

Fish Dilemma

There are 3 boats. There are 4 people fishing on each boat. Each person may catch up to 3 fish. How many fish could be caught?

Be sure to explain your reasoning using words, numbers, diagrams and/or charts.

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Suggested Grade Span

3-5

Task

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Alternate Versions of Task

More Accessible Version:

There are 3 boats. There are 4 people fishing on each boat. Each person catches 3 fish. How many fish have been caught?

More Challenging Version:

There are 3 boats. There are 4 people fishing on each boat. Each person may catch up to 3 fish. There are 10 different types of fish in the lake.

What are all of the different numbers of fish that could have been caught?

Context

This problem was given to a first-grade class. I looked over the results and was intrigued. What would a fourth-grade class do with this problem? Would I be able to see any differences in their reasoning?

What This Task Accomplishes

This task looks at a problem with many solutions.

What the Student Will Do

Most students started by drawing a diagram. Many then went to a chart. Many found the extremes - the most and the least number of fish that could be caught.

Exemplars

Time Required for Task

45 minutes

Interdisciplinary Links

This task can be used with units on science, social studies and art.

Teaching Tips

The problem is slightly different from the Pre-K-2 version. This problem asks students to consider how many fish could be caught, not how many were caught. Students need to be made sensitive to thinking about problems this way.

Suggested Materials

Graph paper

Possible Solutions

You can get any number of fish caught from 0 to 36. This is assuming you do not consider 12 solutions for one person catching a fish - Person "A" on first boat and no one else, Person "B" on first boat and no one else, etc.

More Accessible Version Solution:

$$4 \times 4 \times 3 = 36 \text{ fish}$$

More Challenging Version Solution:

$$3 \times 4 \times 3 = 36 \text{ different fish caught.}$$

Now, if there are 10 different types of fish, so $36 \times 10 \times 9 \times 8 = 25,920$ different possible combinations

Task Specific Assessment Notes

Novice

The solution does not have a relationship to the task (did 21 mean 12?). There is not an explanation of the solution so no reasoning is given.

Apprentice

This solution, although beautifully drawn, is not complete. The student did not understand that more than one solution could be found.

Exemplars

Practitioner

This student understands that there is more than one solution, "I think I could do this a lot more times, but I'm getting tired of it." S/he indicates the least and most number of fish to be caught. If s/he had made an organized list, s/he could have found all the combinations. They also realize that the same number of fish does not have to be caught on each boat.

Expert

This student went immediately to the number sentences that would tell him/her that there are 36 possible solutions. The solution shows a deep understanding of the problem and the communication is very clear.