

Notes for the Teacher

Students develop methods for arranging counters within a collection of ten frames that make it easier to find the total number without counting them one-by-one.

Objectives:

- Students use a ten frame model to represent numbers greater than 10.
- Students explore strategies for moving and rearranging counters within multiple ten frames to make them easier to count.
- Students develop counting strategies such as counting by twos and fives or using landmark numbers like 10.

Common Core Mathematical Practices: (1) Make sense of problems and persevere in solving them; (2) Reason abstractly and quantitatively; (3) Construct viable arguments and critique the reasoning of others; (5) Use appropriate tools strategically; (7) Look for and make use of structure

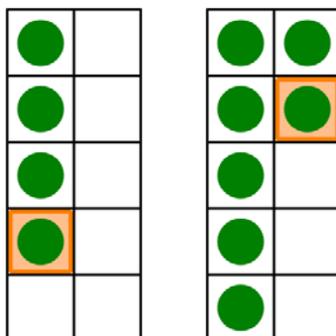
Common Core State Content Standards: K.CC.2, 3, 4, 5; K.OA1, 3, 4; 1.OA1, 2

Grade Range: Grades K–1

ACTIVITY ONE

Introduce:

Open **Ten Frames--Counting Strategies.gsp**. Use a projector to show sketch page “Pair of Frames.” Drag the left frame’s gold square to show 4 green counters. Drag the right frame’s gold square to show 7 green counters. Finally, press the *Ready* button to hide the gold squares.



Say, “I want to find the total number of green counters. To make it easier, we can drag counters from one frame to the other.” Have a volunteer come to the computer and drag counters from one frame into the other and then ask, “Can moving the counters between frames make it easier to tell the total number of counters?”

Have the student explain her thinking. Sample strategies might include:

- *I dragged 3 counters from the frame on the left to fill the frame on the right. That makes it easy to count. There are 10 and 1 more, or 11 counters in all.*
- *I dragged counters so there were pairs of counters, side by side. I counted by twos...2, 4, 6, 8, 10, and 1 more makes 11.*

Model a few more examples until you feel students understand the activity.

Note: Pressing *Show Numbers* displays the number of counters in each frame. These numbers are updated as counters are dragged into and out of the frames. You can choose whether or not to display these numbers as students work.

Explore:

Assign students to partners and send them in pairs to the computers. Have them open **Ten Frames--Counting Strategies.gsp** and go to the “Pairs of Frames” page.

Tell students to take turns adding green counters to the ten frames and having their partner figure out the total number of counters. Students should follow these steps:

- Drag each gold square to add counters to the ten frames.
- Press the *Ready* button.
- Have your partner drag counters to find the total number of counters.
- Press the *Reset* button to play again.

Observe students as they work. What different strategies are they using? Are they filling a frame to make 10 when possible? Do they count by twos or fives? Recognizing students’ strategies will give you insight into their concept of number.

Discuss:

Bring students together and discuss the activity. Ask, “How did you figure out the total number of counters?” Sample student responses include:

- *I counted each counter one by one to find the total number.*
- *I started with the ten frame with the most counters and counted on from that number. For example, if the ten frames showed 3 and 9, I started with 9 and counted on 3 more: 9, ... 10, 11, 12. So, there were 12 counters in total.*
- *I filled a ten frame with counters, so I knew there were 10 counters plus any extra in the other ten frame. It’s easy to add with 10.*

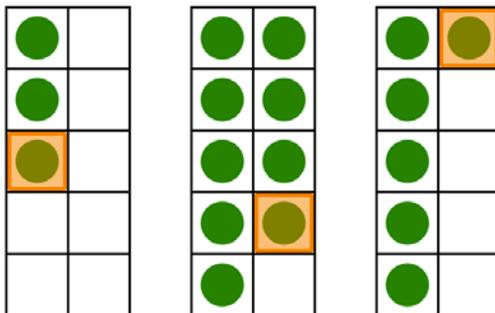
- *I made pairs of counters and counted by twos.*
- *I made groups of 5 counters and counted by fives.*
- *I tried to even out the columns so there was the same number of counters in each column. Then I skip counted by the number and added on any extra.*

ACTIVITY TWO

Introduce:

Go to the “Three Frames” page. Explain that the goal is similar to the prior ten-frames activity, but now there are three frames and more counters.

Demonstrate the activity: Drag the gold squares to show 3, 9, and 6 counters. Press the *Ready* button.



Say, “I want to find the total number of green counters. We can drag counters to any frame we want.” Ask a volunteer to drag the counters. Can moving the counters between frames make it easier to tell the total number of counters?

Have the student explain his thinking. A sample strategy is, “I dragged 1 counter from the first frame to fill the middle frame. Then I dragged the 2 remaining counters from the first frame onto the third ten frame to make 8. So 10 and 8 are 18.”

Explore:

Assign students to partners and send them in pairs to the computers. Have them open **Ten Frames--Counting Strategies.gsp** and go to the “Three Frames” page.

Tell students to take turns adding green counters to the ten frames and having their partner figure out the total number of counters. Students should follow these steps:

- Drag the gold squares to add counters to all three frames.
- Press the *Ready* button.
- Have your partner drag counters to find the total number of counters.

- Press the *Reset* button to play again.

Observe students as they work. Watch for students who are still counting each counter one-by-one to find the total. Encourage them to drag the counters from frame to frame to make it easier to see, without counting individually, how many counters there are in all.

Discuss:

Bring students together and discuss the activity. Ask, “How did you figure out the total number of counters?” Students will likely suggest strategies similar to those in the first activity.

ACTIVITY THREE

Go to page “Frames Game.”

Activity Three is the same as Activity Two, but now Sketchpad generates the problems at random. To play, students press *New Problem*. A random number of counters appear in each of the three frames. Students now drag the counters from frame to frame to make them easier to count. They enter the total number of counters in the box labeled *Total*. Then they press *Check Answer* to see if they are correct. As with the previous two activities, students can choose whether to display the number of counters in each frame by pressing *Show Numbers*.

Related Activities:

- *Ten Frames—Making 10*

License (CC-BY-NC-SA 3.0)

This work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-sa/3.0/> or send a letter to Creative Commons, 444 Castro Street, Suite 900, Mountain View, California, 94041, USA.

If you adapt and/or share this work, you must attribute it to “KCP Technologies, Inc., a McGraw-Hill Education Company,” and you may distribute it only non-commercially under the same or similar license.

Portions of this material are based upon work supported by the National Science Foundation under award number DRL-0918733. Any opinions, findings, and conclusions or recommendations expressed in this work are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.