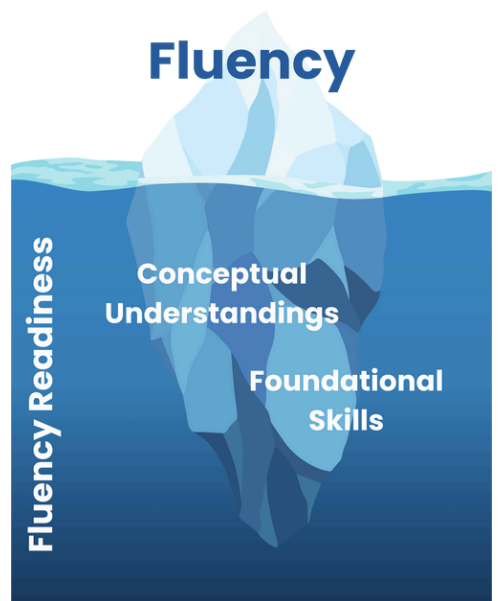


In this packet, you will find a sample of the KCM Fluency Assessments - Fluency Readiness within 20. For free access to all of the assessments, visit our information page here: [https://kcm.nku.edu/FluencyAssessments/fra\\_intro.php](https://kcm.nku.edu/FluencyAssessments/fra_intro.php).

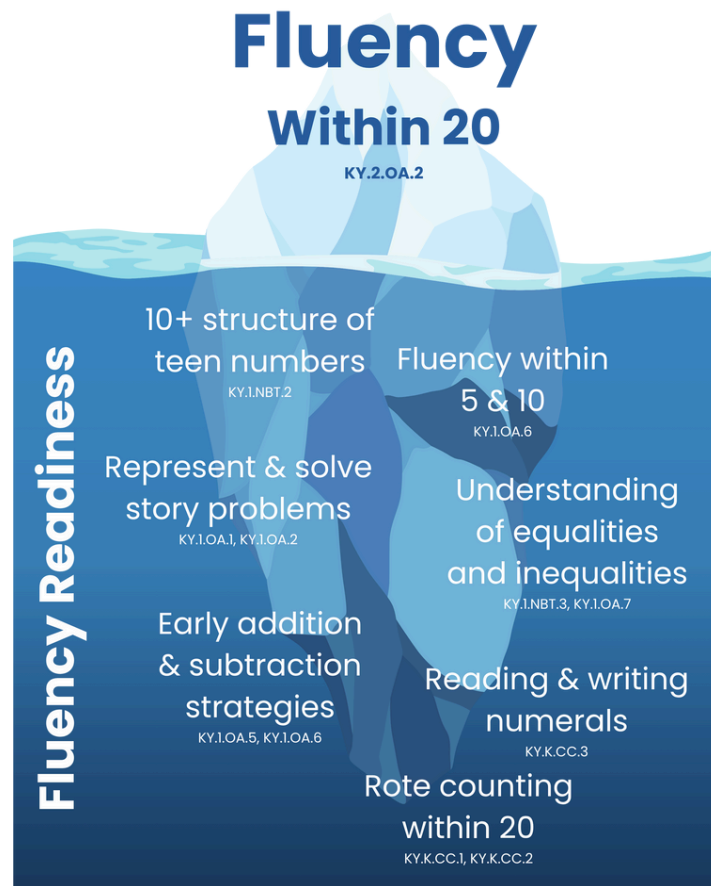
## Fluency Readiness Assessments Overview

Fluency in mathematics extends beyond speed and accuracy; it involves a deep understanding of mathematical concepts and the ability to apply a range of strategies flexibly and effectively. According to *Principles to Actions* (p. 42), fluency means students can choose among methods and strategies to solve problems, explain their reasoning, and produce accurate results efficiently. Fluency readiness assessments are designed to identify whether students have the foundational skills and conceptual understandings needed to develop this kind of meaningful fluency. These assessments highlight students' abilities to move across representations (e.g., visual, symbolic, contextual), connect equivalent forms of expressions or problems, and apply multiple strategies for solving mathematical tasks.

The KCM Fluency Readiness Assessments focus on the essential conceptual understandings and foundational skills that support fluency across different content areas. Students are expected to interpret operations in various contexts, such as understanding subtraction as both "take away" and "difference," or division as both "grouping" and "partitioning." For example, to demonstrate fluency readiness with whole numbers within a specific range, students should exhibit strong number sense skills such as counting forward and backward by 1s or multiples, identifying and writing numerals, and interpreting essential mathematical symbols and vocabulary. Fluency readiness assessments help determine students' current understanding of these foundational skills, allowing teachers to adjust instruction and provide targeted support as students build the conceptual understanding needed for lasting success in mathematics.



# Fluency Readiness within 20



By the end of 2nd grade, students are expected to develop fluency with addition and subtraction within 20 (KY.2.OA.2). However, fluency cannot develop in isolation; it must be built on a strong foundation of early numeracy skills and conceptual understanding. This Fluency Readiness assessment identifies and assesses critical prerequisite understandings that must be developed before a student is ready to work toward full fluency within 20. These foundational skills and concepts, aligned with selected Kindergarten and Grade 1 standards in Counting and Cardinality (CC), Operations and Algebraic Thinking (OA), and Number and Operations in Base Ten (NBT), include knowledge of the counting sequence, reading and writing numerals, applying early addition and subtraction strategies, understanding equality and equations, and achieving fluency within 10. The accompanying chart outlines how each standard is addressed through this assessment.

# Fluency Readiness Assessment within 20 (FRA 20) Clarifications

Students are expected to develop fluency with addition & subtraction within 20 in 2nd grade (KY.2.OA.2). This assessment identifies and assesses critical skills and understandings (what we call "Fluency Readiness") that must first be developed within 20 before a student will be ready to work toward full fluency. These skills and understandings, aligned to selected Kindergarten and First Grade CC, OA, and NBT standards, include knowledge of the counting sequence, reading and writing numerals, early addition and subtraction strategies, understanding of equality and equations, and fluency within 10. Refer to the chart for an explanation of how each standard is addressed.

Standard	Question(s)	Clarification
<b>Part 1: Knowledge of numerals and counting sequences</b>		
KY.K.CC.1	1,2,3,4	These items assess students' counting forward/backward by ones, starting with a given number other than 1, within 20. In this standard, students are expected to count to 100 and count backward from 30 by ones.
KY.K.CC.2	1,4	These items assess students' counting forward by ones, starting from a given number different from 1, within 20. In the standard, students are expected to count to 100 starting at any number.
KY.K.CC.3	5,6	These items assess students' skills with reading and writing teen numbers. The focus of these items is symbolic and verbal recognition of numbers. Students are not asked to build a set for a given quantity as required by the standard.
KY.1.NBT.3	7	This item assesses a students' ability to compare two teen numbers with a symbol. In the standard, students are expected to compare any pair of two-digit numbers. Because both of these numbers will be a teen number and a student will likely answer this by reasoning about each number's location in the counting sequence, we include this in Part 1 of the assessment as evidence of a student's knowledge of the numerals and numeral sequences within 20.
<b>Part 2: Conceptual Underpinnings - Fluency within 10 is expected</b>		
KY.1.OA.1	8a, 9a, 13a	These tasks assess students' ability to solve and represent three different types of word problems of the problem structures expected (KAS, Appendix A, Table 1). Question 8a assesses Take From; Result Unknown within 20. Question 9a assesses Take From; Change Unknown within 20. Question 13a assesses Put together; Both Addends Unknown within 10. For each of these problems, students are expected to solve these problems successfully with their strategy of choice and there is no ranking of any of the strategies in the rubric. Students are asked to provide an equation or a visual to represent the story situation for 9a only. Refer to Table 1 to determine structures expected for first grade that are not assessed with this tool (shaded in blue or green).

KY.1.OA.2	10a	Students are solving a story problem (Put Together, Total Unknown with three addends) with addends within 10 and the total within 20. Students are expected to represent this story situation with an equation. This standard is fully addressed.
KY.1.OA.3	10b	This is assessed by observing how the student adds to solve the 3 addend task in Question 10b. The problems are crafted to encourage use of the commutative and/or associative properties.
KY.1.OA.4		This standard is omitted from this assessment, but should be mastered as students work toward full fluency within 20.
KY.1.OA.5	8b, 9b	This is assessed by observing how the student solves the subtraction (task 8a) and missing subtrahend (task 9a) problems. To score a 2, the student should be counting on, counting back, or using a chunking strategy. Students who use a chunking strategy are assumed to also have a counting strategy.
KY.1.OA.6a	13b	This is assessed by observing how students decompose a number within 10. To be fluent, a student is expected to decompose numbers without counting by ones or building by ones.
KY.1.OA.6b	12	This is assessed by observing how students add two numbers less than 10 presented on ten frames. Students are expected to use strategies such as commutative property, counting on, or decomposing and composing numbers.
KY.1.OA.7	14	This item assesses students' understanding of the equal sign by asking if equations involving addition and subtraction situations are true or not.
KY.1.OA.8		This standard is omitted from this assessment, but should be mastered as students work toward full fluency within 20.
KY.1.NBT.2b	11	This item assesses students' knowledge of the 10+ structure of teen numbers. Students are briefly shown a teen number represented by two ten frames (one filled, one partially filled). To score a 2, students should identify the total number of dots quickly and without counting by ones.

The Fluency Readiness Assessment within 20 is organized into two parts. Part 1 (Questions 1-7) assesses students' knowledge of the counting sequence and numerals within 20. Part 2 (Questions 8-14) assesses students' understanding of early addition and subtraction strategies, ability to apply addition and subtraction to contextual situations, understanding of equality and equations, knowledge of the 10+ structure of teen numbers, and fluency within 10. If a student has significant struggles within Part 1, we recommend stopping the assessment and progress monitoring with Part 1 of this assessment. When using this assessment as a progress monitoring tool, teachers may choose to monitor using either or both parts of the assessment.

When using this assessment for progress monitoring, if a student scores a 2 on a question for three assessments in a row, the assessor may skip that question on future administrations, assigning the student a "2" on subsequent administrations.

*\*FRA 20 Version 1.1 was released August 2024. Changes include minor edits and formatting changes to the Clarifications and minor corrections to the question pages. No changes were made to the printables or task cards.*

## KCM Fluency Readiness Assessment within 20 (FRA20)

Position the student so that you can easily see the student's face & hands (to observe for finger use). Make sure no supports are in the student's line-of-sight, such as a number line, number posters, or a 100 chart.

### Part I - Skills

#### Test 1

1	KY.K.CC.1, KY.K.CC.2	Say " <b>Start counting from 7 and I'll tell you when to stop.</b> " Stop student at 20. If needed clarify "Start at 7 and count forward." If the student continues to struggle, ask the student to count from 1. (Assessor may wish to allow the student to count further for additional information.)	0 - makes an error when saying the number sequence 1 - correctly says number sequence but there are concerns such as needing to count from 1, having more than one self-correct, or long pauses 2 - correctly says number sequence at a steady pace with at most one self-correct
2	KY.K.CC.1	Say " <b>This will be different. I want you to count backward. Start at 16 and count backward.</b> " If the student counts forward, clarify the task by saying "That's forward. I want you to count backward from 16."	0 - makes an error when saying the number sequence 1 - correctly says number sequence but there are concerns such as needing to count from 20, having more than one self-correct, or long pauses 2 - correctly says number sequence at a steady pace with at most one self-correct or clarifying prompt
3	KY.K.CC.1	Ask " <b>What number comes right before 18?</b> " If the student says the number after, clarify the task by saying "That's the number after. What number is before 18?" Assessor may also clarify by saying "What is one less than 18?"	0 - incorrect 1 - correct but not fluent (e.g. student needed to be prompted more than once or get a running count) 2 - correct, quick, and requires at most one clarifying prompt
4	KY.K.CC.1, KY.K.CC.2	Ask " <b>What number comes after 11?</b> " If the student says the number before, clarify the task by saying "This time I'm asking for the number after. What number comes after 11?" Assessor may also clarify by saying "What is one more than 11?"	0 - incorrect 1 - correct but not fluent (e.g. student needed to be prompted more than once or get a running count) 2 - correct, quick, and requires at most one clarifying prompt
5	KY.K.CC.3	Give the student paper or a whiteboard with marker and say " <b>Write the number 13.</b> "	0 - incorrect 1 - correct but not fluent (e.g. student counted, self-corrected, or reversed the numeral) 2 - fluent
6	KY.K.CC.3	Show the numeral 15 and ask " <b>What number is this?</b> " Repeat with the numeral 19. (If using the binder printables, use cardstock to cover one numeral while showing the other number so only one number is shown at a time.)	0 - student incorrectly identifies one or both 1 - student correctly identifies both but is inefficient (e.g. counts to generate name, or builds quantity on fingers) 2 - fluent
7	KY.1.NBT.3	Display the two numerals side by side then gesture to the comparison symbols and say, " <b>Use one of these symbols to compare these numbers.</b> " Then ask the student to read the comparison. If using cards, the student can move cards to create the comparison. If using binder bages, the student need only point to the appropriate symbol.	0 - incorrect 1 - correct but the student is inefficient (e.g. counts from 1 to compare numerals) 2 - fluent

#### Part I Cumulative Score

If the student's cumulative score is 0-5, it is recommended that the teacher stop here and progress monitor with Part I only. If the student's score is 10-14, it is recommended that the assessor continue with Part II. If the student's score is within 6 to 9, the assessor may choose to either stop or continue to Part II.

## FRA20 Part II - Conceptual Understandings

## Test 1

\*For tasks with Story Cards (Questions 8, 9, 10, 13), show story card and read the story to the student. Read again as needed. Have a whiteboard, marker, and loose counters available for the student to use.

8a	KY.1.OA.1	Show story card A and read the story to the student*.	0 - student does not know what computation to make 1 - partially correct (e.g. student knows what computation to make but has an incorrect result) 2 - correct	
8b	KY.1.OA.5	Score this task based on the computational strategy the student used in the previous task. If necessary, ask " <b>How did you work that out?</b> " If the student uses a low level computation strategy such as direct modeling, the assessor may prompt "Is there another way you can work it out?"	0 - incorrect 1 - correct but uses a low level strategy such as direct modeling or counting from 1 2 - correct and solves either by counting back (may use fingers to track) or a strategy based on properties and/or place value (e.g. "I know 7-6 is 1 so 17-6 is 11")	
9a	KY.1.OA.1	Show story card B and read the story to the student*. After the student gives an answer, point to the whiteboard and marker and say " <b>Write an equation or draw a picture that matches this story.</b> "	0 - incorrect solution 1 - partially correct, e.g. student knows what they need to solve but may make an error when solving or cannot represent their work with an equation or appropriate drawing 2 - correct and represents with an equation or appropriate drawing. May include direct modeling or counting by one when solving. Using Test 1 as an example, any of the following equations are correct: $13 - ? = 9$ , $13 - 9 = ?$ , $9 + ? = 13$ , $13 = 9 + ?$ . The student may use a different symbol to represent the unknown or write in a 4 in place of the unknown (e.g. $13 - 4 = 9$ )	
9b	KY.1.OA.5	Score this task based on the computational strategy the student used in the previous task. If necessary, ask " <b>How did you work that out?</b> " If the student uses a low level computation strategy such as direct modeling, the assessor may prompt "Is there another way you can work it out?"	0 - incorrect 1 - correct but uses a low level strategy such as direct modeling or counting from 1 2 - correct and solves either by counting on, counting back (may use fingers to track), or a strategy based on the relationship between addition and subtraction, the properties and/or place value (e.g. to solve $13 - ? = 9$ , the student thinks about $9 + ? = 13$ )	
10a	KY.1.OA.2	Say to the student " <b>I'm going to read you a story. I want you to write an equation and find the solution.</b> " Show story card C and read the story to the student*.	0 - incorrect solution 1 - partially correct, e.g. student knows what they need to solve but makes an error or does not represent it with an equation 2 - correct (may include direct modeling or counting by ones) and represents the situation with an equation	
10b	KY.1.OA.3	Score this task based on the computational strategy the student used in the previous task. If necessary, ask " <b>How did you work that out?</b> " If the student uses a low level computation strategy such as direct modeling, the assessor may prompt "Is there another way you can work it out?"	0 - incorrect or uses direct modeling (e.g. builds with counters or draws all individual items) 1 - student solves without manipulatives (may track on fingers) using an inefficient counting strategy. For example, for $4 + 8 + 2$ , the student counts by 1 starting from 1 or 4. 2 - student is strategic in working with the addends (e.g. uses properties of operations). For example, for $4 + 8 + 2$ , the student first solves $8 + 2$ , then add 4.	

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

## FRA20 Part II - Conceptual Understandings Continued

## Test 1

\*For tasks with Story Cards (Questions 8, 9, 10, 13), show story card and read the story to the student. Read again as needed. Have a whiteboard, marker, and loose counters available for the student to use.

11	KY.1.NBT.2b	Quickly show (1-2 seconds) the pair of 10 frames showing $10+6$ and ask " <b>How many dots?</b> "	0 - incorrect 1 - correct but student needed to count by ones, count on, or build on fingers 2 - fluent (answers within 3 seconds with no visible counting by 1s)	
12	KY.1.OA.6b	Quickly show (1-2 seconds) the pair of 10 frames showing $4+8$ and ask " <b>How many dots?</b> "	0 - incorrect 1 - correct but student counts from one or counts from the smaller addend 2 - correct. Student counts on from larger addend or uses a composite strategy such as make 10.	
13a	KY.1.OA.1	Show story card D and read the story to the student.)* After the student responds, ask " <b>What might be another answer?</b> " If needed, prompt for additional combinations if (1) the student gives a trivial partition involving zero or (2) gives the reversal of the previously stated partition (e.g. 3 and 5, then 5 and 3).	0 - no correct non-trivial answers 1 - student gives one correct non-trivial answer 2 - student gives 2 correct, non-trivial answers. May include counting by ones, drawing, or using manipulatives.	
13b	KY.1.OA.6a	Score this task based on the computational strategy the student used in the previous task. If necessary, ask " <b>How did you work that out?</b> "	0- one or both incorrect 1 - correct but student needed to count by ones or build sequentially on fingers for one or both combinations 2 - fluent (e.g. student quickly gives both answers with no visible evidence of counting by ones (may flash fingers)	
14	KY.1.OA.7	Show first equation and ask " <b>Is this equation true or false?</b> " If needed, clarify "Is this equation correct?" or use other terminology familiar to the student. Repeat with next equation. (Use a piece of cardstock to cover the equation not being shown each time.) If the student's reasoning is not clear, ask "How do you know?"	0 - one or both incorrect 1 - correct for both but student is uncertain or cannot explain thinking 2 - correct for both and student can explain why	

Part II Score (Questions 8-14)  
22 points possible

Part I Score (Questions 1-7)  
14 points possible

Part I and Part II combined Score  
36 points possible

Notes:

# Fluency Readiness Assessment for Addition and Subtraction Within 20

## Additional Materials Needed:

- Whiteboard or paper and marker
- Loose counters or cubes (approx. 20)
- 1 sheet of cardstock to cover printables pages as needed

For each FRA 20 test, questions 6 & 7 involve numeral identification and comparing two numerals in the range of 11 to 19 using a symbol (<, >, =). Some students may benefit from working with numeral and symbol cards for these tasks rather than the provided full page displays. To prepare cards, print this page on cardstock and cut on the dotted lines.

>	11	12	13	14	15
<					
=	16	17	18	19	



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# Fluency Readiness Assessment for Addition and Subtraction Within 20

## Test 1

# Questions 1 - 5

**\*No Printables or Cards\***

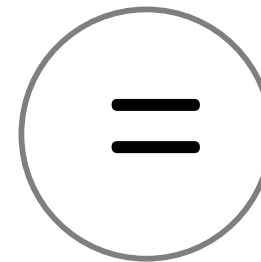
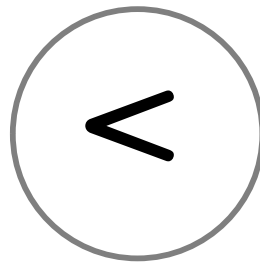
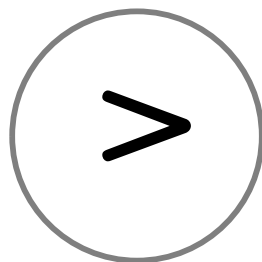
## Question 6

15

19

## Question 7

$$\boxed{15} \quad \bigcirc \quad \boxed{19}$$



## Question 8 (Card A)

Michael had 17 crayons. He gave 6 to his friend. How many crayons does Michael have left?

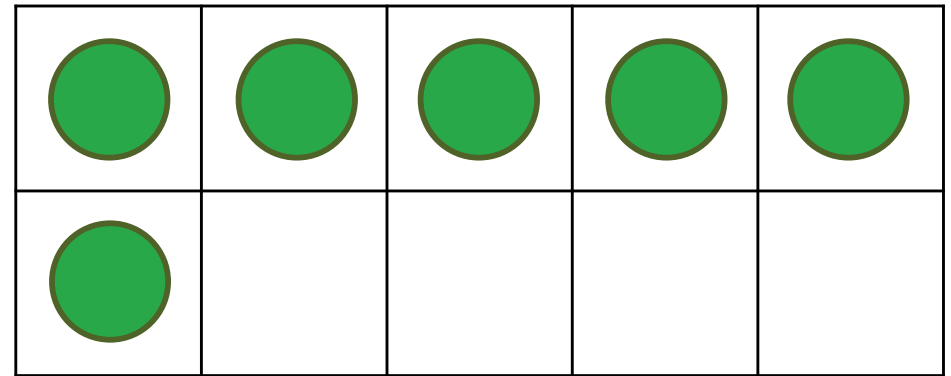
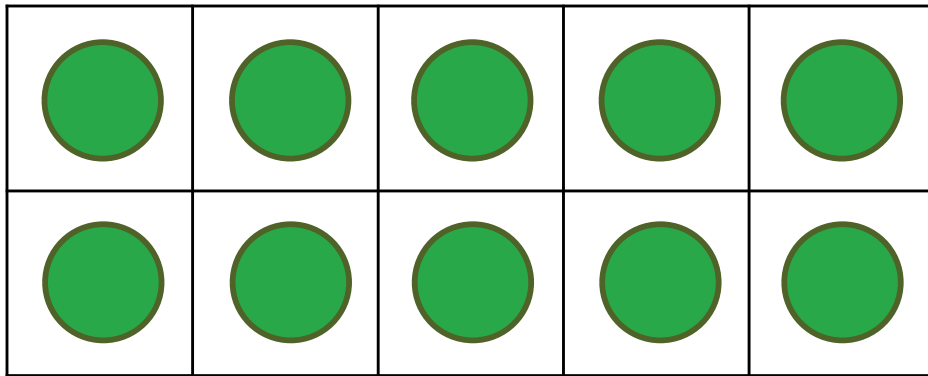
## Question 9 (Card B)

There were 13 children on the slides. Some children moved to the swings and now 9 children are on the slides. How many children went to the swings?

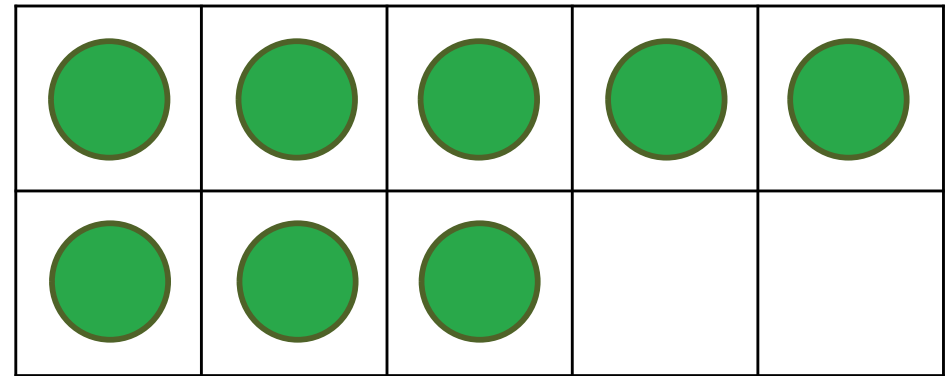
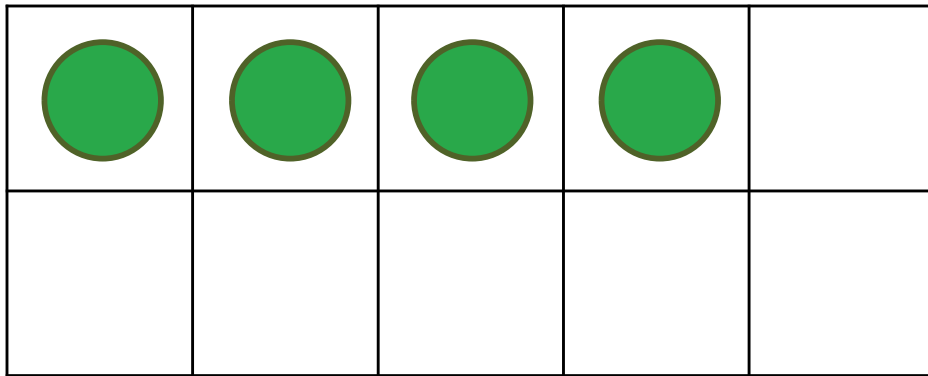
## Question 10 (Card C)

Mrs. Hardin has a bookcase. There are 4 books on the top shelf, 8 books on the middle shelf, and 2 books on the bottom shelf. How many books are on Mrs. Hardin's bookcase?

## Question II



## Question 12



## Question 13 (Card D)

Amanda has 8 markers. Some are red and some are blue. How many might be red and how many might be blue?

## Question 14

$$4 + 2 = 6 + 3$$

$$7 - 2 = 8 - 3$$