Counting Activity[1]

Group #: 6

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Intended audience (i.e., who will be your "students" in the Count you Enact):
> Our intended audience is grade 1 students. It is important to note that the enactment will be performed in front of students who have delayed learning developments.

Start at 2, Count up by 2

Draw what you expect your completed count to look like on the "board" below. Mark the "missing numbers" that you want students to predict (at least 3).

2	4	6	8	10
12	14	16	18	20
22	24	26	28	30
	(A)___			
			(B) __	
		(C)___		

Mathematical Instructional Goals
For the whole activity:
- In this count, we want to develop students' understanding of how to find, and explore patterns. We also want them to see how/why patterns work.
- We would like the students to learn how to count to larger numbers on their own using strategies and patterns
- We also want to help students learn about different ways to count.
- In addition, we want students to be able to justify their strategies used through explaining their thought processes.

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[1] This Counting protocol is adapted from the Learning Teaching in, from, and for Practice Project (http://sitemaker.umich.edu/ltp/home).

What goals will you target during Phase 1?
- We want to support all students in identifying and explaining any strategies used to count.

What goals will you target during Phase 2?
- We want to support all students in identifying and explaining any process used to count.
- We want students to begin using patterns to count out loud.

What goals will you target during Phase 3?
- We want students to learn to look for and explore patterns in a set of numbers. If they find some, we will use these patterns to try and get them to count of numbers they didn't think they could reach.
- We want students to find and make predictions using patterns.

Describe how your count (e.g., the number you count by, the number you started with, the direction of the count, and how you organized the numbers) helps you teach toward your instructional goals.

In order to develop students' understanding of addition by adding 2, we organized the count in 5 rows because then in the 5th place, the set is ended with a multiple of 10. This occurs because we jumped and started by the same number. We stop our count at 30 to suit the knowledge of our audience.

In order to develop students' understanding of counting, we chose missing number A in order to aid students in the counting, and show that they can count by 2. Missing numbers B and C allow students to begin to identify some of the patterns in the count and utilize them.

Anticipated students' strategies and difficulties:

- Students will use their fingers to count up.
- Students who are more advanced may use standard algorithm.
- Students may use numbers lines.
- Students may count physical objects.
- Students may have difficulty counting in their heads.
- Students may have difficulty reaching 10.
- Students may have difficulty with each set if they do not understand the pattern.
- Students may have difficulty jumping from the 4th to the 5th column. For example, it may be difficult to jump from 18 to 20 as the numbers in the tens column are not the same.
- Students may have difficulty understanding that adding 2 to 8 makes the ones place 0.
- Students may not have a clear understanding of the difference between odd and even numbers, and therefore may mix them up.

Anticipated students' patterns:

- In the ones place, the number remains the same when working down the columns. This happens because each set increases the numbers by 10. This always holds true.
- In the tens place, the number increases by 1 when working down the columns. This happens because each set increases the number by 10, so the tens place increases by a set of 10. This always holds true.
- When working down the columns, each number increases by a factor of 10. This always holds true. This happens because each set increases by the 10.
- In between the 4th and 5th column, the tens increase by 1. This happens because you are completing a set of 10, so the place value increases. This always holds true.
- When looking at the count, we noticed that the students may see a diagonal pattern in the numbers; that the numbers in the ones place go up by 2. For example, if we start at 2, the number diagonal to it is 14 and the number diagonal to 14 is 26. Therefore, when looking diagonally the numbers in the ones place go 2, 4, 6 etc. This works because by counting diagonally, you're simultaneously counting vertically down by 10 and then horizontally by 2 in one step.

What to do
Phase I: Launching the Count
A. Introduce the activity/establish expectations for participation. Today we are going to do an activity with numbers and try to discover some amazing patterns. First, we are going to make a list of numbers to use to find the patterns. We are all going to together to make this list. I will record the numbers on the board as I hear everyone's' voices counting together. ***Review your general expectations for student participation.*** You can come up with an answer any way you want as long as it's by yourself. You can count your fingers or in your head. Does anyone know what you're supposed to do when you have an answer? (says raise hand) This time, you're going to raise your silent thumb. Remember it is **silent**. What do you do when your friends are speaking? (says we listen). Correct, when your friends are speaking, **listen** quietly. When your friends say how they figured out their answer, think about if you did the same thing or if you think it would be a good strategy for you to use next time. OK, let's think of a few examples of ways we already know how to count. Who has an example of what counting sounds like?

Students might say:
- 1, 2, 3, 4, 5, 6, …
- 5, 10, 15, 20, …
- 10, 20, 30, 40, …

You might continue:
Great! So we know a lot of ways to count. Today we're going to start at 2 and count up by 2. If we start at 2 and count up by 2, what will our next number be? *(Write 2 (the starting number) on the top left of your board space with a +2 (e.g., +19) and arrow drawn as shown. Pause for thinking time; Reinforce silent thumbs by showing your thumb.)*

2

 +2

<u>*Get out all solutions (answers)*</u>
Once you are sure that most people have an answer, *ask:*
- Who is willing to tell me your solution?

Call on one person. Record the answer to the side of the problem.

Ask:
- Did anyone get a different solution?

If so, call on that person and record the answer to the side of the problem. Do this until you have collected all of the solutions.

<u>*Find out how students solved the problem (incorrectly before correctly)*</u>
First focus on getting out an incorrect solution strategy.

You might ask someone who gave you an incorrect answer:
- How did you get ____ for an answer?

Or you might ask:
- Is anyone who got _____ (incorrect answer) for a solution willing to share how they figured out the problem?

Now focus on getting out a correct solution strategy.

You might ask someone who gave you a correct answer:
- How did you get ____ for an answer?

Or you might ask:

- Is anyone who got ___ (correct answer) for a solution willing to share how they figured out the problem?

After eliciting a correct and incorrect strategy, ask:
- OK. We have two ways of thinking about this problem that give us two different answers. Who can tell us which answer you think is correct and why?

If <u>all</u> students gave a correct answer, then you might say:
- OK, it sounds like we're all in agreement that the answer is ___. Let's now find out how we figured that out.
(Use prompts for getting out a correct strategy.)

Ask:
- Did anyone figure it out in a different way?

After the group establishes that 4 is the next number, quickly check to see if students understand how to count up by 2 starting at 2 by asking…
- What number will come after 4?

Again, gather students' ideas and find out how they found the next number.

B. Start class counting together.
Here you will want to explain your expectations for participating in the count. Say something like…

OK, now that we all have a strategy for counting by 2, we are going to start counting together! It is very important that as we count, we count together. I am going to record what you say on the board. We want to create a rhythm together, but remember, don't count too fast, otherwise I won't be able to keep up with you! Let's start!

Write the count starting in the top left corner of the board or poster paper going down or across, depending on how you designed the count.

2	4	6	8

Phase 2: Getting the Count Out

C. Stop the count at 8 by turning to the group and saying, "Stop."

2	4	6	8

Ask:
- What number will come next?

(Remind students to raise their thumb by making the gesture yourself, and be sure to call on a student who is doing this.)

Follow-up:
- Did anyone get a different number?

(If someone got a number other than 6, write both on the board. Ask the next question first to that student. Then, ask a student who got ___.)

Ask:
- How did you figure it out?

Ask:
- Did anyone figure it out a different way?

Ask:
- Who thinks they understand what _____ just said and can explain it in your own words?

Ask:
- If we use _____'s strategy, what number will come here (*pointing to the spot left blank below*)?

D. Resume count, beginning at 16. Count together until 30.

Ask:
- What number do you think comes after 30? *(Gather students' ideas.)*
- [Student], why do you think the next number is ___?
- Did anyone get a different answer?
- How did you come up with that number? Did you use a specific strategy?
- Did anyone use a different strategy?
- Can you explain _____'s strategy in your own words?

Phase 3: Exploring Patterns

E. Identify patterns & future numbers.

Ask:
- Does anyone notice any patterns?
- Does anyone notice any other patterns?
- Why do you think that pattern exists?

Resume count, beginning back at 16. Count together until 30.

2	4	6	8	10
12	14	16	18	20
22	24	26	28	30

Draw a line to represent a missing number, and ask for B and C:
- What number do you think will come here?
- How did you figure that out?
- Did anyone figure that out differently?

2	4	6	8	10
12	14	16	18	20
22	24	26	28	30

(A)___

(B) __

(C)___

F. Conclude the Count by saying something like:
Nice work counting together today and looking for patterns. (*Summarize the key strategies, patterns, and explanations that students described. If you noticed them listening well to each other, you can comment on this too. Be as specific as possible about what you noticed they were doing well.*)
➔ "You guys did really great today. We found a lot of strategies and patterns to help you count in different ways. (Insert strategies & patterns found). Thank you so much for listening to your friends and using your silent thumb! We had a really fun time with you!"