



7: Ten Frames Assessment

Linking Assessment to instruction

The following charts outline suggested activities for each instructional level of the *Ten Frames* assessment. They refer you to particular activities from the *Developing Number Concepts* (DNC) series of books. The DNC series includes both teacher-directed and independent activities specifically designed to meet the varied needs of students. The suggested activities are coded for easy access. For example, “1:2-23” refers to Book 1, Chapter 2, Activity Number 23.

Please note, these charts provide a quick-overview of activities for instruction. For complete background information, please refer to these other helpful resources:

Math Time: The Learning Environment by Kathy Richardson

Developing Number Concepts by Kathy Richardson

For Professional Development Opportunities

Contact Math Perspectives Teacher Development Center: www.mathperspectives.com

Suggested Reading

For additional information that will support your instruction, read the following sections from

From *Developing Number Concepts Book Two: Addition and Subtraction*:

- Internalizing Number Combinations to 10 (pp. 42-44, 54-55)
- About Number Combinations to 20 (p.151)

Providing Appropriate Instruction

When you are helping students develop proficiency adding and subtracting by making or breaking up a ten, it is important to recognize that competency develops over time. To be proficient, students must know parts of numbers to 10, understand teen numbers as a ten and some ones, and be able to mentally reorganize two single-digit numbers into a ten and leftovers and to know immediately the number they end up with.

Provide opportunities over several weeks for students to work with the idea of forming tens and leftover ones and breaking up tens in many ways. At the same time, provide additional experiences with number combinations, if needed. Let student’s responses dictate the amount of instructional time you spend before moving on.

- **Teacher-Directed Small-Group Work**

Choose 3 or 4 activities and present them in a 10-15 minute small-group session to provide the children with a variety of experiences. Do the same tasks for several days. Occasionally replace one of the tasks with a new one. Adjust the size of the numbers according to the children's responses. Usually work with just one group a day so you have time to interact with the children while they work at the Independent Stations.

- **Independent Station Work**

Give children opportunities to choose from among several activities. These choices should be available for several weeks. During this time, the children will be developing proficiency and moving to larger numbers, as they are able. Interact with the children as they work, supporting them and challenging them as needed.

TEN FRAMES

Children must have several skills in place in order to fluently add and subtract by forming and breaking up tens. They must be able to think of numbers from 11-19 as one ten and some more. In order to use the structure of tens and ones efficiently, they also need to know the parts of numbers through 10 and to be able to compose and decompose teen numbers. Whether the children are asked to add or subtract, they must be able to hold several steps in mind as they complete the process. Competency with all these skills develops over time. It is important to provide whatever time is necessary, because these skills are foundational to children's understanding of numbers to 99 and multi-digit addition and subtraction.

Ten Frames: Addition

In this assessment, children are asked to combine two numbers. While there are many different strategies children could bring to these tasks, this assessment poses questions deliberately worded to find out what children know about making tens and leftovers and to check their ability to use what they have learned about number relationships and combinations up to ten when solving these problems. For addition, the children have a model (the ten frame) of the number they start with, but do not have a model of the number being added. This requires them to mentally decompose the number they are adding to determine how many are needed to make a ten and how many are left.

1. Addition: Adding Ones to a Ten ($10 + 9$, $6 + 10$)

Needs Prerequisite (N)

(N) – Is unable to add to 10 so counts all the stars, or makes 2 errors.

*In order to get more information about what the children understand about numbers, assess using **Assessment 5: Number Combinations** and **Assessment 4: Number Arrangements**, and work with the tasks recommended.*

Needs Instruction (I) and Needs Practice (P)

Needs Instruction (I)

(I) – Knows either $10 + 9$ or $6 + 10$ and counts all to figure out the other one, **or** makes an error.

Needs Practice (P)

(P) – Knows either $10 + 9$ or $6 + 10$, but is able to count on from ten for the one not known.

The children who need instruction or need practice have a limited understanding of numbers as tens and ones. Focus on teacher-directed experiences asking them to combine one ten with various leftovers. This will help them begin to recognize the pattern that emerges when ten is added to a single digit number.

Teacher Directed Activities	
2:3-30	<i>Working with Ten-Shapes Addition: Ten Plus a Number</i>
2:3-31	<i>A Ten-Shape and More: Subtraction (Do the readiness activity described with this activity which focuses on addition.)</i>

Ready To Apply (A)

(A) – Knows both $10 + 9$ and $6 + 10$ without any counting or errors. Has the skills necessary to go on to combining numbers by making a ten and leftovers.

2. Knows Parts of Numbers

When children add by making a ten and leftovers, they need to know the parts of ten and the parts of the numbers being added to ten.

Needs Prerequisite (N)

(N) – Does not know the parts of numbers so counts all or guesses or makes 2 or more errors.

*To get more information about what the child knows about parts of numbers use **Assessments 4: Number Arrangements** and **Assessment 5: Combination Trains**.*

Needs Instruction (I)

(I) – Knows 1 of the 4 parts of numbers.

*To get more information about what the children know, assess using **Assessment 6: Hiding**.*

Focus on describing the parts of numbers

TEACHER-DIRECTED ACTIVITIES			
		To 6	To 10
2:2-1	<i>Snap It</i>	•	•
2:2-2	<i>The Tub Game</i>	•	•
2:2-5	<i>The Cave Game</i>	•	•
2:2-6	<i>Grab-Bag Subtraction</i>	•	•
2:2-8	<i>Working with Number Shapes</i>	•	•
2:2-9	<i>Number Shapes: On and Off</i>	•	•
2:2-21	<i>Number Shapes: Using Spinners</i>	•	•

INDEPENDENT ACTIVITIES			
		To 6	To 10
2:3-15	<i>Build-a-Floor Race</i>	•	•
2:3-19	<i>Addition-and-Subtraction Spin It</i>	•	•
2:3-20	<i>Counting Boards: Think and Write</i>	•	•
2:3-21	<i>Grab-Bag Addition Station</i>	•	•
2:3-22	<i>Grab-Bag Subtraction Station</i>	•	•
2:3-26	<i>What's Missing?</i>	•	•

Needs Practice (P)

(P-)– Know parts for 2 of the items with 1 error.

(P) – Knows 2 with no errors or knows 3 or 4 with 1 error.

(P+)– Knows 3 and counts on for 1 with no errors.

Children who need practice know some of the parts of numbers. Focus on asking the children to predict ahead of time what they think the missing part will be.

TEACHER-DIRECTED ACTIVITIES			
		To 6	To 10
2:2-1	<i>Snap It, Level 2</i>	•	•
2:2-2	<i>The Tub Game, Level 2</i>	•	•
2:2-5	<i>The Cave Game</i>	•	•
2:2-6	<i>Grab-Bag Subtraction Station</i>	•	•

INDEPENDENT ACTIVITIES			
		To 6	To 10
2:3-15	<i>Build-a-Floor Race</i>	•	•
2:3-16	<i>Apartment Buildings</i>		•
2:3-22	<i>Grab-Bag Subtraction Station</i>	•	•
2:3-25	<i>The Snap-It Station</i>	•	•
2:3-26	<i>What's Missing?</i>	•	•

Ready to Apply (A)

(A) – Knows all 4 of the parts necessary to solve the problems and uses them with ease to determine the number of tens and leftovers.

3. Making a Ten and Adding Ones

Children can often add 10 and a number of ones with ease, but find it much more difficult if they have had to break up numbers to make the ten with some leftovers. They can't just rely on the pattern of adding 10 and some more but must hold the ten in their mind as a unit.

The children need to work with the following activities listed that focus them on making tens and combining them with ones no matter what their instructional level. They will need differing amounts of support to do the tasks and differing amounts of time working with these ideas depending on their instructional level.

Needs Prerequisite (N)

(N) – Counts all or counts on from the number of stars in the ten frame for 2 (out of 3).

Children at this level show little or no understanding of tens and ones. They are still thinking of numbers as a collection of ones instead of as groups of tens and leftover ones, so they count all or count on from the number of stars in the ten frame for 2 out of the 3 items.

Needs Instruction (I)

(I) – Adds by counting on from 10 for all three items, or by counting on from the number of stars or counting all the stars for 1 or 2 of the items.

Children at this level have a very beginning understanding of combining a ten and some ones.

Needs Practice (P-, P, P+)

(P-) – Combines tens and ones without counting for 2 items but makes an error or counts all the stars for one item.

(P) – Either counts on from 10 for 2 of the items or counts from the number of stars for one item.

(P+) – Knows 2 parts and counts on from 10 to figure out 1 of the items.

Children at this level understand how to combine a ten and some ones, but it is not yet easy, or is not always accurate.

First, focus on breaking up the numbers to make a ten; "How many do we need to make a ten?"

Then, focus on how many would be left; "If you used this part to make a ten, how many would be left?"

After, focus on what the total would be; "What do you notice about the part that is left and the total?"

TEACHER-DIRECTED ACTIVITIES	
2:3-30	<i>Working with Ten-Shapes</i> <i>Focus on Addition</i>
2:3-31	<i>A Ten-Shape and More: Subtraction</i> <i>(Do the readiness activity described with this activity which focuses on addition.)</i>
2:3-33	<i>Number Shape Pairs (Adapt–have children combine by making a ten and leftovers).</i> <i>Break the number to be added on (8 in this example) into the parts necessary to make a ten.</i> <i>Example: 7 + 8</i> $\begin{array}{c} \wedge \\ 3 \quad 5 \end{array}$ <i>Add the 3 to make a ten: $7 + 3 = 10$</i> <i>Add the part left over (5 in this example) to find the total: $10 + 5 = 15$</i> <i>(Make sure they understand before having them work with this as an independent task.)</i>

INDEPENDENT ACTIVITIES	
2:3-33	<i>Number Shape Pairs (Adapt–have children write how many to make a ten as described above in Teacher-Directed Activities.)</i> <i>Example: 7 + 5</i> $7 + 3 = 10$ $\begin{array}{c} \wedge \\ 3 \quad 2 \end{array}$ $10 + 2 = 12$
2:3-34	<i>Two Ten-Shapes: Addition Station (Focus on Addition)</i>

Ready to Apply (A)

(A) – Knows the totals without counting for all of the items.

Ten Frames: Subtraction

1. Subtracting a Ten From Ones (15 is 10 and 5, 14 is 10 and 4, 13 is 10 and 3)

Needs Prerequisite (N)

(N) – Knows 0 (out of 3), or has 2 or more errors.

Children at this level do not have an understanding of decomposing teen numbers into a ten and some ones. Make sure they can combine tens and ones before working with them on decomposition. Then, explore what happens to numbers when ten is taken away.

TEACHER-DIRECTED ACTIVITIES	
2:3-30	<i>Working with Ten-Shapes – Subtraction: Minus Ten</i>
2:3-31	<i>A Ten-Shape and More: Subtraction</i>

Needs Instruction (I) and Needs Practice (P)

Children at this level have a beginning understanding of the composition of teen numbers as 1 ten and some ones.

Needs Instruction (I)

(I) – Knows 1 (out of 3), may have 1 error.

Needs Practice (P)

(P-)– Knows 2 (out of 3) and counts on 1 (out of 3), with 1 error.

(P) – Knows 2 (out of 3) and counts on 1 (out of 3), no errors.

For all levels, focus on decomposing numbers from 11 to 19 into 1 ten and the ones that are left over. The following activities use ten frames. Sometimes use connecting cubes to organize cubes into one ten and some ones in addition to using ten frames

TEACHER-DIRECTED ACTIVITIES	
2:3-30	<i>Working with Ten-Shapes: Subtraction</i>
2:3-31	<i>A Ten-Shape and More: Subtraction</i>

INDEPENDENT ACTIVITIES	
2:3-34	<i>Two Ten-Shapes: Addition and Subtraction</i>
2:3-35	<i>A Ten-Shape and More: Subtraction Station</i>
2:3-37	<i>Wipe Out</i>

Ready to Apply

(A) – Knows 3 (out of 3), no errors.

Knows Parts of Numbers

When children subtract by breaking up a number in order to get to ten and then take the rest of the number away from the ten, they need to know the parts of ten and the parts of the numbers being taken from ten. Children may appear to know the parts to 10 when assessed on the *Hiding Assessment*, but in *Ten Frames*, they have to apply what they know about parts.

The Instructional Levels and the Tasks are the same as for Ten Frames: Addition

Making a Ten and Subtracting Ones

For subtraction, students decompose a teen number into one ten and leftovers. They subtract by breaking up a number to get to ten and take the remaining part from the ten.

Needs Prerequisite (N)

(N) – Knows 0, or has 2 or more errors.

Needs Instruction (I)

(I) – Knows 1 (out of 3), may have 1 error.

Needs Practice (P)

(P) – Knows 3 (out of 3) with 1 error, **or** knows 2 (out of 3) and counts 1.

(P-)– Knows 2 (out of 3), with 1 error.

First, focus on breaking up the teen number to make a ten, “How many do we need to take away to get to ten?” Example: “We have 14. We are going to take 6 away. How many do we need to take away to get to 10?” ($14 - 4 = 10$)

Then, focus on the part that would be left, “We have 14. We are going to take away 6. We take away 4 to get ten. How many do we still need to take away? 6 is 4 and 2. We have to take 2 away.”

After, focus on what the remainder would be; “How many of the ten will be left if we take 2 away?”

TEACHER-DIRECTED ACTIVITIES	
2:3-30	<i>Working with Ten Shapes: Subtraction</i>
2:3-31	<i>A Ten-Shape and More: Subtraction</i>

INDEPENDENT ACTIVITIES	
2:3-34	<i>Two Ten-Shapes: Addition and Subtraction</i>
2:3-35	<i>A Ten-Shape and More: Subtraction Station</i>
2:3-37	<i>Wipe Out</i>

Ready to Apply (A)

(A) – Knows 3 (of 3), no errors.

3. Extension: Ten More (Addition and Subtraction)

This question is designed to see whether children recognize the relationship between "8 + 7" and "18 + 7," and "13 - 6" and "23 - 6." The same experiences can be used for both addition and subtraction. All students who reach this level of the assessment need to work with more than 1 ten frame to see what happens with the numbers.

Needs Prerequisite (N)

(N) – Is unable to do the task or needs to count all to determine how many.

Needs Instruction (I)

(I) – Counts on/back to determine how many.

Needs Practice (P)

(P) – Makes twenty with 3 left over when adding, **or** subtracts 3 from 23.

Ready to Apply

(A) – Adds ten to the previous total.

Work with the following tasks but adapt them by adding one or more ten frames. Focus on what happens to the numbers when ten frames are added.

Examples: $12 - 6 = 6$ $22 - 6 = ?$ $32 - 6 = ?$

TEACHER-DIRECTED ACTIVITIES	
2:3-30	<i>Working with Ten-Shapes (Adapt by adding another ten frame)</i> <i>Addition: Ten Plus a Number</i> <i>Subtraction: Minus Ten</i>
2:3-31	<i>A Ten-Shape and More: Subtraction (Adapt by adding one or more additional ten frames.)</i>

INDEPENDENT ACTIVITIES	
2:3-34	<i>Two Ten-Shapes: Addition Station (Adapt by adding one or more additional ten frames.)</i>
2:3-35	<i>A Ten-Shape and More: Addition Station (Adapt by adding one or more additional ten frames.)</i>