What are Open Tasks?

Open tasks help elicit academic language and engagement in problem solving with early elementary students. Open tasks provide multiple entry points into a problem and opportunities for students at different ability levels and modalities to think mathematically at their current level. They also provide opportunities to grow. By engaging your full class in conversations about open tasks that have been solved in different ways, you can expand many students' understanding of various approaches and strategies. Open tasks have a high level of cognitive demand because students can't just apply an algorithm or memorize a fact to provide a solution.

Background

"A question is open when it can be solved in a variety of ways or when it can have different answers."
(Van de Walle, et al., 2014)

Example:
Three numbers add up to 100. One number is 27. What are two other numbers that when added to 27 have a sum equal to 100?

There are **multiple solutions** to this question **AND** there are **multiple strategies to solve** the problem.

Sample Solutions	Notes
27+3+70 = 100	In this case the student could easily add 3 to 27 and end up with a number 30 that can easily be added to 70 to get to 100. If the student starts with 27 all they need to do is to count on…27…28, 29, 30 then know 3 + 7 = 10 so 30 + 70 = 100.
27+43+30 = 100	In this case the student could use a similar approach by seeing the 3 added to 27 would result in 30 plus 40 is 70 then they only need to add 30 more to 70 to get to 100.
100-30 = 70 so 100 – 27 = 73 so 27 + 70 + 3 = 100	In this case, the student could subtract and then build back up. They could break apart the 73 in a lot of different ways. The easiest is to add the 27+70+ 3 but they could also have a number of other examples once they know the difference is 73… 27+69+4 = 100, 27+68+5=100, 27+67+6=100 and so on…
27+23+50=100	In this case the student could build from prior knowledge of 50+50=100 and 25+25=50 so make 50 from 27…27+23=50 then 50 more 27+23+50=100 In this case the student uses a near double to help break the problem up into smaller numbers.
27+73 = 100 27+(33+40)=100	Again, perhaps finding a difference of 73 and rebuilding in any number of ways. 27+(34+29) or 27+(35+28) and so on. Sometimes students show this as splitting or on an open number line.

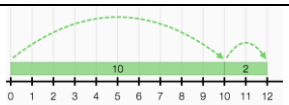
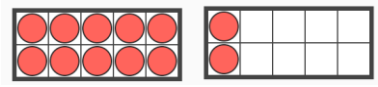
Strategies to "Open Up" a Task

1. Give the answer, ask for the problem
2. Replace a number in a task with a blank or ?
3. Offer two situations or examples and ask for similarities or differences
4. Create a question where students have to make choices

(Small, 2009; Sullivan & Lilburn, 2012)

Example 1:

The answer is 12. What is the question?

Sample Solutions	Notes
How much is….6+6	In this case the student used a double fact
How much is….11+1	In this case the student can enter easily
How much is….144÷12	In this case the student could stretch beyond the operations they are currently focused on which allows for meeting a broader range of student skill level or experience
What is a dozen?	Students can practice mathematics vocabulary in context.
What is the solution to 12+2?	Students can provide a representation Or what number is shown on the number line? 
How many red dots are there?	Students can provide a representation 

You can add rigor by just saying, find as many "questions" as you can. The teacher can set a time like "in 3 minutes" or can observe and determine when students have hit a wall, keeping in mind that productive struggle

Example 2:

Ask them to complete:

_____ butterflies and _____ bees were in the garden. The total number of

butterflies and bees in the garden was _____.

Example 3:

How are 4 and 12 alike? How are 4 and 12 different? Find as many solutions as you can.

Example 4:

A number is 3 more than another number. What could the number be?