# Octopus

How many tentacles are on 4 octopuses? How did you do it?


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**Grade Levels Pre-K-2**

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## Context

This task was given as part of a unit on Australia that included the study of ocean life in and around Australia. The children spent time studying the octopus.

If an octopus is not appropriate for your class, you could change the task to another being such as cows' horns, four-legged animals, spiders or centipedes.

## What This Task Accomplishes

This task integrated mathematics with science and geography. It allowed children to take a subject that they had been studying and apply it mathematically. They were able to generalize from one to four octopuses.

## What the Student Will Do

Students drew octopuses as their first step. Some students then counted the arms and added, while others were able to use a formula.

## Time Required for Task

45 minutes

## Interdisciplinary Links

This task can be used with a unit on science or geography.

## Teaching Tips

The children had had an opportunity to learn about the octopus before they began and, therefore, knew an octopus had eight tentacles. You can substitute the word arms for tentacles. They could use manipulatives or draw on paper. If you have been studying insects or other types of animals you could substitute for them.

## Suggested Materials

- Manipulatives


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- Pencil
- Paper

## Possible Solutions

There are 32 tentacles in all.

## Benchmark Descriptors

**Novice**
This benchmark is interesting. The child knows that an octopus has eight tentacles and is able to count four sets of eight. However, s/he does not finish the problem by adding the four sets together. This indicates the absence of a strategy that leads to a solution. Beyond counting the tentacles, there is no attempt to summarize across the four octopuses.

An argument could be made that this benchmark lies between Novice and Apprentice because the child does know that an octopus has eight tentacles and s/he does count them correctly. This is the beginning of a strategy. A pure Novice might draw octopuses or their tentacles randomly, not know an octopus had eight arms, or not count correctly.

**Apprentice**
The student has drawn four octopuses with eight arms and even has a formula adding to 32. However, while the formula and addition are correct, the counting is wrong. The arms are not counted correctly. The student does not show consistent mathematical reasoning and could not complete the mathematical procedures.

**Practitioner**
This work might be placed between Apprentice and Practitioner. The student has a strategy for reaching a correct solution, having drawn 32 tentacles. However, on his/her third octopus s/he does not label one tentacle and therefore counts 31 tentacles. The strategy is appropriate and will lead to a solution. The mathematical reasoning is fine, but there is one small error that prevents the correct solution.

**Expert**
The student counts all tentacles and then adds a formula indicating two approaches to arrive at a correct solution. The student has a clear explanation of his/her strategy. The mathematical representation is appropriate.


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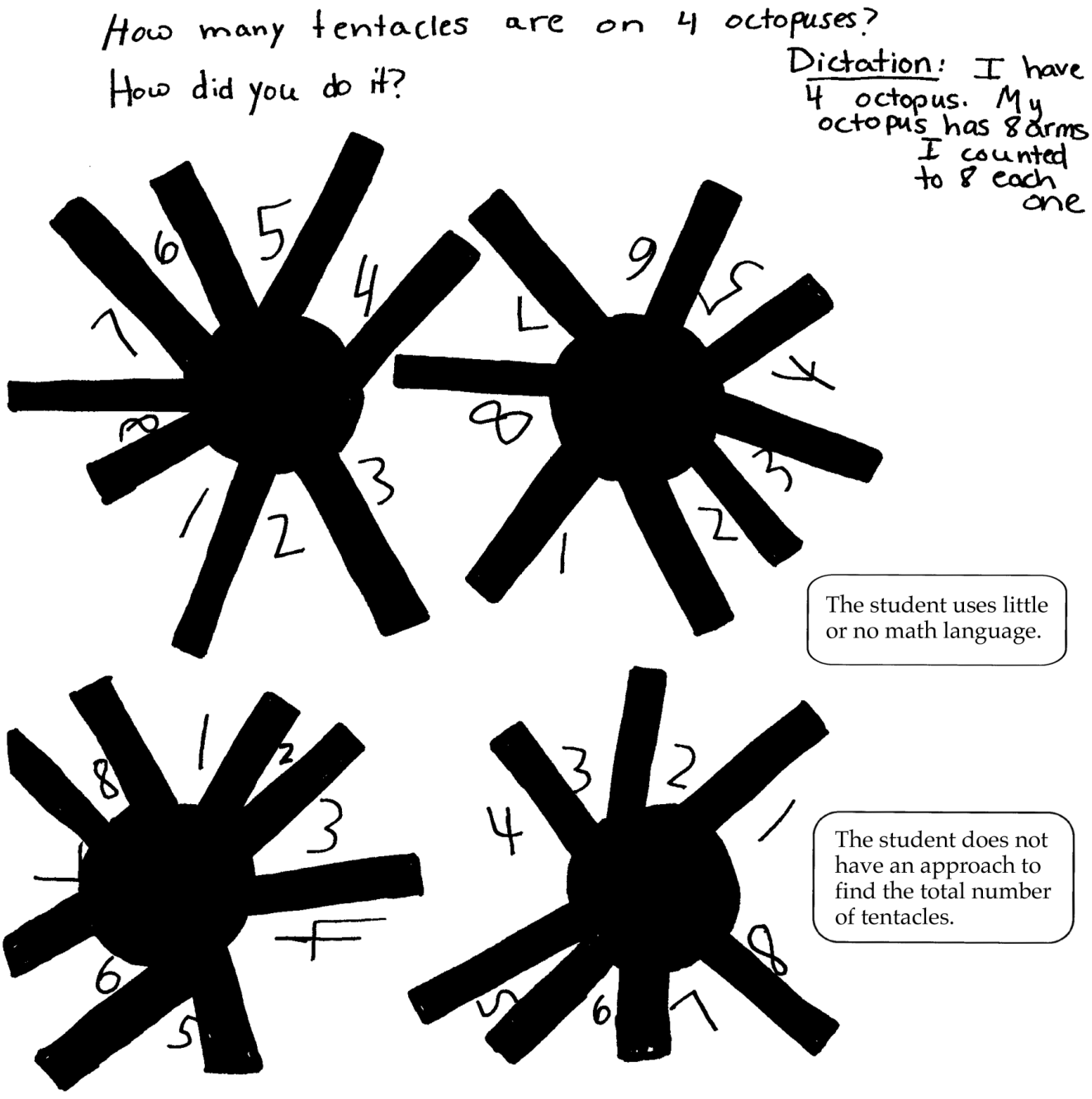
## Novice

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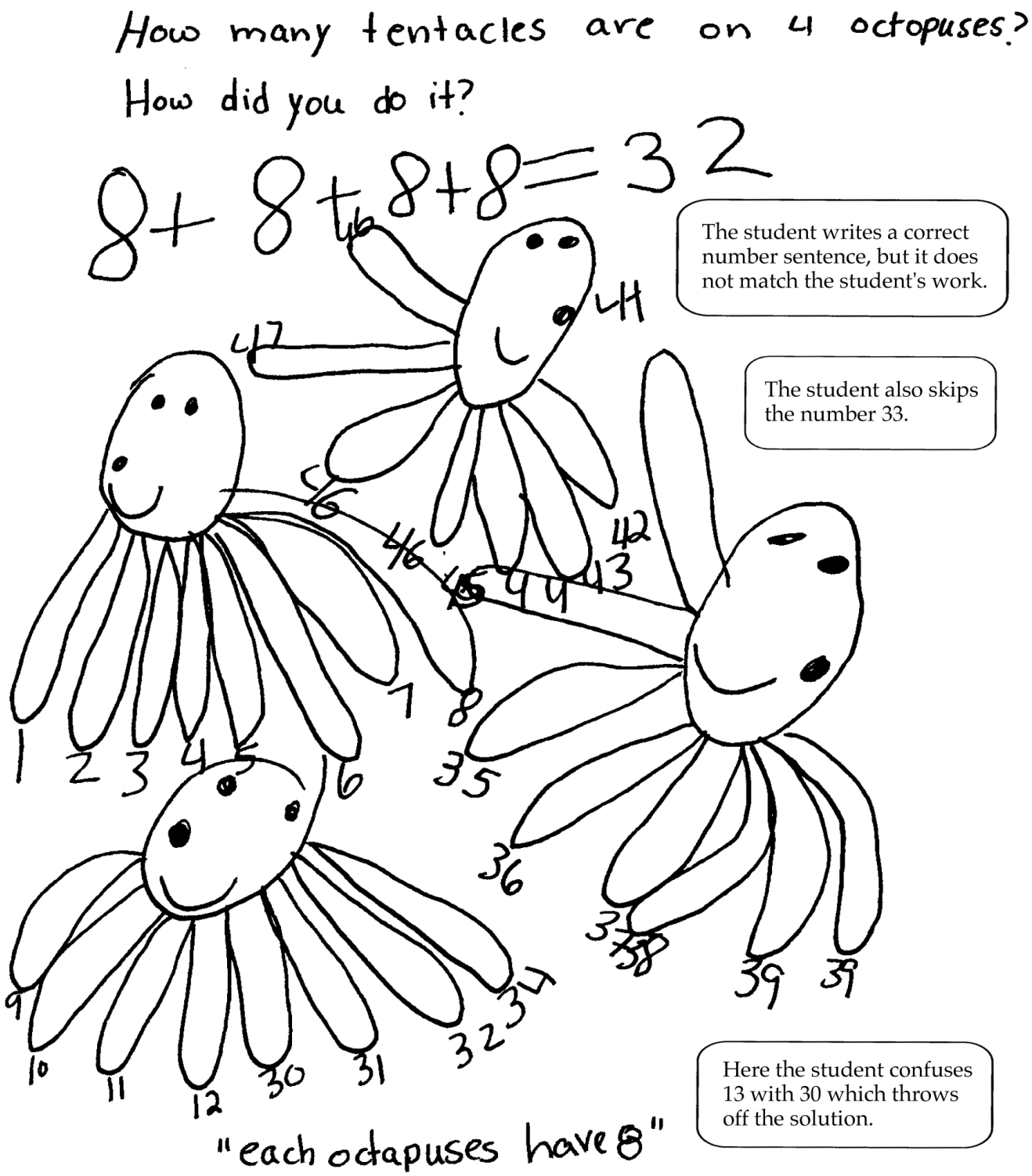
## Apprentice




The student writes a correct number sentence, but it does not match the student's work.

The student also skips the number 33.

Here the student confuses 13 with 30 which throws off the solution.

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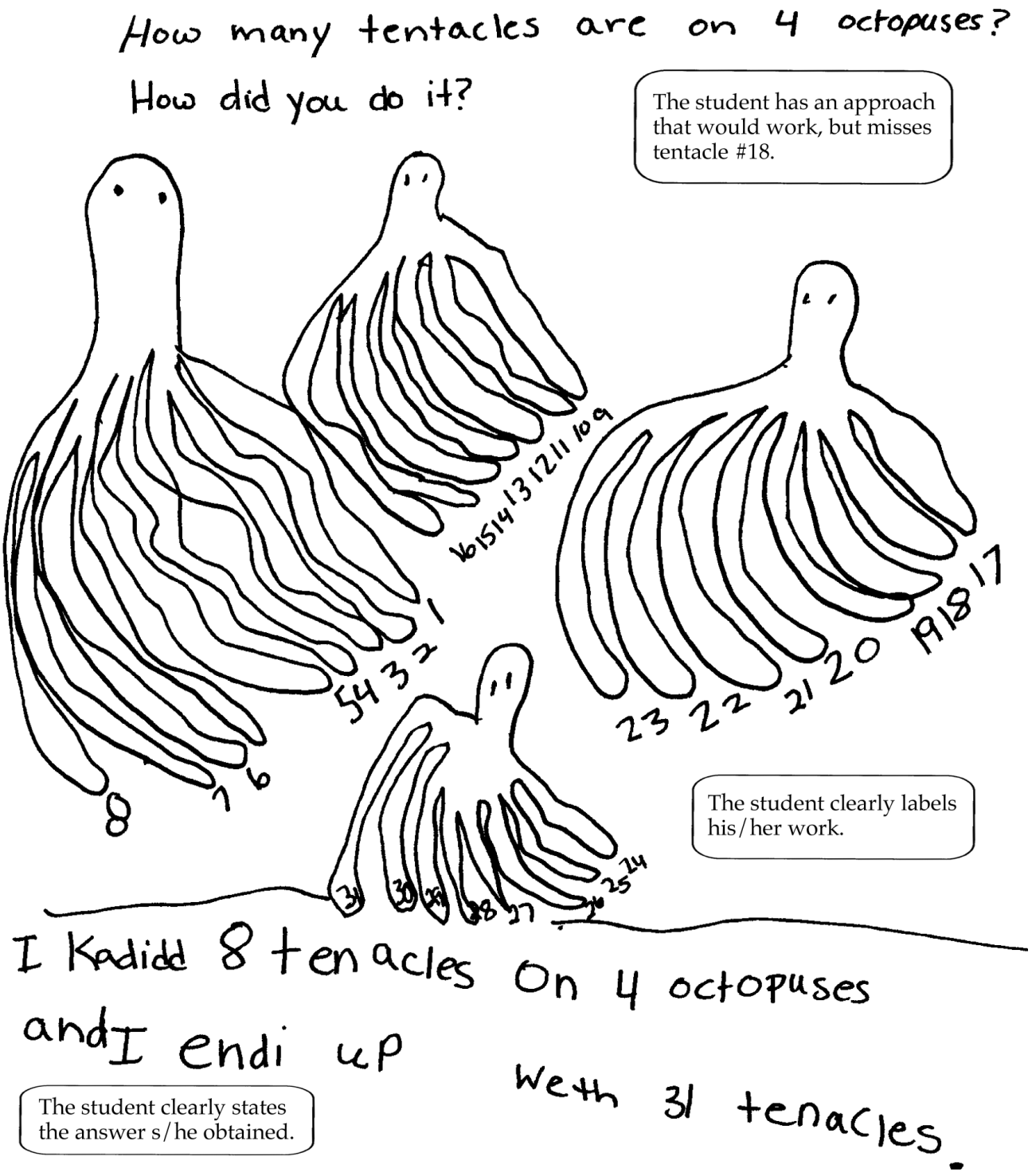
## Practitioner

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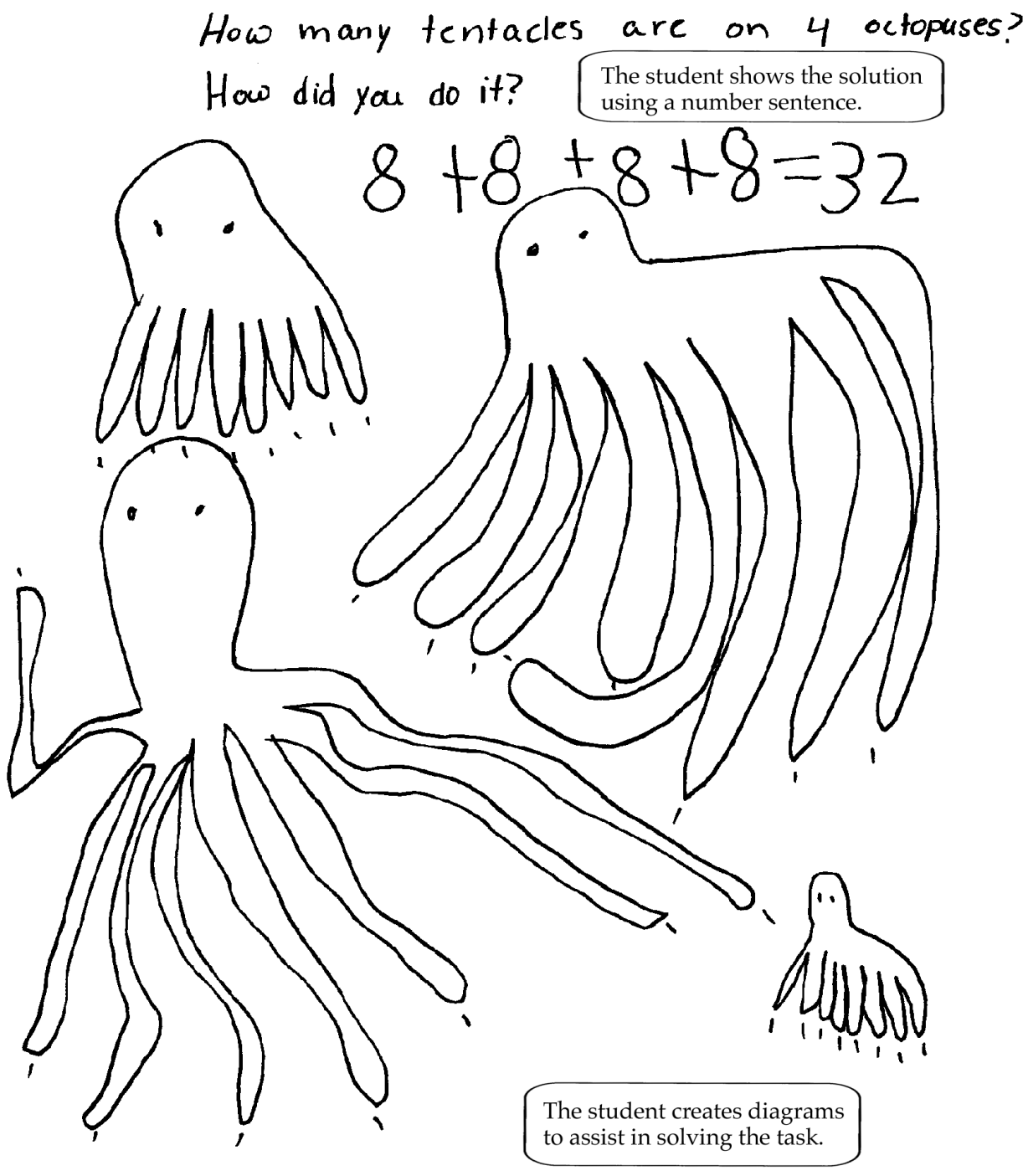
## Expert

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