ICE CREAM PIE

An ice cream stall sells vanilla, strawberry and chocolate ice creams.

The pie chart illustrates the sales of ice cream for last Saturday.

The number of vanilla and the number of chocolate ice creams sold were the same.

The stall sold 60 strawberry ice creams.

How many chocolate ice creams were sol

HELP

What you have to find out?

Would it help to find the total number of ice creams sold?

What does the square sign in the diagram tell you about the angle in the sector showing the sales of strawberry ice creams?

NEXT

With a partner, each write a short story about ice cream with some hidden numbers and draw a pie chart for your story. Then swop your story with your partner and see if you can each find the numbers hidden by the other person.

NOTES FOR TEACHERS

SOLUTION

The square sign shows that the angle in the pie chart representing strawberry is 90° and we know this 90° is one quarter of 360°.

So ¼ or 25% of the pie chart represents 60 ice creams

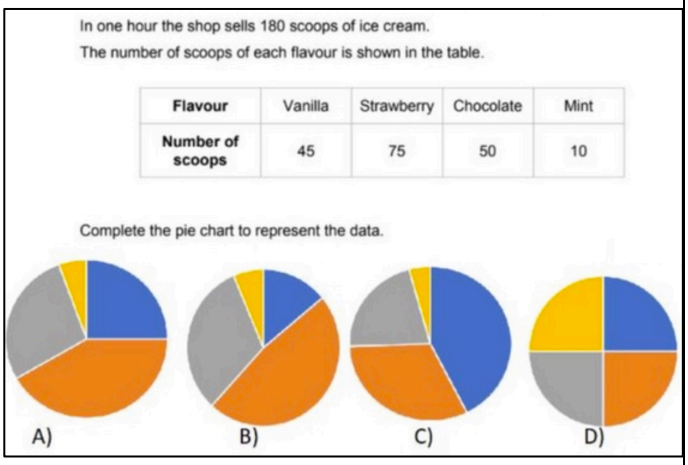
Solution by fractions: Three quarters of the ice creams were not strawberry, that is 3/8 vanilla and 3/8 chocolate then 3/8 represents 3 times 60/2 that is 90 ice creams. The solution is 90 chocolate ice creams were sold.

Solution by percentages A: 25% represents strawberry ice cream and 75% represents other flavours so the total number of vanilla and chocolate ice creams sold was $3 \times 60 = 180$. Half of these were chocolate so half of 180, that is 90 of the ice creams sold were chocolate.

Solution by percentages B. As 25% represented 60 ice creams, $4 \times 60 = 240$ ice creams were sold altogether. Chocolate ice creams were half of 75%, that is 37.5%, that is 60 + 30 = 180 ice creams. (or 0.375 x 240 = 180)

Diagnostic Assessment

This should take about 5–10 minutes. Write the question on the board, say to the class:
"Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 for D".



1. Notice how the learners responded. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
2. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
3. **Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.** It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.
4. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task.

The correct answer is A Total sold 180

Notice blue represents 45 that is 25% of 180, so the chart is A or D.

The given amounts are different so the answer cannot be D.
Vanilla – blue – 45
Strawberry – brown – 75
Chocolate – grey – 50
Mint – yellow – 10

Why do this activity?

Here learners have to interpret a pie chart and think about what it means. This can be much quicker to do than making an accurate drawing, but it requires as much understanding. It can be tackled using an argument based on fractions or one based on percentages, or a mixture, and it can be used to deepen learners' understanding that the two are equivalent.

Learning objectives

In doing this activity students will have an opportunity to:

- use what they know about pie charts, angles, fractions and percentages and deepen their understanding of these concepts and the connections between them;
- work with others to solve a problem.

Generic competences

In doing this activity students will have an opportunity to:

- **think mathematically,** reason logically and give explanations;
- **visualize** and develop the skill of interpreting visual images;
- interpret information to **solve a problem**;
- **work in a team**:
    - collaborate and work with a partner or group
    - exchange ideas, criticise, and present information and ideas to others
    - analyze, reason and record ideas effectively.

Suggestions for teaching

If possible put the diagnostic quiz question on the board before the lesson. Start with the diagnostic quiz as a warm-up to introduce the idea of ice cream sales and pie charts. This is a good question for learners to discuss so you might use the '**one, two, four, more strategy'** (not usual for diagnostic quizzes and formative assessment).

First get learners to read the diagnostic quiz question and do it **on their own**. Then after a short time ask them to **work in pairs**. When quite a few pairs have an answer ask the learners to work in fours. Finally ask the learners to vote in the usual way for their chosen answer (1, 2, 3 or 4 fingers up). Then, in the usual way, ask one representative from a group who gave answer A to explain their reasons, then another group for B, another for C, another for D and then vote again.

Explain to the class that you use the 'one, two, four, more strategy' because (1) they have to read the question for themselves in tests so they need lots of practice and (2) also explain that, in life, it is necessary to be able to work with other people to solve problems. Using this strategy, pairs can turn round, even in a crowded classroom, and discuss the problem with the pair behind them. They can find out whether they have used the same method and have the same answer and learn from each other. Learners who struggle get help quickly and can make good progress and everyone develops communication skills.

Then give the Ice Cream Pie question and use the 'one, two, four, more strategy'. The Ice Cream Pie question is a good one to give practice in reading and comprehension. Point

out that there are different ways to solve this problem and ask learners how many different methods they can find.

Good practice suggests that learners should be encouraged to think for themselves so be open to them finding different methods. You might expect the learners to use fractions, particularly if this exercise follows other work on fractions, or alternatively you might expect learners to use percentages.

Then have a **class discussion** and perhaps get different learners to come to the board and explain their different methods to the whole class.

Key questions

- What does the little mark in the angle in the strawberry ice cream sector mean?
- What fraction (or what percentage) of the whole is that?
- How many ice creams are represented by 90^{o}?
- How many ice creams were sold in total? How many of these were vanilla or chocolate?

Follow up

Water Crisis 2 https://aiminghigh.aimssec.ac.za/years-6-8-water-crisis-2/

Pizza https://aiminghigh.aimssec.ac.za/years-8-9-pizza/

Match the Matches https://aiminghigh.aimssec.ac.za/years-7-12-match-the-matches/

Note: The Grades or School Years specified on the AIMING HIGH Website correspond to Grades 4 to 12 in South Africa and the USA, to Years 4 to 12 in the UK and school years up to Secondary 5 in East Africa.
New material will be added for Secondary 6.
For resources for teaching A level mathematics (Years 12 and 13) see https://nrich.maths.org/12339
Mathematics taught in Year 13 (UK) & Secondary 6 (East Africa) is beyond the SA CAPS curriculum for Grade 12

	Lower Primary Approx. Age 5 to 8	Upper Primary Age 8 to 11	Lower Secondary Age 11 to 15	Upper Secondary Age 15+
South Africa	Grades R and 1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
East Africa	Nursery and Primary 1 to 3	Primary 4 to 6	Secondary 1 to 3	Secondary 4 to 6
USA	Kindergarten and G1 to 3	Grades 4 to 6	Grades 7 to 9	Grades 10 to 12
UK	Reception and Years 1 to 3	Years 4 to 6	Years 7 to 9	Years 10 to 13