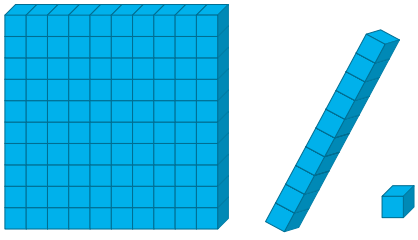
How Many Can You Hold?

OBJECTIVE

Children will make and revise estimates using place-value concepts. They will explore capacity as they revise their estimates.

WHAT YOU WILL NEED

Base Ten Blocks, 1 set per pair



1–100 Grid, 1 per pair, page 89

Plastic containers of various sizes (optional)

OVERVIEW

In this activity, children estimate and then count the number of Base Ten units that they can hold in their two hands.

THE BIG IDEA

How Many Can You Hold? helps sharpen children's number sense by leading them to think about the reasonableness of their answers. Challenging children to make estimates and then evaluate whether or not their estimates make sense helps to reinforce the idea that we should approximate numerical amounts based on what we know and not on "wild" guesses.

After filling one partner's hands with unit blocks, each member of a pair should estimate the total number of units independently. To ensure that each partner's estimate reflects his or her own thinking, have the partner doing the recording secretly record his or her own estimate first and then ask for and record the other child's estimate.

Some children may sight the filled hands, realize that they contain a great many units, and then go on to "estimate" that there are 100, 1,000, or even 1,000,000 units! Finding an actual count for about half the total number of units sheds light on the estimation process.

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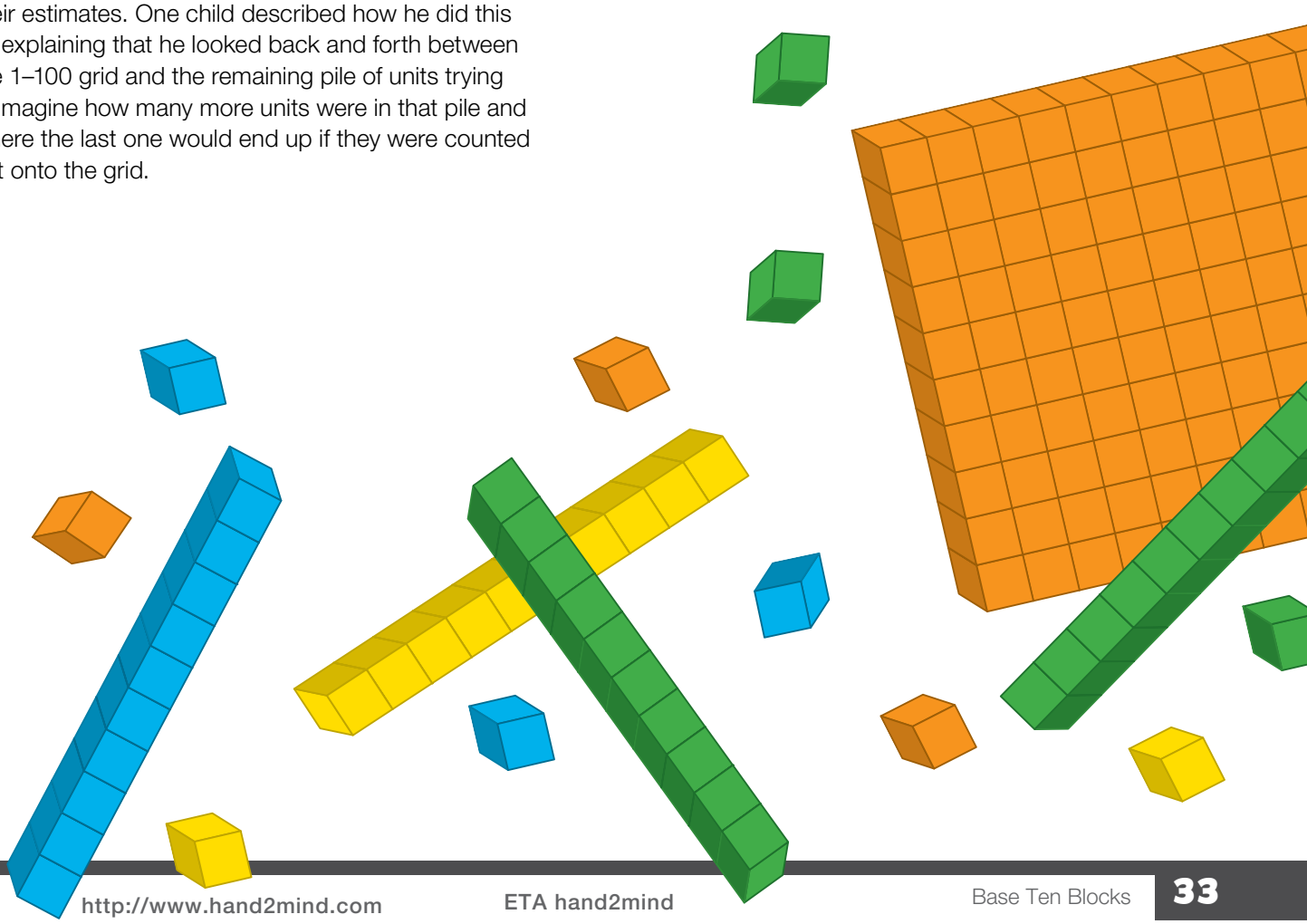
After counting the first half of the units, many children will be able to generalize how they should change their estimates to more accurately estimate the entire quantity.

Make sure that children understand that the purpose of changing an estimate after counting about half of the units is to make a better estimate, one that is probably closer to the actual value of the total. It is important that children understand that a good estimate should be close in number to the actual value while not necessarily matching it exactly. Encourage children to state their estimates in approximate terms as, for example, “about 15” or “between 20 and 24.”

After children have distributed the units in their first pile, remind them to look carefully at the units that remain in the second pile in order to help them improve their estimates. One child described how he did this by explaining that he looked back and forth between the 1–100 grid and the remaining pile of units trying to imagine how many more units were in that pile and where the last one would end up if they were counted out onto the grid.

Do not hesitate to be creative as you lead children to understand the process of estimating. One teacher’s search for large adult-size gloves led her to a pair of huge rubber gloves. Because the children in her class had begun the activity with a set of Base Ten Blocks containing 100 units, they knew there could be no more than 100 units in any pair of hands at one time. The teacher thought of a fanciful model that would skew the activity in such a way that would distract the children from focusing on the fact that they had a maximum of 100 units. Out of sight of the class, the teacher spilled the units into one of the large gloves, pushing them down into each of the fingers and then filling the glove to the top. This glove provided an exciting challenge that inspired the children to estimate the number of units in this special “handful”!



1 INTRODUCTION

- Grab a large handful of units in one hand. Now display the handful and ask children to guess, or estimate, the number of units you are holding.
- Have children each write a secret estimate on a piece of paper. Tell them to fold the papers to hide the estimates.
- Now have children count along with you as you place each unit, one to a box, on a 1–100 grid. About halfway through the count, ask children to think about their estimates. If they would now like to change their estimates, allow them to write a second estimate next to their first.
- Finish counting the blocks. Invite children to each compare their own estimate(s) with the number on which the last unit was placed.
- Have children tell whether their estimate was close to the actual number of units. Ask those children who made a second estimate whether or not it was closer than their first.

2 ON THEIR OWN

Children will complete the On Their Own. During this time, the teacher's role is to:

- ask probing questions to guide and extend
- record student thinking
- record student conversation that promotes collaboration

Use the information gathered to inform the Math Talk.

3 MATH TALK

Invite pairs to talk about what happened each time they worked through the activity.

Use prompts like these to promote class discussion:

- How did you decide on your first estimate?
- After you counted about half the units, did you change your estimate? Explain.
- The second time you did the activity were your estimates closer to the actual number of units? Explain.
- What is meant by a "good estimate"?

4 EXTENSION

Challenge children to estimate how many units containers of different sizes can hold. After having children fill containers of different sizes with units, tell them to count about half of the contents. At this point, allow them to decide whether or not to make a better estimate. Have children complete their counts and compare their estimate(s) to their final counts.

How Many Can You Hold?

ON THEIR OWN

How many Base Ten units do you think you can hold at once?

1. Work with a partner. Hold your two hands together while your partner fills them with units.
2. Each of you make an estimate of how many units you are holding. Your partner should first record his or her estimate and then record your estimate.
3. Now count to check your estimates.
4. Dump the units in a pile. Make the pile into two piles of about the same size.
5. Take the units from one pile. Place them, one to a box, on a 1–100 grid. On what number did you place the last unit?
6. Look back at your estimate. Does your estimate still make sense? You may change your estimate now.
7. Pick up the other pile of units. Start where you left off on the grid. Place each unit on the grid.
8. Where did you put the last grid? What number is this? Draw a circle around it. Record the number next to your estimate or estimates.
9. Repeat the activity. This time, start by filling your partner's hands with units.
10. Be ready to talk about how you estimate each time.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

FOLD

4 About how many units long do you think this object is? Make a guess, or estimate. Write your estimate.

5 Line up units along the object to measure its length. How many units is that? Write the actual number.

6 Was your estimate less than, greater than, or about the same as the actual length? Talk with your partner about this.

7 Trace around the object to record its shape. Then move it off the worksheet.

8 Repeat this with the other two objects. Estimate, measure, and compare the length for each.

LOOKING FOR LENGTH B

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LOOKING FOR LENGTH A

How can you use a Base Ten long to help you estimate the length of an object?

1 Work with a partner. Each of you pick up 1 long. Stand it up. Lie it down. Turn it around. Notice that the long is the same length as 10 units. Now, put the long away.

2 Walk around the classroom together. Carry a paper bag. Look for three different objects, each of which you think is shorter than 1 long. Put these into your bag.

3 Now put one of your objects at the top of a Looking for Length worksheet.

Put your first object here:

Estimate the length. | Our estimate: ___ units long
Measure the length. | Actual measurement: ___ units long

FOLD