Building Mathematical Thinkers: Mini-Activities

Scale It On A Bar Graph

Objective: 3rd grade Statistics – Bar Graphs

Theoretical Foundation: Students learn best by doing. In this activity students practice the entire data collection process and deepen their understanding by examining 4 representations of the same data. In this way students draw their own conclusions about the purpose and use of scale on a bar graph.

Estimated Time: 60 minutes

Materials: Notebook paper, Pre-Scaled graph paper (see attached) – each group needs only one of these sheets

Directions:
1. Explain that the class will be taking a survey and graphing the results.
2. Invite the students to suggest what group of people they'd like to survey (perhaps K-2 students – be sure it is a large group of people so there will be lots of data) and what question they'd like to ask.
3. Record suggested questions and guide the class toward settling on one question to actually pursue.
4. Now tell the students that they will actually be surveying TWO groups of students, the one already agreed upon *and* the class. They will keep the data separate and make 2 different graphs so that they can compare their class with the other group.
5. Guide students through preparing two data tables on a piece of notebook paper, which they will use to collect the data. One data table should be labeled – Our Class – and the other should be labeled with whatever large group was decided upon.
6. Lead a discussion with the class about the best way to collect the data. You will want to be sure that all students work from the ***exact same data*** when they get to the graph making stage of the activity.
7. Proceed with data collection.
8. Compile and display the data in 2 tables for the class to see so that everyone will be working from the same data.
9. The students will be working in four to eight groups to create bar graphs of the data.
10. There will be 4 bar graphs for each set of data, each graph using a different scale.
11. Explain the directions to students. For instance, one group would make a bar graph for Our Class with a scale of 5 and another would make Our Class with a scale of 10.
12. Allow students time to create their graph.
13. When the groups finish, post each of the 8 graphs.
14. The discussion about the graphs should **focus on how the size of the scale impacts the shape of the graph and why a group size might warrant different scales.**

Differentiation Suggestions:
- Struggling students may need additional guidance and supervision. To help with this pair or group struggling students so that they are working with someone who is helpful. Be sure to encourage groups to share the workload.
- Advanced students may try representing the same data using different scales such as 3 or 7. They may also try representing the data using a pictograph (A comparison of different scales would work for pictographs as well.).

Probing Questions:
- In what ways are the 4 graphs about our class similar? In what ways are they different?
- In what ways are the 4 graphs about the other group similar? In what ways are they different?
- How does the shape of the data change as the scale changes?
- Which scale do you think is the best one for helping you understand the data?
- Why does a scale of 10 make our class data look almost the same, but it doesn't do this for the other group?

Assessment:
- How well do students understand the process of data collection and display?
- How much teacher guidance do students need to accurately display the data on the paper provided?
- How do students interpret the differences among the graphs?
- How well do they understand concepts of scale?

Name _____

BAR GRAPH WITH SCALE OF 10

Directions: Create a table of the data you will use for your graph, and then use the blank graph below to neatly make and color a bar graph.

Data Table

Bar Graph

Number of students

150
140
130
120
110
100
90
80
70
60
50
40
30
20
10

Name _____

BAR GRAPH WITH SCALE OF 5

Directions: Create a table of the data you will use for your graph, then use the blank graph below to neatly make and color a bar graph.

Data Table

Bar Graph

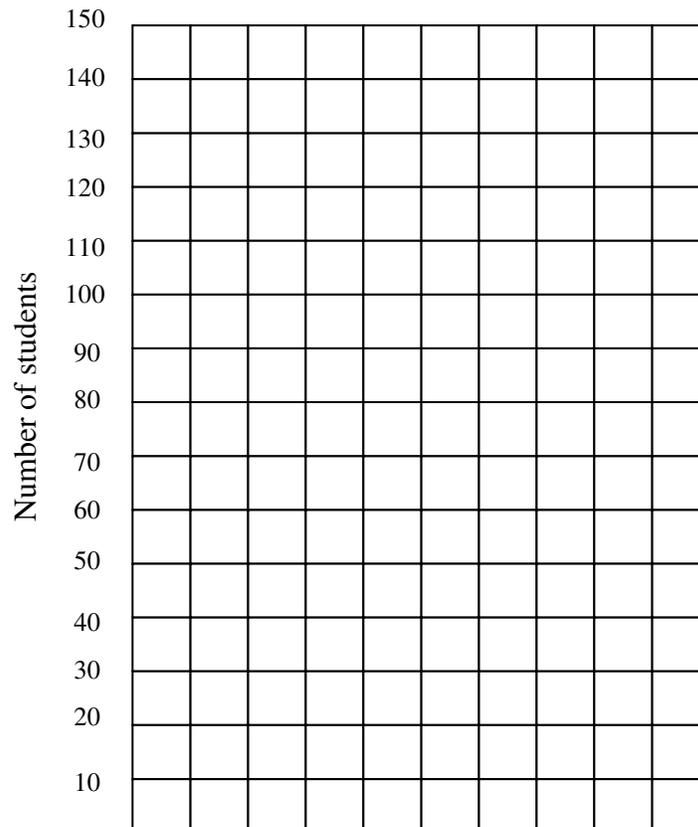75
70
65
60
55
50
45
40
35
30
25
20
15
10
5

Number of students

Name _____

BAR GRAPH WITH SCALE OF 3

Directions: Create a table of the data you will use for your graph, and then use the blank graph below to neatly make and color a bar graph.
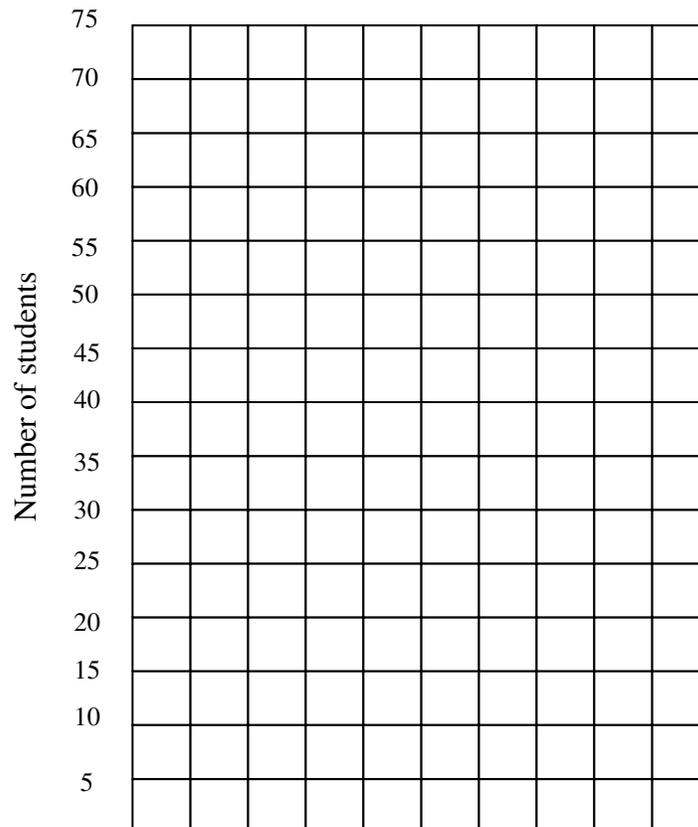
Data Table

Bar Graph

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45 ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
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42 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
   │  │  │  │  │  │  │  │  │  │  │
39 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
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36 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
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33 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
   │  │  │  │  │  │  │  │  │  │  │
30 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
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27 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
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24 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
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21 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
   │  │  │  │  │  │  │  │  │  │  │
18 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
   │  │  │  │  │  │  │  │  │  │  │
15 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
   │  │  │  │  │  │  │  │  │  │  │
12 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
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 9 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
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 3 ├──┼──┼──┼──┼──┼──┼──┼──┼──┼──┤
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   └──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
```

Number of students

Name _____

BAR GRAPH WITH SCALE OF 1

Directions: Create a table of the data you will use for your graph, and then use the blank graph below to neatly make and color a bar graph.
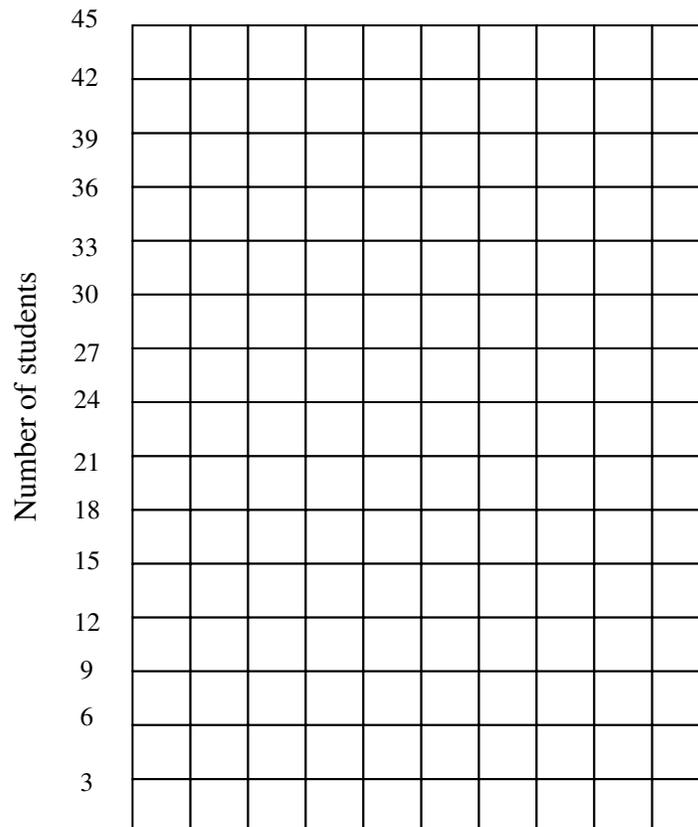
Data Table

Bar Graph

Number of students

15
14
13
12
11
10
9
8
7
6
5
4
3
2
1