

Thinking About Thirty

Grade 1

Activity #121

Relevant Chapters in the *Digi-Block Comprehensive Teacher's Guides*:

Overview

Students explore the quantity 30. They find ways to separate it into two parts, identify patterns in the addends, and explore the regrouping concept as they add.

Objectives

Thinking Skills: Students describe patterns in the addends that total a given number, in this case 30. They reflect on and describe why the sum is always the same. They relate the number line model to the base ten model as they combine addends.

Mastery Skills: Students learn to model complements of 30 using blocks on a number line.

Materials

Each pair of students needs:

- 1 number line (0-30)
- 30 single blocks
- 6 small holders
- 1" x 3" strip of tag board - cutting up an index card works well

- "Thinking About 30" Activity Sheet #1
- "Parts of 30" Activity Sheet #2

Class Introduction

(10 minutes)

Have student pairs fill a number line with blocks. Ask, **How many blocks did you use? How do you know there are 30 blocks on the number line?**

- The most obvious answer may be that students read the number 30 on the number line. If so, ask, **What are some other ways I could make sure that I have 30 without packing?**
- Students may count by ones, describe the 3 tens, or count 10, 20, 30 using the hash marks.

Explain to students that they will be learning more about thirty.

- They will explore combinations of two numbers ("parts" or "addends") that make 30 (the "total" or "sum").
- They will look for patterns in the number pairs.

Have students turn their number lines around so the side without numbers is facing them. Review the significance of the hash marks.

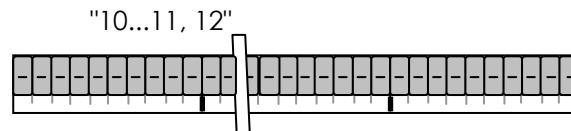
- Use the hash marks to count by tens to 30.
- Also, have students use the hash marks to help them locate specific blocks: for example, the fifth block, the twenty-second block, and so on.

Give each student pair a 1" x 3" strip of tag board. They will use this to "slice" the 30 blocks into two parts. Have volunteers demonstrate placing the strip between any two blocks.

Ask, **How many blocks are on this (the left) side? How do you know? How many blocks on the other (the right) side? How do you know?** Accept students' strategies as long as they can justify their thinking.

- Some students will be comfortable counting by ones only, but many will likely use the hash marks as a "shortcut" to counting all the blocks on each side of the strip. To begin, it may be wise to show $10 + 20$ and $20 + 10$. Then place the strip at 12, for example.
- Students may easily name the first addend by counting tens and ones from the left, as they practiced earlier. To identify the second

addend, however, they may discover that this is easily done by counting from right to left! Again, the hash marks make it easy to count tens and ones.



"One ten and 8 ones - that's 18. I can check myself because I also know that 2 less than 20 is 18!"

Activity

(30 minutes)

Have student pairs use the "Thinking About 30" activity sheet to record number pairs that equal 30.

- One partner separates the block number line with the paper strip, **both** students name the parts, then the other partner records the addends in the table.
- Partners switch roles after each new number pair is named.
- For the last four numbers, students **predict** the second addend before counting the blocks.

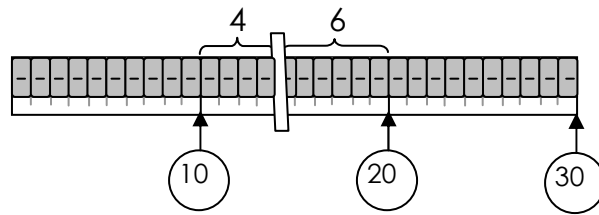
Have partners study and discuss their lists of numbers. Ask, **What do you notice about numbers that add up to 30? Do you see any patterns?**

Next, open up the discussion to the whole class. Have students share some of their number pairs that make 30.

- Record examples on chart paper for the whole class to view. Begin with random pairs, then ask, **Is there a way I could organize these number pairs to help me know if I have made all of the combinations?**
- As a class, create an organized list of addends. Have students convince one another that it is complete. This will be a long list, indeed, but students will enjoy the challenge!

Have students describe some generalizations or patterns they see in the pairs of numbers. In their own words, students will likely describe the following ideas:

- There are "flip-flop" addends such as $3 + 27$ and $27 + 3$. This is an example of the commutative property of addition, where the order of the addends doesn't change the sum.
- They will see a "growing-shrinking" pattern: as one addend gets larger, the second addend gets smaller.
- In most pairs, the ones digits make a ten. In the above example, 3 and 7 make 10. For 14 and 16, the 4 and 6 make 10. Show this pair on the number line. Show how the middle ten is broken into 4 + 6:



Model these ideas with the blocks, this time in the holders, to show the base ten view of addition. For example:

- Have students use their "sliced" number line that shows $14 + 16$.
- Distribute holders to student pairs.
- Have them pack each addend separately.
- **Ask, How many blocks-of-10 do you have? How many singles? What happens when we combine the blocks of ten and singles?**

Here is a "top-down" view of the addends packed separately. Set up this way, it is easy to see how the 4 and the 6 combine to make the 3rd block-of-10.

14		
16		

- Repeat with other examples of number pairs in holders.

Closure

(5 minutes)

Refer to the class-generated list of number pairs that make 30.

- Have students summarize some of the mathematical ideas that were explored during the lesson.
- Have students explain and demonstrate how the number line model of $14 + 16$ is related to the block (base ten) model.
- Encourage children to think about ALL the number pairs that total 30. Ask, **Did anyone make an organized list to try to find all the number pairs that total 30?** Discuss how this list might look:

$$0+30$$

$$1+29$$

$$2+28$$

...and so on

Assessment

Observe students as they model and name pairs of addends. All levels of students can be successful if they use a strategy that works and makes sense to them. Do they:

- Count by ones?
- Count by tens and then tack on ones (10, 20, 21, 22, 23)?
- Instantly "see" and name the number represented by tens and ones?

Provide students with the "Parts of 30" Activity Sheet #2.

- To complete this activity sheet, students practice naming addends of 30.
- Students may use the blocks, holders, number line, or do the work mentally.
- Although there are many "right" answers, or number pairs that total 30, the numbers students choose to write should reflect the relative sizes of the addend spaces.
- For those students who need more guidance, fill in some of the blanks for them and have them find the other number pairs.

Observe students as they complete Activity Sheet #2. Do they:

- Count up by ones to 30 to name the second addend or do they employ some kind of "shortcut?"
- Use the number line and/or holders to name addends?
- Understand what happens when ten ones are combined? Do they "see" the new ten?
- Predict what the second addend will be **before** checking with the blocks?

Extensions

- Play "How Far to 30?" Say a number less than 30. Have students use the number line to find the second addend to make 30. Then try playing without the number line to build mental math skills! Discuss strategies. Here are some examples of student strategies if the first addend is 17:
 - Student A: (17) 27, 28, 29, 30 . . . that's one ten and three ones, or 13.
 - Student B: Hmm . . I want to get to a nice number. (17), 18, 19, 20, . . . 30. I count on 3 to get to 20, and then just addend a ten. That's 3 +10, or 13.
 - Student C: Drawing tally marks (17) 18, 19, 20, 21, 22,30.
- Explore other ways to name 30. For example, $10 + 10 + 10$, 6 fives, minutes in a half hour, days in January, March, May, . . . , $2 \frac{1}{2}$ feet (30 inches), and so on.
- Repeat a similar activity as described above to name addends of 20, 40, or even 100.

Partners: _____

Thinking About Thirty

Directions:

1. "Slice" the block number line.
2. Agree on the parts.
3. Record the parts.
4. Take turns "slicing" and recording.

Part	Part	Total
		30
		30
		30
		30
		30
		30

Parts of 30

Directions:

Imagine that each is a number line that shows 30.
Write a number in each part so that their total makes 30.
Write bigger numbers in bigger parts and smaller numbers in smaller parts. Use your number line and blocks if you need help.

10	
----	--

--	--

--	--

--	--

--	--

Draw a line to separate the last line into parts. Name your parts!

--