The Very Hungry Caterpillar

Sample task from achievethecore.org
Task by Illustrative Mathematics, annotation by Student Achievement Partners

GRADE LEVEL First

IN THE STANDARDS 1.OA.A.2, 1.OA.C.5, 1.OA.D.7, 1.NBT.B.2

WHAT WE LIKE ABOUT THIS TASK

Mathematically:

- Develops students' understanding of the relationship between counting on and addition (1.OA.C.5),
- Builds toward understanding of the place value system (1.NBT.B).
- Engages students in several Standards for Mathematical Practice (see Additional Thoughts).

In the classroom:

- Presents an application in an engaging setting.
- Encourages students to talk about each other's thinking, in order to improve their mathematical understanding.
- Allows for group or individual work.

This task was designed to include specific features that support access for all students and align to best practice for English Language Learner (ELL) instruction. Go here to learn more about the research behind these supports. This lesson aligns to ELL best practice in the following ways:

- Provides opportunities for students to practice and refine their use of mathematical language.
- Allows for whole class, small group, and paired discussion for the purpose of practicing with mathematical concepts and language.
- Includes a mathematical routine that reflects best practices to supporting ELLs in accessing mathematical concepts.
- Provides opportunities to support students in connecting mathematical language with mathematical representations.

MAKING THE SHIFTS[1]

	Focus	Belongs to the Major Work[2] of first grade
	Coherence	Builds on kindergarten work with addition
	Rigor[3]	Conceptual Understanding: secondary in this task Procedural Skill and Fluency: not targeted in this task Application: primary in this task

1 For more information read Shifts for Mathematics.
2 For more information, see Focus in Grade One.
3 Tasks will often target only one aspect of rigor.

For a direct link, go to: http://www.achievethecore.org/page/612/the-very-hungry-caterpillar-task

INSTRUCTIONAL ROUTINE

The steps in this routine are adapted from the Principles for the Design of Mathematics Curricula: Promoting Language and Content Development.

Engage students in the Compare and Connect Mathematical Language Routine. This will support students as they identify, compare, and contrast differing mathematical approaches and representations.

Begin this task by reading *The Very Hungry Caterpillar*, asking students to estimate how many things the caterpillar ate, and begin reading it again with students using the counters and ten-frames. Use the first few pages of the book to see that students are understanding the process of adding counters and writing an equation. After 1 apple, 2 pears, 3 plums, and 4 strawberries are eaten, look for any ten-frames with answers other than 10 and facilitate a discussion about what the sum should be at this point so that all the ten frames have 10.

Strategically select students who have used the following equations to share so that they can be publicly recorded by the teacher:
1+2+3+4=10
3+3+4=10
6+4=10
These equations attend to the mathematical goals of the task. Other equations should not be shared at this time as they will take attention away from the goal. As they share, ask students to restate responses while the teacher records. Ask students to look at each of these representations. Then ask: "What is the same in the equations?" and "What is different in the equations?" If possible demonstrate the ten-frame placement for each equation using different colors.
Think aloud if no one mentions the following:
"I noticed that Jose used the number 6, but the other students didn't use that number. What did they use instead of 6?"
"What number is the same in all of the equations? I wonder if everyone used a 10 in our equations?"
This question directly supports 1.OA.D.7.

Follow this same procedure after the oranges are eaten. Monitor and select students who use the following equations:
1+2+3+4+5=15
3+3+4+5=15
10+5=15
Make connections here to the filled ten frame and the five counters in the next frame. This example directly supports 1.NBT.B.2

In the story, the caterpillar eats a variety of items on Saturday. Before reading this section, ensure that all students' ten-frames show 15. If using two-color counters, use 15 of one color and then add on in the other color. Ten items were eaten on Saturday one at a time.
After students have added the 10 counters and written their equations, have them share their work with two other partners. Then ask a few students to share with the class the equations of their partners.

On the last day, the caterpillar eats one leaf. No need to share the equations, but you may need to discuss why that leaf counts as food.
Facilitate a discussion about the number 26. Ask students to make connections between the number 26 and their ten-frames attending to the place value (1.NBT.B.2). What does the 2 mean? What does the 6 mean?
Finally, compare the final answer of 26 to their original estimates. Which estimates were greater or less than 26? Which estimates were equal to 26?

LANGUAGE DEVELOPMENT

Ensure students have ample opportunities in instruction to read, write, speak, listen, and understand the mathematical concepts that are represented by the following terms and concepts:

- Tens
- Ones
- Equal
- Equation
- Estimate
- Ten-frames

Students should engage with these terms and concepts in the context of mathematical learning, not as a separate vocabulary study. Students should have access to multi-modal representations of these terms and concepts, including: pictures, diagrams, written explanations, gestures, and sharing of non-examples. These representations will encourage precise language, while prioritizing students' articulation of concepts. These terms and concepts should be reinforced in teacher instruction, classroom discussion, and student work

ELLs may need support with the following Tier 2 words during the classroom discussion:

- Represent
- Same
- Different

ADDITIONAL THOUGHTS

In this task, first graders have opportunities to engage with several Standards for Mathematical Practice. Students need to make sense of what is being asked and persevere through multiple steps in order to solve this problem (MP1). Students take something concrete (the story), represent it physically (with the counters or unifix cubes), and then represent it symbolically as an equation (MP2). These equations are mathematical models of the real-world situation described in the book (MP4).

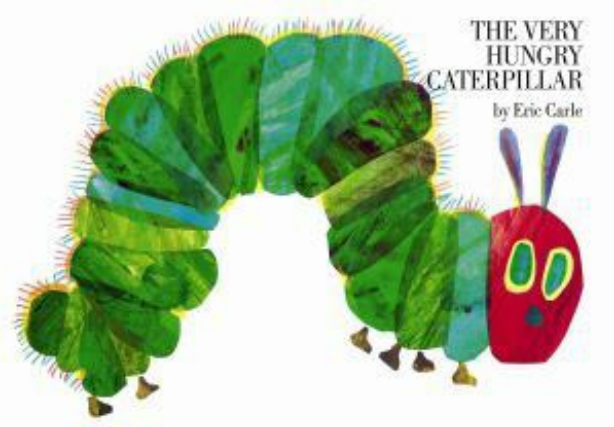
For the variety of addition and subtraction situations students should encounter in grades K–2, read Table 2 on page 9 of the progression document, *K Counting and Cardinality; K–5 Operations and Algebraic Thinking*, available at http://www.achievethecore.org/progressions.

1.OA, NBT The Very Hungry Caterpillar

Task

Materials

- *The Very Hungry Caterpillar* by Eric Carle



The students work individually or in pairs. Each student or pair needs:

- Three ten-frames for each student or pair of students (see PDF for black line master)
- 30 counters or unifix cubes per pair of students
- One small dry-erase board and dry-erase maker per pair of students

Actions

The teacher reads the book to the class and asks, “How many things do you think the caterpillar ate in this story?” The students take a minute to share their estimate with a partner. Next, the teacher reads *The Very Hungry Caterpillar* again. After each page, the teacher pauses so that the students can add counters or unifix cubes to the ten-frame to represent the number of things the caterpillar ate, and then write an equation on the dry-erase board connecting addition to the number of counters used. After each

ten-frame is filled in the students move to the next one. If the students are working in pairs, one student can add the counters/unifix cubes to the ten-frame while the other student writes the equation. By the end of the story, there should be a total of 25 food items eaten and 1 leaf eaten. (The students can decide as a class whether to count the leaf as a food). There will be two ten-frames completed with 5 or 6 counters/unifix cubes on the third ten-frame. If students come up with different, but correct, equations, then discuss the different equations and ask students, "Can all of these be correct?"

Commentary

The purpose of this task is for students to solve word problems that call for addition of three whole numbers (1.OA.2), to relate counting on to addition (1.OA.5), and to understand that the two digits of a two-digit number represent amounts of tens and ones (1.NBT.2). This task supports developing conceptions of counting on and base-ten structure, and is thus appropriate early in the school year.

There is the possibility that students may write different, but correct, equations. If this happens, then the teacher should take the opportunity to ask students whether the different equations are correct and how they know. An appropriate classroom discussion can help support students' understanding of the equals sign (1.OA.7). While the standard only calls for sums within 20, in instructional situations it is appropriate to go beyond that. This limit is most salient for assessment developers.

Note that if this task is to support all these different standards, the teacher needs to be aware of the various connections and take the opportunity to draw them out as necessary.

Solution: 1

An example of what the students will be doing as the story is read:

After 1 apple and 2 pears are eaten, there will be 3 counters on the ten-frame. The equation will be 1+2=3.

After 1 apple, 2 pears, and 3 plums are eaten, there will be 6 counters on the ten-frame. The equation could be either 3+3=6 or 1+2+3=6.

After 1 apple, 2 pears, 3 plums, and 4 strawberries are eaten, 4 more counters would be added to the ten-frame for a total of ten counters. The equation could be 6+4=10, 3+3+4=10, or 1+2+3+4=10.

And so on!