PBS Lesson Series

Math: Grade 1, Lesson 15, Problem Solving Using Repeated Reasoning

Lesson Focus: How to find better, faster ways to solve problems.
Practice Focus: Students become more flexible by practicing better, faster ways to solve problems.
Objective: Students will find better, faster ways to solve problems.
Key Vocabulary: model, label
TN Standards: 1.NBT.A.1
Teacher Materials:

- A group of objects (counting bears, square tiles, macaroni noodles, unifix cubes, skittles, M&Ms…)
- Counters
- Empty box (approximately the size of a Kleenex box)
- Printed color copies of Task Cards (See Appendix)
- Paper
- Markers
- Document Camera
- Student Practice Packet

Student Materials:

- Paper
- Pencil

Teacher Do	Student Do
NOTE: Teacher may use any type of object(s) as counters. When you see the word /object/ in the script, insert the name of the object(s) the teacher chooses to use. Opening (1 min) **Hello! Welcome to Tennessee's At Home Learning Series for math! Today's lesson is for all our 1st graders out there, though all children are welcome to tune in. This lesson is the fifteenth in our series.** **My name is ____ and I'm a ____ grade teacher in Tennessee schools! I'm so excited to be your teacher for this lesson! Welcome to my virtual classroom!** **If you didn't see our previous lesson, you can find it on the TN Department of Education's website at www.tn.gov/education. You can still tune in to today's lesson if you haven't seen any of our others. But, it might be more fun if you first go back and watch our other lessons since we'll be talking about things we learned previously.**	Students get materials ready for the lesson.

Today we will be learning about how to find better, faster ways to solve problems! Before we get started, to participate fully in our lesson today, you will need: ● **Paper** ● **Pencil** ● **The student packet for Math, Grade 1, Lesson 15 which can be found at www.tn.gov/education** **Ok, let's begin!**	
Intro (3 min) **To get ready for our lesson today, let's get our workspace ready. I am going to lay out some paper and pencil on my writing surface. You lay out your paper and pencil too.** [Pause] **For our first task, let's get our brains thinking about counting and writing numbers.** [Teacher will need a total of 19 objects to count.] [1st - Teacher lays out 19 counting objects (i.e. - counting bears, square tiles, macaroni noodles, unifix cubes, skittles, M&Ms...) in a random configuration. They need to look like they are strewn about.] [Teacher will also write the sentence _____ [insert name of object]. For example _____ bears, or _____ cubes.] **I have some objects that I need to count.** **Notice my objects are NOT arranged in pattern.** **What do you think is the best way for me to count all of my objects?** [Pause] **How could we group the objects to make counting easier?** [Pause] **I know! I could put my objects into groups of 10.** **Watch as I count and make groups of 10.** [Teacher models counting and forming one group of 10.] **1-2-3-4-5-6-7-8-9-10. I found one group of 10. I will circle my group of 10 and write a number 10 beside my group of 10 objects.** [Teacher circles group of 10 and writes 10 beside the group of 10.] **Let's see if I can count another group of 10. Count with me.** [Teacher models counting to see if he/she can form another group of 10.] **1-2-3-4-5-6-7-8-9.** **Uh Oh. I don't have enough objects to make another group of 10.**	Students set up work space with needed items. Student observes.

[Pause] **My second group is a group of 9. I will write the number 9 beside my group of 9 objects.** [Teacher models writing the number 9 beside one group of 9.] **I am looking for a better, faster way to count all my objects. I know I don't want to count them all. That would take too much time. What strategy can I use?** [Pause] **Did I hear you say I can use my counting by 10s strategy?** [Pause] **Great idea! I know I have one group of 10, so I have 10 objects in my first group.** **What should I do next?** [Pause] **I know! I can count on from 10 by 1s. Can you count with me? 10……..** [Teacher points to group of 10 as he/she says 10 aloud. Then teacher then counts 11 thru 19 touching each item as he/she goes.] **…..11 - 12 - 13 - 14 - 15 - 16 - 17 - 18 - 19.** **Great job counting with me. Let's write the numbers that represent our counting strategy.** **First we counted a group of 10. 10 ……..** [Teacher points to group of 10 as he/she says 10 aloud.] **So, I will write the number 10 beside my group of 10 to show I counted a total of 10 objects in this group.** [Teacher write the number 10 beside the group of 10.] **Great!** **Next, we counted by 1s to get the number 9. I will write our numbers as I count.** [Teacher then counts 11 thru 19 touching each item as he/she goes and writes each number by the object as he/she counts.] **…..11 - 12 - 13 - 14 - 15 - 16 - 17 - 18 - 19.** **That means I have 19 objects total.** [Teacher writes the number 19 in the blank.] **Thank you for helping me count the total number of objects. We counted a total of 19 objects by counting a group of 10 and counting on by 1s. We also wrote our numbers to show our total number of objects.**	
<u>Teacher Model</u> (10 min.) Objective 1: Teacher will explicitly guide students to, make groups of 10, count by 10s, and count on by 1s. Teacher will also explicitly	Objective #1:

guide students to write numerals to represent a number of objects. Teacher will explicitly build upon students' previous work with the counting by 10s, 1s, and counting on strategies. [Teacher will need a total of 31 objects to count.] [1st - Teacher lays out 31 objects (i.e. - counting bears, square tiles, macaroni noodles, unifix cubes, skittles, M&Ms...) in a random configuration. They need to look like they are strewn about.] [Teacher will also write the sentence _____ [insert name of object]. For example _____ bears, or _____ cubes.] **I have some objects that I need to count.** **Notice my objects are NOT arranged in pattern.** **I will put my objects into groups of 10.** [1st group of 10.] **Watch as I count and make groups of 10.** [Teacher models counting and forming one group of 10.] **1-2-3-4-5-6-7-8-9-10. I found one group of 10. I will circle my group of 10 and write a number 10 beside my group of 10 objects.** [Teacher circles group of 10 and writes the number 10 beside the group of 10.] [2nd group of 10.] **Let's see if I can count another group of 10. Count with me.** [Teacher models counting and forming the 2nd group of 10.] **1-2-3-4-5-6-7-8-9-10. I found another group of 10. I will circle my 2nd group of 10 and write a number 10 beside this group of 10 objects.** [Teacher circles 2nd group of 10 and writes the number 10 beside the group of 10.] [3rd group of 10.] **Let's see if I can count another group of 10. Count with me.** [Teacher models counting and forming the 3rd group of 10.] **1-2-3-4-5-6-7-8-9-10. I found another group of 10. I will circle my 3rd group of 10 and write a number 10 beside this group of 10 objects.** [Teacher circles 3rd group of 10 and writes the number 10 beside the group of 10.] **Hmmm...I don't think I can count another group of 10...Do you? I just see one more object. I will write the number 1 beside this object.** [Teacher models writing the number 1 beside one object.]	Students will be observing how to form groups of 10 and how to use the counting on strategy to find the number of objects in a group and write numerals to represent a number of objects in a group. Students will be prompted to activate prior knowledge of the counting by 10s, 1s, and counting on strategies.

Remember, I am looking for a better, faster way to count the total number of object. I will use my counting by 10s strategy. Count with me. [Teacher models counting the three groups of 10 while touching each group.] 10….20….30…. **Next, I will count on by 1s. THIRTY-ONE.** **That means I have 31 objects total.** [Teacher writes the number 31 in the blank.] Objective #2 Teacher will explicitly guide students to identify an initial quantity and count on by 10s and 1s to find the number of objects. Counting on will still be modeled explicitly as strategy. [Teacher displays Task Card A.] TASK CARD A Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.  	Objective #2: Students will be building off of their work of counting by 10s, counting by 1s, and counting on as strategies for finding the number of objects.

[Teacher reads task card directions aloud and discusses images provided.] **For our next problem, let's take a look at my task card. Listen as I read the directions aloud. How many in all? Use a shortcut to count on. Tell what shortcut you used.** [Pause] **What am I being asked to find?** [Pause] **That's right. I am being asked to find how many shoes there are in all.** **What do I already know?** [Pause] **Hmmmm….** [Teacher points to box of shoes labeled '30 shoes'.] **It looks like this box has 30 shoes in it. I also see some number of shoes** [Teacher points to shoes not in the box.] **that are not in the box.** **How can I use what I know to find how many shoes are in all?** [Pause] **What does it mean to use a shortcut?** [Pause] **To use a shortcut means I will look for a better, faster to solve the problem.** **Well, I see two groups of shoes that have been circled.** **I wonder if that could be a shortcut.** **I am going to count to see how many shoes are in each circled group.** [Teacher models counting shoes in one of the circled groups]. **1-2-3-4-5-6-7-8-9-10** **Cool! Just as I thought! There are 10 shoes in a group.** **I bet there are 10 shoes in this group too.** [Teacher models counting shoes in the 2nd circled group.] **1-2-3-4-5-6-7-8-9-10. Yes. There are 10 shoes in this group as well.** **I wonder why these shoes are not circled.** **[Pause]** **I bet you are right. I bet there are less than 10 shoes.** [Teacher models counting remaining shoes.] **1-2-3-4-5-6-7-8. There are 8 shoes not in the box and not in a group.** **I am looking for a shortcut to count all my objects. I know I don't want to count them all. That would take too much time. What strategy can I use?** [Pause] **Did I hear you say I can use my counting on strategy?** [Pause]	

Great idea! **I think I will start with the box of shoes because I know there are 30 shoes in the box.** [Teacher points to box of 30 shoes.] **I will count on from 30 by 10s. THIRTY…..FORTY…..FIFTY.** **Almost done…..** **Now I need to count on the shoes that are not in the box and not in a group of 10. I will use my counting by 1s strategy to count the remaining shoes.** [Teacher touches each remaining shoes while counting aloud.] **FIFTY-ONE, FIFTY-TWO, FIFTY-THREE, FIFTY-FOUR, FIFTY-FIVE, FIFTY-SIX, FIFTY-SEVEN, FIFTY-EIGHT!** **Great job counting with me. Now I can answer the question "How many shoes in all?"** [Teacher points back to the directions.] [Teacher then points to the 58 that is the first blank.] **I will write the number 58 to show there are 58 shoes in all.** [Teacher models tracing over the number 58 that is in the blank.] **The directions also ask me to tell what short cut I used.** [Pause] **I used the shortcut of counting on by 10s and 1s because it is faster and I'm less likely to lose track of my counting.** [Teacher fills in rest of answer blanks by tracing over 10s and 1s.] **Great job! Thanks for following along with me. So far, we have learned that we can use what we know about counting by 10s and 1s to count a large group of objects. Counting by 10s and 1s is a better, faster way to solve a problem instead of only counting by 1s.**	Tying the learning together: Students will listen to the teacher compare/contrast counting strategies to determine the most efficient counting strategy.
<u>Guided Practice</u> (13 min.) [I Do – A think aloud where the student works alongside the teacher.] **Now let's look at our next problem. I will read the problem aloud.** [Teacher displays TASK CARD B.] TASK CARD B Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.	Students will listen to the teacher do a think aloud.

_____ muffins.

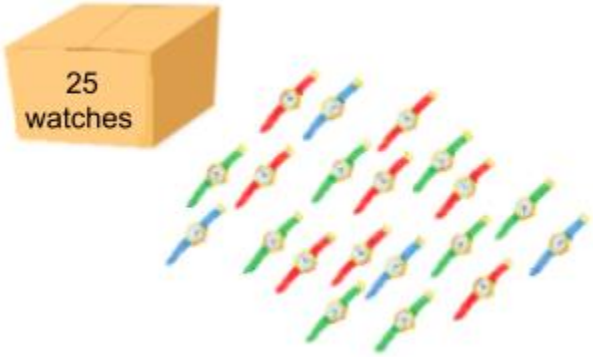
I counted on by _____.

[Teacher reads Task Card B directions aloud.]
How many in all? Use a shortcut to count on. Tell what shortcut you used.
[Pause]
What am I being asked to find?
[Pause]
That's right. I am being asked to find how many muffins there are in all.
What do I already know?
[Pause]
[Teacher points to box of muffins labeled "60 muffins".]
It looks like this box has 60 muffins in it. I also see some number of muffins [Teacher points to muffins not in the box.] **that are not in the box.**
I will use a shortcut to find how many muffins are in all?
[Pause]

[1st group of 10.]
Watch as I count and make groups of 10.
[Teacher models counting and forming one group of 10.]
1-2-3-4-5-6-7-8-9-10. I found one group of 10. I will circle one group of 10.
[Teacher circles one group of 10.]

[2nd group of 10.]
Let's see if I can count another group of 10.
[Teacher models counting and forming the 2nd group of 10.]
1-2-3-4-5-6-7-8-9-10. I found another group of 10. I will circle my 2nd group of 10.

[Teacher circles 2nd group of 10.] **It looks like I don't have enough muffins for another group of 10, so I will stop there.** **Remember, I am looking for a shortcut to count all the muffins. I know I don't want to count them all. That would take too much time. I will use my counting on strategy to count by 10s and 1s.** [Pause] **I will start with the box of muffins because I know there are 60 muffins in the box.** [Teacher points to box of 60 muffins.] **I will count on from 60 by 10s. SIXTY….SEVENTY….EIGHTY…. Almost done…..** **Now I need to count on the muffins that are not in the box and not in a group of 10. I will use my counting by 1s strategy to count the remaining muffins.** [Teacher touches each remaining muffins while counting aloud.] **EIGHTY-ONE, EIGHTY-TWO, EIGHTY-THREE, EIGHTY-FOUR.** **Great job counting with me. Now I can answer the question "How many muffins in all?"** [Teacher points back to the directions.] [Teacher then points to the first blank.] **I will write the number 84 to show there are 84 muffins in all.** [Teacher writes 84 in the blank.] **The directions also ask me to tell what short cut I used.** [Pause] **I used the shortcut of counting on by 10s and 1s because it is faster and I'm less likely to lose track of my counting.** [Teacher writes 10s and 1s in the blank.] **Great job! Thanks for following along with me.** [We Do - Intentional pauses for student to do work and then receive answers along the way.] **For our next task, I would like for you to get your paper and pencil ready.** [Teacher displays TASK CARD C.] TASK CARD C Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.	Students will draw, count, and label a model along with the teacher to count a total number of objects by 10s and 1s.



_____ watches.

I counted on by _____.

I would like for you to draw a quick draw of our task.
I will draw a quick draw too. You follow along with me.
[Pause to allow students time to get materials ready.]

I will draw a square to represent the box of watches. You draw a square using your paper and pencil.
[Teacher models drawing one square to represent the box of watches.]
Great! Next, I will draw straight lines to represent the watches. You draw along with me.
[Teacher models drawing 20 lines to represent the 20 watches. Teacher counts aloud as he/she draws.]
Does your model look like mine? Let's double check.
I have one square [Teacher points to square.] **and 20 lines**
[Teacher counts aloud from 1-20 as he/she touches each line.]
Great job getting your model ready. Now follow along as I ready the problem aloud.

[Teacher reads directions on the task card and discusses the image.]
How many in all? Use a shortcut to count on. Tell what shortcut you used.
[Pause]
What are we being asked to find?
[Pause]
That's right. We are asked to find how many watches there are in all.
What do we already know?
[Pause]
[Teacher points to box of watches labeled 25 watches.]

It looks like this box has 25 watches in it. I will label my square in my model with the number 25. You label your square with the number 25 too. [Teacher models labeling square with the number 25.] **I also see some number of watches** [Teacher points to watches not in the box.] **that are not in the box. Do you see the watches that are not in the box? Point to the part of your model that represents the watches not in the box.** [Pause**]** **Did you point to the lines you drew?** [Pause] **Yes. The lines we drew in our model represent the watches that are not in the box.** **Let's use a shortcut to help us find how many watches there are in all?** [Pause] [1st group of 10.] **First, let's count and make groups of 10. You count the lines you drew in your model to make a group of 10.** [Teacher models counting the watches on the task card and forming one group of 10.] **1-2-3-4-5-6-7-8-9-10. We found one group of 10. I will circle my group of 10. You circle your group of ten.** [Teacher circles one group of 10.] [2nd group of 10.] **Let's see if we can count another group of 10.** [Teacher models counting and forming the 2nd group of 10.] **1-2-3-4-5-6-7-8-9-10. I found another group of 10. I will circle my 2nd group of 10. You circle your 2nd group of ten.** [Teacher circles 2nd group of 10.] **It looks like we don't have any more watches to make another group of 10, so we should stop there.** **Remember, we are looking for a shortcut to count all the watches.** **I know...we don't want to count them all. That would take too much time. We can use the counting on strategy to count by 10s and 1s.** [Pause] **We can start with the box of watches because we know there are 25 watches in the box.** [Teacher points to box of 25 watches.]	

Let's *count on* from 25 by 10s. You count along with me. Twenty-five...Thirty-five, Forty-five… **Great job counting with me. Now we can answer the question "How many watches are there in all?"** [Teacher points back to the directions.] [Teacher then points to the first blank.] **I will write the number 45 to show there are 45 watches in all. You write along with me.** [Teacher writes 84 in the blank and directs students to write the remainder of the sentences, which includes the word watches and a period.] **The directions also ask us to tell what short cut we used.** [Pause] **We used the shortcut of counting on by 10s because it is faster and we are less likely to lose track of our counting. Let's write our strategy. You write on your paper with me.** [Teacher writes 10s in the blank and prompts students to write the sentence I counted on by _____.] **I counted on by 10s.** [Pause to allow students time to write sentence.] **Great job! Thanks for working with me.** [You Do - The student independently working and then the teacher showing their work and answer.] **Now it is your turn.** [Teacher displays TASK CARD D and reads directions.] TASK CARD D **Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.**  _____ books.	Students will solve a task independently from the start of the task through finding the solution. Teacher will share the solution.

I counted on by _____.

You should have circled one group of ten books with 4 books left over.
There are 59 books in all.
You counted on by 10's and 1's.

Additional Problems:

Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.

1.
Matt spills some puzzle pieces on the floor.
61 pieces are still in the box.
How many puzzle pieces are in all?

_____ puzzle pieces in all.

I counted on by _____.

2.
The classroom has 30 desks.
Some desks are added to the classroom.
How many desks are in all?

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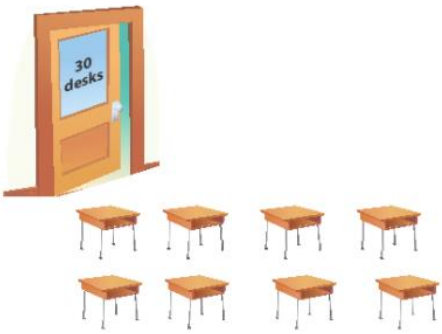
<td> 

_____ desks in all.

I counted on by _____.</td>
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<td><u>Independent Practice</u> (3 min.)
Great work! Today, we reviewed how to use a faster way to count a group of objects by 1s and 10s. You sure did a great job! After the video, you will have some tasks practicing on your own.

I will show you the independent practice tasks now, or you can find them in the student practice for this lesson posted on our website, www.tn.gov/education.
[Teacher shows student practice page under document camera or camera zooms in on student practice page.]

Good luck and do your best! To get you started, I will read the tasks aloud with you.

[Teacher posts student work page.]
[Teacher reads directions.]

Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.</td>
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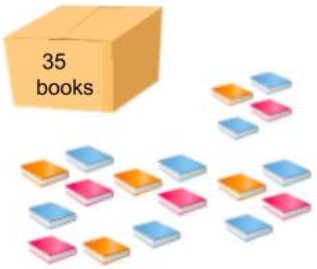
1.

_____ train cars.

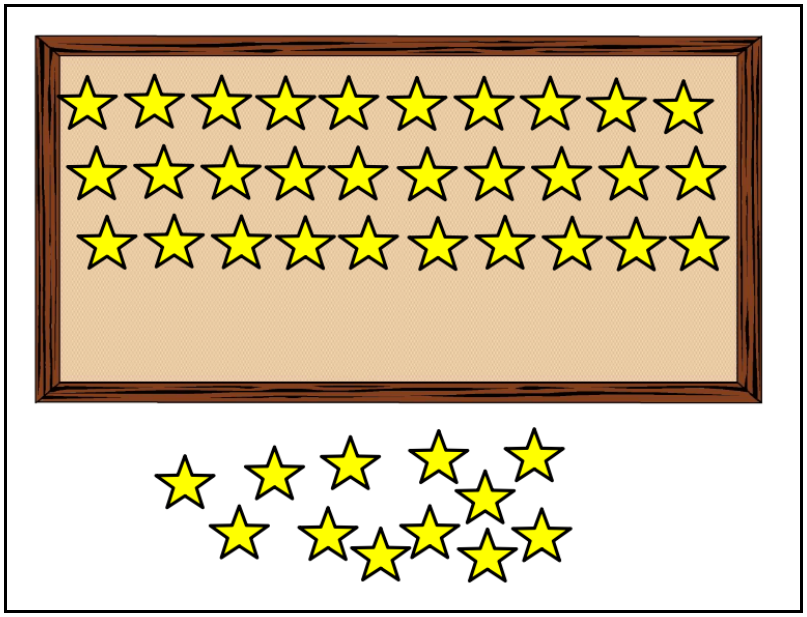
I counted on by _____.

2.



_____ books.

I counted on by _____.

3.  _____ stars. I counted on by _____.	
Closing (1 min) **I enjoyed learning how to use a faster way to count a group of objects by 1s and 10s. Thank you for inviting me into your home. I look forward to seeing you in our next lesson in Tennessee's At Home Learning Series!** **Bye!**	

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TASK CARD A

Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.

58 shoes

I counted on by

10s and 1s .

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TASK CARD B

Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.

_____ muffins.

I counted on by _____.

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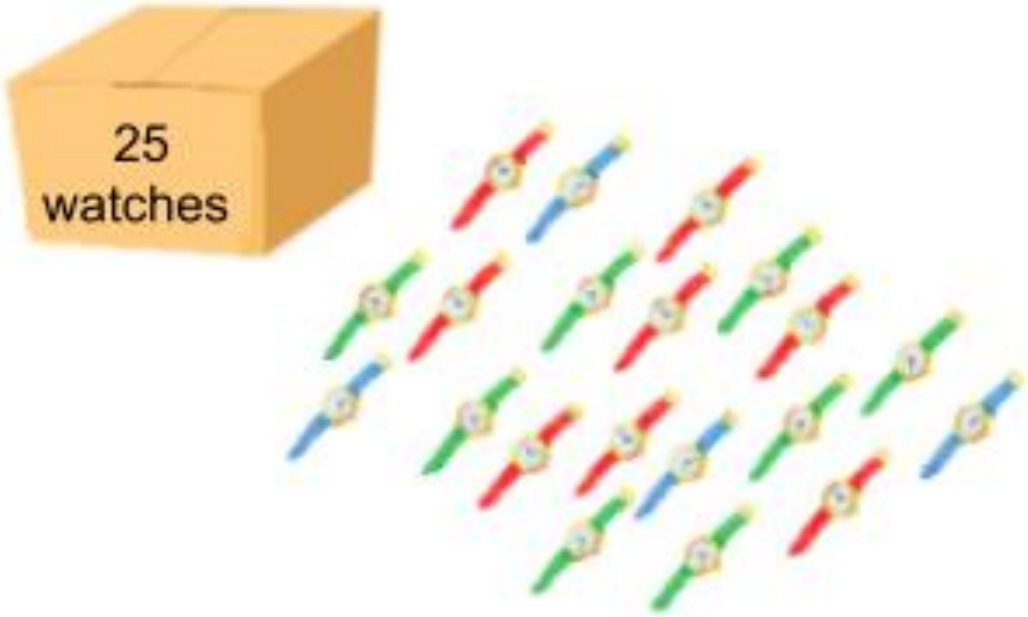
TASK CARD C

Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.



_____ watches.

I counted on by _____.

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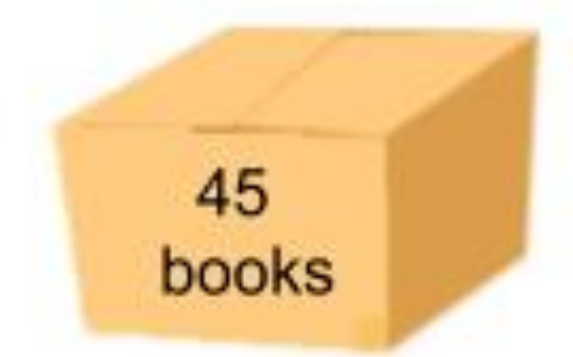
TASK CARD D

Directions: How many in all? Use a shortcut to count on. Tell what shortcut you used.



_____ books.

I counted on by_____.

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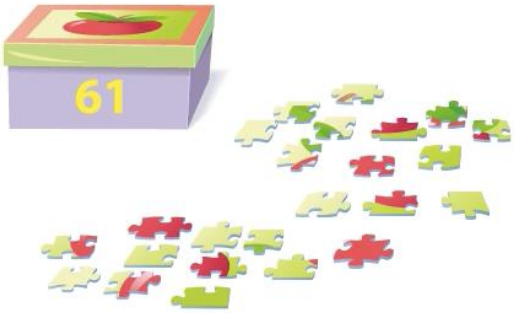
ADDITIONAL PROBLEMS AS NEEDED

Matt spills some puzzle pieces on the floor.

61 pieces are still in the box.

How many puzzle pieces are in all?



_____ puzzle pieces in all.

I counted on by _____.

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2.

The classroom has 30 desks.

Some desks are added to the classroom.

How many desks are in all?

_____ desks in all.

I counted on by _____.

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