

Design a Flavor

Activity 2

Kids take ice-cream making to the next level; they add flavorings to make genuine strawberry ice cream. In doing so, they practice important science and engineering skills. For example, they make their flavored ice cream following a problem-solving approach engineers use. Then they test their product the way a scientist would. They collect data using a blind taste test and interpret the results to see which recipe the group likes the best. Best of all, they get to eat the results!

Prepare Ahead

- Put a small amount of one of the flavorings into a 3-ounce cup. Repeat with all six flavorings.
- Set up a *mixing* station with a large cup pre-filled with $\frac{1}{2}$ cup half-and-half (referred to as “cream” in the activity) for each team, quart-size bags, the six flavorings, sugar, spoons, and measuring spoons.
- Set up a *freezing* station with the gallon-size bags, ice, salt, and measuring cups for salt and ice.
- Copy the *Strawberry Ice Cream Ratings* data chart (below) onto chart paper. Leave lots of room in the center column for stickers.

Strawberry Ice Cream Ratings

Ice Cream	Your Votes	Total Points
Brand A		
Brand B		
Brand C		
Brand D		
Brand E		

Lead the Activity

- 1 Introduce Ruff's challenge.** (5 minutes)
Tell kids that today they will make their own brand of strawberry ice cream. Each team will select flavorings to add to the ice cream they learned to make in the last session. Their goal is to have their ice cream look, taste, and smell like strawberries. Explain that, at the end of the activity, everyone will taste all the different versions and vote on which team's flavoring mix was their favorite.
- 2 Make predictions.** (10 minutes)
Hand out six plastic coffee stirrer “tasting sticks” to each kid. Remind kids to use each one only once. Then, one at a time, pass around the cups containing the flavorings. Have kids taste each one by dipping a *clean* tasting stick into the flavoring and tasting it. Ask kids to describe the color, smell, and taste of each flavoring.
 - Which flavorings might work well together? Will this combination need sugar? How much?
 - Predict which flavoring or combination of two flavorings (but no more than two) will produce the best-tasting ice cream.

Materials

- Activity sheet for each kid
- Half-and-half ($\frac{1}{2}$ cup per pair)
- 6 strawberry flavorings (strawberry syrup, fresh strawberries (chopped), frozen strawberries, strawberry extract, strawberry gelatin, and strawberry jam)
- 1 pound sugar
- 1 box quart-size zip-lock bags
- 1 box gallon-size zip-lock bags
- 1 pound salt (table, kosher, or rock)
- Ice (an 8-pound bag is enough for six pairs)
- 50 8-ounce cups
- 50 3-ounce cups (for tasting)
- Measuring cups (1 cup, $\frac{1}{2}$ cup, $\frac{1}{4}$ cup)
- 3 teaspoons and 3 tablespoons
- Plastic coffee stirrers, cut in half
- Cooler (for ice and bags)
- Paper towels
- Scissors
- Spoons (for tasting)
- Chart paper and marker
- Permanent markers (to label bags)
- 1 pack of $\frac{3}{4}$ -inch round stickers (from office supply store)

National Science Education Standards

Grades K-4

Science and Technology:
Abilities of technological design

Grades K-4, 5-8

Science as Inquiry: Abilities
necessary to do scientific inquiry

3 Test Predictions by making ice cream.

(20 minutes) Divide the group into pairs. Hand out the activity sheets and have kids follow the directions. Remind kids to add flavorings just a little at a time, record how much they add, and taste as they go, using their tasting cups (see Activity Tips). When kids finish mixing, send them to the freezing station to get a large bag, ice, and salt. After about 10 minutes of shaking, the ice cream will be ready. During the ice-cream making, visit each pair and ask:

- How did you decide on the amount to use to get the best flavor, color, and smell?
- Did you record what you added and how much?

4 **Evaluate flavors.** (10 minutes) Have pairs initial their small bag with permanent markers. Collect the bags. Explain that the group will now conduct a blind taste test, a test where tasters don't know who made the ice cream. Without letting the kids see, label each team's bag with a "brand" letter (i.e., A, B, C, . . .). Place the bags in the cooler. Then repeat the following sequence with each bag:

- Select a bag at random. Cut off its corner and squeeze some of the ice cream into each kid's tasting cup or bowl.
- Tell kids: *After you taste, smell, and look at Brand ____, record your ratings on your activity sheet.*

5 **Discuss what happened.** (10 minutes) Ask kids to give each ice cream a final score. To do this, have them add the looks, taste, and smell points on their activity sheet's data table. Post the *Strawberry Ice Cream Ratings* chart. Give each kid a round sticker. Have them initial it and place it in the box of their

top-rated choice. Everyone should put a sticker on the chart. Once all the stickers are up, ask:

- What does the pattern of the stickers tell us about the flavors we made? (*The more stickers a flavor has, the more popular it is.*)
- Do we all have the same taste preferences? (*If several flavors have stickers next to them, it means that people have different favorites.*)

Reveal which teams made each brand. Ask them to share their recipes. Then review the data and identify which flavorings worked best.

6 **Award points.** (5 minutes) Time to rack up some points. Gather as a group. Review the activity's key ideas by asking the following questions. Each one is worth 50 points. Whenever you hear an acceptable answer, award 50 points to the entire group.

- Why is it important to keep accurate records of the flavorings you use? (*Knowing the amount used helps people make the recipe again.*)
- Name five kinds of flavorings you could use to create chocolate ice cream. (*Answers include cocoa powder and chocolate-flavored syrup, chips, frosting, and pudding.*)
- Why did we call our test a "blind taste test"? (*We didn't know who made the ice cream or which flavorings they used.*)
- What did the chart reveal about our ice cream? (*How popular each flavor was*)
- Doing science involves making predictions, testing them (which includes doing something, making observations, and drawing conclusions), and sharing your results. Give an example of how we did these steps today. (*Answers will vary.*)

Activity Tips

- Ask if anyone is allergic to strawberries or any other ingredients used today. If so, don't expose them to the ingredients. Seek alternatives, such as other flavorings or soy milk.
- Kids should take small tastes of their mixtures as they add flavorings. To avoid spreading germs, have them spoon a small amount into the small tasting cups.
- Tell kids to add small amounts of flavor and taste the mix as they go. It's easier to add flavor than to remove it. If kids accidentally over-flavor, allow them to add additional cream. Remind kids to measure and record everything they add.
- Kids might avoid using strawberry extract because it tastes bitter. Remind them that they used vanilla extract in Ice Cream Shake. It also tasted bitter but was delicious after mixing it with cream and sugar.
- Tell kids to keep accurate records. If they invent a great recipe, they'll want to be able to make it again. That's what professional ice-cream makers do!
- Make sure kids are familiar with using measuring spoons so that they can keep accurate records.



Design a Flavor



Today, you'll design a recipe for strawberry ice cream, you lucky dawg! The challenge is to blend the flavorings so the ice cream looks, tastes, and smells like real strawberries.

What to DO

- 1 Meet the flavorings.** Taste each of the following flavors:
- fresh strawberries • strawberry jam
 - frozen strawberries • strawberry gelatin
 - strawberry syrup • strawberry extract

- 2 Design Your recipe.** Choose one or two flavorings for your ice cream. List them in the table below.

Flavoring	Reason for using (Looks? Taste? Smell?)	Amount used
Sugar (optional)		

- 3 get what you need.**
- ½ cup cream • Sugar
 - Quart-size zip-lock bag
 - Gallon-size zip-lock bag
 - 2 cups ice • ¼ cup salt • Spoons
 - Chosen flavoring(s) • Paper towels

- 4 Mix the ingredients.** Put the cream, sugar, and flavorings into the small bag. Add flavoring(s) and sugar, measuring carefully, until you have a flavor you like. In the data table, record how much you used. Taste by putting a spoonful in a small cup so you don't spread germs. Squeeze the air out of the bag and zip it closed, making sure it is tightly sealed.

- 5 Add ice.** Put the small bag into the big bag. Add the ice and salt to the big bag. Then seal the big bag tightly.
- 6 Shake the mixture.** Gently shake the bags for about 10 minutes. When the cream feels solid, remove the small bag. Dry it with paper towels so salt doesn't get in your ice cream. Have a taste!

- 7 DO a taste test.** Rate the ice creams. Circle the number in the chart describing your opinion. Use the following scale:
 1 = Strongly disagree 2 = Disagree
 3 = Agree 4 = Strongly agree

chew on This!

To invent your recipe, you had to think like an engineer! You brainstormed an ideal flavor, chose the best flavorings, and made and tested your ice cream. And you had to measure carefully and take excellent notes so you—or someone else—could recreate your recipe exactly.

You also tested your ice cream using a blind taste test—a test where the taster doesn't know who made the ice cream. This kind of testing is very fair because people judge *only* the ice cream. Manufacturers do a lot of testing before putting their products in stores. They want to create products that they know people will like and buy.

	Tastes like strawberries	Smells like strawberries	Looks like strawberries	Total Score (add the 3 columns)
Brand A	1 2 3 4	1 2 3 4	1 2 3 4	
Brand B	1 2 3 4	1 2 3 4	1 2 3 4	
Brand C	1 2 3 4	1 2 3 4	1 2 3 4	
Brand D	1 2 3 4	1 2 3 4	1 2 3 4	
Brand E	1 2 3 4	1 2 3 4	1 2 3 4	

Dig Deeper

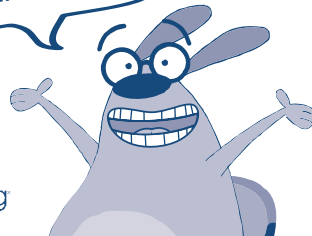
If you liked designing an ice-cream flavor, here are some similar challenges to try.

- * Designing recipes could be your career! Challenge yourself to create other flavors of ice cream, like chocolate, pineapple, maple, or something completely new. Do a taste test with your friends and family. Be sure to give your flavor a catchy name.
- * Use your creative talents to make something new. Try inventing a new game, writing a song or poem, drawing in a new way, or making a new kind of smoothie, pizza, or sandwich.
- * Try an experiment on your tongue and learn more about how you taste things. Get the Tongue Mapping challenge from the ZOOM Web site at pbskids.org/zoom/activities.



Watch FETCH! on PBS KIDS GO! (check local listings) and visit the FETCH! Web site at pbskidsgo.org/fetch.

How about strawberry and bacon next time? Mmmmm! Delicious!



FETCH! is produced by WGBH Boston. Major funding for FETCH! is provided by the National Science Foundation and public television viewers. Additional funding is provided by The Arthur Vining Davis Foundations. Corporate funding is provided by Arby's and Greendog®. This FETCH! material is based upon work supported by the National Science Foundation under Grant No. 0452485. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. © 2006 WGBH Educational Foundation. All rights reserved. FETCH!, the characters, and related indicia are trademarks of the WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission.

Fold

Fetch!

Design a Flavor

What's the most exciting new flavor in ice cream land? Definitely, my liver and pineapple-biscuit ice cream. It's a sure winner! What? I haven't sold any yet? Oh, boy. I need to make some sales! I need you to help me design a flavor everyone will like.

GOOO
FETCH!

