

A Scale That Fits the Data

GRADE 3

MATHEMATICS

B1.1

D1.3

Choosing a key is a decision with consequences. Too small and the rows run off the page; too large and every class looks the same. The table below gives what five classes earned this term.

Points Earned This Term

Class	Points
3A	400
3B	250
3C	600
3D	150
3E	550

Source: our class balances

PART A: A KEY OF 50

1. With a key of 50 points per symbol, 3A's 400 points need _____ symbols.
2. With a key of 50 points per symbol, 3B's 250 points need _____ symbols.
3. With a key of 50 points per symbol, 3C's 600 points need _____ symbols.
4. With a key of 50 points per symbol, 3E's 550 points need _____ symbols.
5. 3C has _____ more symbols than 3D at that key.
6. With a key of 50 points per symbol, 3D's 150 points need _____ symbols.

PART B: TESTING OTHER KEYS

7. With a key of 10 points per symbol, how many symbols would 3C need, and why is that a poor choice?

SHOW YOUR WORK

Answer: _____

8. With a key of 100 points per symbol, how many symbols would 3D need? What does that show about a key that is too large?

SHOW YOUR WORK

Answer: _____

9. What did 3A, 3B and 3D earn altogether, and how many symbols is that at 50 points per symbol?

SHOW YOUR WORK

Answer: _____

10. Write 3E's 550 points and 3B's 250 points as hundreds, tens and ones, then say which is larger and by how much.

SHOW YOUR WORK

Answer: _____

PART C: PICK THE KEY

11. Which key suits data that runs from 150 up to 600?
 (A) 50 points per symbol (B) 5 points per symbol (C) 500 points per symbol
12. 3E earned 550 points. At 50 points per symbol that is:
 (A) 11 symbols (B) 10 symbols (C) 55 symbols

PART D: DEFEND YOUR KEY

13. Choose a key that fits every class into the 12 boxes of a row, then draw the pictograph for all five classes, with a title, the key written out, each row labelled, and a line naming the source. Then justify your key by saying what would go wrong with a key twice as large, and what would go wrong with one half as large.

TITLE _____

KEY: ☆ = _____

WHERE THE NUMBERS CAME FROM _____

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ANSWER KEY

1. 8
2. 5
3. 12
4. 11
5. 9
6. 3
7. 60 symbols, which is far too many to draw neatly or to count across a row.
8. 1 1/2 symbols. A key that large forces half symbols and squashes the classes so close together that the differences stop showing.
9. 800 points altogether, which would be 16 symbols.
10. 550 is 5 hundreds, 5 tens and 0 ones, and 250 is 2 hundreds, 5 tens and 0 ones. 3E is larger by 300 points.
11. A) 50 points per symbol
12. A) 11 symbols
13. A key of 50 points per symbol fits: 3A gets 8 symbols, 3B 5, 3C 12, 3D 3 and 3E 11, each row labelled, under a title with the key written out and a source line. Doubling the key to 100 would make 3D one and a half symbols and push the classes too close together to compare. Halving it to 25 would give 3C twenty-four symbols, twice as many as a row holds.

TEACHER NOTES

Extension beyond the grade-level expectation: students test three keys against the same data rather than applying one they were given, and Part B question 2 produces a half symbol on purpose so the cost of too large a key is concrete. Part D asks for a justification in both directions, which is harder than picking a key that works.