

## 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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# Exemplars

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## Fish Dilemma

### 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.

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## 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.

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## **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.