Pat loves ice cream. He went to the store to buy an ice cream cone. They had strawberry, vanilla, and chocolate ice cream. He could have a sugar cone or a plain cone. How many different ways could Pat have ordered his ice cream cone?
Grade Level K–2

Ice Cream

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Context

This task was given to students while studying combinations. It was spring, and ice cream season was just around the corner, making this task a yummy motivation.

What This Task Accomplishes

Students will employ a variety of problem–solving strategies. Some students may apply previous knowledge about tasks dealing with combinations, while others might try drawing diagrams or creating systematic lists.

Time Required for Task

One 45 minute class period.

Interdisciplinary Links

This task links to the study of ice cream. Students could learn how it is made, what it is made of, and even make some themselves! Students could learn about ice cream making production, visiting manufacturers’ web sites or even their factories.

Books that may complement this task include Aldo Ice Cream, by Johanna Hurwitz, Curious George Goes To The Ice Cream Shop, by Margaret Rey, and Ben and Jerry’s Ice Cream Is For Everyone, by Keith Elliot Greenberg.

Teaching Tips

Students should have some experience with combination tasks and learning different strategies such as drawing diagrams, making charts, or using multiplication. Students may verify their solutions by employing 2 different strategies and comparing the results.
Suggested Materials

Most students will simply require paper and crayons. Others may want to use manipulatives to represent ice cream cones and ice cream.

Possible Solutions

There are 6 possibilities if students create single scoop cones:

- Plain Cone – Strawberry
- Plain Cone – Vanilla
- Plain Cone – Chocolate.
- Sugar Cone – Strawberr
- Sugar Cone – Vanilla
- Sugar Cone – Chocolate.

Students may make the task more complicated by creating double or triple scoop cones.

Benchmark Descriptors

Novice

The novice will show little or no understanding of the underlying mathematics in the task. No math language will be used, and diagrams will not lead to a solution.

Apprentice

The apprentice will have a partially correct solution. Some combinations may be missing. Some math language may be used, and diagrams will assist in understanding the student’s solution.

Practitioner

The practitioner will have a correct solution. All parts will be labeled and accurate. Math language will be used, and representations will communicate the solution.

Expert

The expert will have a correct solution and may solve the problem in more than one way to show its correctness. The expert may also make mathematically relevant observations about the solution.

Author

This task was written by Deb Armitage, K–8 Mathematics Assessment Consultant at the Vermont Department of Education. The task was piloted by teachers and students in Vermont.
Novice

S-strawberry
V-vanilla
C-chocolate

The diagrams do not assist in finding an answer.
The student shows no attempt to use sugar or plain cones.
No math language is used.
It is unclear why the student crosses out correct combinations and then writes them.

The student lists only 5 combinations.

The student uses a key to communicate the solution.
The student achieves a correct answer.
All combinations are present.
Work is organized and easy to follow.

Practitioner

\[ S = \text{Sugar} \]
\[ P = \text{Plain} \]

- chocolate \( P \)
- vanilla \( P \)
- strawberry \( P \)
- chocolate \( S \)
- vanilla \( S \)
- strawberry \( S \)

Ice Cream (cont.)
Expert

He has 2 cones x 3 ice creams = 6 choices.

T = plain cone

Six choices.

Δ = sugar cone

O = strawberry

● = chocolate

V = vanilla

The student creates an accurate diagram.

The student makes a relevant observation.

A correct answer is achieved.

Color coding is used and explained in a key.
Expert (cont.)

key

p = Plain
st = Strawberry
s = Sugar
c = Chocolate
vo = Vanilla
po = Peaches

The student creates an organized list of combinations.

2 cones x 4 ice cream

The student extends the solution by finding a solution with an additional flavor of ice cream.