbsp. sugar)
3/4 cup egg whites (about six)
1¼ tsp. cream of tartar
1/2 cup sugar
1/2 cup egg yolks (about six)
1/4 cup water
1 tsp. vanilla
1 tsp. lemon extract

1. Sift flour, then measure. Add salt, baking powder and 1 c. sugar to flour and sift together into small bowl. Set aside.
2. Beat egg whites until foamy. Add cream of tartar. Beat until very soft peaks form. Peaks turn over slightly when you lift the beater slowly from beaten egg whites. Use a hand rotary beater for better volume in baked cake.
3. Add 1/2 cup sugar gradually by sprinkling 2 Tbsp. at a time over whites. Beat after each addition. After beating last addition, the eggs and sugar mixture should form stiff peaks.
4. To flour mixture, add yolks, water, vanilla and lemon extract. Mix until flour is dampened. Then beat with electric beater two to three minutes or with hand rotary beater three to four minutes until yolk mixture is very thick. When you lift the beater, yolk mixture should mound slightly. The thicker the mixture, the better the volume of the baked cake.
5. Pour the flour and yolk mixture into the beaten whites and fold in, using a rubber spatula. Use 30 to 40 fold-over strokes.
6. Pour batter into ungreased tube pan. Using a circular stroke, cut gently through batter two or three times with knife to remove large air bubbles.
7. Bake in 375 F oven about 35 to 40 minutes or until cake springs back when you press it lightly.
8. Remove cake from oven. Invert pan on wire rack and let stand until cool.
9. When cool, loosen cake from sides and tube with spatula; gently remove from pan.
10. Cover tightly or wrap the cooled cake to prevent drying. Store upside down.



How does your cake rate?

Reasons for Butter Cake Failures

Undersized
- Too little leavening agent
- Too large a pan
- Oven too hot
- Overmixing

Tough Crusts
- Too much flour
- Too little sugar or shortening
- Oven too hot
- Cake baked too long

Fallen Cake
- Too much sugar
- Too much shortening
- Insufficient baking

Soggy or Heavy Bottom
- Undermixing
- Too little leavening
- Lower part of oven too cool
- Too much liquid

Course-grained
- Insufficient creaming
- Too much leavening
- All-purpose rather than cake flour
- Oven too slow

Reasons for Sponge Cake Failures

Tough Cake
- Oven too hot
- Not enough sugar
- Overmixing

Coarse Texture
- Underbeaten egg whites
- Too slow an oven
- Ingredients not blended well enough

Heavy Sticky Layer at Bottom
- Egg yolks not beaten enough
- Insufficient mixing of yolks with other ingredients

Cracks in Crust
- Overbeating egg whites
- Too much sugar
- Too hot an oven

Sticky Crust
- Too much sugar
- Underbaking

Undersized Cake
- Underbeaten or overbeaten egg whites
- Overmixing
- Too large a pan
- Too hot an oven
- Removed from pan too soon

Cake Finishes

Frosting adds beauty and appetite appeal, and complements the flavor of the cake. Frostings fall into two general categories — creamy and fluffy.

Creamy frosting has a soft, lustrous, smooth surface. Uncooked butter frosting is popular. Other creamy frostings, such as fudge and penuche, are cooked, cooled and beaten to a creamy consistency.

Fluffy frostings have a glossy surface and are light and fluffy. You make the most familiar of these, seven-minute frosting, in a double broiler. A fluffy frosting will set on the surface, but remain soft underneath.

Be sure cakes are cool before frosting. Brush off all loose crumbs so they will not cause frosting to look bumpy.

Uncooked Butter Frosting

1/3 cup soft butter or margarine
3 cups confectioners' sugar
3 Tbsp. (approximately) cream or rich milk
1 tsp. vanilla

1. Cream butter or margarine and gradually add the sugar. Mix until blended.
2. Add vanilla and enough cream or milk so frosting will spread easily, but not run.
3. If desired, add coloring to all or part of this frosting. Be careful to use only a small amount of the food coloring so the frosting will have a very delicate tint.

Variations

- Add 3 ounces (three squares) unsweetened chocolate, melted.
- Use 1 Tbsp. grated rind and 3 Tbsp. orange or lemon juice instead of vanilla and cream.

Seven-minute Frosting

3/4 cup sugar
1 egg white
1/2 tsp. vanilla
1/8 tsp. cream of tartar
3 Tbsp. water
1/4 tsp. almond extract (if desired)

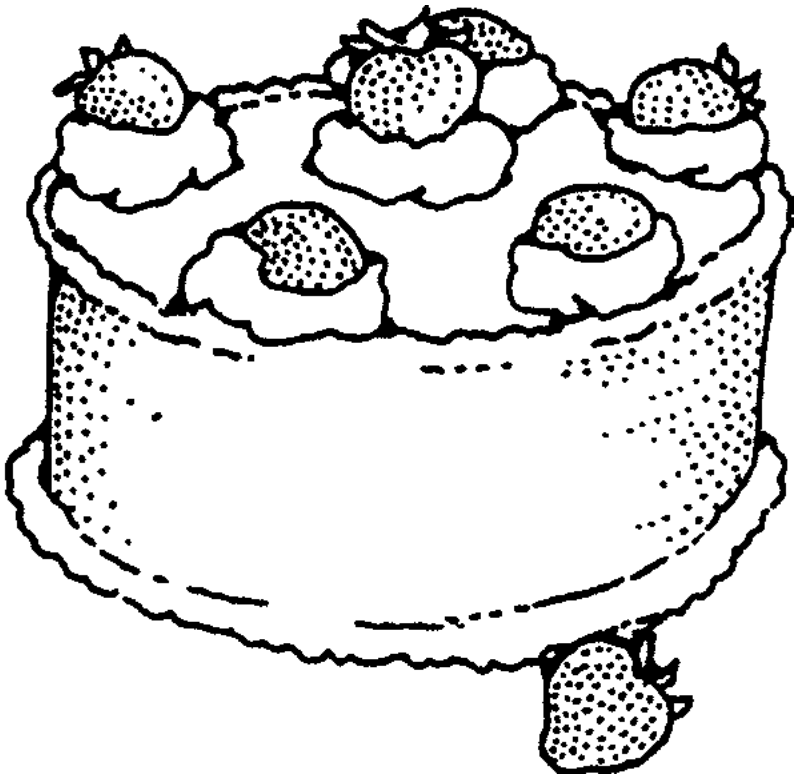
1. Mix all ingredients, except extracts, in top of double broiler. Beat until blended.
2. Place over boiling water and beat rapidly until frosting holds a peak.
3. Add extracts. Spread on cooled cake.

Fudge Frosting

2 squares unsweetened chocolate
2 cups sugar
2 Tbsp. light corn syrup
1 tsp. vanilla
1 cup milk
1/8 tsp. salt
2 tsp. butter or margarine

1. Combine chocolate and milk in medium-sized saucepan. Place over low heat and cook until mixture is smooth and well-blended, stirring constantly.
2. Add sugar, salt and corn syrup. Stir until sugar is dissolved and mixture boils. Continue boiling, without stirring, until a small amount of mixture forms a very soft ball in cold water.
3. Remove from heat. Add butter or margarine and vanilla. Cool until lukewarm.
4. Beat until of creamy consistency that you can spread on the cake. If necessary, place over hot water to keep soft while spreading.

Good cakes taste great with fresh fruit, gentle glazes or whipped cream as a spectacular finish, too. Fruit has more nutrition, less fat, and is better for your teeth as well!



Busy Day Oatmeal Cake

Ingredients

1 cup oatmeal, quick
1¼ cups boiling water

Pour water over oats and let stand while mixing the following:

1 cup sugar
½ cup shortening
2 eggs
1½ cups plain flour
1 tsp. vanilla
1 tsp. cinnamon
1 tsp. nutmeg
1 tsp. allspice
1 tsp. soda

Directions

1. Preheat oven to 350 F.
2. Cream sugar and shortening. Add eggs; beat.
3. Add flour, oatmeal, vanilla and spices.
4. Pour into floured 9-inch by 13-inch pan.
5. Bake at 350 degrees for 30 to 35 minutes or until done.
6. Cool cake before icing.

Icing for Oatmeal Cake (optional)

Ingredients

1 cup brown sugar
½ stick butter
4 to 5 Tbsp. evaporated milk

Directions

1. Boil one minute and add 1 cup coconut and 1/2 cup nuts (optional). Spread on top of cake.
2. Broil a few minutes until lightly browned.

Makes 12 servings

Per serving: 210 calories, 30 g carbohydrates, 10 g fat, 2 g fiber and 120 mg sodium

(With icing: 380 calories, 50 g carbohydrates, 20 g fat, 2 g fiber and 170 mg sodium)

Mixes

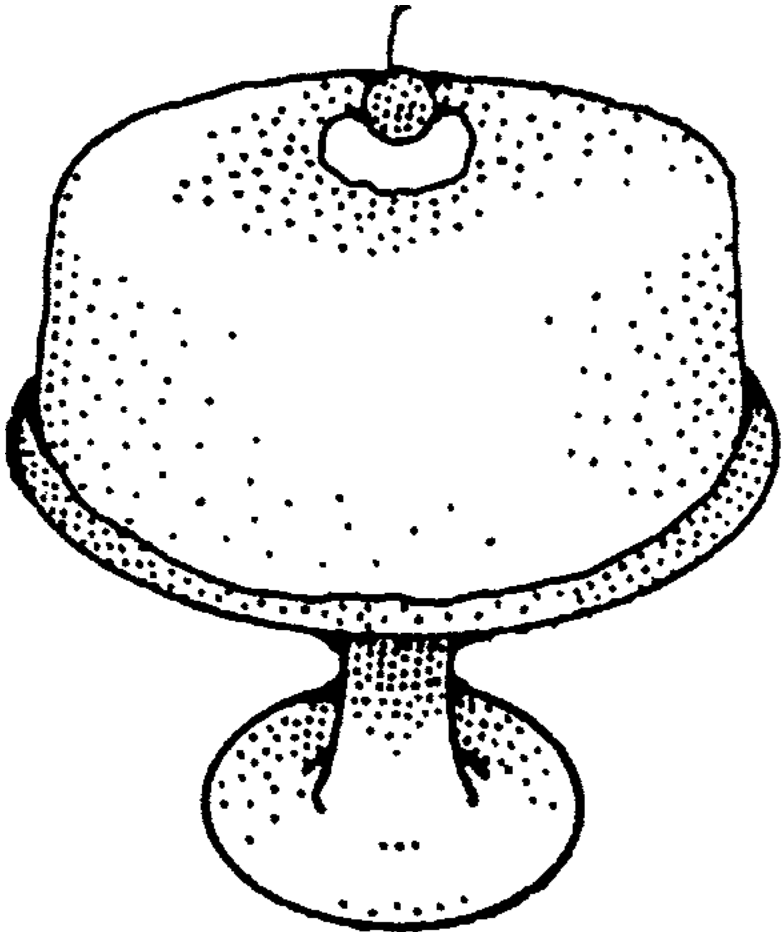
Check your grocery store and see how many packaged mixes you find for:

yellow butter cake
sponge cake
fluffy white frosting
chocolate frosting

Select a package mix of your choice from the above group. Prepare it at home. How did it compare with "scratch" products you made in:

cost
flavor
time of preparation
keeping quality
number of servings

When would you use the "scratch" method for family meals? The mix?



Other Important Things to Do

Demonstrations

- Give a demonstration on how to make a cake or food science.

Citizenship

- Help with a food drive
- Visit a nursing home. Call first to see if you can bring home-baked treats.
- Help with a soup kitchen.
- Bake for family, friends, shut-ins, neighbors.

Leadership

- Serve as a junior leader for a 4-H food project group.
- Chair a club picnic, party or special event.
- Inspire other 4-H members to excel.

Career Exploration

- Learn about careers in food preparation, microbiology or food science.
- Interview someone in the field that interests you.
- Ask the person what he or she enjoys most.
- Ask the person why he or she chose that career.
- Ask the person how he or she got started.
- Ask the person what training he or she had to succeed.

Keep a record of your 4-H activities.

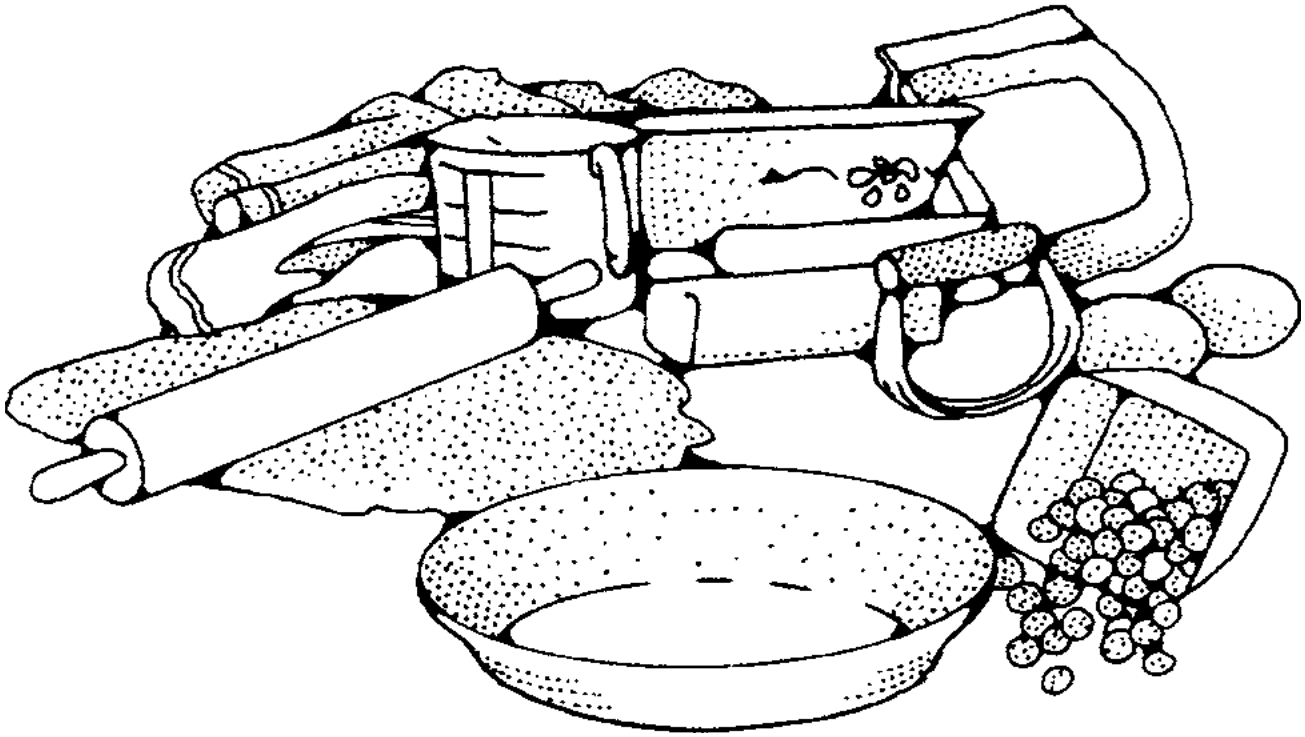
- Use the form in this project, or a form you designed on the computer program.

Let's Make Pastry

Another word for pie crust is pastry. Pastry is stiff dough made of flour, salt, some form of fat and a small amount of liquid. Pastry can hold many wonderful fillings that serve as snacks, appetizers, main dishes or desserts.

Making good pastry requires 4-H members to learn and practice a few basic rules. These are called principles of cookery. One of the first and most important principles is: "Keep cool." All the ingredients and utensils, even your hands, should be cool when making pastry. One professional chef says, "I have hot hands, so I dip my hands in a bowl of ice cold water before and during handling the pie crust to make sure the dough does not get overly heated, as that makes it hard to roll out."

Another rule: Choose a standard recipe that fits the size of pan you will use and the type of pie you are making. Most fruit pies require a double, unbaked pie crust. Use a baked, single crust for cream pies. Use a raw, single crust pastry for custard pies, such as pecan and pumpkin.



Basic Recipe for Pastry
(from solid shortening)

	Single Crust	Double Crust	
	8- or 9-inch	8-inch	9-inch
Flour	1 cup	1½ cups	2 cups
Salt	1/2 tsp.	3/4 tsp.	1 tsp.
Shortening	1/3 cup	1/2 cup	2/3 cup
Water	2 Tbsp.	3 Tbsp.	4 Tbsp.

Be sure to measure accurately, using the correct measuring tools and techniques.

1. Lightly spoon flour into dry measuring cups, forming a slight mound above the cup rim. Do not tap on the cup or pack more flour into the cup. Level off with a spatula or straight-edged knife. Place in medium mixing bowl.
2. Measure salt (not over the mixing bowl!); add to flour and stir to blend the two ingredients.
3. Measure shortening accurately and add to flour and salt.
   a. Measure shortening by packing it into a dry measuring cup, leveling the top with a spatula, then using a rubber scraper to remove all the shortening from the cup.
   b. Pre-measured shortening sticks are available. This is a neat, timesaving method, but is more expensive than measuring your own bulk shortening.
4. Using two knives or a pastry blender, cut the shortening into the flour mixture until the texture is the size of small peas (Figure 1).
5. Add ice cold water, sprinkling water on flour, one tablespoon at a time. Mix lightly with a fork until the flour is moistened. Each time you add a tablespoon, be sure to add it to a dry portion (Figure 2). The dough should form a ball, but not be sticky. Sticky dough results in tough pastry.

Figure 1

Figure 2

6. Lightly flour a dough board or pastry cloth, which you can purchase or make from a lightweight canvas fabric. (Some people prefer waxed paper underneath and on top of the dough — see Stir and Roll Pastry for directions). Place the dough ball (divide in half if you are making a double-crust pie) on the board or cloth.

   Flatten and press the dough into a circle to provide a starting point for rolling out the pastry. Using a lightly floured rolling pin,* roll the pastry from the center to the outer edge (Figure 3 and Figure 4). As you reach the edge, lift the rolling pin to achieve an even thickness throughout the crust. Set the rolling pin back in the center, rolling in a different direction to the edge. By rolling out in different directions from the center, the pastry will be round in shape (Figure 5).

7. Measure the crust by holding an inverted pie pan over the pastry to see if it is large enough (Figure 6). Remember to allow 1 inch extra diameter for the crust edge and sides of the pie pan.

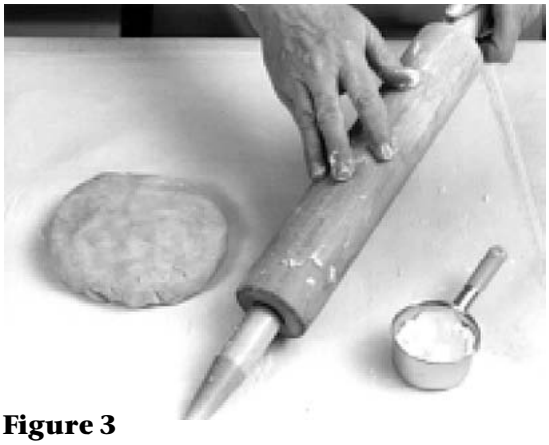


Figure 3

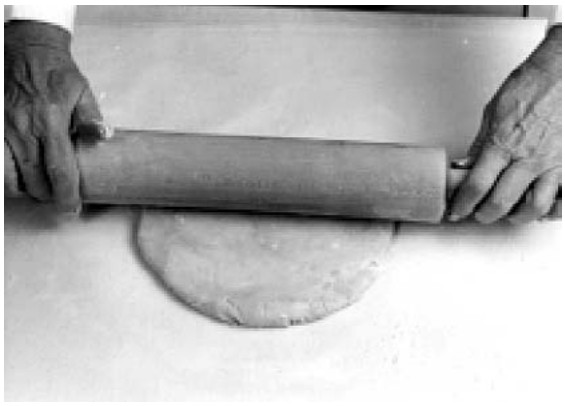


Figure 4

Figure 5

Figure 6

*A stockinette rolling pin cover prevents sticking; it may be purchased at specialty kitchen shops.

8. Fold the pie crust into fourths, transferring quickly to the pie pan (Figure 7). Unfold, being careful to center the pastry in the pie pan (Figure 8). Do not stretch the crust since it will shrink when baked.
9. If you have an uneven amount of crust hanging over the edge, trim it away with kitchen shears or a knife (Figure 9). A 1-inch overhang is adequate. Save the scraps for special treats! For a single-crust pastry used in making cream pies, such as chocolate or lemon, turn the edge under and form an attractive border with the tines of a fork or with a pinch and a twist of the dough between the thumb and forefinger (Figure 10 and Figure 11). This process is known as "fluting."

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

10. Prick the unbaked shell liberally with a fork to prevent "bubbling" during the baking process (Figure 12 and Figure 13). Bake the crust on a rack in the center of an oven preheated to 425 F until lightly browned on the edges, approximately 10 minutes. Cool.

Figure 12

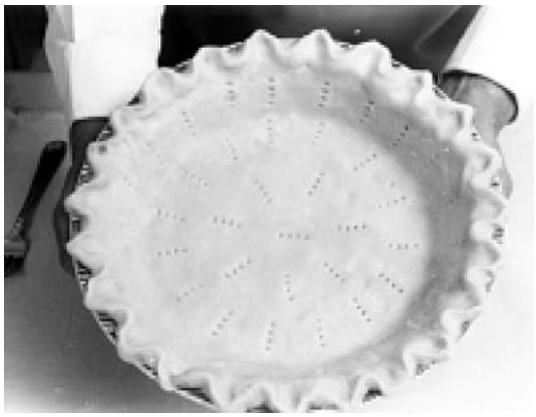


Figure 13

For a **custard pie** — pecan, pumpkin, etc. — follow the same steps, but leave the crust unbaked. It will be filled with raw custard, then baked.

For a **double-crust pie,** roll the remaining ball of dough as you did the lower crust. Before transferring this top crust to the pie, cut some vent holes using a sharp knife, cookie cutter or other tool. This cut-out design allows the steam to escape during baking, keeping the juices and fruit inside the crusts. Fill the lower crust with the prepared pie filling. Trim the bottom crust flush with the edge of the pie pan. Place the top crust over the rolling pin and gently lay it on the filled pie, centering as well as possible. Cut away long, overhanging pieces of dough as before. Lap the top crust edge over the bottom crust edge and press together. Form an attractive edge as described in step 9. Bake as directed in the recipe.

Let's Practice

Now it's time for you to try your hand at preparing pastry. Make a one-crust, baked pie crust and rate it with the following score sheet.

Rating Your Pastry Score Sheet

Appearance Score - Golden brown color; blistery surface; uniform, attractive edges; fits pan well

❑ Perfect - 5 points ❑ Fair - 1 point
❑ Good - 3 points ❑ Poor - 0 points

Poor Characteristics	*Here's Why*
Burned	Overbaking
Pale, dull color	Underbaking, overhandling
Smooth, not blistery surface	Overhandling, too much flour when rolling
Uneven edge	Crust not rolled in even circle, not careful enough in shaping crust in pan
Shrunken	Stretched crust when easing into pan
Large air bubbles	Not pricked well enough

Tenderness Score - Cuts easily with table knife or fork but holds shape when served

❑ Perfect - 5 points ❑ Fair - 1 point
❑ Good - 3 points ❑ Poor - 0 points

Poor Characteristic	*Here's Why*
Tough, rubbery	Too much water and overhandling
Too tender, falls apart	Undermixing, not enough liquid, too much shortening

Texture Score - Flakes layered throughout crust; crisp eating

❑ Perfect - 5 points ❑ Fair - 1 point
❑ Good - 3 points ❑ Poor - 0 points

Poor Characteristics	*Here's Why*
Compact, doughy	Underbaked, too much liquid
Dry, mealy	Shortening cut in too finely, not enough liquid

Flavor Score - Pleasant, bland flavor to enhance the filling

❑ Perfect - 5 points ❑ Fair - 1 point
❑ Good - 3 points ❑ Poor - 0 points

Poor Characteristics	*Here's Why*
Burned	Overbaked
Rancid	Poor-quality shortening, overbaked
Raw	Underbaked

Now Add Up Your Score

Appearance _____
Tenderness _____
Texture _____
Flavor _____
Total _____

This evaluation has a possible score of 20.
How well did your pastry score?

Let's Experiment

High-quality pie crust should be flaky and tender. Flakiness is due to open spaces that form between layers during baking. The layers result because the fat trapped between the layers of flour melts and is absorbed into the dough. This leaves air spaces needed for a flaky crust. Tenderness is the result of minimal formation of gluten, the protein structure found in flour. The less handling involved in making pastry, the more tender the pastry will be. Pastry also is tender due to the high fat-to-flour ratio.

In the following food science experiment, you will prepare three single pie crusts using three different types of fat.

Equipment Needed

Three 8-inch aluminum pie plates
Pastry blender
Measuring spoons
Medium mixing bowl
Rolling pin
Fork
Dry measuring cups
Sharp knife/kitchen shears
Pie server/pancake turner

Ingredients

3 cups all purpose flour
1/3 cup vegetable shortening
1/3 cup softened* margarine (not diet)
1/3 cup vegetable oil
2 Tbsp. milk
water
waxed paper
salt

1 . Prepare the pie crust using 1 cup flour, 1 tsp. salt, 1/3 cup shortening and 2 Tbsp. water. Using the tines of a fork, prick the crust generously and bake at 425 F for 10 minutes or until lightly browned. Set aside to cool.

2. Prepare the second pie crust following the same procedure as the shortening crust, but use 1/3 cup margarine instead of shortening.

3. Prepare the third pie crust using the following procedure for "stir and roll" pastry, using oil as the fat.

   a. Measure 1 c. of flour, place in medium size bowl. Add 1/2 tsp. of salt; mix well. Measure 1/3 cup vegetable oil into liquid measuring cup. Add 2 Tbsp. milk to the oil; do not mix the two liquids together.

   b. Make a "well" in the center of the flour; add milk-oil mixture all at once in the well. Using a fork, mix the two substances together until the dough follows the fork and no dry flour is on the sides of the bowl.

   c. Place the ball of dough on a lightly floured sheet of waxed paper. Cover the ball with a second sheet of waxed paper. Press the ball to flatten; then roll from the center until you reach the correct size of crust. Peel away the top piece of waxed paper. Invert the pie pan over the crust and turn the pan right side up. Peel away the waxed paper.

   d. Form crust gently into the pan and complete a fluted edge as in previous crusts. Prick generously on bottom and sides.

   e. Bake at 425 F until lightly browned, about 10 to 12 minutes. Cool.

***Soften margarine by laying it out on the counter for two hours before use or place it in a microwave for 10 to 15 seconds on "defrost."**

4. When all of the pie crusts are complete, set them side by side on a flat surface. Examine each crust, recording your observations on Chart A.
   a. Observe the **appearance** of the crusts. How does the surface look? Is it flat and smooth? Bumpy? Does it have "blisters" or air bubbles? Describe the color of each crust. Record your observations.
   b. Use a sharp knife to cut each crust in half across the pie pan. Turn the pie pan 90 degrees and cut each crust in half the opposite direction. Use a pie server to lift one of the wedges from the pan. Put the wedge on a small plate that you have labeled with the type of fat you used.
   c. Compare the **flakiness** of each crust. Look closely at the cut edge of each wedge of crust. Can you see layers of dough separated by layers of air? Record your observations on the worksheet.
   d. Compare the **tenderness** of each crust. To do this, use a fork to cut a piece of crust from the wedge. Evaluate the ease of cutting each crust. Record your observation.
   e. Take a bite of each crust. Describe the **flavor** and the "**mouth feel**" of each. Record your observations.

Now answer these questions on the basis of your experiment and observations.

1. Which crust(s) were: most attractive? _____
   least attractive? _____
2. Which crust was: flakiest? _____
   least flaky? _____
3. Which crust was: most tender? _____
   toughest? _____
4. Which crust(s): tasted best? _____
   had the poorest flavor? _____
5. Which crust(s): felt smooth in your mouth? _____
   did not "melt" in your mouth? _____
6. Which crust: stayed together best? _____
   fell apart easily? _____
7. Which crust was: simplest and quickest to make? _____
   the most difficult to make? _____

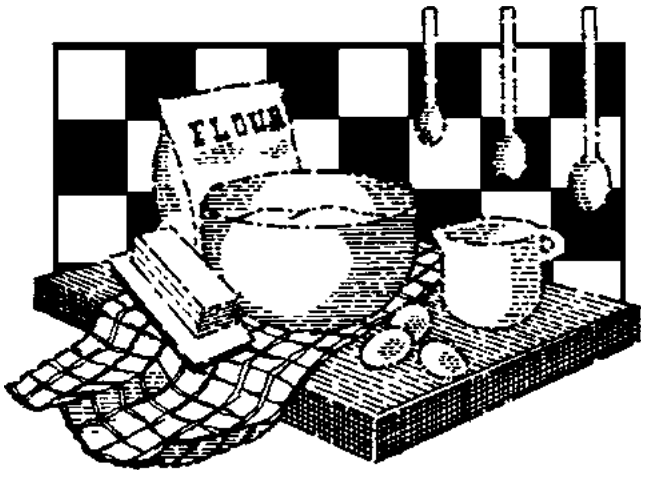


Chart A: Characteristics of Pie Crusts Made With Different Fats

Type of Fat	**Appearance of Uncut Crust** (golden brown, uniform, blistery surface, attractive edge, fits pan well)	**Flakiness** (layered, crisp)	**Tenderness** (cuts easily with table knife or fork)	**Flavor** (pleasant, bland flavor, not salty or with rancid fat taste)	**Mouth feel** (melts in the mouth, smooth, pleasant to tongue and skin of the mouth)
Shortening					
Margarine					
Vegetable Oil					

Great Ideas With Pastry

Freezing Pastry

Make several recipes of your favorite pie crust. On a lightly floured surface, roll the pastry into rounds. Stack them with two sheets of waxed paper between layers or place them in aluminum foil pie pans. Place the pastry in freezer bags; then seal, label and freeze. Plan to use the frozen pastry within six to eight weeks.

To use the frozen pastry, thaw the flat rounds, covered, at room temperature while making the filling. Gently place in pan; form edge. Bake or fill according to pie type. Frozen pastry shells can be baked without thawing first; just add five to 10 minutes to the baking time.

Best Pans

For well-baked, brown undercrust, choose pie pans of heat-resistant glass, ceramic ware or enamelware. Dark metal pans or aluminum pans with a dull, satiny finish give good results. Shiny metal does not bake the undercrust as well because it deflects the heat.

Tart Shells

Make standard pastry for a two-crust pie. Divide into eight equal parts. Roll each part into a 4-inch circle or square. Fit shells inside or over backs of individual pie pans, fluted tart pans, custard cups or muffin cups. Prick well with a fork to prevent puffing. Place cups on a cookie sheet and bake in an oven preheated to 425 F for eight to 10 minutes. When cool, remove from cups or pans. Fill with any desired pie filling, jam or fresh fruit.

Pretty Pastry

Pastry cutouts make pies look festive. Using regular-sized or miniature cookie cutters, cut rolled pastry into holiday shapes, such as pumpkins for Halloween or bells for Christmas. Brush the cut-out shapes with water and sugar and place on the filling to bake. You also may place them on unbaked crust or bake on a cookie sheet, then place on top of a baked pie.

To achieve a shiny top, brush the top crust with milk before baking. For a golden brown, glazed top, brush the top crust with water; sprinkle evenly with granulated sugar before baking. For a glazed top, brush the top crust lightly before baking with beaten whole egg or egg yolk mixed with a little water.

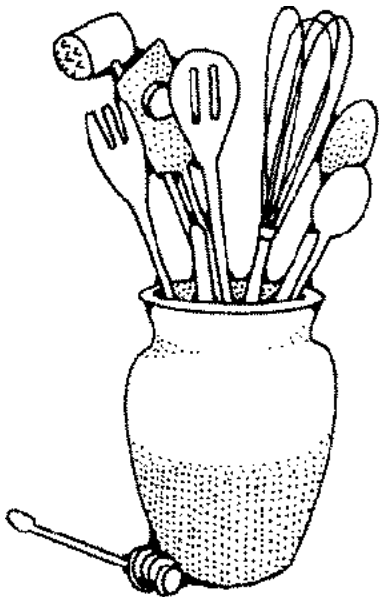
Scrap Dough Projects

Remember those scraps you trimmed from the pastry? Make a quick snack by placing them on a cookie sheet and sprinkling them lightly with salt. Bake, and you have homemade crackers! You may brush scraps lightly with margarine, sprinkle with a cinnamon and sugar mixture, and bake for a sweet treat! Another idea — bake the scraps, then sprinkle them with grated cheese for a tasty snack.

Hidden Treasure Pastries - Heat oven to 425 F. Pat 1 tsp. dough into a thin circle. Wrap around one of the following fillings:

- A maraschino cherry (drained well)
- Mint-flavored chocolate pieces (six to eight)
- Pineapple chunk (drained well)
- Pecan filling (Mix 1/4 cup chopped pecans, 2 Tbsp. packed brown sugar, 1 Tbsp. margarine and 1/2 tsp. vanilla. Form into tiny balls.)

Be sure dough is wrapped around filling and sealed well. Bake 10 to 15 minutes or until light brown. Roll immediately in confectioners' sugar. If desired, roll again before serving.



Pie Fillings

Whether you are making a fruit, custard or cream pie, the filling must be thick enough to hold its shape when served and it does not cause the bottom crust to be soggy.

Food manufacturers need information about how thick or thin a food will be. Food technologists test various recipes to see what type of mixing equipment, food pumps and packaging materials the manufacturers need. The technologists use a device called a viscometer, pronounced viz-com-uh-tur. The device is a cup with a hole in the bottom. It is centered on a line spread chart, filled with a thickened substance, then lifted straight up. The substance then spreads for a predetermined time, and the technologists take a measurement.

Let's Experiment!

You will need

A copy of the line spread viscometer (page 33)
Clear laminating film and laminator or plastic sleeve
Ring biscuit/cookie cutter, small paper/plastic cup with bottom removed, or a small cross section of plastic pipe close in size to the center of a bull's-eye (about 1 inch high)
Stopwatch or kitchen timer

Samples

Jam
Ketchup
Applesauce
Pudding
Yogurt

Procedure

1. Make a copy of the bull's-eye (line spread viscometer). Laminate or insert it into the plastic sleeve available in a school supply department.
2. Find a sample holder. It must be round with the top and bottom open (Figure 14). Center the sample holder on the center of the bull's-eye. Fill it to the top with one of the samples (Figure 15). As you lift the sample holder straight up, start the stopwatch or kitchen timer (Figure 16). Allow the sample to spread for two minutes.
3. At the end of the two minutes, measure how far the sample has spread at the top, bottom and both sides of the bull's-eye. Use the numbers on the lines of the bull's-eye to help determine how far the sample has spread (Figure 17). Place the measurements on Chart B. Add the four measurements together, divide by four for the average number. Place the average in the chart.
4. Wash the sample holder and dry. Clean the bull's-eye with a damp cloth and dry well. Repeat the procedure with the other four samples, noting the results.
5. Answer the questions at the bottom of Chart B, based on your observations and data.

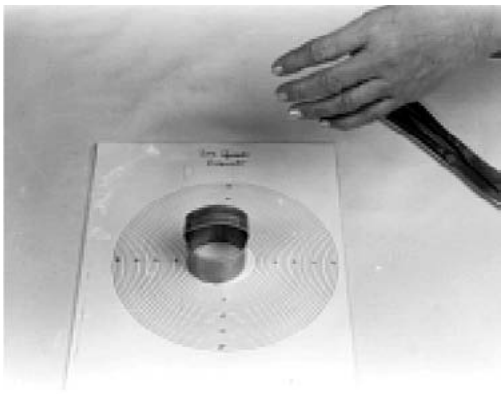


Figure 14

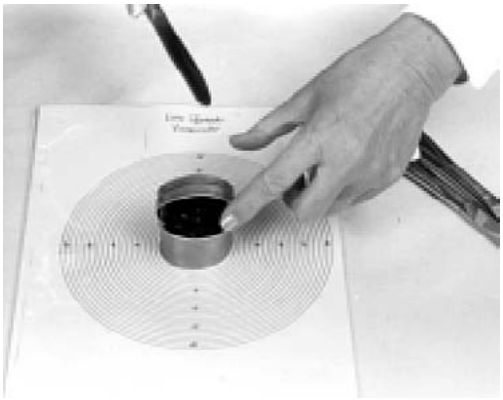


Figure 15

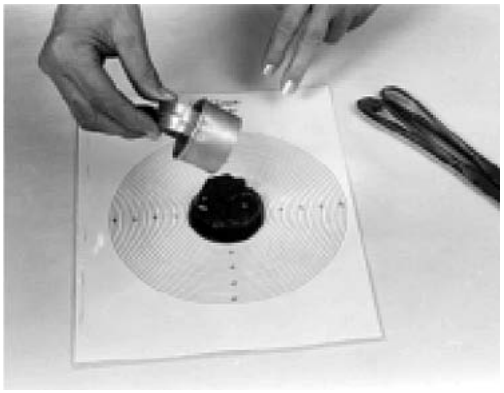


Figure 16

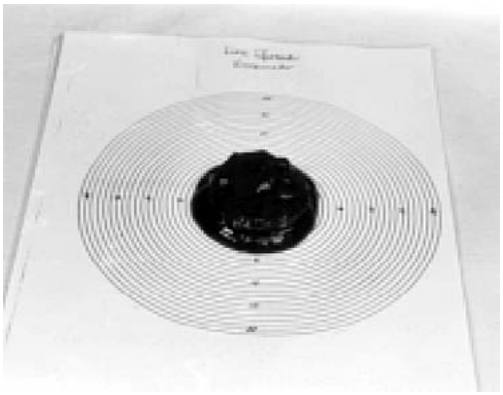


Figure 17

Line Spread Viscometer

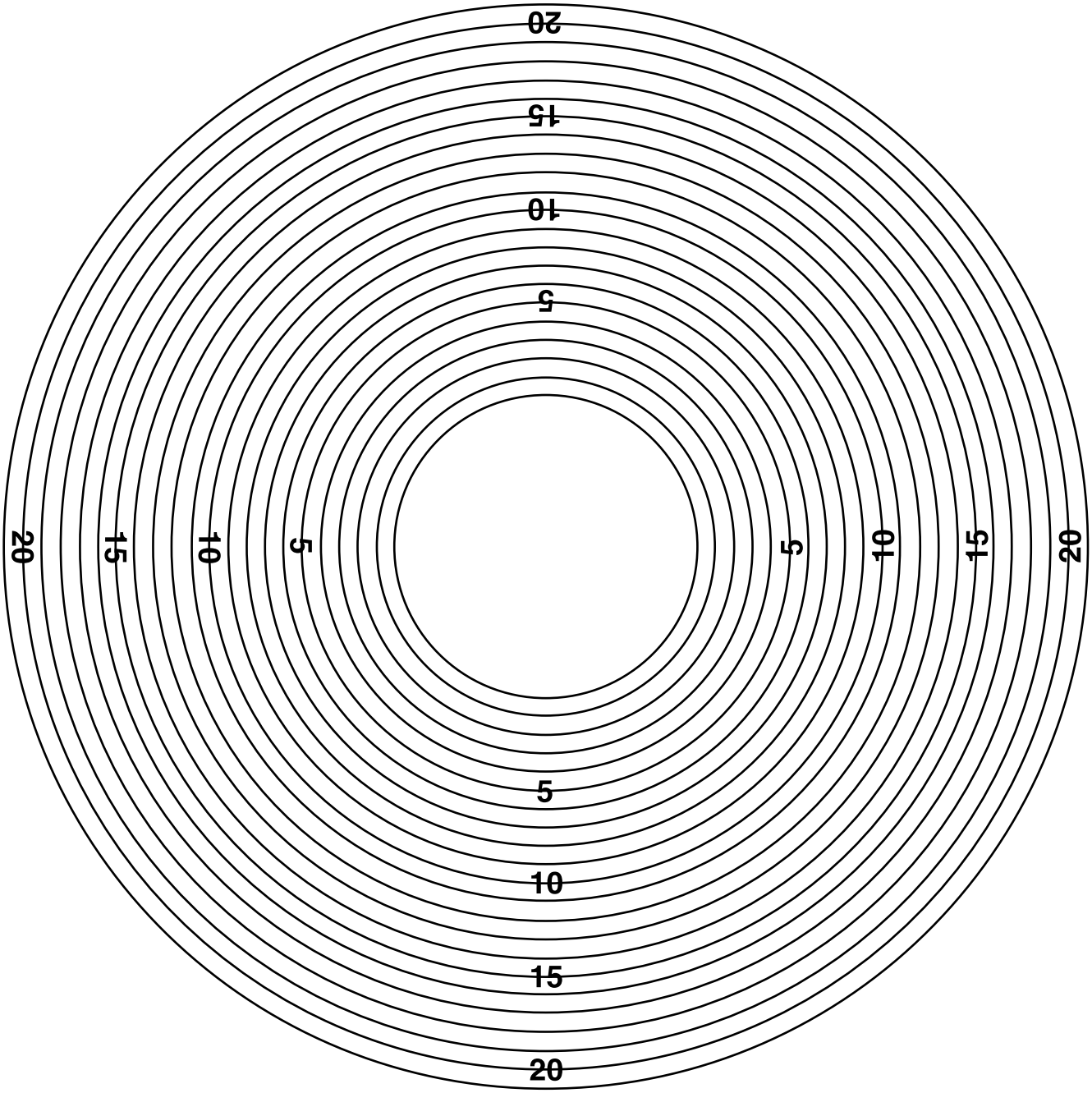


Chart B — Observations on the Thickness of Foods

Observations on the thickness of foods using a line spread viscometer						
	Line Spread Measurements					
Sample	**1**	**2**	**3**	**4**	**Average Spread**	**Rank (1 = thickest)**

Questions:

1. Which foods were thickest?

2. Which foods or products do you think could serve as pie fillings?

Thickening Agents

Canned fruit with juice or thin, watery pudding does not make a good pie filling. Various thickening agents are used to thicken the foods. All-purpose flour is made from ground wheat starch and often is used to thicken gravy. Cornstarch is made from ground starch found in corn kernels and is used in foods such as pie fillings. Tapioca is made from a root vegetable called cassava and is used to make tapioca pudding. Food manufacturers also use ingredients called modified food starches, which are starches that food scientists have changed to make them work better in foods.

Let's Experiment!

Each of the thickeners mentioned above has a different thickening ability, gives a different appearance to the thickened foods and has a different texture. In this experiment, you will thicken water with different starches, use the viscometer to measure the thickness and observe the results.

Equipment

Quart saucepan
Large spoon
Measuring spoons
3 medium bowls
Viscometer equipment

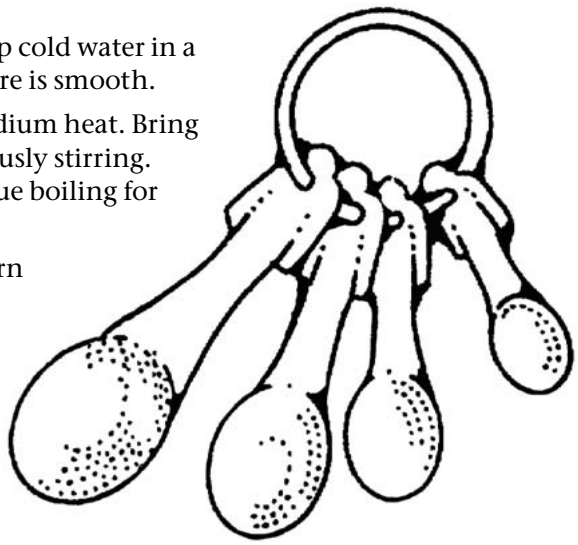
Supplies

All-purpose flour
Cornstarch
Tapioca
Water

Directions

1. Flour plus water
   - Combine 1 Tbsp. flour with 1 cup cold water. Stir until the mixture is smooth.
   - Place the 1-quart saucepan on a burner at medium heat. Bring the starch mixture to a boil, continuously stirring. Once the mixture is bubbling, boil for one minute.
   - Remove the pan from the heat and turn the burner off. Carefully pour the starch mixture into a bowl. Set the bowl aside to cool while you prepare the other treatments.

2. Cornstarch plus water
   - Combine 1 Tbsp. cornstarch and 1 cup cold water in a 1-quart saucepan. Stir until the mixture is smooth.
   - Place the saucepan on a burner at medium heat. Bring the starch mixture to a boil, continuously stirring. Once the mixture is bubbling, continue boiling for one minute.
   - Remove the pan from the heat and turn the burner off. Carefully pour the starch mixture into a bowl. Set the bowl aside to cool while you prepare the final mixture.



3. Tapioca plus water
   - Place 1½ Tbsp. of quick tapioca and 1 cup cold water in a 1-quart saucepan. Stir the mixture until combined. Let the mixture stand for 15 minutes. Place the saucepan on a burner and cook on medium heat.
   - Bring the starch mixture to a boil, continuously stirring. Once the mixture is bubbling, let it boil for one minute. Remove the pan from the heat and turn the burner off. Carefully pour the starch mixture into a bowl. Let the mixture cool to room temperature before evaluating the starch pastes.

When all of the starch mixtures are cool, set the bowls side by side. Label each mixture with the name of the starch used. Fill in Chart C with your observations.

1. First, compare the **appearance** of the three pastes. What is the color of each paste? Are the pastes clear or cloudy? Do they look smooth or lumpy?
2. Next, use your line spread viscometer to compare the **thickness** of the starch pastes as you did in the previous experiment.
3. Finally, compare the **texture** of each starch paste. Rub some of each paste between your thumb and finger. Does it feel gritty or sandy? Does it feel smooth? Is it lumpy? Is the paste sticky?

Based on your observations, think about which starch will result in the smoothest cream pie or the most attractive fruit pie. Consider which starch or starches will result in a firm filling that will not run when cut. Remember these thoughts and observations and put them into practice when preparing fruit or cream pies.

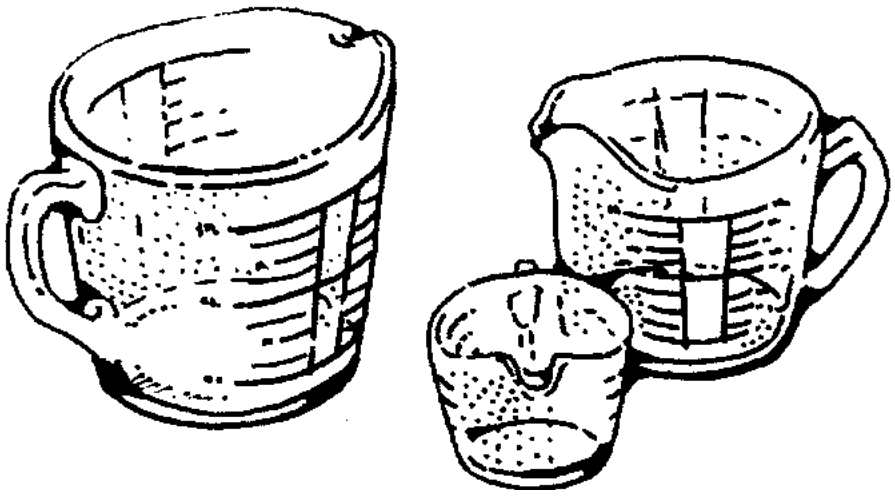


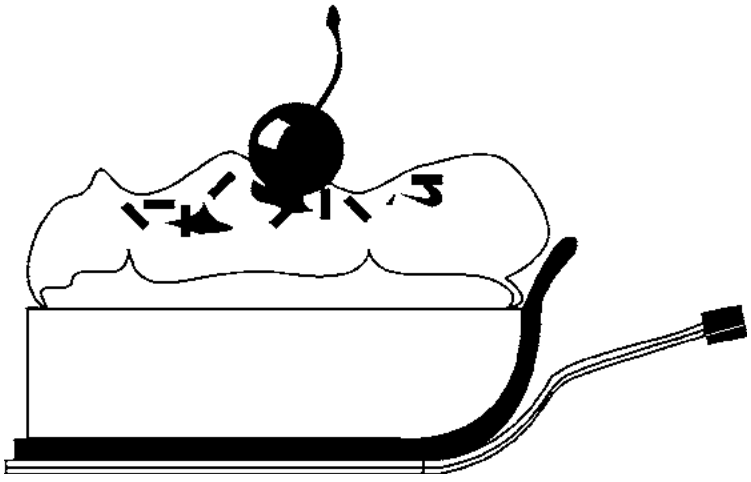
Chart C: Observations of Pastes Made With Different Starches

Paste Type	Appearance	Viscosity (line spread)				Average Spread	Texture
		1	2	3	4		
Flour Plus Water							
Cornstarch Plus Water							
Tapioca Plus Water							

Cream Pies

Several principles of cookery apply to making and serving cream pies.

- Cream pies are made in a single, baked bottom crust.
- Be sure to use the correct size of crust/pan as indicated in the recipe.
- Be sure the oven is accurate. If you are not sure, check the oven with an oven thermometer.
- You must stir fillings constantly and watch them carefully so they do not scorch on the bottom.
- Place meringue on a hot cream filling, which cooks the underside of the meringue.
- Cream pies must be refrigerated within two hours because of the egg and milk content. Protein foods are highly susceptible to organisms that cause foodborne illness if not handled properly. Do not allow cream pies to sit out for more than two hours.
- An 8-inch pie makes six servings; a 9-inch pie serves eight people.



Basic Cream Pie

Prepare a 9-inch pastry with high fluted edge; bake in a preheated oven (425 F) for 10 to 12 minutes. Set aside to cool.

Ingredients

2/3 cup sugar
1/2 tsp. salt
2½ Tbsp. cornstarch
1 Tbsp. flour
3 cups milk
3 egg yolks, slightly beaten
1 Tbsp. margarine
1½ tsp. vanilla

Mix sugar, salt, cornstarch and flour in a heavy saucepan. Add milk gradually, stirring well to mix ingredients. Cook over medium heat, stirring constantly until mixture thickens and boils. Boil two minutes. Remove from the heat. Slowly add half of the mixture to the eggs yolks, stirring constantly.

Return egg mixture to remaining ingredients in the saucepan and blend well. Boil one minute more, stirring constantly. Remove from heat; blend in margarine and vanilla. Cool (unless adding meringue), stirring occasionally. Pour into cooled pie crust. Chill thoroughly (two hours). Top with sweetened whipped cream, which you make by beating 1/2 cup of whipping cream until stiff, and beating in 1 Tbsp. confectioners' sugar and 1/4 tsp. vanilla. Or sprinkle with shaved nuts, toasted coconut or fresh berries. Take the chilled pie out of refrigerator 20 minutes before serving; this allows the crust to be at the peak of flavor.

Chocolate Cream Pie

Follow the basic cream pie recipe, except increase the sugar amount to 1½ cups and add 3 squares (3 oz.) of chopped, unsweetened chocolate with the milk (or add 1/2 cup cocoa with the dry ingredients before adding milk). Top with whipped cream or meringue.

Banana Cream Pie

Follow the basic cream pie recipe, except arrange a layer of sliced bananas, ½ inch deep, in a pastry shell before pouring in cooled filling. Three bananas usually are adequate. If you use whipped cream topping, garnish with a ring of sliced bananas. To prevent the bananas from turning brown, dip them in lemon or pineapple juice or a commercial fruit preservative containing ascorbic acid.

Coconut Cream Pie

Follow the basic cream pie recipe, except fold in 3/4 cup moist, shredded coconut just before filling pastry shell. Sprinkle an additional 1/4 cup of shredded coconut on whipped cream or meringue topping (before meringue is baked so coconut will toast in the final baking).

Lemon Meringue Pie

Make a single 9-inch pie crust; bake in 425 F oven for 10 to 12 minutes.

Ingredients

1½ cups sugar
1/3 cup cornstarch
1½ cups water
3 egg yolks, slightly beaten
3 Tbsp. margarine
1/4 cup lemon juice
1 1/3 Tbsp. lemon rind or orange rind

Mix sugar and cornstarch in a medium-sized, heavy saucepan. Stir in water gradually. Cook over medium heat, stirring constantly, until mixture thickens and boils. Boil for one minute. Slowly stir half the hot mixture into the beaten egg yolks, then return to hot mixture in the saucepan. Boil one minute longer, stirring constantly. Remove from heat. Continue stirring until smooth. Blend in margarine, lemon juice and lemon rind. Pour into baked pie shell; cover with meringue. Bake until a delicate brown in a 400 F oven (about eight to 10 minutes). Serve as soon as pie has cooled.

Tip: Fresh lemon juice is desirable, but bottled is quick and easy to keep on hand!

Tip: When grating lemon or orange rind, grate just the thin, colored rind with a fine grater.

Perfect Meringue (for 9-inch pie)

3 egg whites
1/4 tsp. cream of tartar
6 Tbsp. sugar (1/4 cup + 2 Tbsp. is a quick way to measure!)
1/2 tsp. vanilla

Special Note

Eggs separate best when cold; use an egg separator if one is available. The alternative is: Separate white from yolk by tapping the egg with a table knife in the center of the egg shell. Pull the two halves apart and pour the egg back and forth, draining the white into a clean glass or metal container, carefully keeping the yolk intact in the shell. Use caution or the yolk will break; yolk in white prevents the whites from whipping to a nice volume. After separating each egg, move that white and yolk to new containers, being sure to place the whites in clean metal or glass bowls. Plastic bowls often retain grease even when washed; grease prevents egg whites from whipping. The leftover egg yolks should be used within 24 hours in pie fillings, puddings, quick breads, French toast or other egg dishes. Be sure they are stored in the refrigerator until you are ready to use them.

Beat room-temperature egg whites with cream of tartar until frothy, using an electric mixer or egg beater. Gradually add sugar, a small amount at a time, beating between additions (Figure 18). Continue beating until egg whites are stiff and glossy. Test the stiffness by lifting the whites to a peak. If they stand firm, the meringue is stiff enough (Figure 19). If overbeaten, the egg whites "clump" and will not spread smoothly on the pie.

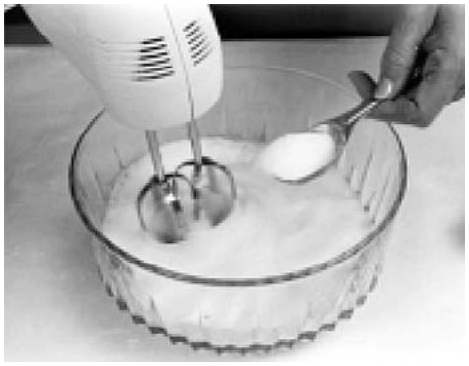


Figure 18

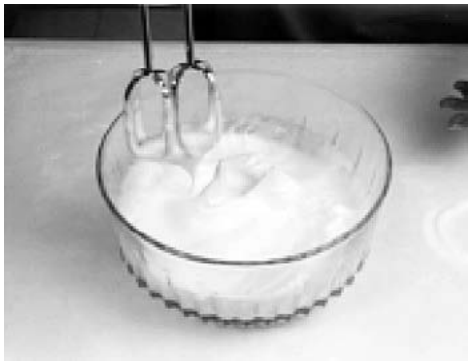


Figure 19

Pile the meringue, a spoonful at a time, on top of the hot filling. Be sure to seal the meringue to the edge of the crust to prevent shrinkage when baked (Figure 20). Cover the pie completely. Swirl or pull up points for a decorative look (Figure 21). Bake until delicately browned in a 400 F oven, about eight to 10 minutes. Cool gradually in a slightly warm place away from drafts. Chilling the meringue before it cools usually will make the meringue "fall."

Figure 20

Figure 21

Never-fail Meringue

If you admire the "mile-high" meringue that professional pastry chefs add to their pies, try this recipe!

Ingredients

1 Tbsp. cornstarch
1/2 cup water
2 Tbsp. sugar
3 egg whites, at room temperature
1/2 tsp. salt
1/2 tsp. vanilla
6 Tbsp. sugar

Tip: Incomplete blending of sugar or overbaking cause meringue to "weep."

Preheat oven to 350 F. In a 1-quart saucepan, combine cornstarch, 2 Tbsp. sugar and water. Cook until clear; set aside to cool. Beat egg whites, salt and vanilla until stiff, then add 6 Tbsp. sugar, 1 Tbsp. at a time. Fold cornstarch mixture into egg whites. Spoon on hot pie filling, being sure to attach meringue to crust. Bake approximately 20 minutes or until meringue is golden brown. Makes enough meringue for one 9-inch pie.

Cream Pie With Meringue Score Sheet

1. **Filling -** Thick consistency, no separation of filling, smooth with no lumps

   ❑ Excellent ..... 5 points
   ❑ Good ..... 3 points
   ❑ Fair ..... 1 point
   ❑ Poor..... 0 points

2. **Crust -** Crisp, tender, well-browned but not burned on edges

   ❑ Excellent ..... 5 points
   ❑ Good ..... 3 points
   ❑ Fair ..... 1 point
   ❑ Poor..... 0 points

3. **Meringue -** Attractive, well-browned, no "weeping," attached to crust, tender, nice volume

   ❑ Excellent ..... 5 points
   ❑ Good ..... 3 points
   ❑ Fair ..... 1 point
   ❑ Poor..... 0 points

4. **Flavor -** Tasty, flavors blend well, no unwanted flavors

   ❑ Excellent ..... 5 points
   ❑ Good ..... 3 points
   ❑ Fair ..... 1 point
   ❑ Poor..... 0 points

Add up your scores

Filling: _____

Crust: _____

Meringue: _____

Flavor: _____

Total (20 possible):

_____

Custard Pies

Custard pies are made in an unbaked pie crust. The filling is cold when you place it in the raw crust. The filling and crust bake at the same time.

Traditional Pumpkin Pie

Make a 9-inch unbaked pie shell. Do not prick or bake.

Ingredients

2 eggs, slightly beaten
1 16-oz. can of solid-pack pumpkin
3/4 cup sugar
1/2 tsp. salt
1 tsp. cinnamon
1/2 tsp. ginger
1/4 tsp. ground cloves
1½ cups (12-oz. can) evaporated milk

Tip: If the crust edges are browning too quickly, place strips of aluminum foil over the edge.

Preheat oven and cookie sheet to 375 F. Combine filling ingredients in order listed, using a whisk or mixing spoon. Place pie crust on preheated cookie sheet near center of oven.

Pull oven rack out enough to pour filling into pie crust. Bake for 70 minutes or until knife inserted in the center comes out clean. Cool on a wire rack. Garnish with whipped cream or pumpkin cut-outs. Custard pies should be refrigerated within two hours because they contain eggs and/or milk. Leftover custard pie also should be refrigerated.

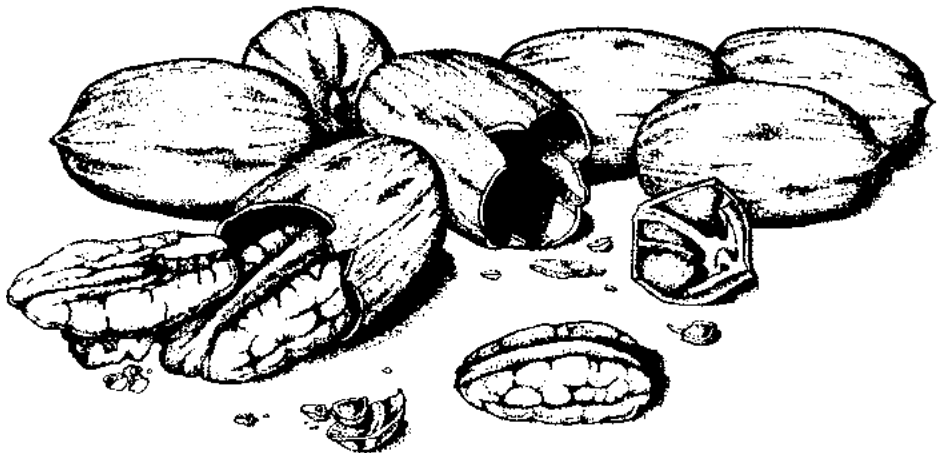
Pecan Pie

A Favorite Southwestern Pie Great for Holidays!

Ingredients for _____

8-inch pie	9-inch pie
2 eggs	3 eggs
1/2 cup sugar	2/3 cup sugar
1/4 tsp. salt	1/2 tsp. salt
1½ Tbsp. flour	2 Tbsp. flour
3/4 cup dark corn syrup	l cup dark corn syrup
2 Tbsp. melted margarine	3 Tbsp. melted margarine
3/4 tsp. vanilla	1 tsp. vanilla
1 cup pecan halves	1¼ cups pecan halves

Prepare unbaked pastry shell. Beat the eggs, sugar, salt, flour, melted margarine and syrup together with rotary beater or whisk. Mix in pecans and pour into pastry-lined pan. Bake until set (40 to 50 minutes) in a 375 F oven. Cool. Serve cold or slightly warm. Remember to refrigerate within two hours after baking or serving!



Custard Pie Score Sheet

1. **Crust -** Tender, well-browned, not soggy on the bottom, cuts easily, attractive edge

   ❏ Excellent ..... 5 points
   ❏ Good ..... 3 points
   ❏ Fair ..... 1 point
   ❏ Poor..... 0 points

2. **Filling -** Smooth, no separation, thick enough to hold shape, pleasing flavor, well-done

   ❏ Excellent ..... 5 points
   ❏ Good ..... 3 points
   ❏ Fair ..... 1 point
   ❏ Poor..... 0 points

3. **Overall appearance -** Garnished attractively, fits pan well, appealing color, crust not overly brown

   ❏ Excellent ..... 5 points
   ❏ Good ..... 3 points
   ❏ Fair ..... 1 point
   ❏ Poor..... 0 points

Add up your scores

Crust: _____

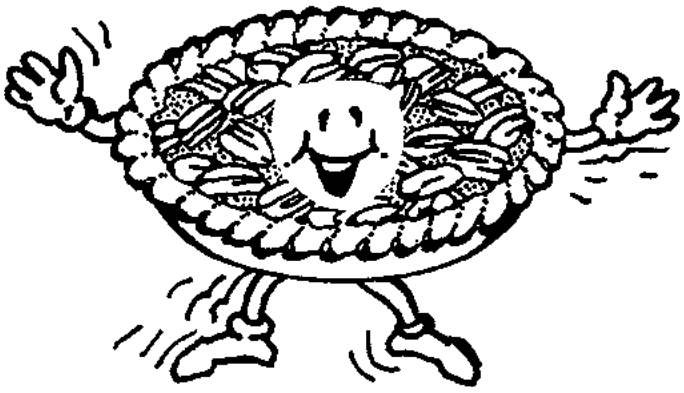
Filling: _____

Appearance: _____

Total: _____

Possible score of 15.

How well did your pie score?



Fruit Pies

Capture the flavor of fresh, frozen or canned fruits in a tender, double crust for a special treat!

Apple Pie

America's Favorite Dessert!

Know your apples. Select tart, firm, juicy apples, such as Granny Smith, Jonathan or Winesap, for pies. One pound of apples will yield about 3 cups of sliced apples. Apples should be peeled and quartered, with the cores removed, and sliced to ¼-inch thickness. If the apples seem dry, sprinkle with a little water. For more tartness, add a little lemon juice.

Make pastry for two-crust 9-inch pie. Line pie pan with one crust.

Tip: Place a cookie sheet on the rack under the pie to catch spills; it may save you from getting a smelly mess and having to clean the oven!

Ingredients

3/4 to 1 cup sugar
1 tsp. cinnamon
6 to 7 cups sliced apples
1½ tsp. margarine

Combine sugar and cinnamon and mix lightly through apples. Heap apple slices in pastry-lined pie pan. Dot with margarine. Cover with top crust, which has steam vents and a 1-inch overlap. Fold overlap over bottom crust and seal. Flute edges. Bake 50 to 60 minutes in hot oven (425 F) until crust is nicely browned and apples are cooked through (test by pricking with a fork). Serve warm or cold with cream, whipped cream or ice cream.

Canned Cherry Pie

"Can she bake a cherry pie, Billy Boy, Billy Boy? Can she bake a cherry pie, charming Billy?"

"She can bake a cherry pie; she's the apple of my eye. She's a young thing and cannot leave her mother!"

In an old song, one test of cooking skill was the ability to make a great cherry pie! Your family and friends will enjoy your cherry pie made from scratch!

Ingredients

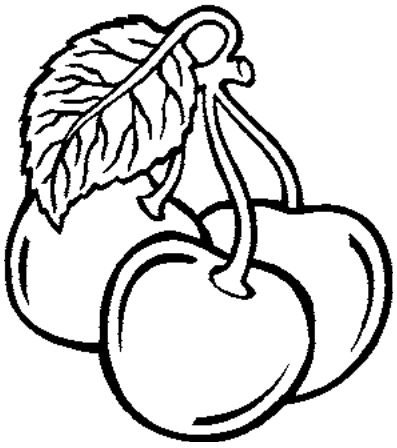
1 c. sugar
1/4 cup flour
2½ cups canned pitted, sour cherries with juice
1/4 tsp. almond flavoring
1 Tbsp. + 1 tsp. margarine
red food coloring

Prepare a double-crust, 9-inch unbaked pie crust. Fill bottom crust and trim flush with pie pan. In a saucepan, mix together sugar and flour, then add cherry juice and stir well. Cook over moderate heat, stirring constantly, until mixture thickens and boils. Remove from heat. Add cherries, margarine, almond flavoring and two to three drops of red food coloring. Stir well; pour into pastry-lined pan. Quickly cover with top crust, which has steam vents and a 1-inch overlap. Fold overlap over bottom crust and seal. Create pretty edge. Bake in 425 F oven until nicely browned and juice begins to bubble through slits in crust (about 30 to 40 minutes). Serve warm, not hot.

Tip: Fruit pies do not need refrigeration for the first 24 hours after baking. Refrigerate after that time — if any pie is left over!

Fresh or Frozen Cherry Pie

Follow the directions for Canned Cherry Pie except use 4 cups fresh or frozen pitted sour cherries, 1/3 cup additional sugar and no added food coloring. Makes a wonderful pie!



Canned Berry, Peach or Apricot Pie

Follow recipe for Canned Cherry Pie, substituting 2½ cups sliced peaches, berries or apricots for cherries, and 1/2 tsp. cinnamon for the almond flavoring. Delete food coloring.

Fresh Strawberry Pie

When strawberries are in season, nothing is more delicious than this wonderful pie!

Ingredients

1 Tbsp. strawberry-flavored gelatin
3 Tbsp. cornstarch
3/4 to 1 cup sugar
1 cup water
1 quart fresh strawberries, washed and hulled
1 baked, cooled 9-inch pie shell

Combine gelatin, cornstarch, sugar and water. Bring to a boil, stirring constantly. Set aside to cool. Place small, whole berries or larger berry halves in pie shell. Pour cooled gelatin mixture over berries; refrigerate about three hours. Garnish with a spoonful of whipped cream on each serving.

Innovative Fruit Fillings

A 9-inch fruit pie needs approximately 4 c. of fresh fruit or 2½ to 3 cups cooked or canned fruit, approximately 2 Tbsp. cornstarch and 2/3 to 1 cup sugar. Experiment with different fruits; try one of these combinations:

- Half apple and half pear
- Half cherry and half strawberry
- Half rhubarb and half strawberry
- One-third cranberry and two-thirds apple
- Two-thirds raspberry and one-third cranberry

Double Crust Pie Score Sheet

1. **Attractiveness -** Evenly browned, fits plate well, adequate filling, attractive edge

    ❏ Excellent ..... 5 points
    ❏ Good ..... 3 points
    ❏ Fair ..... 1 point
    ❏ Poor..... 0 points

2. **Filling -** Flavorful, appealing color; thick enough to hold shape when cut

    ❏ Excellent ..... 5 points
    ❏ Good ..... 3 points
    ❏ Fair ..... 1 point
    ❏ Poor..... 0 points

3. **Crust -** Tender, bland taste that does not detract from filling; crisp, bottom crust not soggy

    ❏ Excellent ..... 5 points
    ❏ Good ..... 3 points
    ❏ Fair ..... 1 point
    ❏ Poor..... 0 points

Add up your scores

Attractiveness: _____

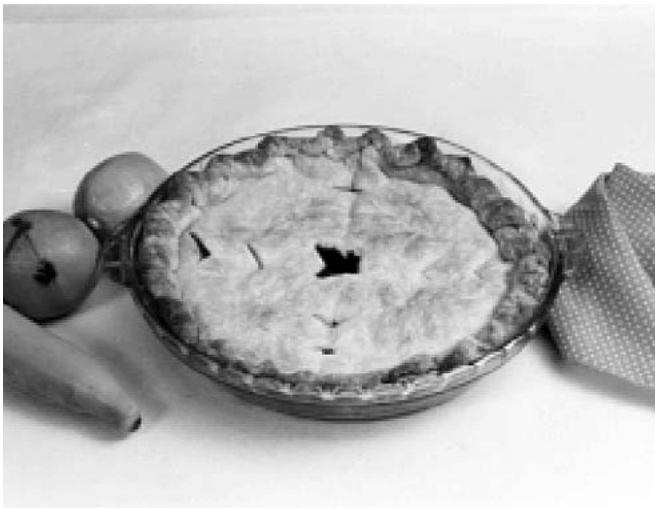
Filling: _____

Crust: _____

Total: _____

Possible score of 15.

How well did your pie score?



Meat Pies, Cheese Pies, Little Pies and More

Traditional Quiche

1 unbaked 9-inch pie shell, pricked
9 slices bacon, cooked and crumbled or 8 oz. diced ham
1½ cups (6 oz.) shredded Swiss cheese
1 egg
2 cups half and half dairy product
1/4 tsp. salt
1/8 tsp. ground nutmeg
dash ground red pepper

Preheat oven to 425 F. Bake pie shell eight minutes; remove from oven. Sprinkle bacon/ham and cheese on bottom of pie shell. In medium bowl, beat eggs; add remaining ingredients. Pour into prepared pie shell. Bake 15 minutes; reduce oven temperature to 350 F and bake 25 minutes longer or until center is set. If pie crust edges become too brown, shield them with aluminum foil strips. Cool slightly. Serve warm; refrigerate leftovers.

Reduced-cholesterol Spinach Quiche

Think low-fat, reduced-cholesterol dishes can't be tasty? This quiche will change your mind.

Ingredients

9-inch single-crust pastry made with vegetable oil
1 Tbsp. vegetable oil
2 cups sliced mushrooms
1/2 cup finely chopped onion
1 clove garlic, minced
3 egg whites
2 tsp. Dijon-style mustard
1/4 tsp. salt
1/4 tsp. pepper
8 oz. low-fat cottage cheese
1 10-oz. package frozen, chopped spinach, thawed and squeezed dry of liquid

In medium skillet, heat oil over medium heat. Add mushrooms, onion and garlic; cook and stir five minutes or until tender. In medium bowl, slightly beat egg whites, mustard, salt and pepper until blended. Stir in cottage cheese, onion mixture and spinach. Place in raw pie crust; bake in a preheated 350 F oven for 45 minutes or until knife inserted in center comes out clean.

Apple Turnovers

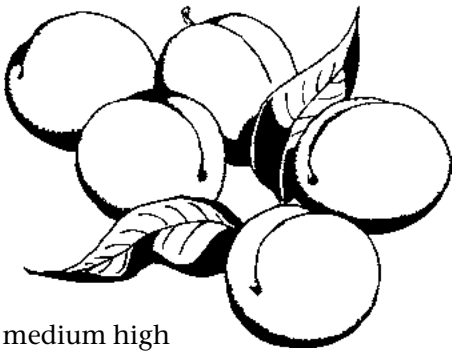
Make a recipe of 9-inch double-crust pastry dough. Roll out in a square shape, 1/8 inch thick. Cut into 5-inch squares. Place drained, cooked apple slices in center of each square. Sprinkle with sugar, cinnamon and lemon juice. Dot with margarine. Moisten outer edges with cold water, fold into triangle and seal well with tines of fork. Cut slit in top. Brush with milk, sprinkle with sugar. Bake at 475 F until delicately browned, about 10 to12 minutes.

Empanadas

Empanadas are a New Mexico version of turnovers or "little pies." Traditionally, they are filled with spicy mincemeat or fruit filling. Pumpkin, prune, peach and apricot are some of the favorites!

Apricot or Peach Empanadas

1 recipe of pastry for 9-inch double-crust pie
1/2 pound dried peaches or apricots
1/8 tsp. ground coriander, optional
1¼ cups sugar
1/4 tsp. salt
1 tsp. cinnamon
1/2 tsp. nutmeg
1/2 cup raisins, soaked in warm water



1. Soak peaches or apricots in enough hot water to cover fruit until soft, about 20 to 30 minutes. Meanwhile, prepare pastry.
2. Simmer peaches in small quantity of water using medium high heat. Cook until very soft, almost mushy. Drain fruit if water has not been absorbed.
3. Mash fruit with potato masher. Add remaining ingredients and mix well.
4. Divide dough into 24 parts; roll into balls.
5. Using rolling pin, roll balls into circles about 4 inches in diameter.
6. Place 1 Tbsp. of filling on center of each circle, fold over in half and seal. Prick top.
7. Bake on an ungreased cookie sheet in a 450 F oven for 10 to 12 minutes or until golden.

Pumpkin Empanadas

16 oz. cooked, mashed or canned pumpkin
1 cup light brown sugar
1 Tbsp. melted margarine
1/4 tsp. ground cloves
1/4 tsp. ground nutmeg
1/2 tsp. ground allspice
1 egg, beaten
granulated sugar
pie crust dough – enough for 9-inch double-crust pie

Mix pumpkin with brown sugar, margarine and spices. Divide pastry into 12 portions. Roll each portion into a 6-inch circle. Spoon 2 Tbsp. of pumpkin filling on each circle; fold to form a turnover and seal edges with the tines of a fork.

Cut a vent in the top to allow steam to escape while baking. Brush turnovers with beaten egg and sprinkle with sugar. Bake on greased baking sheets in a 400 F oven for 30 minutes or until nicely browned. Cool on wire racks. Makes 12 large empanadas.

Empanada/Turnover Score Sheet

1. **Appearance -** No filling on outside, nicely browned, uniform shape, edges crimped

    ❑ Excellent ..... 5 points
    ❑ Good ..... 3 points
    ❑ Fair ..... 1 point
    ❑ Poor..... 0 points

2. **Crust -** Tender, flaky, melts in the mouth, not too salty, no rancid fat flavor

    ❑ Excellent ..... 5 points
    ❑ Good ..... 3 points
    ❑ Fair ..... 1 point
    ❑ Poor..... 0 points

3. **Filling -** Flavorful, nice blend of fruit and spices, not runny

    ❑ Excellent ..... 5 points
    ❑ Good ..... 3 points
    ❑ Fair ..... 1 point
    ❑ Poor..... 0 points

Add up your scores

Appearance: _____

Crust: _____

Filling: _____

Total: _____

Rate your empanadas/turnovers

If you totaled 12 to 15, excellent!

If your total was 9 to 11, good!

If your total was 5 to 8, practice again!

If you scored 4 or lower, read and follow directions closely as you try again!

Freezing Pies and Pastry Products

One timesaving strategy is to make several pies at the same time and freeze some for later use. Fruit pies, both baked and unbaked, freeze well. Some custard pies, such as pumpkin and pecan, freeze well. They freeze more successfully after baking.

Do not add meringue or whipped cream to pies you plan to freeze. Cream pies do not freeze well, but you can freeze pastry shells ahead of time, cutting cream pie preparation time in half.

To freeze unbaked fruit pies:

- Treat light-colored fruit, such as apples and peaches, with an ascorbic acid fruit preservative.
- Use metal, freezer-to-oven or disposable pie pans.
- Seal pie in a freezer bag, being sure it is sealed well, or in heavy aluminum foil that completely surrounds the pie with the edges brought together, rolled and sealed.
- Label with kind of pie and date it was frozen. Be sure to use frozen pies within two to four months.
- To bake a frozen pie, unwrap it and cover with foil. Bake in a 450 F oven for 15 minutes; reduce the temperature to 375 F and continue baking for 15 minutes. Uncover and continue baking for 55 to 60 minutes until crust is golden and filling is bubbly.

To freeze baked fruit/custard pies:

- Bake and cool the pie completely. Place in a freezer bag or heavy foil, seal, label and freeze for up to eight months.
- To use, thaw the pie, covered, in the refrigerator. If desired, reheat the pie by baking it, covered, in a 325 F oven until warm.

Troubleshooting Pastry

If the pastry in your pie or pastry product did not turn out perfectly, look for the reason and make adjustments the next time you make a pie or pastry product.

1. If the pastry was crumbly and hard to roll:
   - Add more water, 1 tsp. at a time.
   - Mix the water and flour together just a little more until evenly moistened.
2. If the pastry was tough:
   - Use a pastry blender to cut in the shortening until well mixed and all of the mixture resembles small peas.
   - Use less water to moisten the flour mixture.
   - Do not overmix the flour mixture and water.
   - Use less flour when rolling out the pastry.
3. If the crust shrinks excessively:
   - Mix in the water only until evenly moistened.
   - Let pastry rest for five minutes if it's hard to roll.
   - Don't stretch pastry when transferring it.
4. If the bottom crust is soggy:
   - Use a dull metal or glass pie plate rather than a shiny metal pan.
   - Patch any cracks in the bottom pastry before adding the filling.
   - Make sure the oven temperature is accurate.
   - Be sure you preheat the oven before baking the pie.

Homemade or Ready-made?

You have learned how to make pastry, pies and meringue "from scratch" in your kitchen. Many people believe that making homemade baked goods is worth the extra time and effort. Others do not feel they have the time to bake at home. Complete a time-taste-cost-wholesomeness survey and determine your values.

A. Purchase a frozen, ready-to-bake pie. Be sure to note the cost and the amount of time baking the pie took. Save the carton or label to determine the ingredients.

B. Prepare from scratch a pie of the same size and flavor (apple, cherry, pumpkin, pecan, etc.) Keep track of the time you took to prepare the pie. Add the cost of the ingredients to determine the total cost of the pie.

C. Serve each person in your "test group" a small piece of each pie, preferably without mentioning which one you made. Note their comments about the flavor, tenderness of the crust, amount of filling and attractiveness of each pie.

D. Complete Chart D, comparing the cost, time, quality and wholesomeness of each pie.

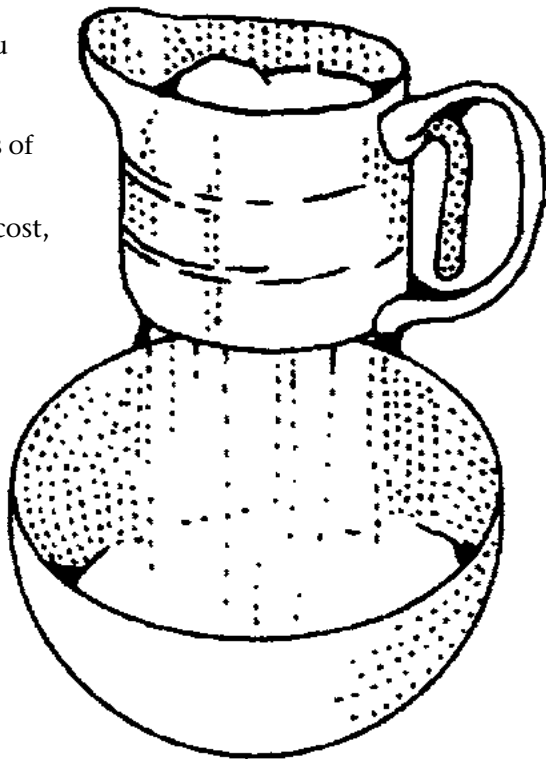


Chart D — Comparison of Homemade and Purchased Pies

A. Homemade Pie: _____
Name and size of pie

Cost of pie _____

Preparation time _____ minutes

Quality _____ (1-5)

Rank from 1 (the lowest) to 5 (the highest) the overall quality of the pie considering:

- Flavor
- Tenderness of crust
- Attractiveness

Wholesomeness/food safety _____ (1-5)

Rate 1 to 5 on the basis of the freshness of the ingredients, how the food was handled and stored, cleanliness of kitchen, and whether preservatives and artificial colors/flavors were used.

B. Purchased Pie: _____
Name and size of pie

Cost of pie _____

Preparation time _____ minutes

Quality _____ (1-5)

Rank from 1 to 5 the overall quality of the pie considering:

- Flavor
- Tenderness of crust
- Attractiveness

Wholesomeness/food safety _____ (1-5)

Rate 1 to 5 on the basis of the freshness of the ingredients, how the food was handled and stored, cleanliness of kitchen, and whether preservatives and artificial colors/flavors were used.

Comparison of Pies

Which pie cost more? _____

Which pie required more time to complete? _____

Which pie was more attractive? _____

Which pie had the better flavor? _____

Which pie had the more tender crust? _____

Which pie seemed to be more wholesome and safe? _____

Your Opinion

Do you think baking from scratch is worthwhile? Why or why not?

Why do you think many people purchase frozen or ready-baked pies?

Baking Record Form

Name _____ Age_____ Number of years in 4-H_____

Years in baking projects_____

Project meetings held_____ Number attended_____

Products prepared	Date	Comments (Excellent, Good, Fair)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

(Add pages if needed.)

What new skills did you learn? Which skills were improved?

_____

_____

_____

_____

Activities

Tours taken related to this project:_____

_____

Judging experience(s): _____

_____

Demonstration: _____

_____

Citizenship:_____

_____

Leadership: _____

_____

Exhibits

Product	Where exhibited	Placing

Leader, helper, or parents' comments: _____

_____

_____

_____

Member signature

_____

Parent signature

_____

Project leader signature

(Add pages as needed.)

www.ext.nodak.edu/4h

This publication is adapted with permission from New Mexico State University's Cooperative Extension Service.

County commissions, North Dakota State University and U.S. Department of Agriculture cooperating. North Dakota State University does not discriminate on the basis of age, color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, sex, sexual orientation, status as a U.S. veteran, race or religion. Direct inquiries to the Vice President for Equity, Diversity and Global Outreach, 205 Old Main, (701) 231-7708. This publication will be made available in alternative formats for people with disabilities upon request, (701) 231-7881.

500-01-06