



# Number and Operations: Pieces of a Hundreds Chart Version 2 Grade 1 Formative Assessment Lesson

Designed and revised by the Kentucky Department of Education  
Field-tested by Kentucky Mathematics Leadership Network Teachers

Rights and Usage Agreement: <https://creativecommons.org/licenses/by/4.0/>

If you encounter errors or other issues with this file, please contact the KDE math team at:  
[kdemath@education.ky.gov](mailto:kdemath@education.ky.gov)

(Revised 2019)

---

# Place Value (Pieces of the Bottom-up hundred chart) Version 2

## Grade 1

---

This Formative Assessment Lesson (FAL) is designed to be part of an instructional unit. This task should be implemented approximately two-thirds of the way through the instructional unit. The results of this task should be used to inform the instruction that will take place for the remainder of

### Mathematical goals

This lesson is intended to help you assess how well students are able to count from any number and recognize patterns on the 100 chart that will help them to count on or back. This formative assessment lesson will utilize a bottom-up hundred chart so students make connections with language and directionality that captures what is happening to the quantity of the numbers i.e. going up on the chart, the value of the number increases. This is a conceptual connection for all students but certainly can avoid confusion for English Language learners (J. Bay-Williams and G. Fletcher, 2017). It will also help you to assess how well they write numbers between 1 and 100. It will help you to identify students who have the following difficulties:

- Recognizing patterns on the bottom-up hundred chart.
- Counting on or back from a given number.

**Note:** This FAL should be used after multiple experiences with the bottom-up hundred chart. This FAL was inspired from the work of Bay-Williams, J. and Fletcher, G. (2017) NCTM Teaching Children Mathematics: A Bottom-Up Hundred Chart? Vol. 24, No. 3

### Kentucky Academic Standards

**This lesson involves mathematical content and practice standards from across the grade, with emphasis on:**

KY.1.NBT.1 Count and represent numbers. a. Count forward to and backward from 120, starting at any number less than 120. b. In this range, read and write numerals and represent a number of objects with a written numeral. **MP.2, MP.5, MP.8**

**This lesson involves a range of Standards for Mathematical Practice, with emphasis on:**

- 2. Reason abstractly and quantitatively.**
- 5. Use appropriate tools strategically.**
- 8. Look for and express regularity in repeated reasoning.**

### Introduction

This lesson is structured in the following way:

- Before the lesson, students work individually on an assessment task that is designed to reveal their current understandings and difficulties. You then review their work and create questions for students to answer in order to improve their solutions.
- Students work with a partner on collaborative discussion tasks to place cards with numerals onto a section taken from a bottom-up hundred chart. Throughout their work, students justify and explain their decisions to their peers.
- Students return to their original assessment tasks, and try to improve their own responses.

### Materials required

Each student will need:

- Two copies of the assessment task *Torn Bottom-up hundred chart*.

Each partner group will need the following resources:

- Place Card A with Card Set A
- Place Card B with Card Set B
- Place Card C with Card Set C
- Place Card D with Card Set D
- Bottom-Up hundred charts on hand for partners that need more support

## Time needed

Approximately 15 minutes before the lesson (for the individual assessment task), one 40 minute lesson, and 15 minutes for a follow-up lesson (for students to revisit individual assessment task). Timings given are only approximate. All students need not complete all sets of cards activities. Exact timings will depend on the needs of the class.

## Before the Lesson

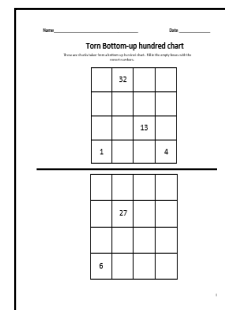
### Assessment task: Torn Bottom-up hundred chart (15 minutes)

Have students do this task individually in class a day or more before the formative assessment lesson. This will give you an opportunity to assess the work, and to find out the kinds of difficulties students have with it. You will be able to target your help more effectively in the follow-up lesson. Depending on your class you can have them do it all at once or in small groups (they should still work individually.)

### Framing the pre-assessment:

Give each student a copy of the assessment task *Torn Bottom-up hundred chart*.

**Teacher says:** *Today we are going to work on a task using a bottom-up hundred chart. This task is to help me see ways that I can help you if you are having any problems with place value. If you are not sure about all of your answers, it is okay. We are going to do an activity that will help you improve. You will write the missing numbers in the white spaces of the torn bottom-up hundred charts.*



It is important that the students are allowed to answer the questions without your assistance, as far as possible.

Students should not worry too much if they do not understand or cannot do everything, because in the next lesson they will engage in a similar task, which should help them. Explain to students that by the end of the next lesson, they should expect to answer questions such as these confidently. This is their goal.

### Assessing students' responses

Collect students' responses to the task. Make notes about what their work reveals about their current levels of understanding, and their different problem solving approaches. Partner students with others who displayed similar errors/misconceptions on the pre-assessment task.

We suggest that you do not score student's work. The research shows that this will be counterproductive, as it will encourage students to compare their scores, and will distract their attention from what they can do to improve their mathematics.

Instead, help students to make further progress by summarizing their difficulties as a series of questions. Some questions on the following page may serve as examples. These questions have been drawn from commonly identified student misconceptions.

We suggest that you write a list of your own questions, based on your students' work, using, but not limited to the ideas that follow. You may choose to write questions on each student's work. If you do not have time to do this, select a few questions that will be of help to the majority of students. These can be written on the board at the end of the lesson before the students are given the post assessment task.

The solution to all these difficulties is not to identify the patterns for the students, but rather to allow them to explore and discover various patterns of the bottom-up hundred chart.

Below is a list of common issues and questions/prompts that may be written on individual tasks or asked during the collaborative activity to help students clarify and extend their thinking.

<b>Common Issues:</b>	<b>Suggested questions and prompts:</b>								
<p><b>Students are placing cards incorrectly.</b></p>	<ul style="list-style-type: none"> <li>• Why did you put that card here?</li> <li>• Think about our hundreds chart, how is each row organized? --You may even want to carry a bottom-up hundred chart with you to allow students a resource when questioning.</li> <li>• How is the bottom-up hundred chart the same or different to other hundred charts we have used?</li> </ul>								
<p><b>Students place inverse numbers incorrectly (e.g. 31 in the place of 13 and vice versa.)</b></p>	<ul style="list-style-type: none"> <li>• Point to one of the numbers and have student explain why they put that number there.</li> <li>• How does this number compare to the numbers around it?</li> <li>• What does this digit represent? (wanting students to identify place value 10s and 1s)</li> </ul>								
<p><b>When going down to the next line, students write the number that comes next.</b></p> <table border="1" data-bbox="110 930 792 1003"> <tbody> <tr> <td style="text-align: center;"><b>37</b></td> <td style="text-align: center;"><b>38</b></td> <td style="text-align: center;"><b>39</b></td> <td style="text-align: center;"><b>40</b></td> </tr> <tr> <td style="text-align: center;"><b>33</b></td> <td style="text-align: center;"><b>34</b></td> <td style="text-align: center;"><b>35</b></td> <td style="text-align: center;"><b>36</b></td> </tr> </tbody> </table>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	<ul style="list-style-type: none"> <li>• What would go into the spaces between the number that is already there and the one that you wrote?</li> <li>• What are some of the patterns you notice in a bottom-up hundred chart?</li> <li>• Why did you put that card here? ---You may even want to carry a bottom-up hundred chart with you to allow students a resource when questioning.</li> </ul>
<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>						
<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>						
	<ul style="list-style-type: none"> <li>•</li> </ul>								
	<ul style="list-style-type: none"> <li>•</li> </ul>								

## Suggested lesson outline

### Whole Class Introduction (10 minutes)

**Teacher says:** *Today we are going to do some more work with pieces of a bottom-up hundred chart (Project this chart on the board). Some numbers fell off of my chart. How can we determine which numbers are missing and where they should be placed? Share with your shoulder partner your reasoning for how you will determine where the numbers go.*

35		37		39
25		27		29
		17	18	

Listen as students share their reasoning and select a few to share whole group. Be careful not to reveal too much information and reteach the concept. The purpose is to generate student thinking before the collaborative activity.

### Collaborative Activity: Placing Card set onto torn bottom-up hundred chart

Strategically partner students based on pre-assessment data. Partner students with others who display similar errors/misconceptions on the pre-assessment task. While this may seem counterintuitive, this will allow each student to more confidently share their thinking. This may result in partnering students who were very successful together, those who did fairly well together, and those who did not do very well together.

Introduce the lesson carefully, **teacher says:** *I want you to work in partners. Take turns placing a numeral card onto the piece of the bottom-up hundred chart. Each time you do this, explain your thinking clearly to your partner. If your partner disagrees with your placement then challenge him or her to explain why. It is important that you both understand why each card is placed where it is. There is a lot of work to do today and you may not all finish. The important thing is to learn something new, so take your time.*

Give each partners Place Card A and Card Set A.

Your tasks during the partner work are to make a note of student approaches to the task, and to support student problem solving. As you monitor the work, listen to the discussion and help students to look for patterns and generalizations.

### Make a note of student approaches to the task

You can then use this information to focus a whole-class discussion towards the end of the lesson. In particular, notice any common mistakes. For example, students may consistently try to place numbers in counting order without noticing that some of the numbers will not show on their section of the chart.

### **Support student problem solving**

Try not to make suggestions that move students toward a particular approach to the task. Instead, ask questions to help students clarify their thinking. Encourage students to use each other as a resource for learning.

If one student has placed a particular card on the chart, challenge their partner to provide an explanation.

If you find students have difficulty articulating their decisions, then you may want to use the questions from the *Common Issues* table to support your questioning.

If the whole class is struggling on the same issue, then you may want to write a couple of questions on the board and organize a whole class discussion.

### **Place Card Set B**

As students finish with matching Card Set A and can explain their thinking, collect Card Set A and give that pair Place Card B and Card Set B. This set provides students with a bit less structure in placing the numerals.

As you monitor the work, listen to the discussion and help students to look for patterns and generalizations. The following patterns may be noticed:

- *Students observe that the numbers in vertical lines have the same digit in the ones place and one ten more or one ten less in the tens place.*
- *Students observe that numbers in horizontal lines have the same digit in the tens place and one more or one less in the ones place.*
- *Students observe that diagonally the digits in each place either rise or fall depending on the direction.*

### **Place Card Set C**

As students finish with matching Card Set B and can explain their thinking, collect Card Set B and give that pair Place Card C. **HAVE STUDENTS COMPLETE THEIR PUZZLES BY WRITING IN THEIR RESPONSES FIRST.** When they have completed this, give them Card Set C to see if their responses match.

### **Place Card Set D**

As students finish with matching Card Set C and can explain their thinking, collect Card Set C and give that pair Place Card D. **HAVE STUDENTS COMPLETE THEIR PUZZLES BY WRITING IN THEIR RESPONSES FIRST.** When they have completed this, give them Card Set D to see if their responses match.

### **Taking two class periods to complete all activities**

If you have to divide the lesson into two class periods, you may want to have a way for students to save the work they have done with the place card sets. You may have each pair tape the cards down with on their place cards. You may choose to have them do this even if you are not dividing up the class period just to use as a visual during the class discussion.

### **Sharing Work (10 minutes)**

As students get as far as they can with matching the card sets, allow pairs to compare their matches to other pairs. Students are permitted to ask questions and make changes to their original work. This strategy can be used for time management so the teacher can work more closely with individual partner groups.

### **Extension activities**

Give students who finish quickly a blank Place Card and a blank Card Set so they can make their own bottom-up hundred chart puzzle. These blanks are provided.

**Whole-class discussion (10 minutes)**

Conclude the lesson by discussing and generalizing what has been learned. The generalization involves first extending what has been learned to new examples, and then examining some of the conclusions students came up with. Allow pairs to bring up some of their work samples and share their thinking. Possibly display a Place Card Mat and discuss how cards were placed in the open spots.

**Ask students:**

- *Why did you decide to place that card there?*
- *What clues did you use to help you in your decision?*
- *Is there another card that could go there?*
- *What was difficult about this task? Why?*
- *What was easy about this task? Why?*

**Improving individual solutions to the assessment task (10 minutes)**

Give the students a new copy of the original task, *Torn Bottom-up Hundred Chart*.

**Teacher says:** *Think about what you have learned during this lesson. Using what you have learned try to improve your work.*

To focus your students, refer to the common issues chart. Use the questions which reflect the greatest need(s) of your students. You may choose to share these aloud with the whole group, ask them of individuals as you move around the room, or work with small groups.

This lesson format was designed from the Classroom Challenge Lessons intended for students in grades 6 through 12 from the [Math Assessment Project](#). It was inspired from the work of Bay-Williams, J. and Fletcher, G. (2017) NCTM Teaching Children Mathematics: *A Bottom-Up Hundred Chart?* Vol. 24, No. 3.

Name \_\_\_\_\_

Date \_\_\_\_\_

## Torn Bottom-up hundred chart

These are chunks taken from a bottom-up hundred chart. Fill in the empty boxes with the correct numbers.

	32		
		13	
1			4

---

	27		
6			



Student Materials  
Place Card Set A Version 2

			34
	22		
		13	
1			

Place Card Set B Version 2

		79	
57			

Place Card Set C Version 2

	57		
			39

11			

Card Set A Version 2

5

Card Set A

2

Card Set A

3

Card Set A

4

Card Set A

11

Card Set A

12

Card Set A

6

Card Set A

14

Card Set A

21

Card Set A

20

Card Set A

23

Card Set A

24

Card Set A

31

Card Set A

32

Card Set A

33

Card Set A

25

Card Set A



Card Set B Version 2

61

Card Set B

58

Card Set B

59

Card Set B

60

Card Set B

67

Card Set B

68

Card Set B

69

Card Set B

70

Card Set B

77

Card Set B

78

Card Set B

50

Card Set B

80

Card Set B

87

Card Set B

88

Card Set B

89

Card Set B

90

Card Set B



Card Set C Version 2

37

Card Set C

38

Card Set C

57

Card Set C

46

Card Set C

47

Card Set C

56

Card Set C

58

Card Set C

59

Card Set C

29

Card Set C

36

Card Set C



Card Set D Version 2

12

Card Set D

13

Card Set D

14

Card Set D

21

Card Set D

31

Card Set D

32

Card Set D

33

Card Set D

34

Card Set D

44

Card Set D





Extension Place Card


Extension Card Set




## Bottom-up Hundred Chart

Name \_\_\_\_\_

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

# ANSWER KEYS Version 2

Place Card Set A

31	32	33	34
21	22	23	24
11	12	13	14
1	2	3	4

Place Card Set B

87	88	89	90
77	78	79	80
67	68	69	70
57	58	59	60

Place Card Set C

56	57	58	59
46	47		
36	37	38	39
			29

Place Card Set D

			44
31	32	33	34
21			
11	12	13	14