

## G-3 BUILDING QUANTITIES ON A TEN-FRAME



### Related Lessons

Consider teaching first L-2 *Five Little Speckled Frogs*. Consider as follow-up lessons G-4 *+1, -1 On a Ten-Frame* and P-1 *How Many Frogs?*

### Overview

This game provides a wonderful context for reinforcing vocabulary and introducing the ten-frame as a valuable mathematical tool to students. Students connect number names to written numerals and build sets to represent the given quantity on a ten-frame. The use of a life-size ten-frame has students actively involved as both counters (counting) and “counters” (students stand on the ten-frame to represent the given quantity). The discussions and immediate feedback that takes place during the game highlight student understandings and discoveries in a meaningful context.

### Common Core State Standards

#### **Counting and Cardinality: Standard K.CC**

*Know number names and the count sequence.*

*Count to tell the number of objects.*

*Compare numbers.*

Aligned to the mathematical practices in the Common Core State Standards

### Goals for Student Understanding

These goals are aligned to the mathematical practices in the Common Core State Standards. Students will

- Make sense of problems and persevere in solving them.
- Construct viable arguments and critique reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

**Setting**

Whole group

**Time**

Approximately twenty minutes

**Materials**

Reproducible H: Number Cards 1–10,  
1 set of cards  
1 life-size ten-frame (see Teaching Tip)  
*Building Quantities on a Ten-Frame*  
Teacher Checklist

*Building Quantities on a Ten-Frame* Student  
Checklist, 1 copy per student

**Key Vocabulary**

add  
count all  
count back  
count on  
numeral  
quantity  
remove  
represent  
ten-frame

**TEACHING DIRECTIONS**

1. Gather students in the whole-group area in your classroom (where you've created your life-size ten-frame). Draw a card from a deck of number cards 1 through 10 (see Reproducible H). Ask students what numeral is on the card.

**TEACHING TIP:  
LIFE-SIZE  
TEN-FRAME**

Create a life-size ten-frame in your whole-group area by using masking tape or colored tape (blue painter's tape works well). Make your ten-frame large enough for one student to be able to stand in each square. Choose a location toward the front or the side of your whole-group area that will allow all students to be able to see.

2. Ask a student who has answered correctly to build a set on the life-size ten-frame with the quantity represented by the numeral on the card. To do this, the student needs to tap seated students. As each student is tapped, he or she comes forward and stands in a square on the ten-frame. The designated student continues to tap seated students until the quantity on the ten-frame matches the numeral on the card.
3. Ask the students if they agree that the number of students on the ten-frame matches the quantity represented by the numeral on the card. If they do not agree, ask a volunteer to explain and change the quantity as necessary. Once again, by tapping students gently, the student should have more students come up to the ten-frame, or have students leave the ten-frame (via a gentle tap) and return to the sitting area.

**Key Question**

- Does the number of students on the ten-frame match the quantity on the card? Why not?

4. Draw another card and repeat Steps 1 through 3 several times.

## Extension

### Using Ten-Frames and Counters

After the procedures of this game are familiar, have students play as a whole group using their own ten-frames and counters. When using their own ten-frames, students should sit in a circle. (When students are seated in a circle, it is easier to observe the strategies students are using as each set is built.) As the teacher, draw a card and have students create the quantity on their ten-frames. As in the original directions, have students share their thinking and strategies. After students are familiar with using their own ten-frames in this game, have them play individually or with a partner.

#### TEACHING TIP: ADDITIONAL RESOURCES

For more games using ten-frames, see *It Makes Sense! Using Ten-Frames to Build Number Sense* by Melissa Conklin.

## FORMATIVE ASSESSMENT IN ACTION: QUESTIONS

Use the following questions to help guide your observations of students as they are engaged in the lesson. These focused observations in turn support the instructional decisions you'll make for individual students and your class.

- Is the student willing to share his or her thinking? In which settings (individual, partner, small group, or whole group) do you see the student as most comfortable in verbalizing his or her mathematical thinking?
- Does the student understand that there are 10 squares on the ten-frame? Five on the top row and five on the bottom row?
- Does the student use this information when building on the ten-frame?
- How does the student build on the ten-frame? Left to right? Top row to bottom row? In groups of two, one on the top row and one on the bottom row?
- Does the student represent the given quantity accurately?
- Does the student represent a new quantity efficiently by adding on or removing from the previous quantity?

## STUDENTS WHO STRUGGLE

### Helping Students Who Are Unwilling to Share Their Thinking

Some students may not be ready to share their thinking. If I ask a student to share and the student is not willing or able to explain his or her thinking to the class, I might try to verbalize the student's thinking. For example, if Andrea is hesitant to share her thinking, I might say, "I noticed Andrea adding on when she built seven on the ten-frame. Why do you think she added on instead of wiping the ten-frame clean, and then building a new set with seven?" By noticing Andrea's strategy and validating that other people are using her way of thinking, I hope to draw Andrea further into the game. With repeated experiences using a ten-frame in this type of setting, Andrea will eventually be encouraged to verbalize her own ideas. Make clear to the class your expectation that everyone is an important part of learning time; we learn from each other!



## Helping Students with Representing a Quantity Accurately

Counting is complex. Children need many experiences counting a variety of objects to develop successful counting strategies. Such counting strategies include being organized, touching each object as it is counted, using one-to-one correspondence, conserving, and double-checking. A combination of student-directed experiences and planned, purposeful experiences helps students

become aware of what good “counters” do. Quick images, Rekenreks (bead boards), ten-frames, counting each other, and counting snacks are all opportunities that will help students become better counters and become better at representing quantities accurately.

## WHAT HAPPENS IN MY CLASSROOM



### BUILDING QUANTITIES ON A TEN-FRAME

#### VIDEO CLIP 11

In this clip, Dana describes the community aspects, benefits, and goals of this game, as well as the types of responses she is interested in seeing from her students. The clip then shows students playing the

game on the floor-size ten-frame in Dana’s kindergarten classroom. As you watch the clip, consider:

- How does Dana use the floor-size ten-frame to build an understanding of number concepts with her students?
- What strategies do students use to build and/or adjust a quantity?
- What questions does Dana ask to help build an understanding of composing and decomposing numbers?

After you watch the clip, consider:

- How does playing this game in a whole-group setting impact student learning?
- What benefits does a floor-size ten-frame provide students?

Often when students are introduced to ten-frames they count all the counters for each new quantity. Each time, they wipe their ten-frame clean and build the next quantity by counting all. I carefully watch for students who are acknowledging that there are five squares on the top row

of their ten-frame and five squares on the bottom row. When I notice this I ask, “Why would that be helpful to remember when playing this game?” Students reach a mathematical milestone after they internalize that there are five on the top row and five on the bottom row, and thus they do not need to count each object within a square every time to know how many are on the ten-frame.

Intentional discourse between students and teacher during this game can encourage children to count on or count back to build a new quantity. When I notice a student adding on or removing from the original set to build a new quantity, I validate and highlight this strategy by talking about it and writing it down. I might say, “I noticed you added on to the students already on the ten-frame. Why did you add on?” For example, if there are seven students standing on the ten-frame, one of my students may respond, “I know I have five and I can add six then seven to make seven” (as the student points to the two students added on). I have also heard, “There are five and two more makes seven.” Strategies I have observed my students using include counting all, counting on, and counting back. I make a list of the strategies *used by the students* to acknowledge and emphasize the use of strategies as well as to encourage vocabulary development.

As students explain their thinking and justify their strategies, they solidify their thinking. Other students are given a different perspective on a way to approach the situation. Students who have not tried the strategy can be asked to try it when the next quantity is built. I check in with a student trying a new strategy by asking key questions:

### **Key Questions**

- Does the strategy of counting on work? Why?
- Do we need to clear the ten-frame every time we build a new set? Why not?

After several more quantities are built, I ask my class questions like the following:

### **Key Questions**

- Is it quicker to count on or to count back from the counters on the ten-frame?
- Is it quicker to clear the ten-frame and then build the new set?

The discussions that take place enhance the learning for all students. Through these discussions, immediate feedback is given and new strategies are tried. Students are empowered to use new vocabulary to communicate their understandings to others. All students benefit from this by speaking, listening, considering new possibilities, and understanding that their voice is important. Allowing time for communication and additional practice gives students the information and reinforcement they need to strengthen their mathematical understandings. In turn, as the teacher I gain insights to the concepts students understand and those that students need additional support with and practice to master (formative assessment in action!).

## FORMATIVE ASSESSMENT IN ACTION: TEACHER AND STUDENT CHECKLISTS

### ***Building Quantities on a Ten-Frame Teacher Checklist***

Checklists are invaluable in helping to focus your observations as well as to document student behaviors, responses, and reactions to lessons. Each column in the checklist specifies what to observe while students are engaged in the mathematical activity. Having the checklist ready on a clipboard, and easily accessible, helps to ensure necessary documentation and recording takes place. For more on using teacher checklists as a successful formative assessment practice, see page 15.

### ***Building Quantities on a Ten-Frame Student Checklist***

This checklist helps students monitor their own learning, set math goals, and ultimately share academic progress with their parents. Each child should have his or her own student checklist and should keep it in his or her student notebook. For more on using student checklists (including video clips) as a successful formative assessment practice, see page 20.

# TEACHER CHECKLIST: BUILDING QUANTITIES ON A TEN-FRAME

[illegible]

# STUDENT CHECKLIST

NAME \_\_\_\_\_

## BUILDING QUANTITIES ON

### A TEN-FRAME

I recognize numbers.	I build sets.	I build top, left to right, then bottom, left to right.	I build from the counters already on the ten-frame.

DATE \_\_\_\_\_

DATE \_\_\_\_\_

DATE \_\_\_\_\_

DATE \_\_\_\_\_