Longitudinal/Cross-Sectional Study of the Impact of *Mathematics in Context* on Student Performance

Classroom Achievement for Conventional Classrooms 1997-1998

(Technical Report #36)

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Introduction

The purposes of the longitudinal/cross-sectional study of the impact of *Mathematics in Context* (MiC; National Center for Research in Mathematical Sciences Education & Freudenthal Institute, 1997–1998) on student performance are (a) to determine the mathematical knowledge, understanding, attitudes, and levels of student performance as a consequence of studying MiC for over three years; and (b) to compare student knowledge, understanding, attitudes, and levels of performance of students using MiC with those using conventional mathematics curricula. The research model for this study is an adaptation of a structural model for monitoring changes in school mathematics (Romberg, 1987). For this study, information is being gathered on 14 variables over a 3-year period for three groups of students (those in Grades 5, 6, and 7 in 1997). The variables have been organized in five categories (prior, independent, intervening, outcome, and consequent). (See Figure 1 for variables and hypothesized relationships.)

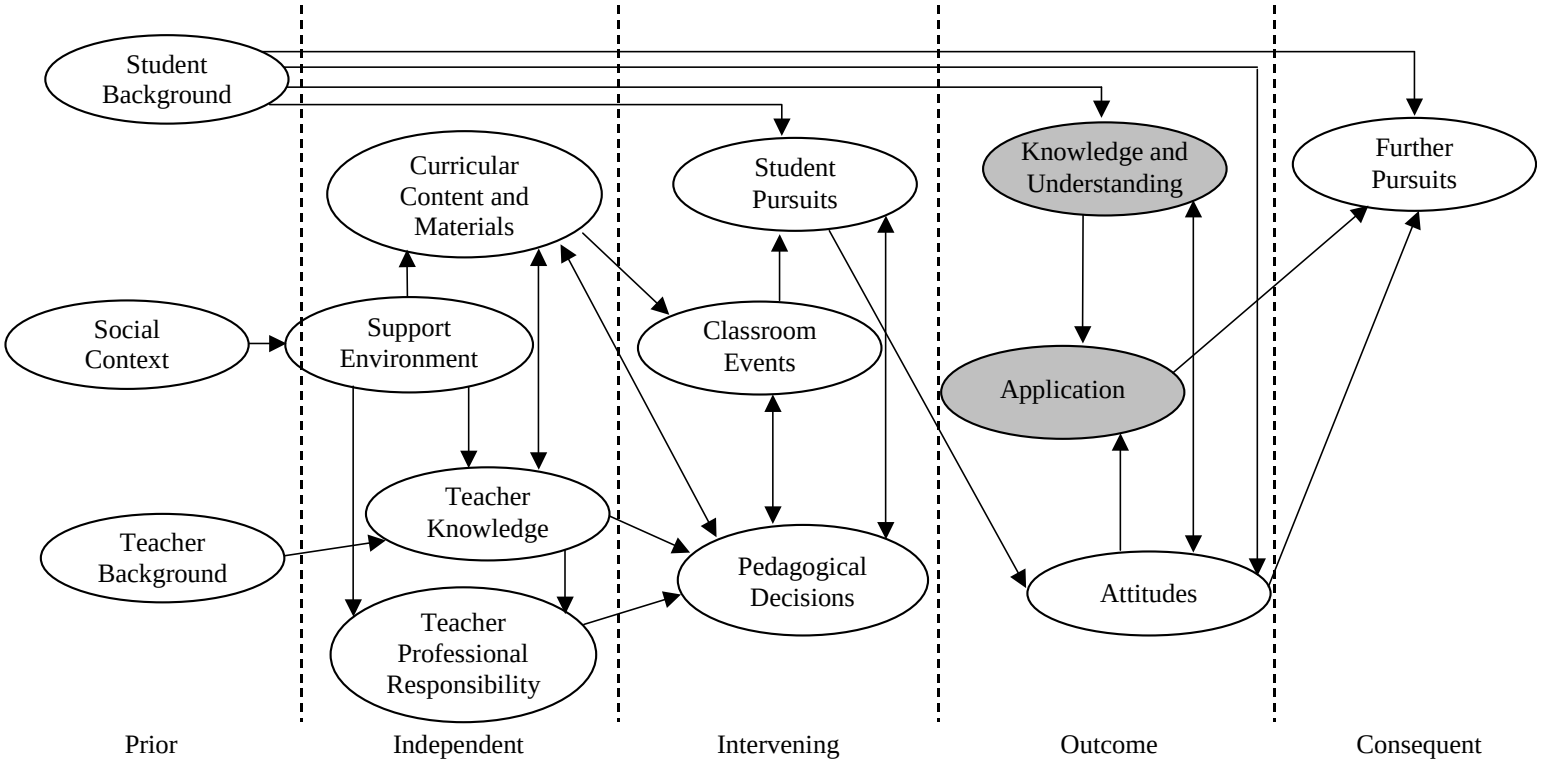


Figure 1. Revised model for the monitoring of school mathematics.

Overview

The data in this Technical Report contain the general results for the eight grade-level-by-year studies shown as white ellipses in Figure 2. The summary data has been derived from each student's weighted item scores on the Classroom Achievement Index (CA) (see Appendix A).

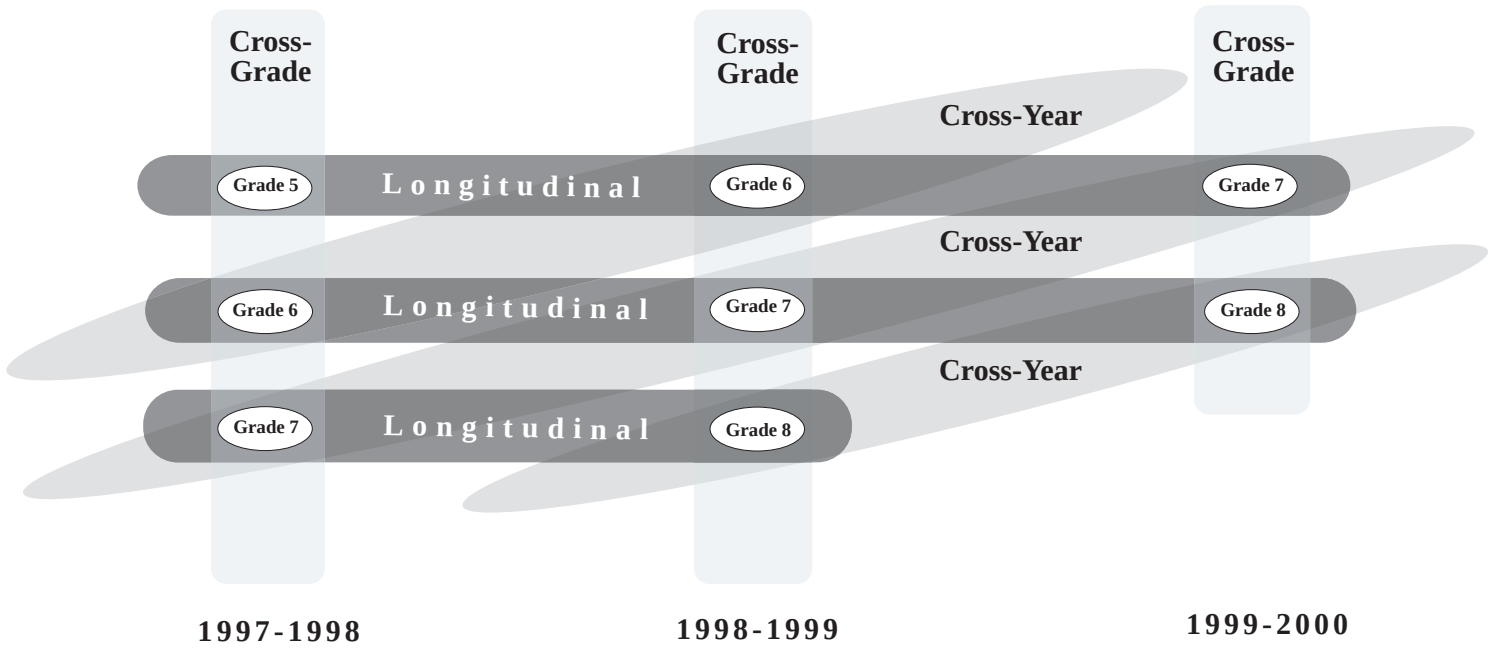


Figure 2. Sources of Data and Planned Comparisons of the MiC Longitudinal/Cross-Sectional Study

In each case the summary data has been displayed in terms of Tables that include the number of students, mean, standard deviation, both lower and upper 95% confidence intervals, and score distributions for the 95%tile, 75%tile, 25%tile, and 5%tile, then a Progress Map has been constructed to portray that data.[1]

The following Tables and Maps have been organized in terms of each of the eight year-by-grade studies. Within each study the data on student performance is then organized first across all districts, second for each district separately, and then by teachers within districts.

[1] Progress Maps were not made if $N \leq 10$.

Grade 5

All Districts

Table 1.5.1
Classroom Achievement in Conventional Classrooms in 1997-1998, *in All Districts, Grade 5, by Gender, by Ethnic Group, and by Content Strand*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	101	270.4	39.4	262.7	278.1	327.9	301.3	247.1	196.3
Male	56	270.2	43.6	258.8	281.7	328.6	304.2	238.9	196.3
Female	45	270.6	34.0	260.7	280.5	314.8	284.4	250.5	218.5
White	46	282.4	30.7	273.5	291.3	327.0	304.2	263.5	226.5
African-American	8	242.8	34.5	218.9	266.7	286.6	261.5	227.8	195.0
Hispanic	14	250.3	38.2	230.2	270.3	309.3	268.6	232.2	191.5
Other	33	268.9	45.8	253.2	284.5	330.4	295.7	239.8	196.3
Number	101	274.7	39.3	267.0	282.3	338.6	300.7	251.4	208.5
Algebra	101	266.1	43.4	257.6	274.5	320.0	300.9	250.3	184.1
Geometry	101	261.4	40.7	253.5	269.4	318.6	287.5	254.0	173.5
Statistics	101	263.3	46.8	254.2	272.5	351.0	292.9	235.2	186.3

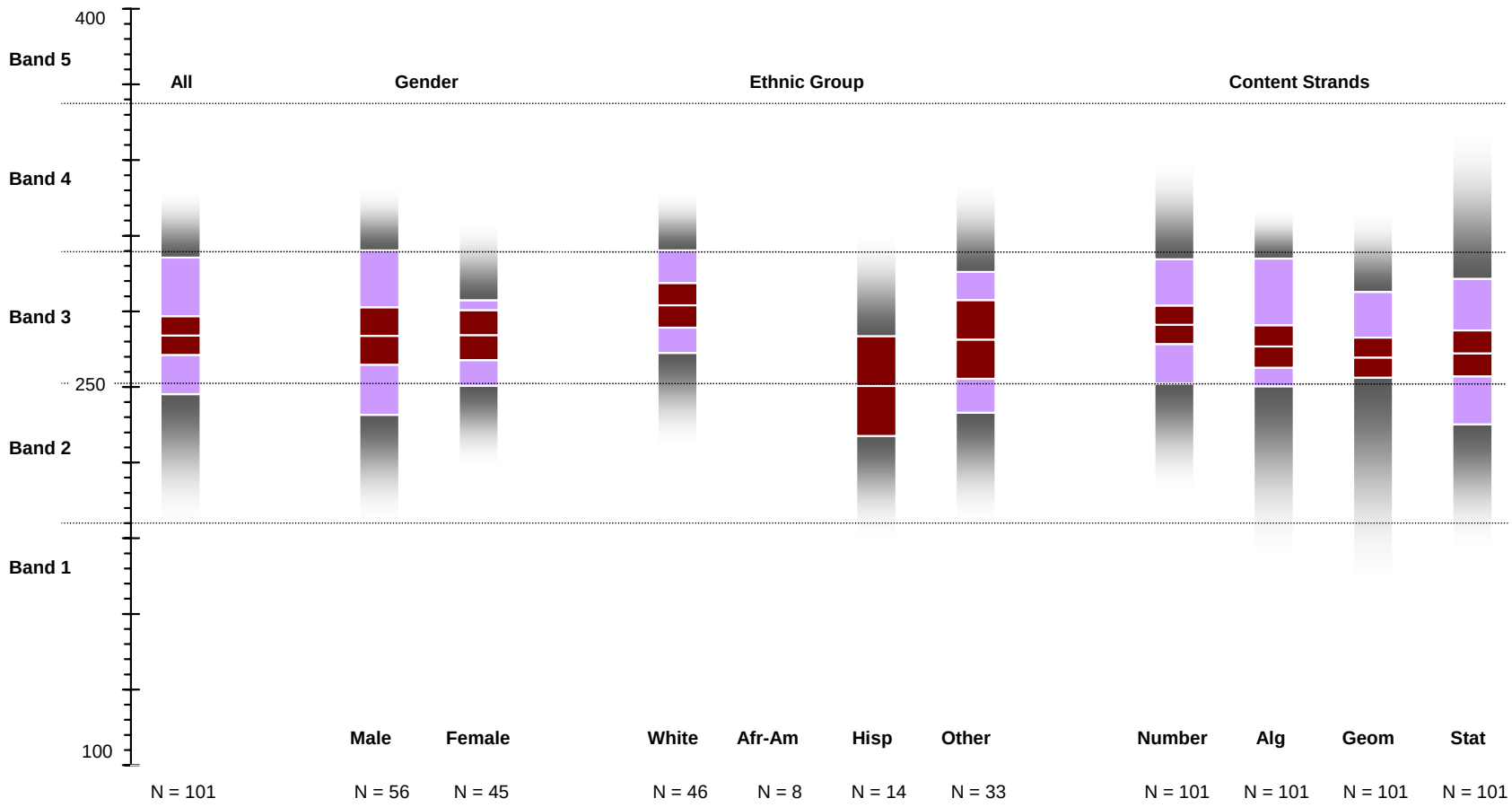


Figure 2. Distribution of Classroom Achievement in Conventional Classrooms in 1997-1998, in All Districts, Grade 5, by Gender, by Ethnic Group, and by Content Strand

Table 1.5.2
Classroom Achievement in Conventional Classrooms in 1997-1998*, in Grade 5, by District*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	101	270.4	39.4	262.7	278.1	327.9	301.3	247.1	196.3
District 1	52	280.6	29.6	272.6	288.7	319.8	304.2	260.7	236.4
District 2	49	259.5	45.5	246.7	272.2	334.1	284.4	228.5	196.3

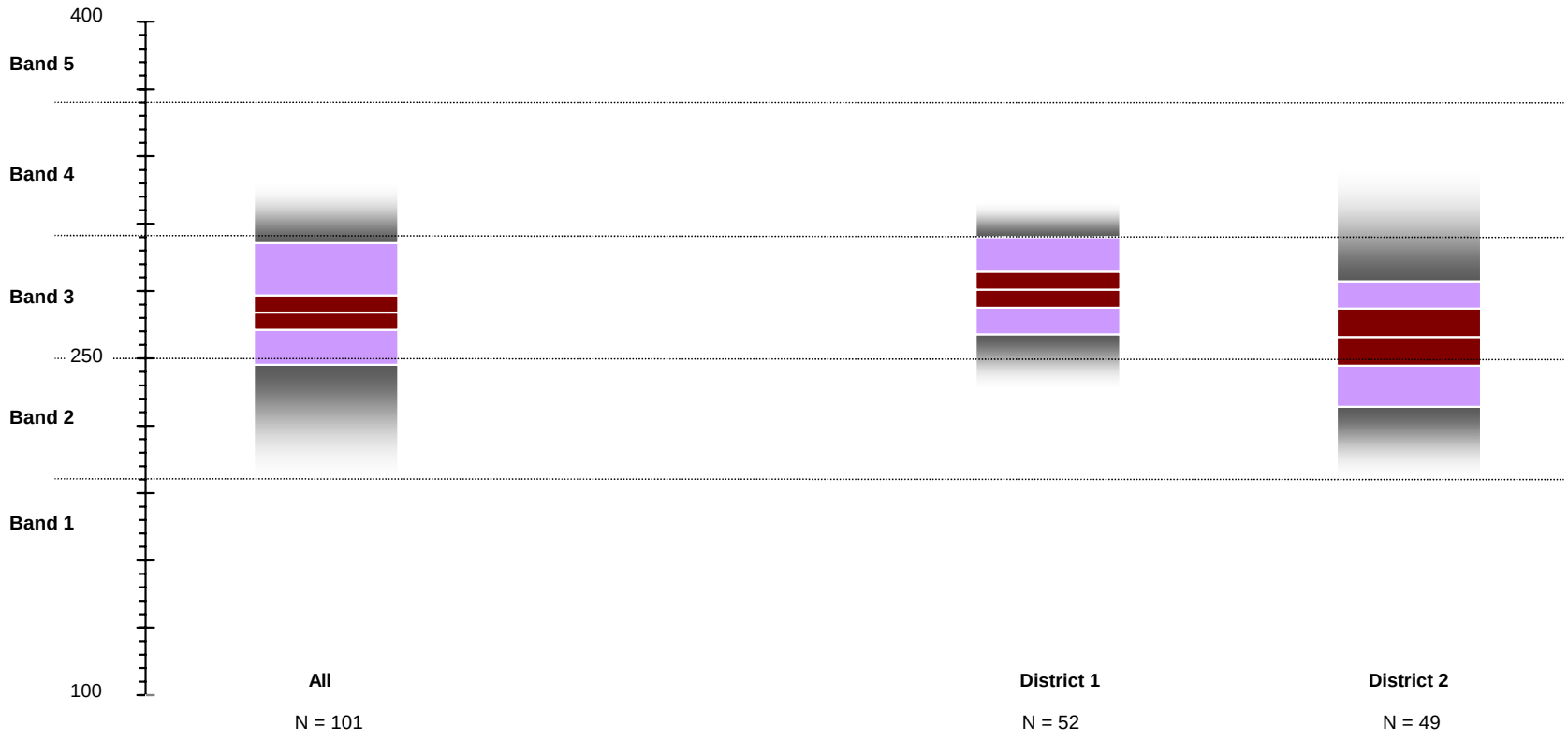


Figure 3. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms, Grade 5, by District

Table 1.5.3
Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 5, by Gender*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
Male	56	270.2	43.6	258.8	281.7	328.6	304.2	238.9	196.3
Female	45	270.6	34.0	260.7	280.5	314.8	284.4	250.5	218.5
District 1									
Male	28	287.8	28.2	277.3	298.2	326.7	304.9	260.7	237.6
Female	24	272.3	29.5	260.5	284.1	309.4	289.8	249.7	236.4
District 2									
Male	28	252.7	49.4	234.4	271.0	331.9	283.1	212.5	180.5
Female	21	268.6	39.1	251.9	285.3	334.1	284.4	250.5	216.1

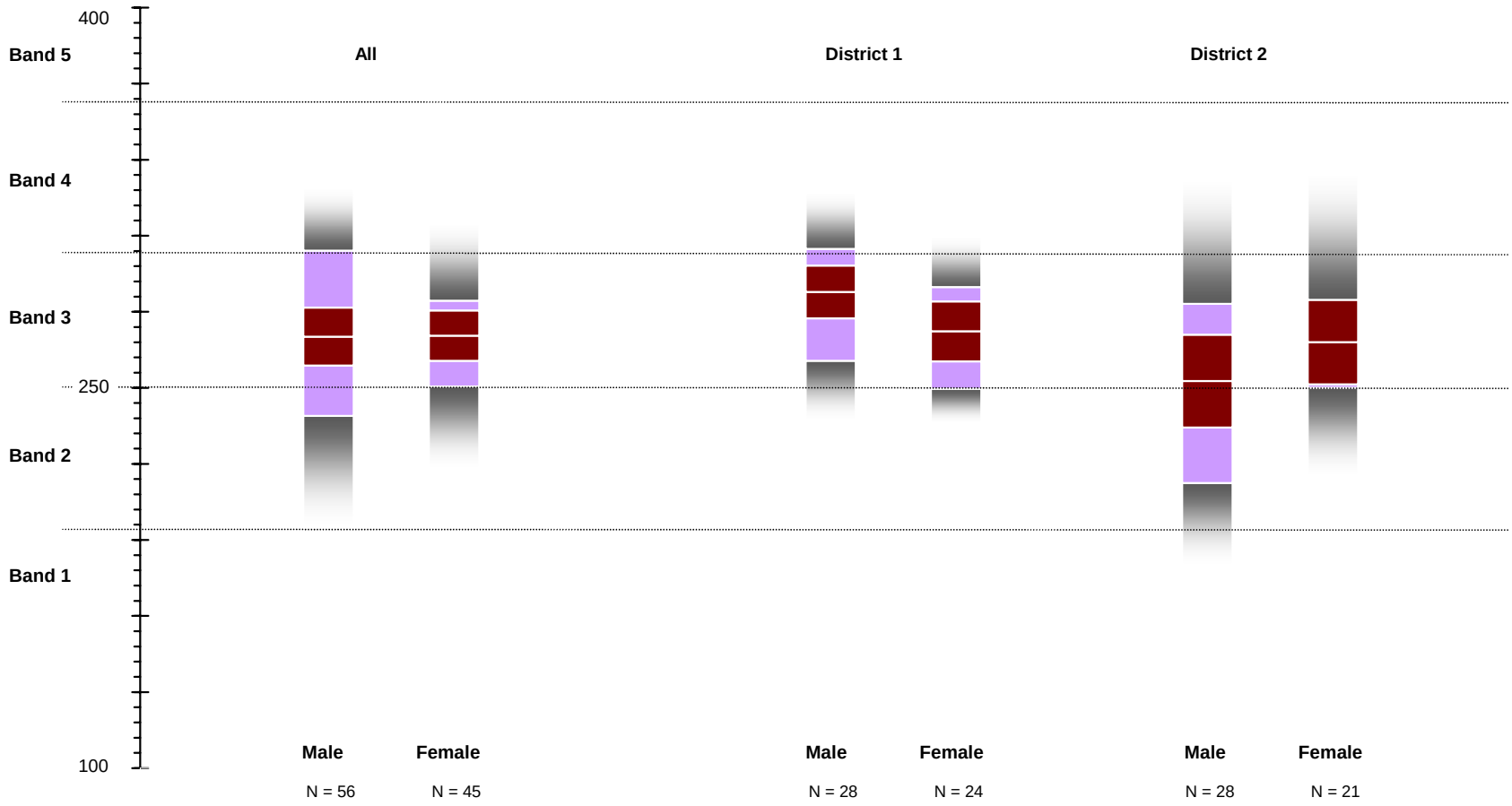


Figure 4. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 5, by Gender

Table 1.5.4
Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 5, by Ethnic Group*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
White	46	282.4	30.7	273.5	291.3	327.0	304.2	263.5	226.5
African-American	8	242.8	34.5	218.9	266.7	286.6	261.5	227.8	195.0
Hispanic	14	250.3	38.2	230.2	270.3	309.3	268.6	232.2	191.5
Other	33	268.9	45.8	253.2	284.5	330.4	295.7	239.8	196.3
District 1									
White	30	288.9	23.5	280.5	297.3	316.0	304.2	273.1	248.6
African American	7	248.7	32.8	224.4	272.9	286.8	269.1	236.4	204.8
Hispanic	3	259.0	15.0	242.0	276.0	271.9	266.9	251.9	244.9
Other	12	284.0	31.5	266.2	301.9	326.0	307.7	259.4	238.3
District 2									
White	16	270.2	39.0	251.1	289.3	334.9	285.2	253.6	217.5
African American	1	201.9				201.9	201.9	201.9	201.9
Hispanic	11	247.9	42.7	222.6	273.1	311.5	266.9	222.3	187.0
Other	21	260.2	50.9	238.4	282.0	334.1	284.4	232.4	196.3

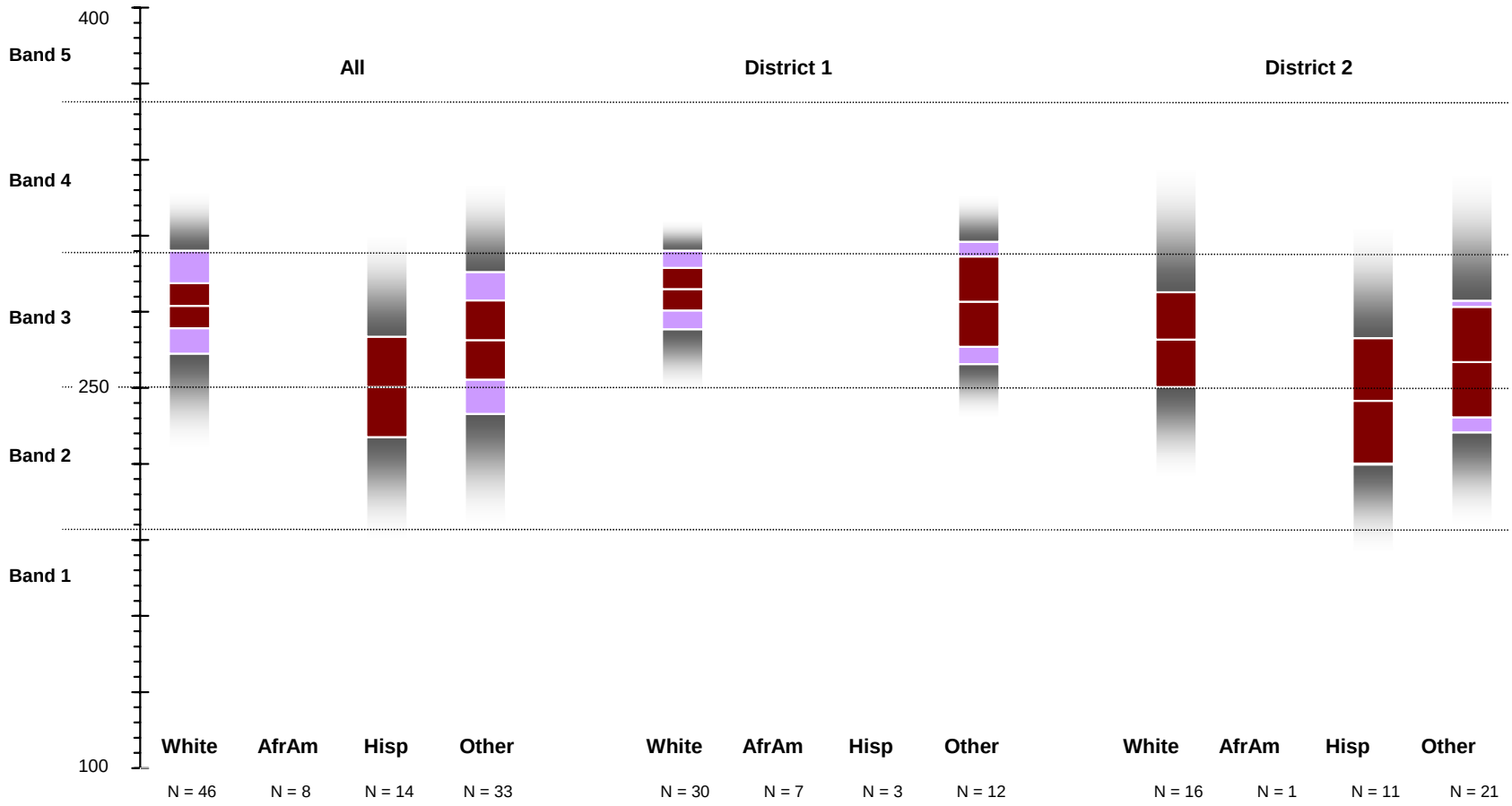


Figure 5. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 5, by Ethnic Group

Table 1.5.5

Classroom Achievement in Conventional Classrooms in 1997-1998, in *All Districts, Grade 5, by Content Strand*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
Number	101	274.7	39.3	267.0	282.3	338.6	300.7	251.4	208.5
Algebra	101	266.1	43.4	257.6	274.5	320.0	300.9	250.3	184.1
Geometry	101	261.4	40.7	253.5	269.4	318.6	287.5	254.0	173.5
Statistics	101	263.3	46.8	254.2	272.5	351.0	292.9	235.2	186.3
District 1									
Number	52	280.6	27.8	273.0	288.1	322.5	300.7	258.8	236.1
Algebra	52	272.9	39.8	262.1	283.7	320.0	300.9	250.3	225.0
Geometry	52	265.9	34.9	256.5	275.4	303.3	287.5	254.0	210.9
Statistics	52	280.3	42.1	268.9	291.8	351.0	304.7	253.7	219.9
District 2									
Number	49	268.4	48.2	254.9	281.9	342.7	300.7	236.1	196.2
Algebra	49	258.8	46.3	245.9	271.8	309.4	293.4	250.3	153.4
Geometry	49	256.7	46.0	243.8	269.5	318.6	287.5	234.8	173.5
Statistics	49	245.3	45.1	232.7	258.0	326.6	263.0	213.7	174.4

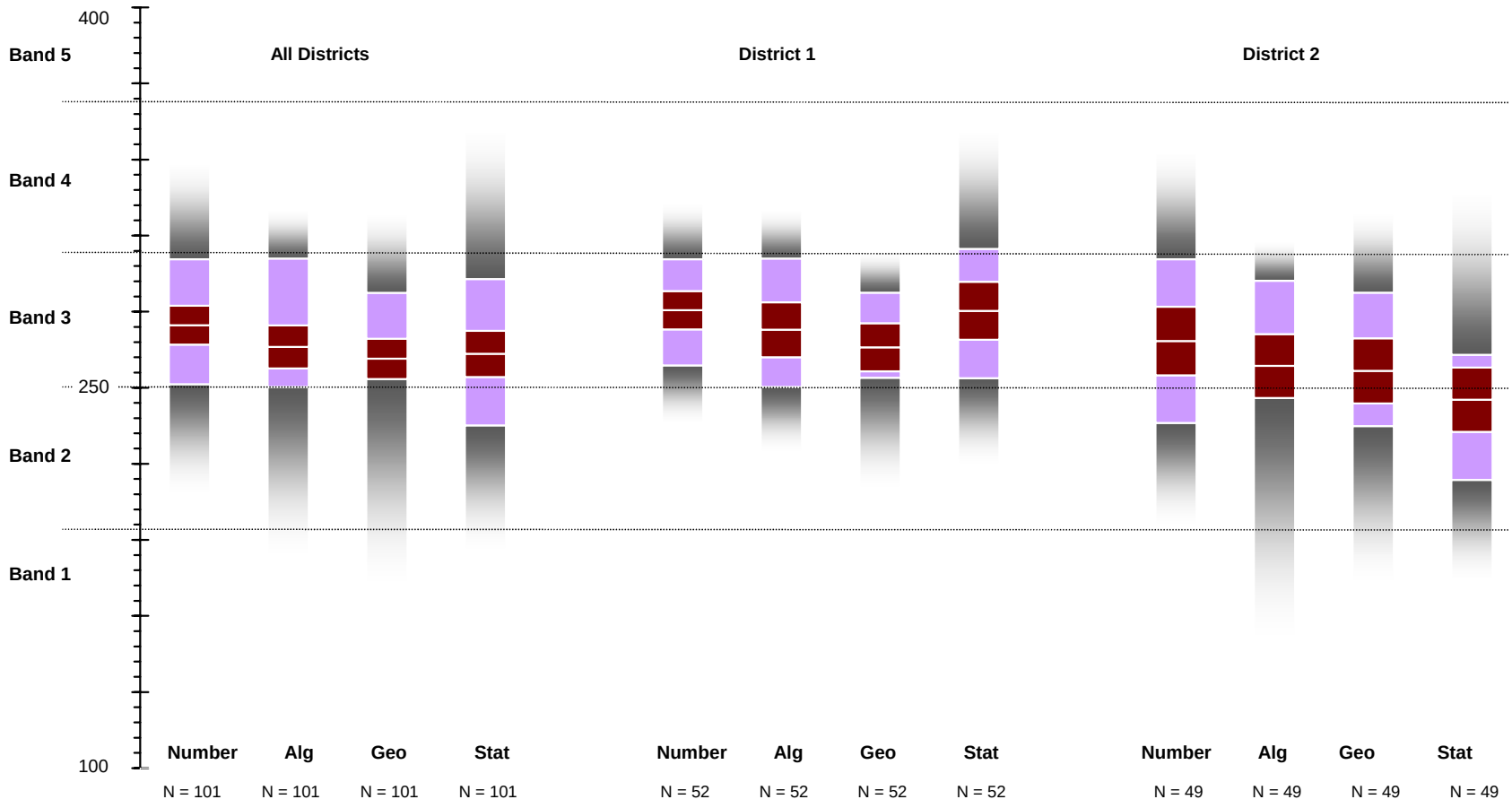


Figure 6. Distribution of Classroom Achievement in 1997-1998, *in Conventional Classrooms in* 1997-1998, *in All Districts, Grade 5, by Content Strand*

District 1

Table 1.5.6
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 1, Grade 5, by Gender, by Ethnic Group, and by Content Strand*

				Confidence Interval		Score distribution percentiles			
	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	52	280.6	29.6	272.6	288.7	319.8	304.2	260.7	236.4
Male	28	287.8	28.2	277.3	298.2	326.7	304.9	260.7	237.6
Female	24	272.3	29.5	260.5	284.1	309.4	289.8	249.7	236.4
White	30	288.9	23.5	280.5	297.3	316.0	304.2	273.1	248.6
African American	7	248.7	32.8	224.4	272.9	286.8	269.1	236.4	204.8
Hispanic	3	259.0	15.0	242.0	276.0	271.9	266.9	251.9	244.9
Other	12	284.0	31.5	266.2	301.9	326.0	307.7	259.4	238.3
Number	52	280.6	27.8	273.0	288.1	322.5	300.7	258.8	236.1
Algebra	52	272.9	39.8	262.1	283.7	320.0	300.9	250.3	225.0
Geometry	52	265.9	34.9	256.5	275.4	303.3	287.5	254.0	210.9
Statistics	52	280.3	42.1	268.9	291.8	351.0	304.7	253.7	219.9

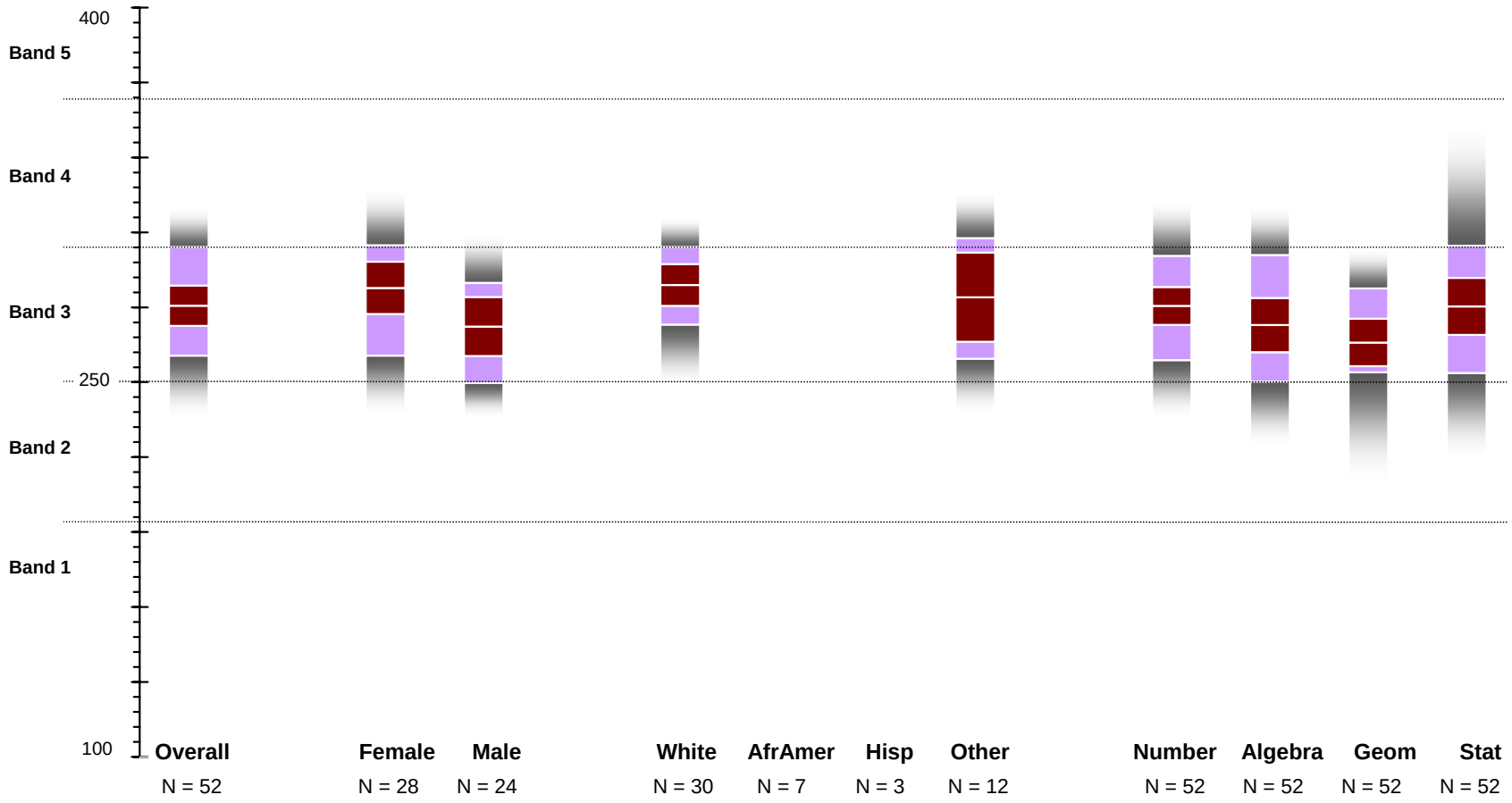


Figure 7. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 1, Grade 5, by Gender, Ethnic Group, and by Content Strand

Table 1.5.7
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 1, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
17	22	272.2	29.8	259.8	284.7	324.1	289.9	248.0	236.4
42	30	286.8	28.3	276.7	297.0	313.2	306.3	273.1	241.2

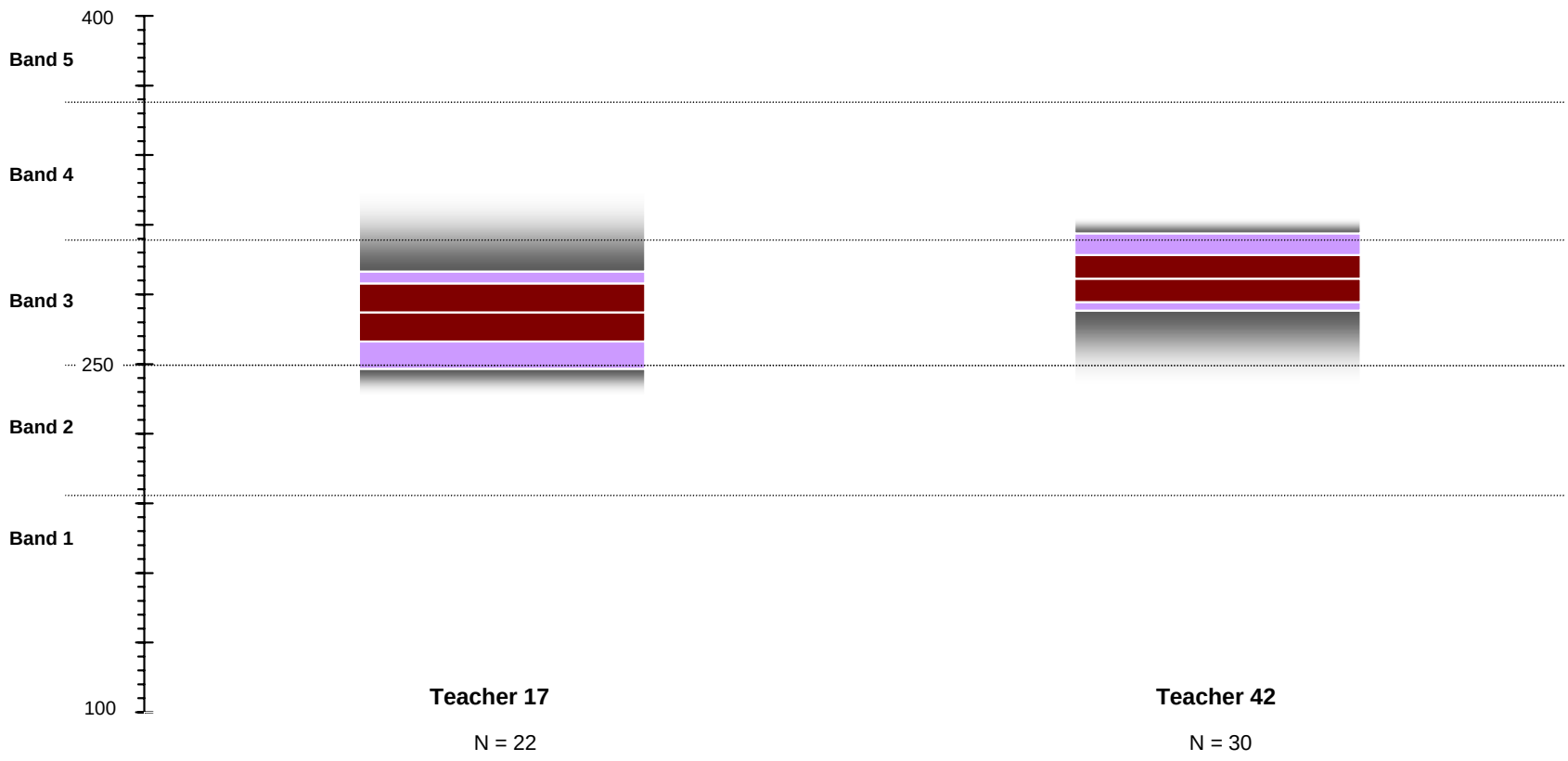


Figure 8. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 1, Grade 5, by Teacher

Table 1.5.8

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Number, District 1, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
17	22	277.7	31.0	264.7	290.7	331.9	286.9	258.8	228.5
42	30	282.7	25.4	273.6	291.8	310.6	305.5	266.2	239.7

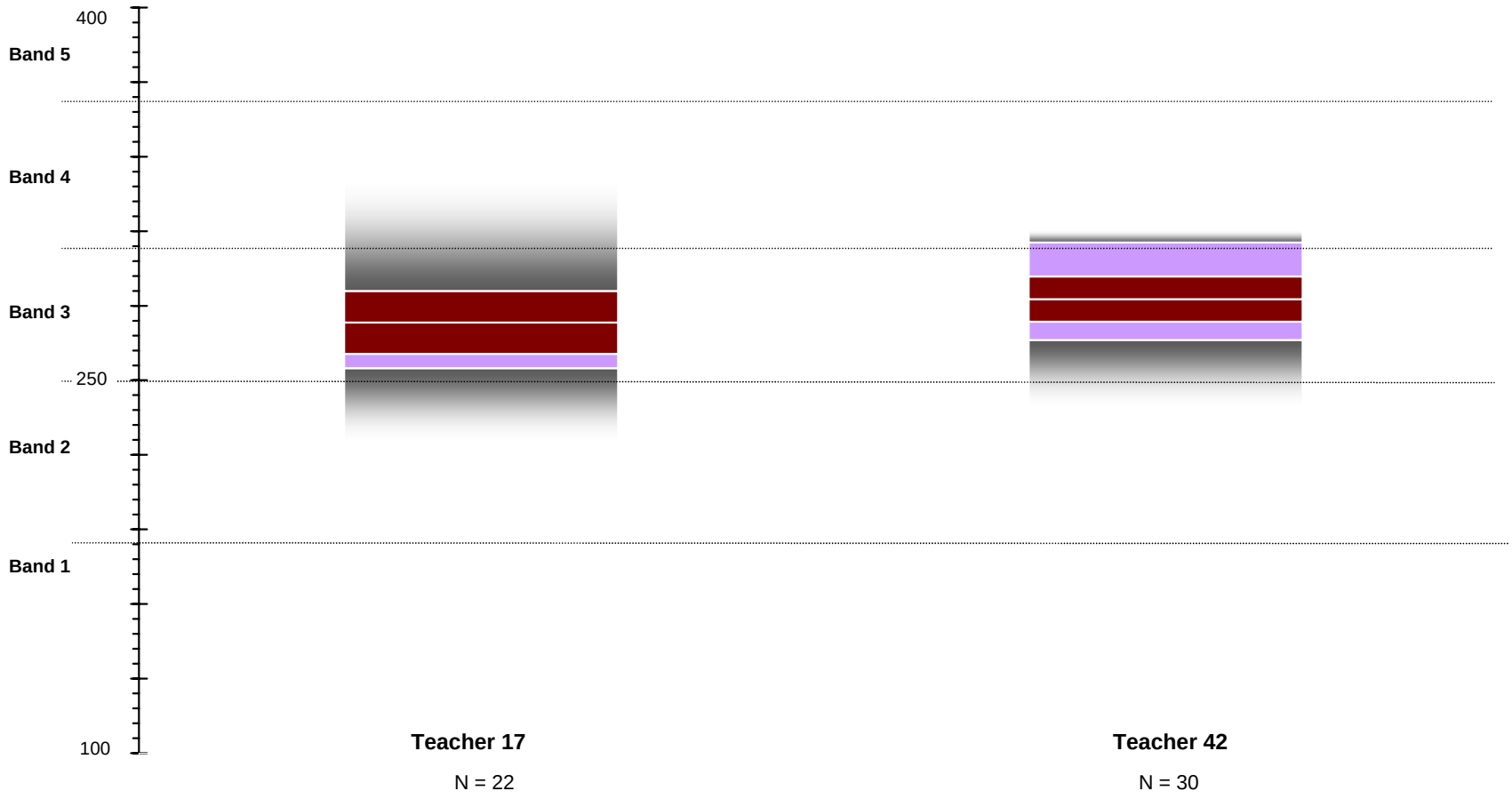


Figure 9. Distribution of Classroom Achievement in 1997-1998, in Number, Conventional Classrooms in District 1, Grade 5, by Teacher

Table 1.5.9

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Algebra, District 1, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
17	22	268.3	38.1	252.4	284.2	309.4	293.4	250.3	225.0
42	30	276.2	41.3	261.5	291.0	320.0	300.9	250.3	225.0

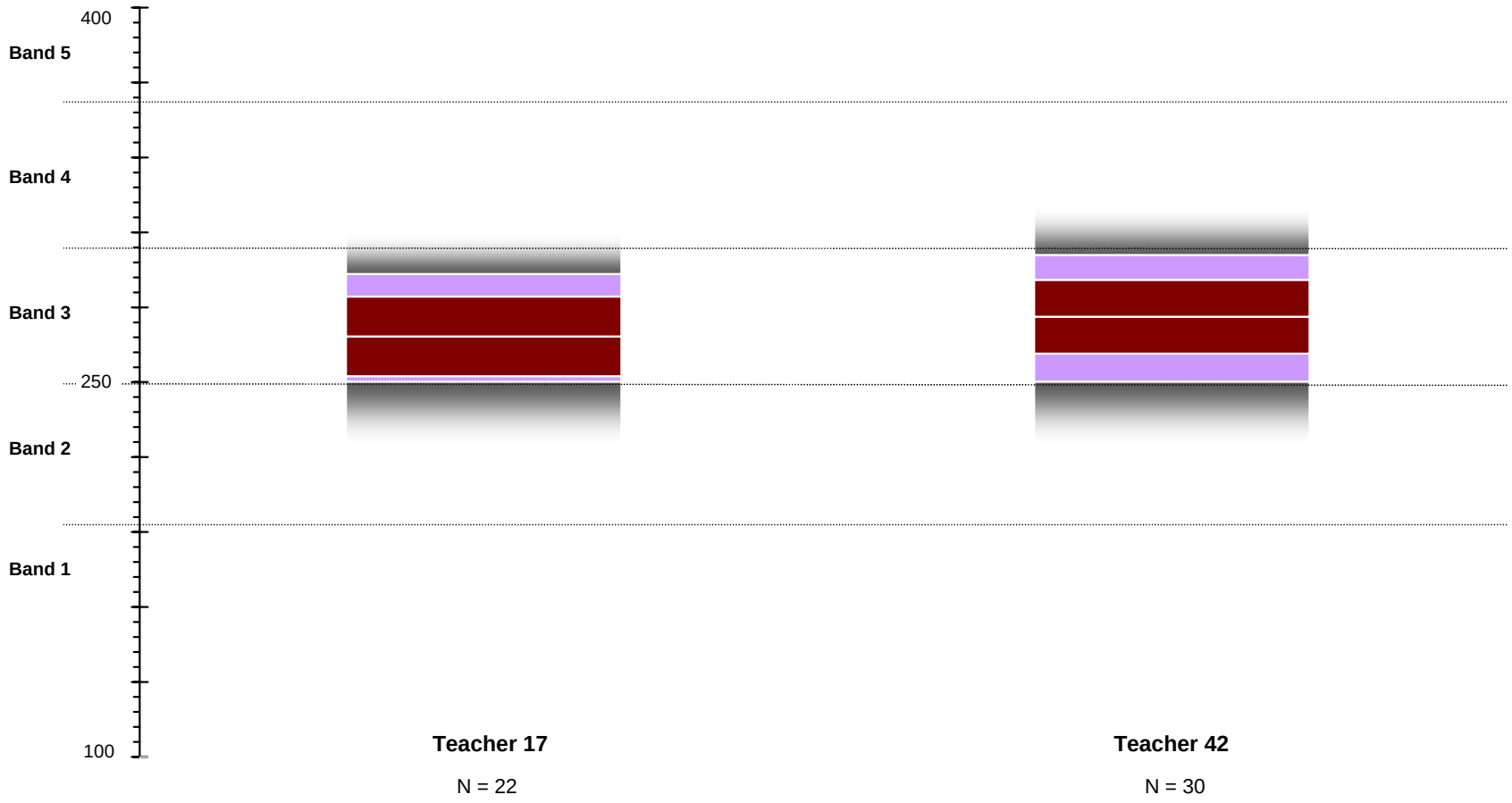


Figure 10. Distribution of Classroom Achievement in 1997-1998, in Algebra, Conventional Classrooms in District 1, Grade 5, by Teacher

Table 1.5.10

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Geometry, District 1, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
17	22	250.7	43.1	232.7	268.7	303.3	271.2	239.6	175.4
42	30	277.1	22.1	269.2	285.0	311.7	287.5	258.3	243.4

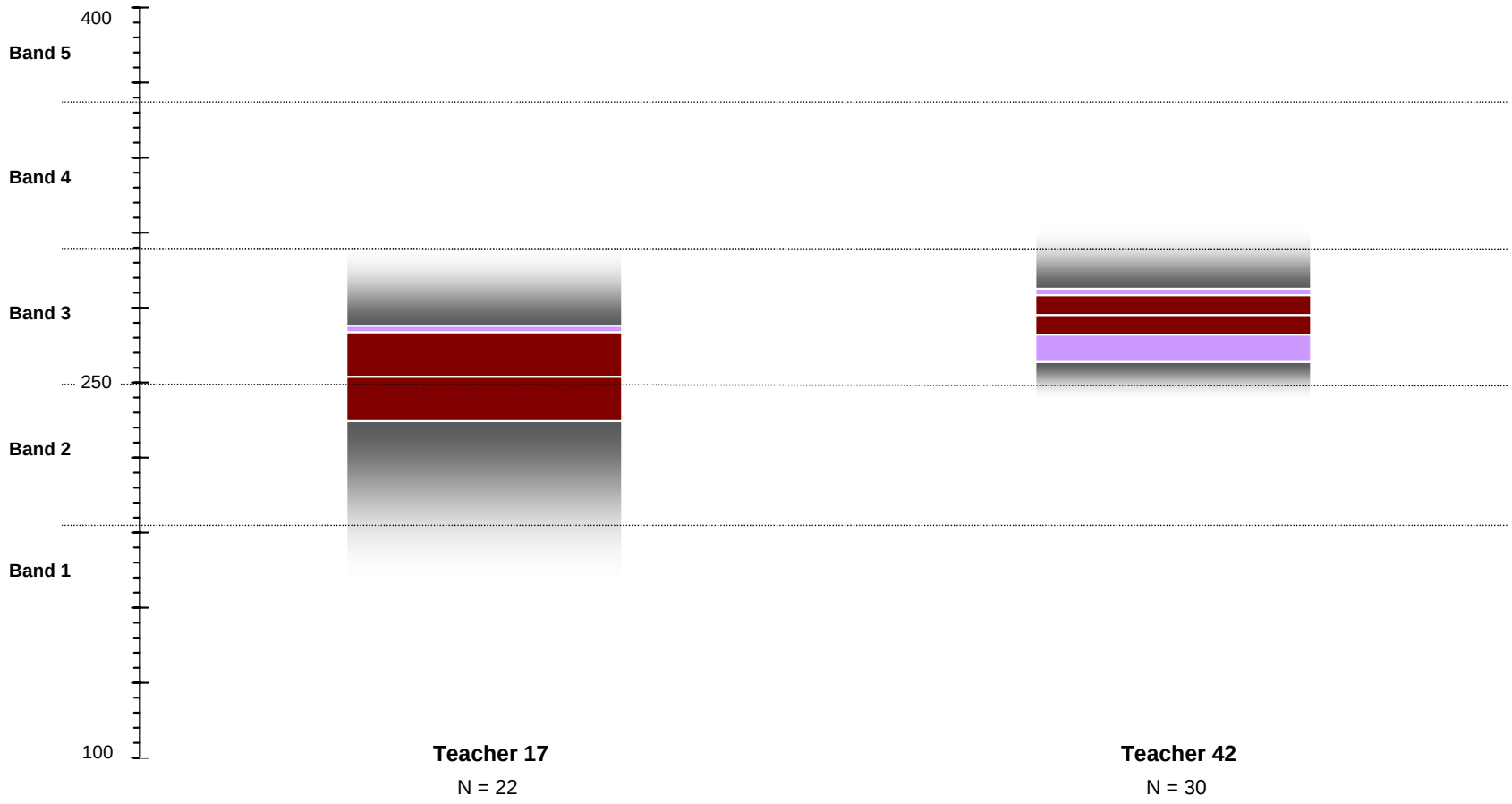


Figure 11. Distribution of Classroom Achievement in 1997-1998, in Geometry, Conventional Classrooms in District 1, Grade 5, by Teacher

Table 1.5.11

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Statistics, District 1, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
17	22	266.8	36.1	251.7	281.9	317.7	292.9	253.7	214.3
42	30	290.2	43.9	274.5	305.9	351.0	304.7	272.7	244.4

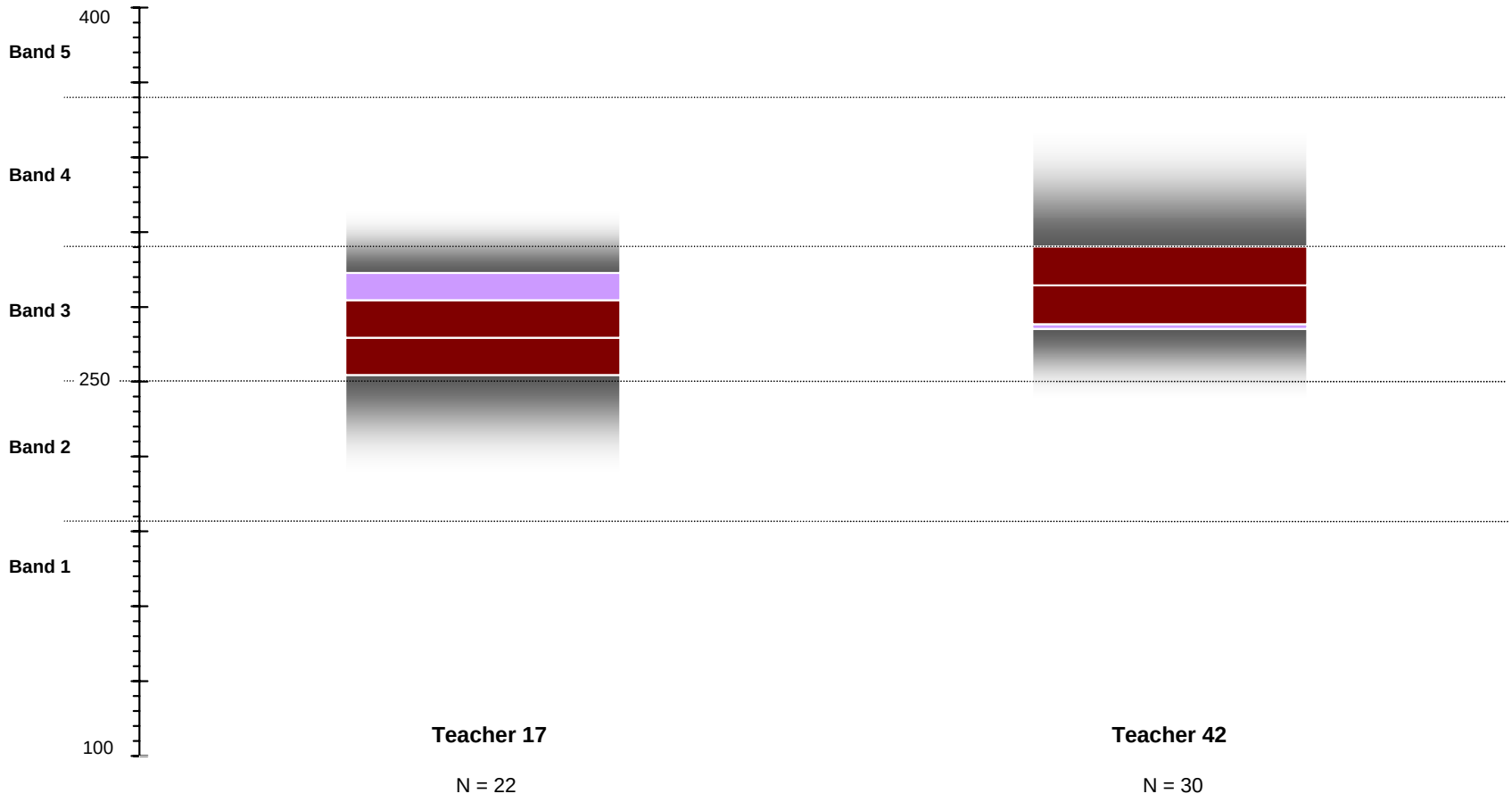


Figure 12. Distribution of Classroom Achievement in 1997-1998, in Statistics, Conventional Classrooms in District 1, Grade 5, by Teacher

District 2

Table 1.5.12
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 2, Grade 5, by Gender, by Ethnic Group, and by Content Strand*

				Confidence Interval		Score distribution percentiles			
	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	49	259.5	45.5	246.7	272.2	334.1	284.4	228.5	196.3
Male	28	252.7	49.4	234.4	271.0	331.9	283.1	212.5	180.5
Female	21	268.6	39.1	251.9	285.3	334.1	284.4	250.5	216.1
White	16	270.2	39.0	251.1	289.3	334.9	285.2	253.6	217.5
African American	1	201.9				201.9	201.9	201.9	201.9
Hispanic	11	247.9	42.7	222.6	273.1	311.5	266.9	222.3	187.0
Other	21	260.2	50.9	238.4	282.0	334.1	284.4	232.4	196.3
Number	49	268.4	48.2	254.9	281.9	342.7	300.7	236.1	196.2
Algebra	49	258.8	46.3	245.9	271.8	309.4	293.4	250.3	153.4
Geo & Meas	49	256.7	46.0	243.8	269.5	318.6	287.5	234.8	173.5
Prob & Stat	49	245.3	45.1	232.7	258.0	326.6	263.0	213.7	174.4

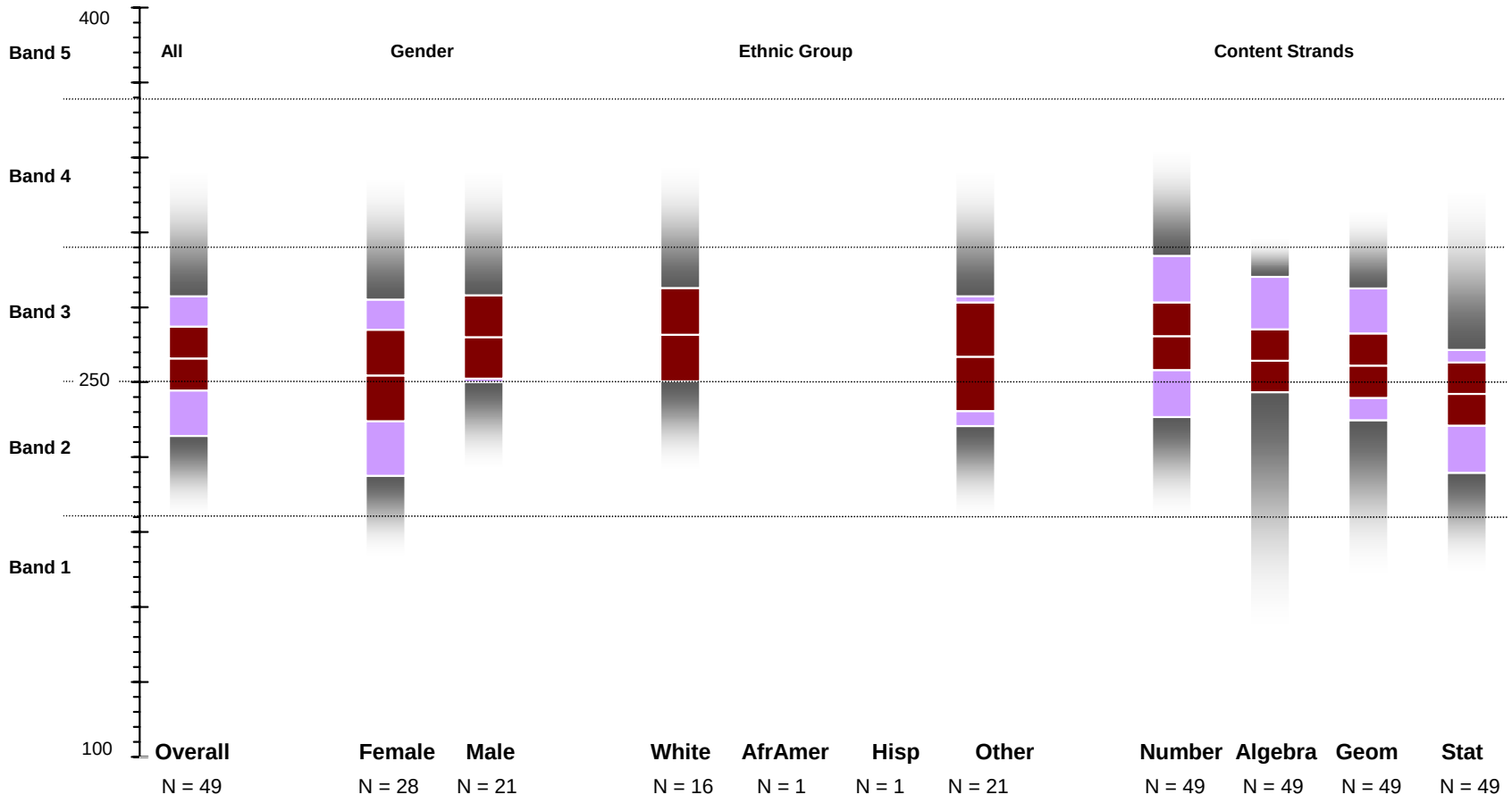


Figure 13. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 2, Grade 5, by Gender, by Ethnic Group, and by Content Strand

Table 1.5.13
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 2, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
43	49	259.5	45.5	246.7	272.2	334.1	284.4	228.5	196.3

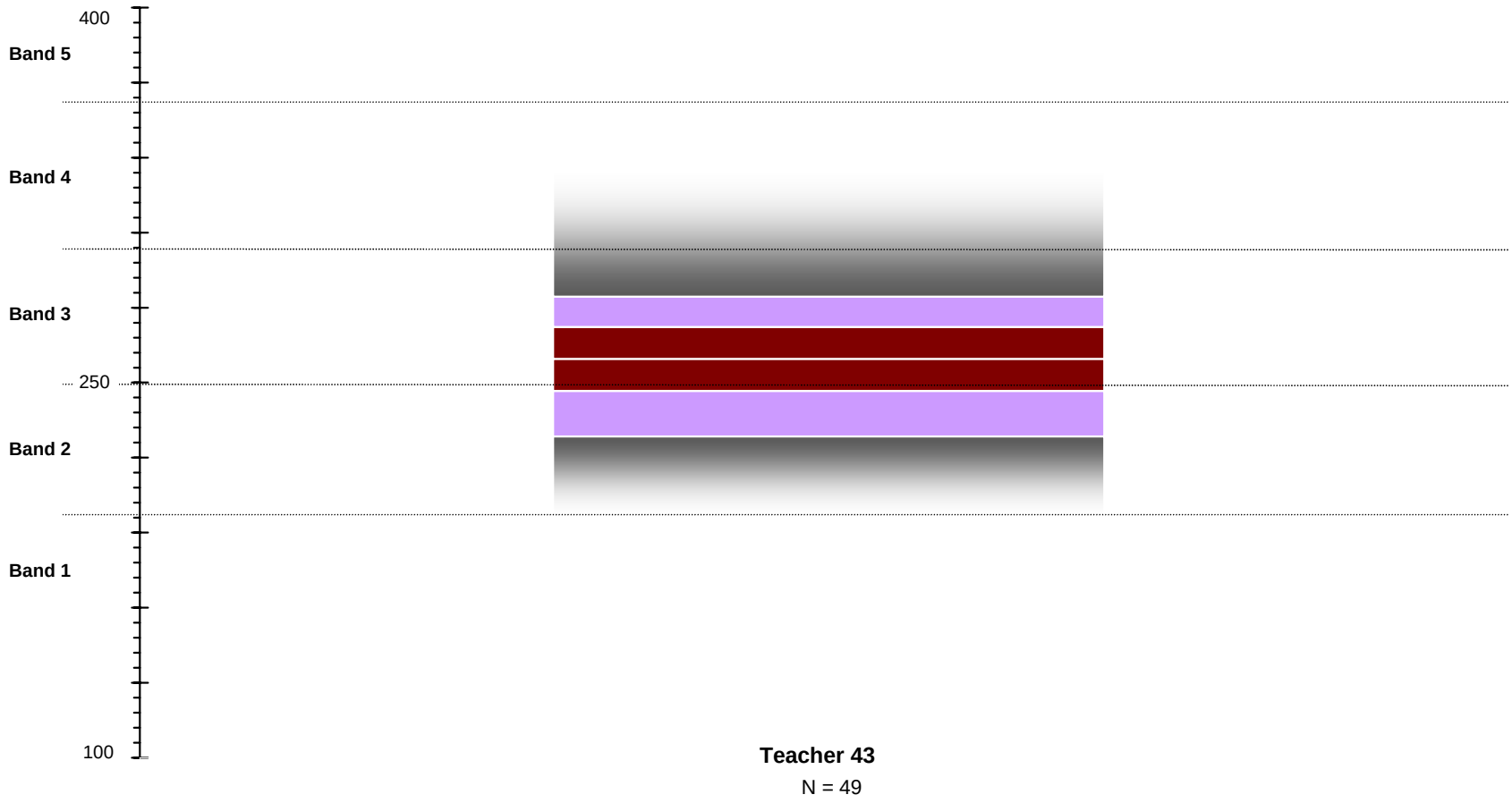


Figure 14. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 2, Grade 5, by Teacher

Table 1.5.14

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Number, District 2, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
43	49	268.4	48.2	254.9	281.9	342.7	300.7	236.1	196.2

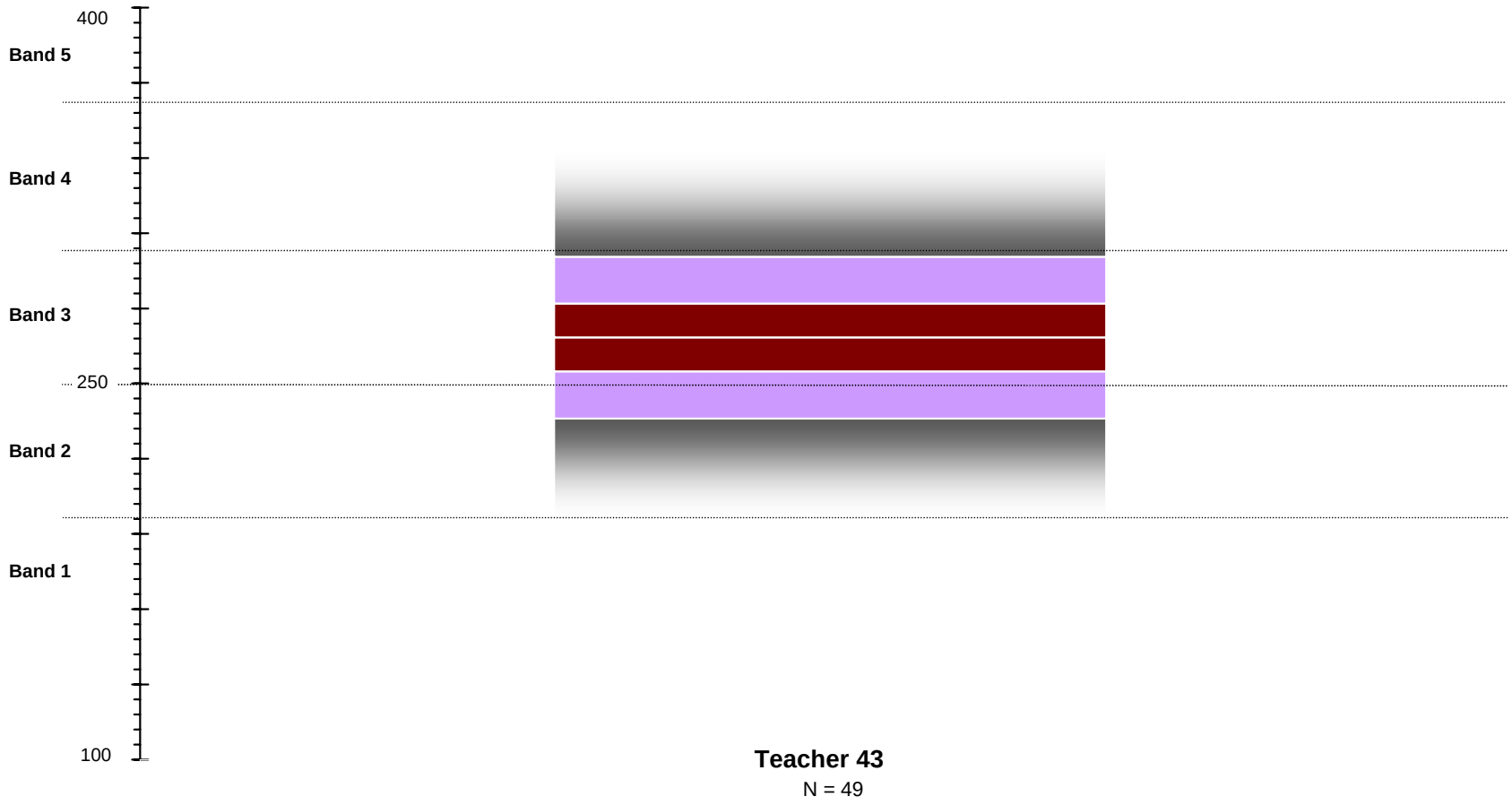


Figure 15. Distribution of Classroom Achievement in 1997-1998, in Number, Conventional Classrooms in District 2, Grade 5, by Teacher

Table 1.5.15

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Algebra, District 2, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
43	49	258.8	46.3	245.9	271.8	309.4	293.4	250.3	153.4

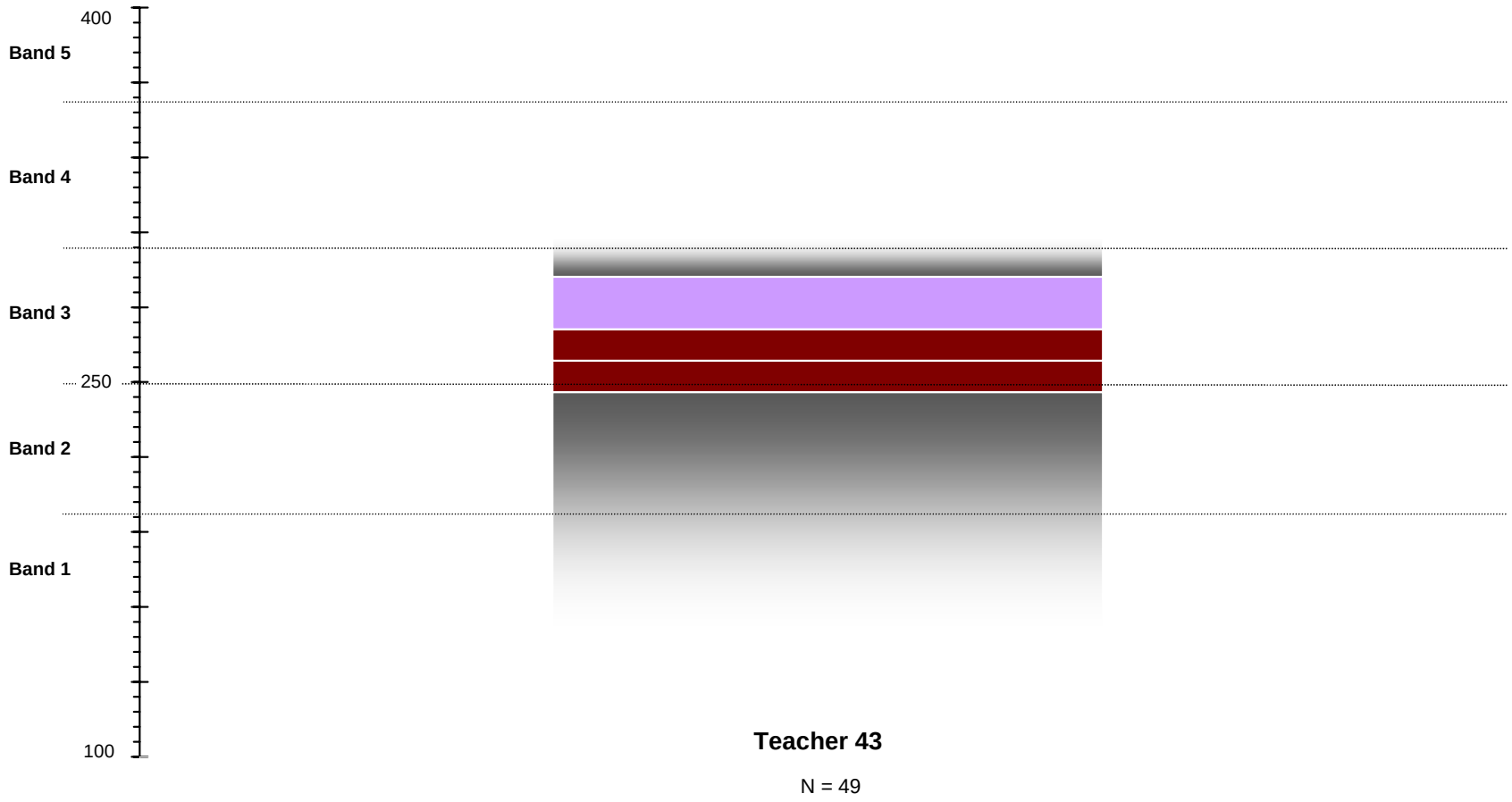


Figure 16. Distribution of Classroom Achievement in 1997-1998, in Algebra, Conventional Classrooms in District 2, Grade 5, by Teacher

Table 1.5.16

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Geometry, District 2, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
43	49	256.7	46.0	243.8	269.5	318.6	287.5	234.8	173.5

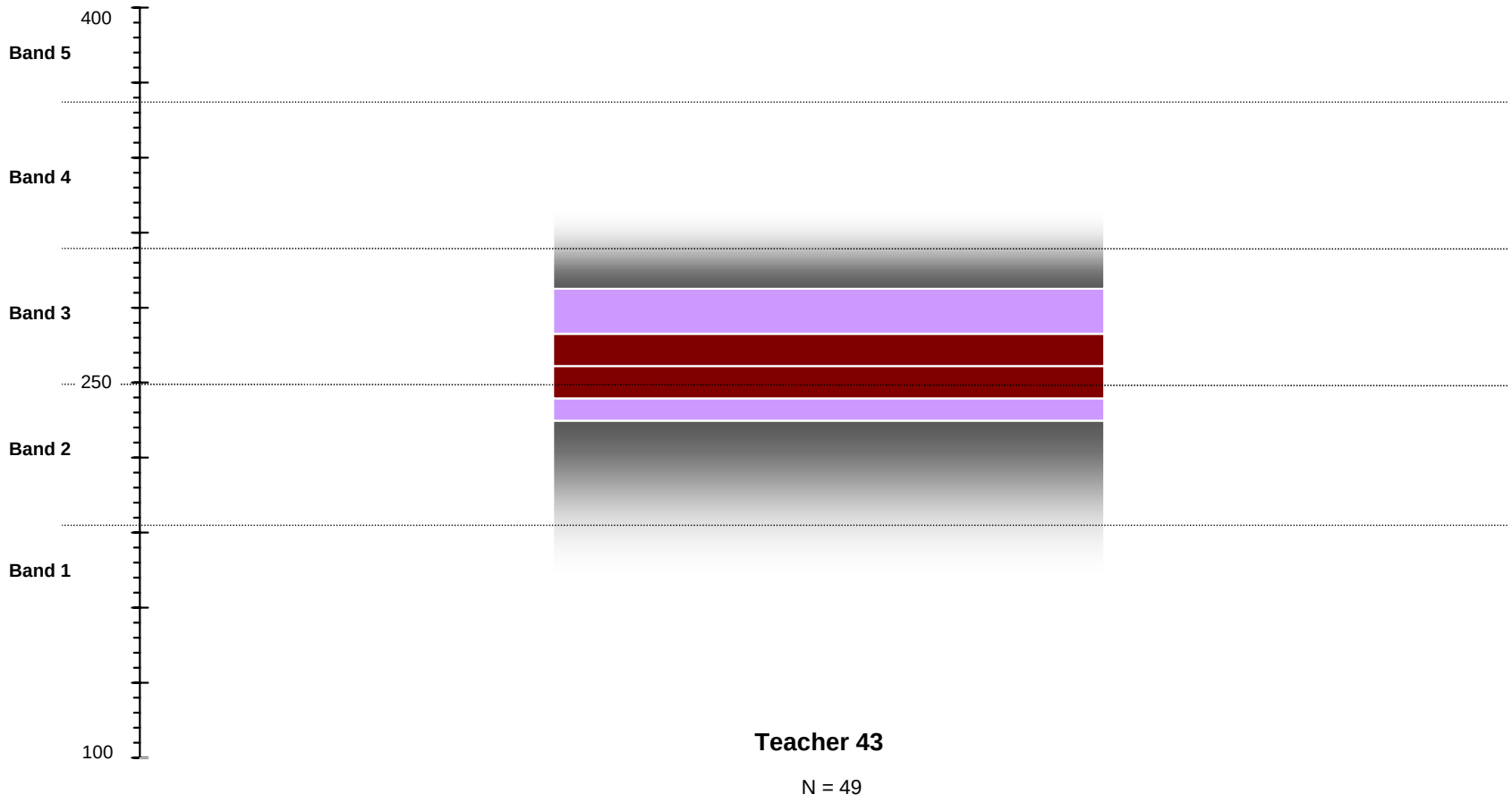


Figure 17. Distribution of Classroom Achievement in 1997-1998, in Geometry, Conventional Classrooms in District 2, Grade 5, by Teacher

Table 1.5.17
Classroom Achievement in Conventional Classrooms in 1997-1998*, in Statistics, District 2, Grade 5, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
43	49	245.3	45.1	232.7	258.0	326.6	263.0	213.7	174.4

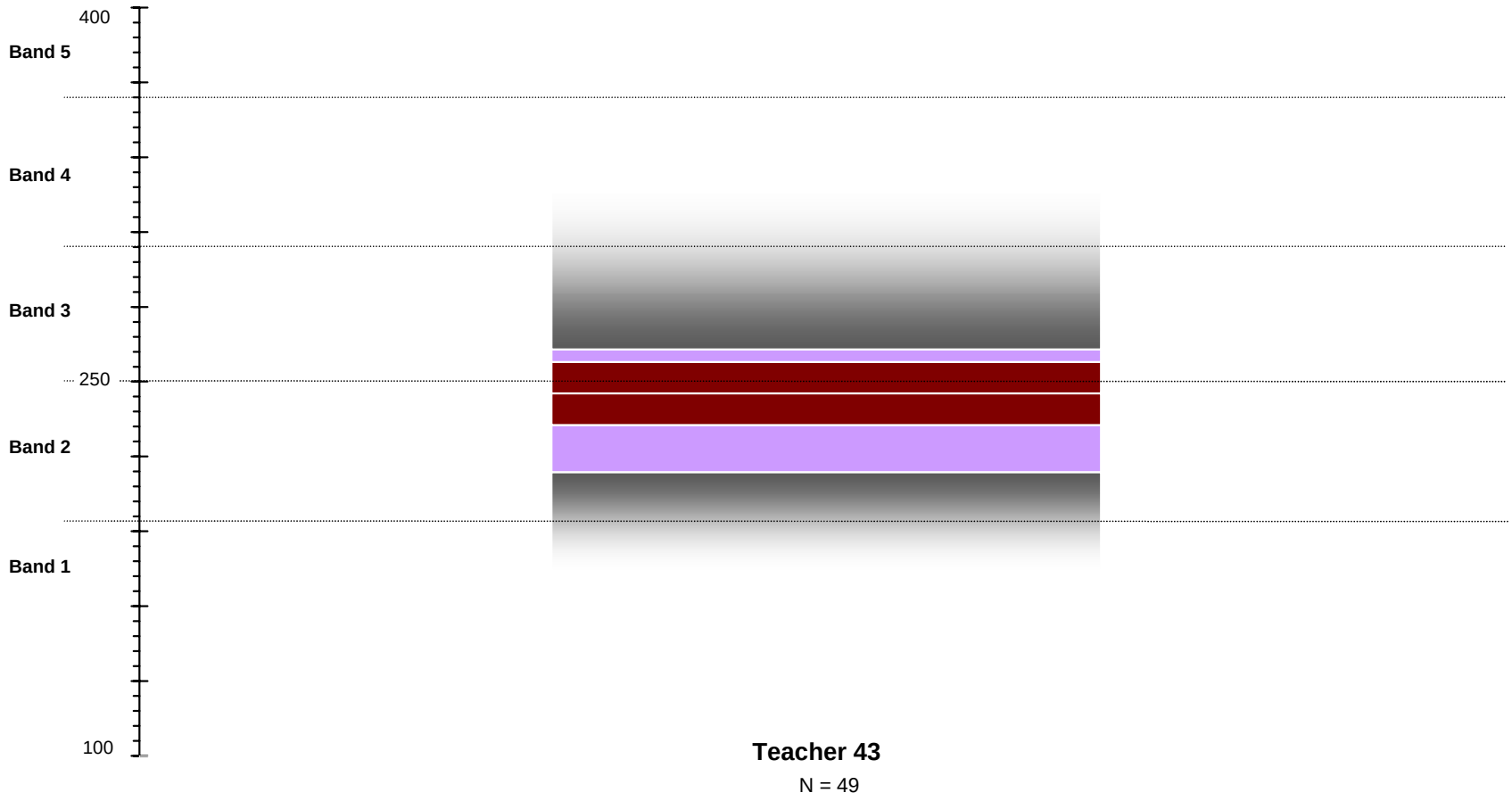


Figure 18. Distribution of Classroom Achievement in 1997-1998, in Statistics, Conventional Classrooms in District 2, Grade 5, by Teacher

Grade 6

All Districts

Table 1.6.1
Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 6, by Gender, by Ethnic Group, and by Content Strand*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	124	232.0	43.2	224.4	239.6	293.4	259.0	206.5	155.1
Male	73	232.3	44.3	222.1	242.5	301.4	259.0	206.5	160.5
Female	51	231.6	41.9	220.1	243.1	290.6	259.0	206.5	159.3
White	40	250.4	37.0	239.0	261.9	314.0	269.7	232.9	191.0
African-American	34	223.9	48.4	207.6	240.1	290.6	261.5	199.7	142.1
Hispanic	24	210.8	42.1	194.0	227.6	259.0	248.1	175.4	153.4
Other	26	233.8	35.2	220.3	247.4	289.2	258.0	208.0	184.4
Number	124	225.9	44.8	218.0	233.8	284.9	254.8	214.4	139.1
Algebra	124	250.3	52.6	241.0	259.6	324.9	288.1	218.3	133.0
Geometry	124	237.7	47.5	229.3	246.0	316.7	270.7	202.7	158.7
Statistics	124	228.4	45.0	220.5	236.3	292.5	260.0	206.5	153.0

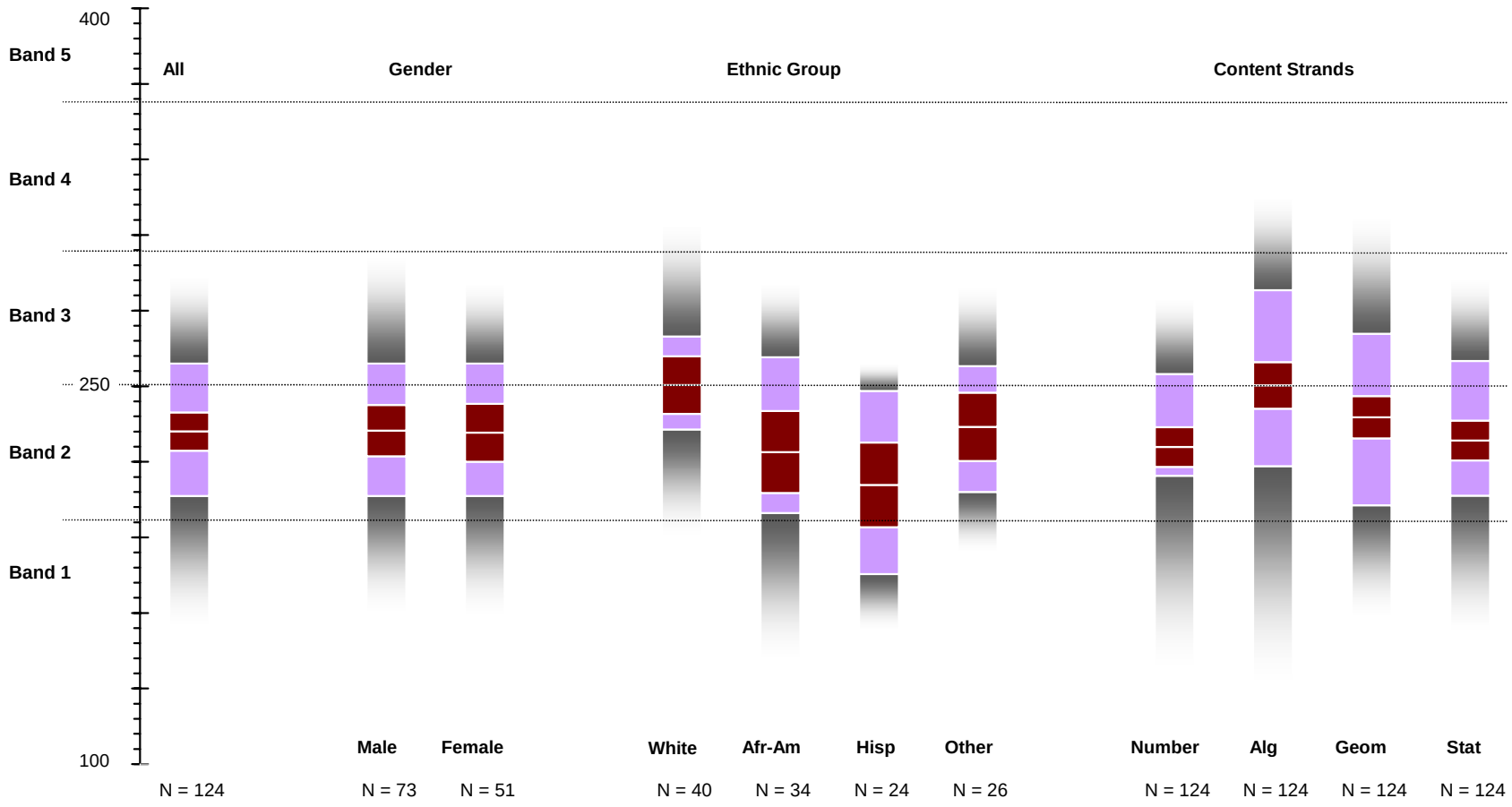


Figure 2. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 6, by Gender, by Ethnic Group, and by Content Strand

Table 1.6.2
Classroom Achievement in Conventional Classrooms, in 1997-1998*, in Grade 6, by District*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	124	232.0	43.2	224.4	239.6	293.4	259.0	206.5	155.1
District 1	76	246.6	36.2	238.5	254.8	299.5	269.7	222.6	190.4
District 2	48	208.8	43.5	196.5	221.1	268.5	244.2	175.4	132.4

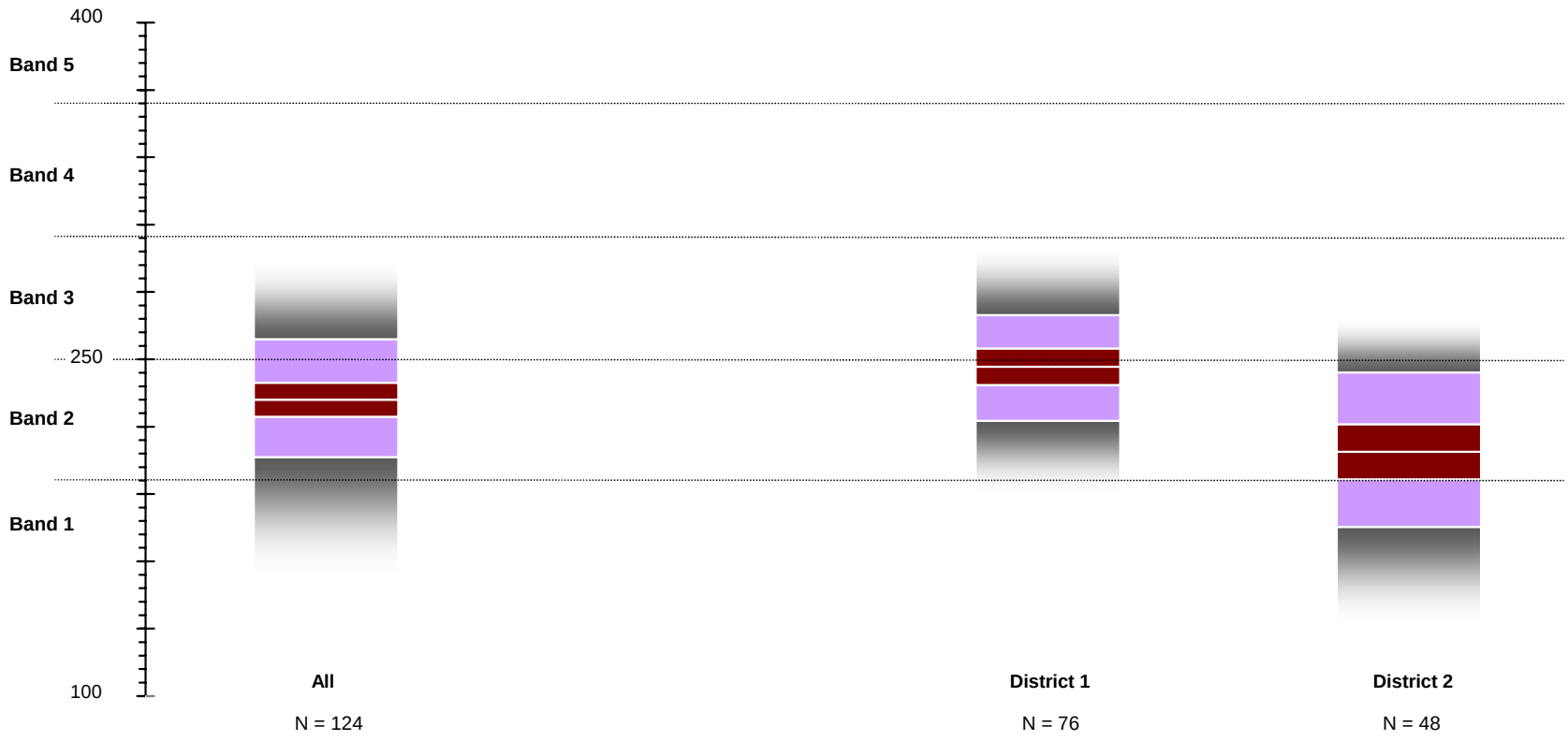


Figure 3. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms, Grade 6, by District

Table 1.6.3
Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 6, by Gender*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
Male	73	232.3	44.3	222.1	242.5	301.4	259.0	206.5	160.5
Female	51	231.6	41.9	220.1	243.1	290.6	259.0	206.5	159.3
District 1									
Male	45	244.6	39.9	232.9	256.2	312.9	269.7	218.3	184.4
Female	31	249.6	30.3	239.0	260.3	292.0	268.0	226.5	199.7
District 2									
Male	28	212.6	44.6	196.1	229.1	274.8	247.1	175.4	132.4
Female	20	203.5	42.5	184.9	222.2	259.5	236.4	182.2	150.5

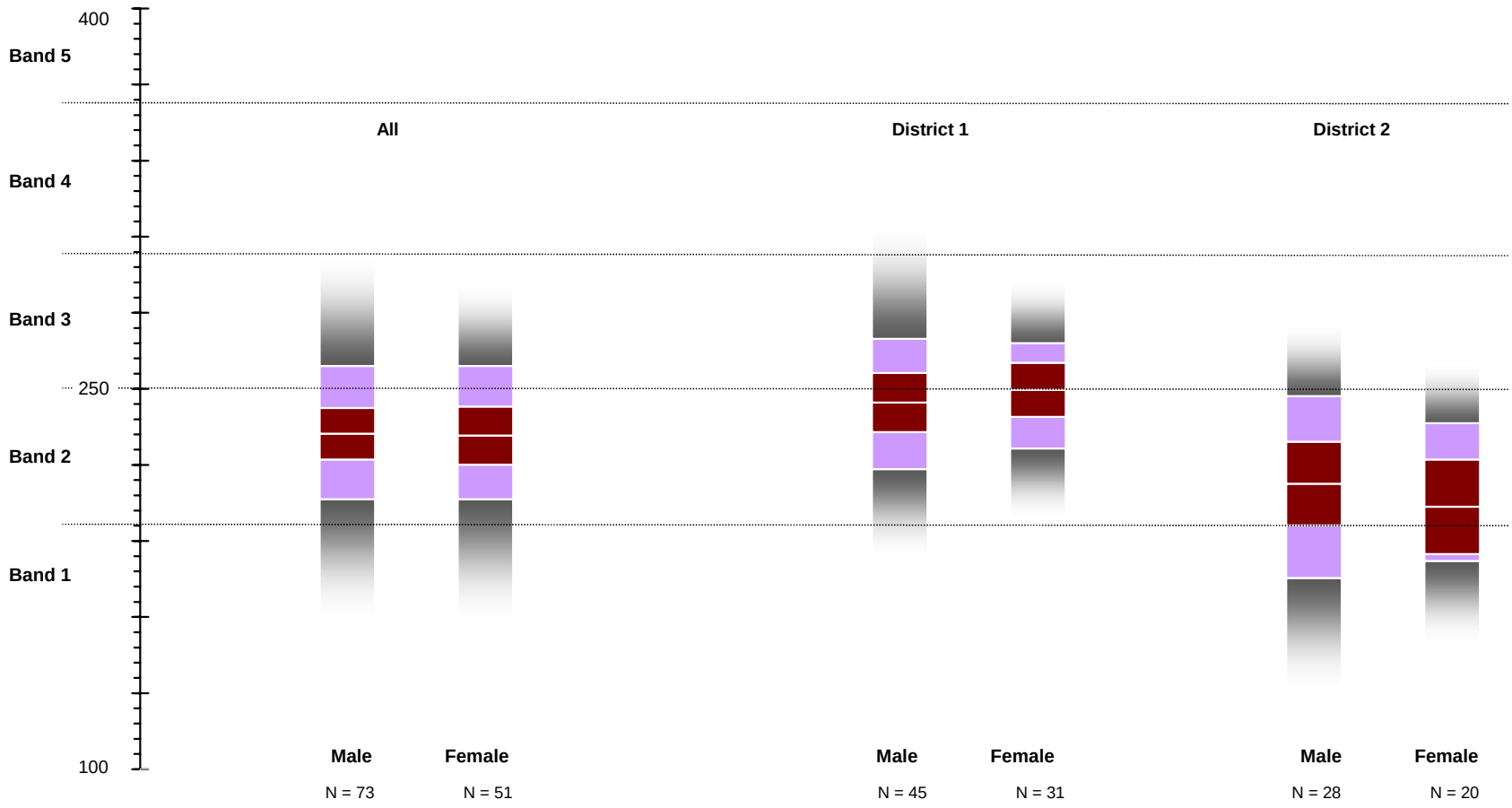


Figure 4. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 6, by Gender

Table 1.6.4
Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 6, by Ethnic Group*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
White	40	250.4	37.0	239.0	261.9	314.0	269.7	232.9	191.0
African American	34	223.9	48.4	207.6	240.1	290.6	261.5	199.7	142.1
Hispanic	24	210.8	42.1	194.0	227.6	259.0	248.1	175.4	153.4
Other	26	233.8	35.2	220.3	247.4	289.2	258.0	208.0	184.4
District 1									
White	37	251.8	35.3	240.4	263.2	314.8	269.7	234.1	203.6
African American	22	242.0	39.7	225.4	258.6	290.6	271.0	201.4	184.8
Hispanic	3	234.9	25.3	206.2	263.5	253.8	249.1	224.8	210.1
Other	14	242.8	35.8	224.0	261.5	291.6	274.2	218.3	194.3
District 2									
White	3	233.8	61.7	163.9	303.6	281.6	268.0	208.2	173.8
African American	12	190.5	46.3	164.3	216.8	240.7	215.5	162.3	110.3
Hispanic	21	207.4	43.3	188.9	225.9	259.0	247.1	175.4	153.4
Other	12	223.4	32.9	204.9	242.0	267.8	248.1	202.9	175.8

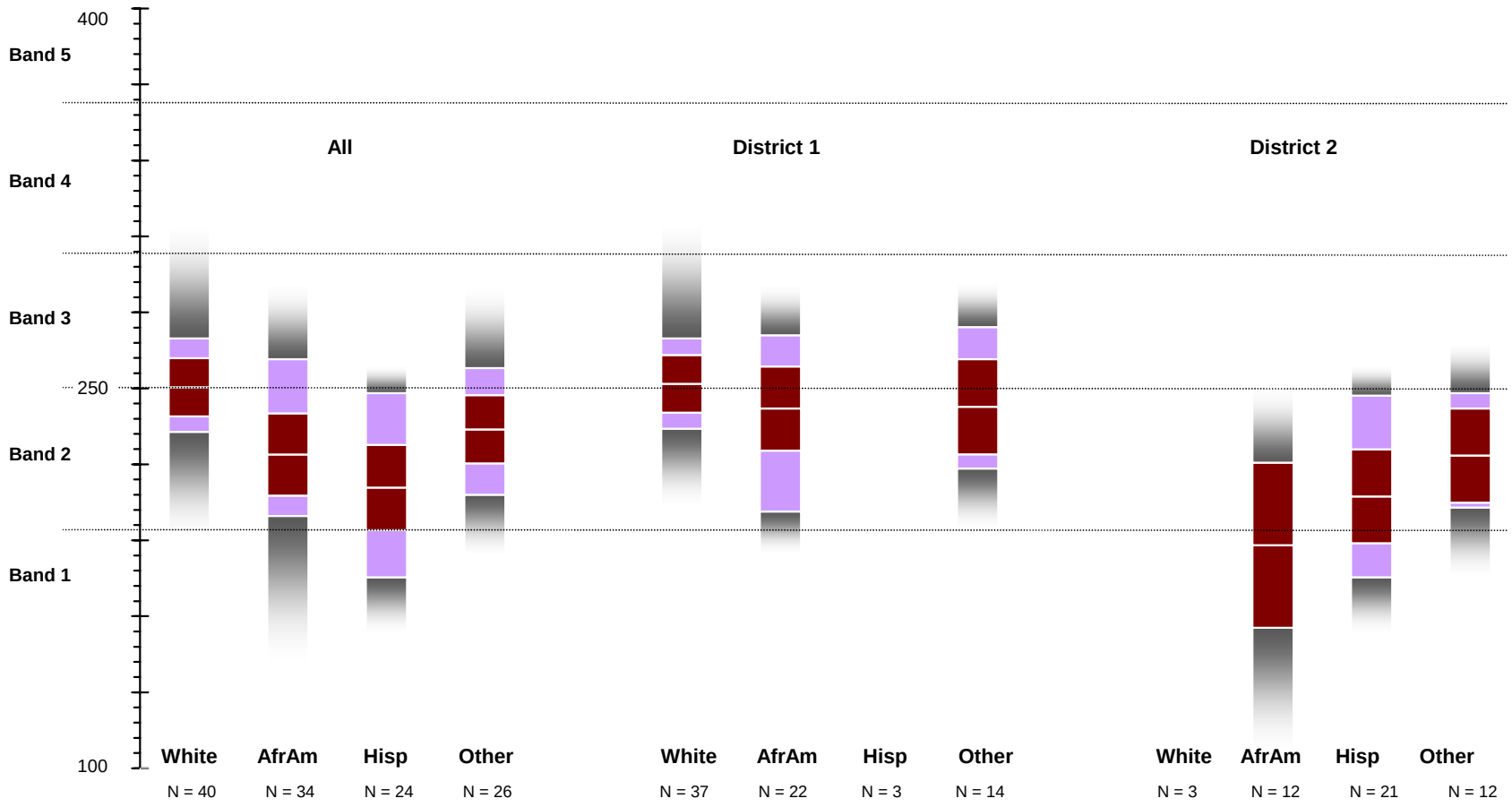


Figure 5. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 6, by Ethnic Group

Table 1.6.5

Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 6, by Content Strand*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
Number	124	225.9	44.8	218.0	233.8	284.9	254.8	214.4	139.1
Algebra	124	250.3	52.6	241.0	259.6	324.9	288.1	218.3	133.0
Geometry	124	237.7	47.5	229.3	246.0	316.7	270.7	202.7	158.7
Statistics	124	228.4	45.0	220.5	236.3	292.5	260.0	206.5	153.0
District 1									
Number	76	241.2	32.9	233.8	248.6	291.7	256.6	214.4	192.6
Algebra	76	264.0	51.7	252.4	275.6	324.9	299.2	242.7	168.3
Geometry	76	246.0	46.8	235.5	256.6	316.7	270.7	202.7	158.7
Statistics	76	238.1	38.1	229.6	246.7	297.3	260.0	218.5	177.7
District 2									
Number	48	201.6	50.4	187.3	215.8	261.7	238.1	176.0	91.8
Algebra	48	228.6	46.9	215.3	241.8	295.3	261.0	218.3	133.0
Geometry	48	224.4	45.9	211.4	237.4	289.9	270.7	202.7	158.7
Statistics	48	213.0	50.8	198.7	227.4	282.8	248.2	185.9	109.6

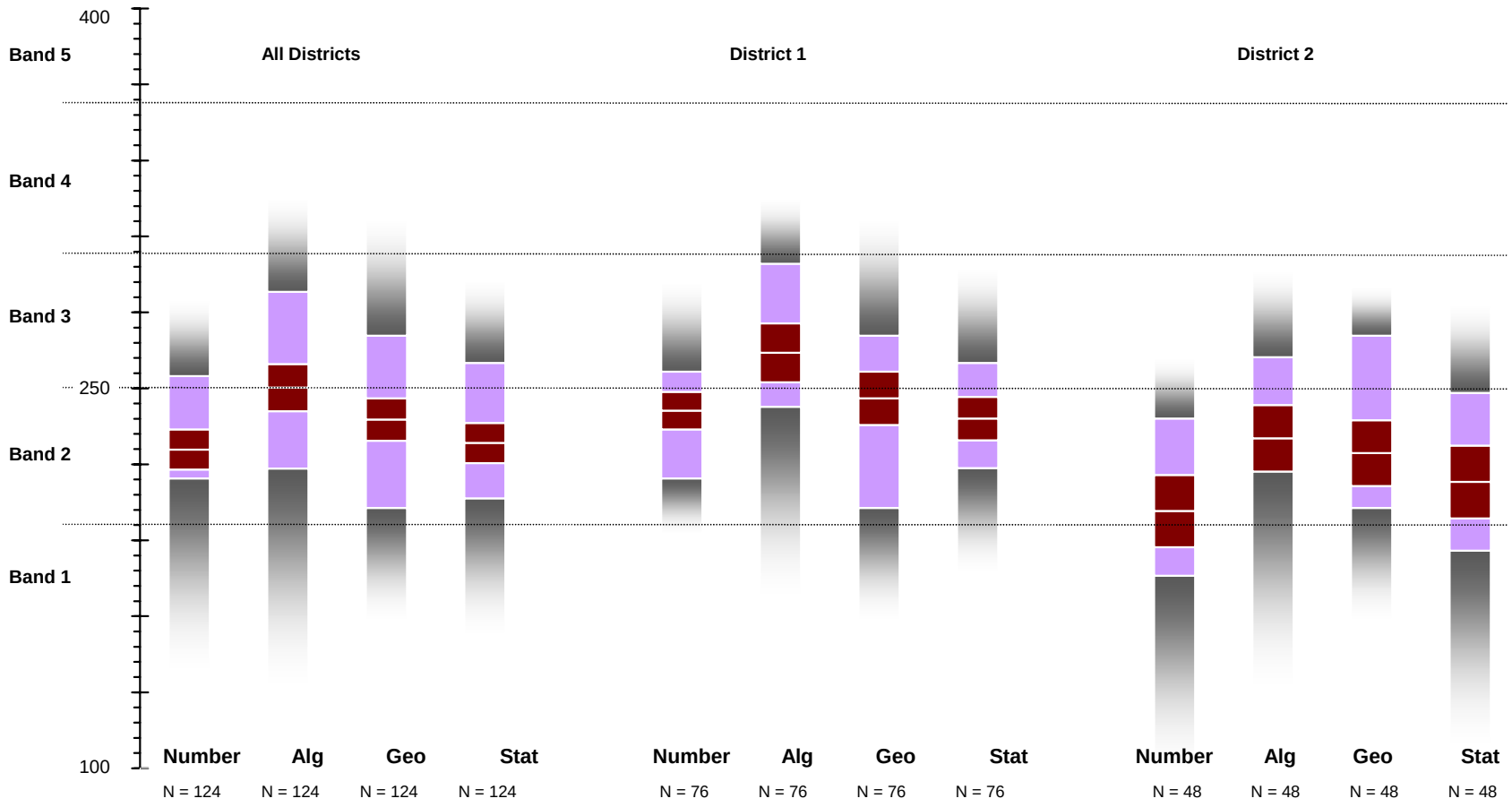


Figure 6. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 6, by Content Strand

District 1

Table 1.6.6
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 1, Grade 6, by Gender, by Ethnic Group, and by Content Strand*

				Confidence Interval		Score distribution percentiles			
	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	76	246.6	36.2	238.5	254.8	299.5	269.7	222.6	190.4
Male	45	244.6	39.9	232.9	256.2	312.9	269.7	218.3	184.4
Female	31	249.6	30.3	239.0	260.3	292.0	268.0	226.5	199.7
White	37	251.8	35.3	240.4	263.2	314.8	269.7	234.1	203.6
African American	22	242.0	39.7	225.4	258.6	290.6	271.0	201.4	184.8
Hispanic	3	234.9	25.3	206.2	263.5	253.8	249.1	224.8	210.1
Other	14	242.8	35.8	224.0	261.5	291.6	274.2	218.3	194.3
Number	76	241.2	32.9	233.8	248.6	291.7	256.6	214.4	192.6
Algebra	76	264.0	51.7	252.4	275.6	324.9	299.2	242.7	168.3
Geo & Meas	76	246.0	46.8	235.5	256.6	316.7	270.7	202.7	158.7
Prob & Stat	76	238.1	38.1	229.6	246.7	297.3	260.0	218.5	177.7

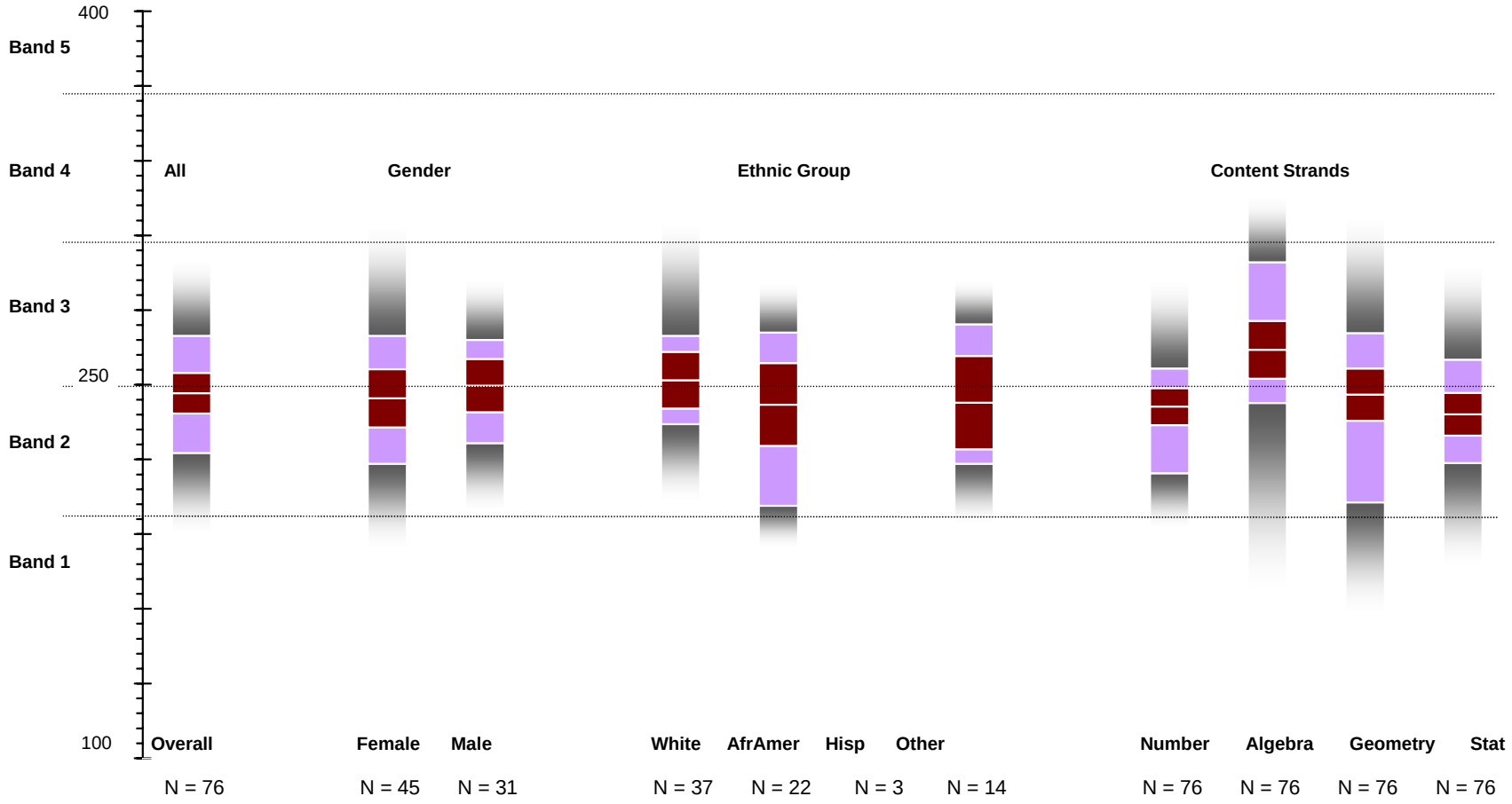


Figure 7. Distribution of Classroom Achievement in Conventional Classrooms in 1997-1998, in District 1, Grade 6, by Gender, Ethnic Group, and by Content Strand

Table 1.6.7
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 1, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
18	17	221.5	37.2	203.8	239.2	272.8	251.1	199.7	162.9
32	59	253.9	32.7	245.5	262.2	309.7	275.9	234.1	198.9

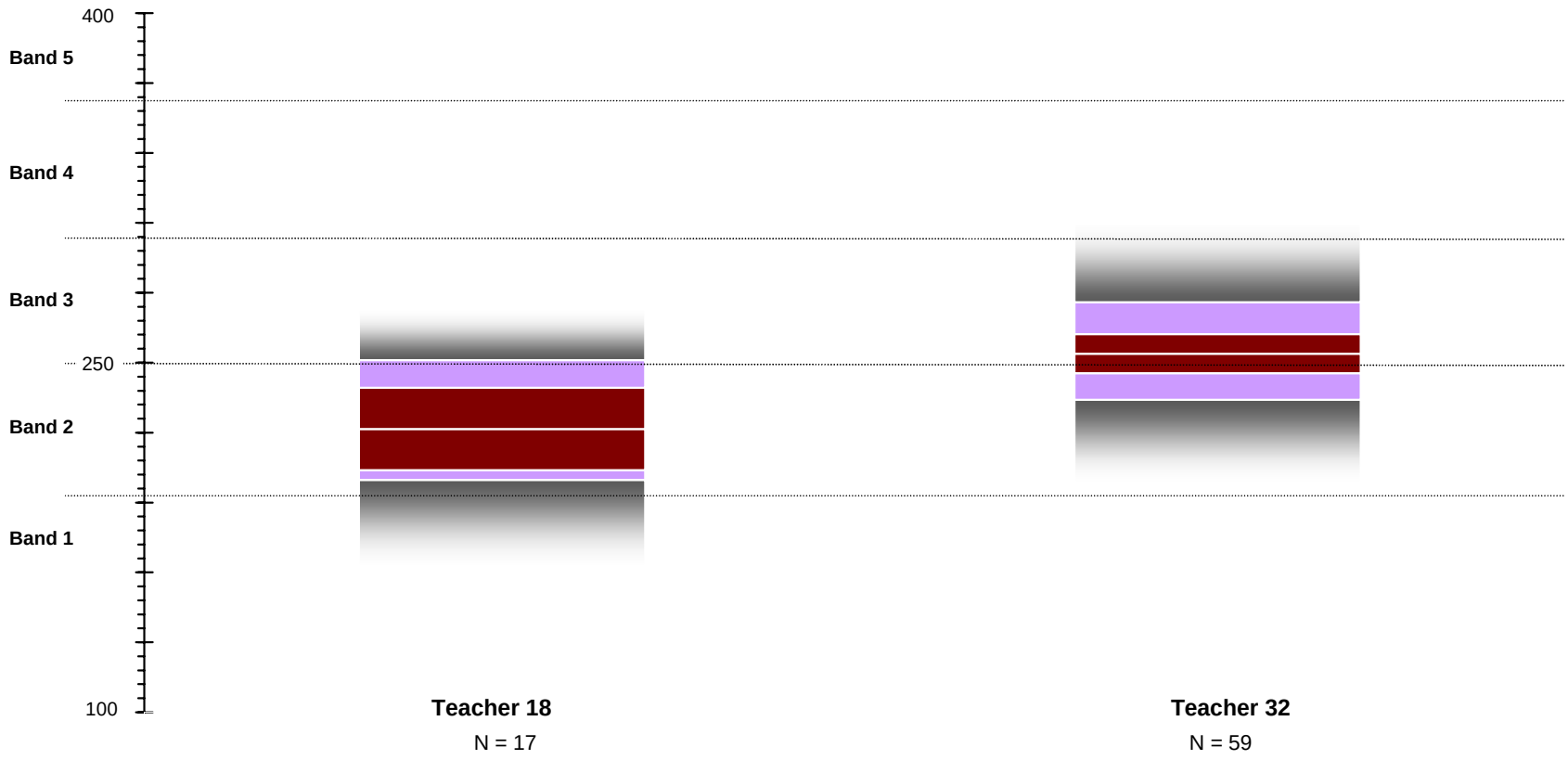


Figure 8. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 1, Grade 6, by Teacher

Table 1.6.8

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Number, District 1, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
18	17	236.9	29.4	222.9	250.9	275.1	254.8	214.4	193.7
32	59	242.5	34.0	233.8	251.2	299.6	258.3	220.8	196.0

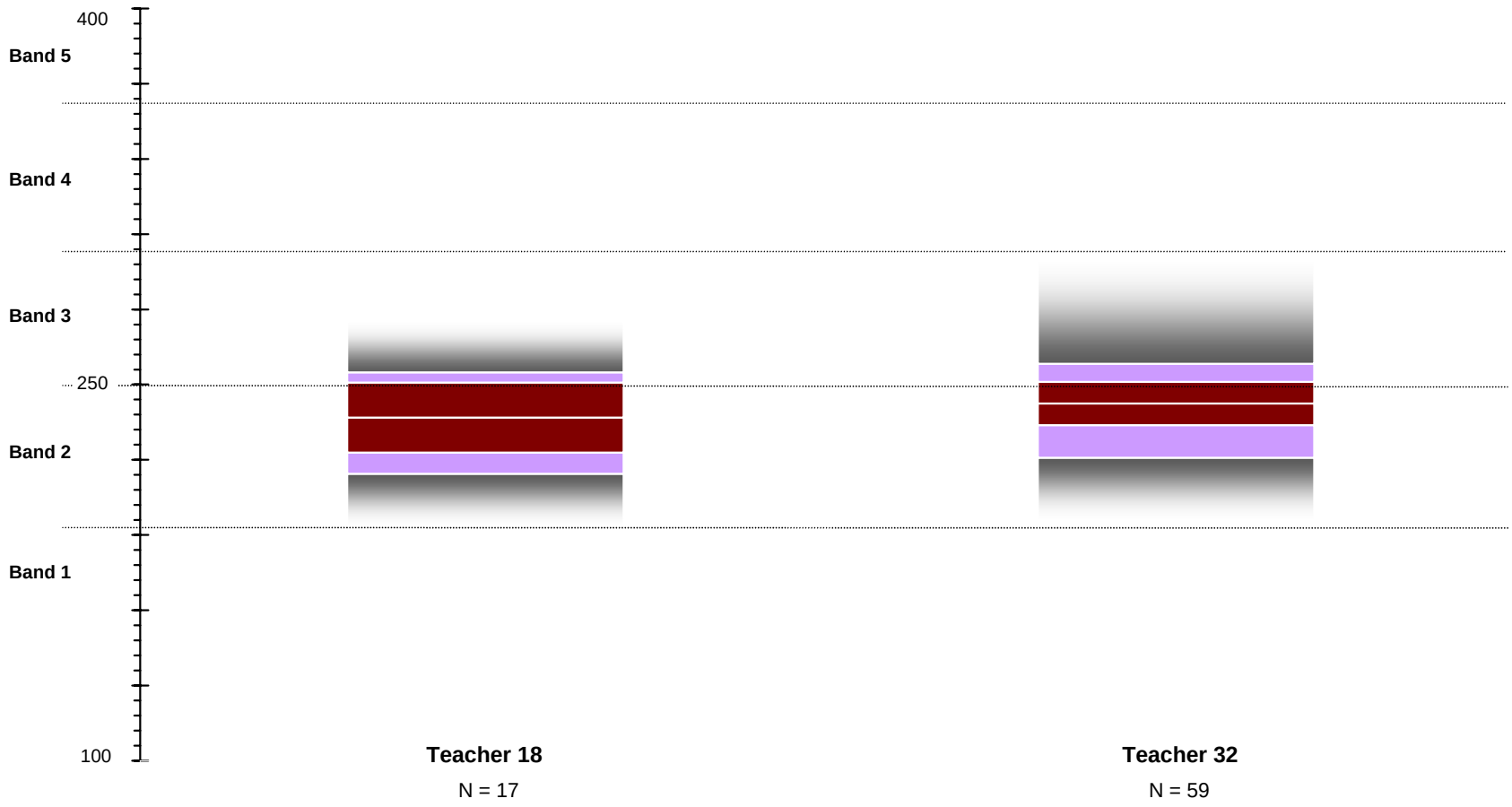


Figure 9. Distribution of Classroom Achievement in 1997-1998, in Number, Conventional Classrooms in District 1, Grade 6, by Teacher

Table 1.6.9

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Algebra, District 1, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
18	17	210.5	52.0	185.8	235.2	292.1	242.7	180.1	133.0
32	59	279.5	40.3	269.2	289.7	325.6	303.8	261.0	214.5

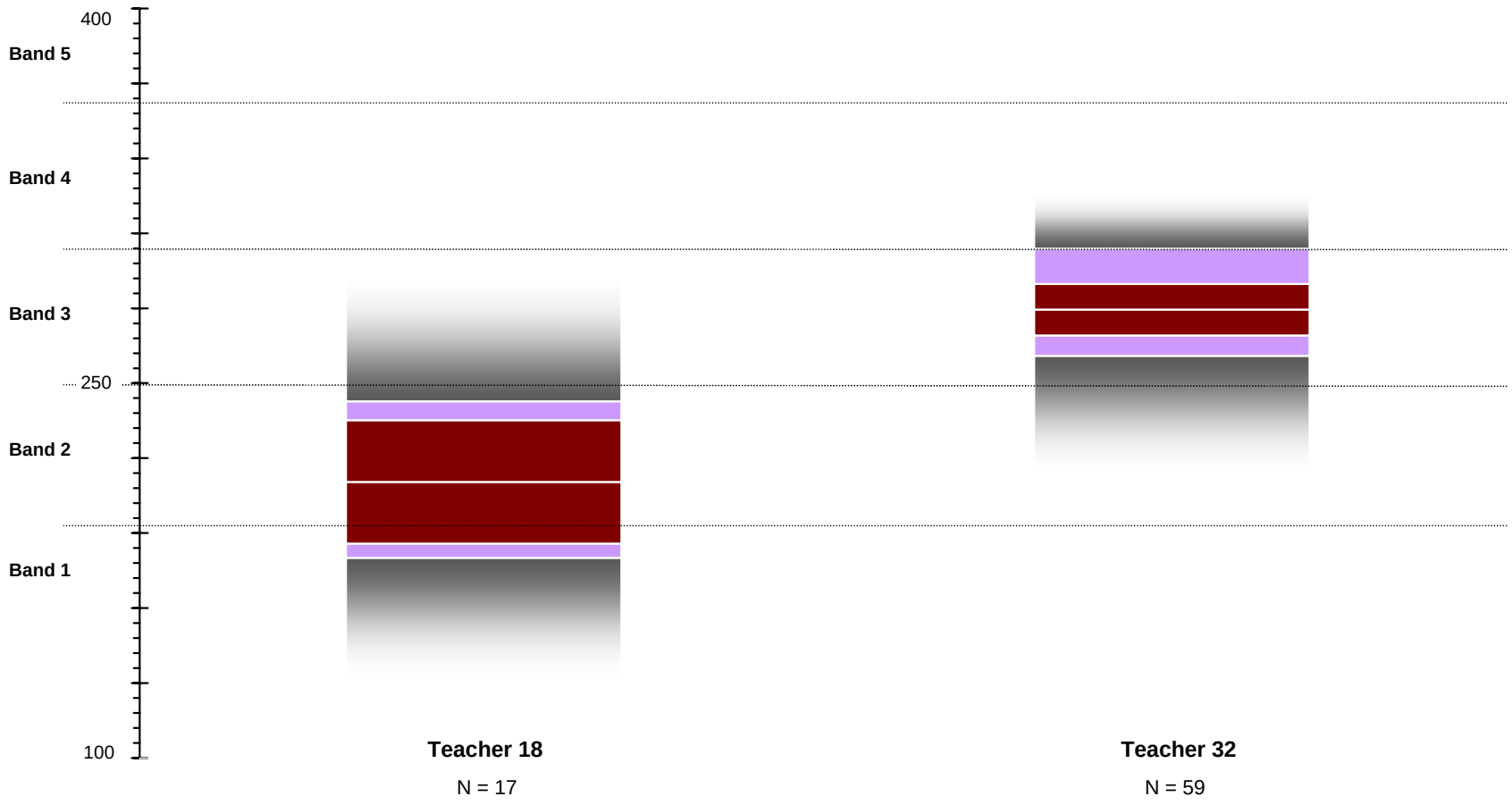


Figure 10. Distribution of Classroom Achievement in 1997-1998, in Algebra, Conventional Classrooms in District 1, Grade 6, by Teacher

Table 1.6.10

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Geometry, District 1, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
18	17	222.4	40.9	202.9	241.8	292.9	243.9	202.7	158.7
32	59	252.9	46.5	241.0	264.7	316.7	289.9	202.7	158.7

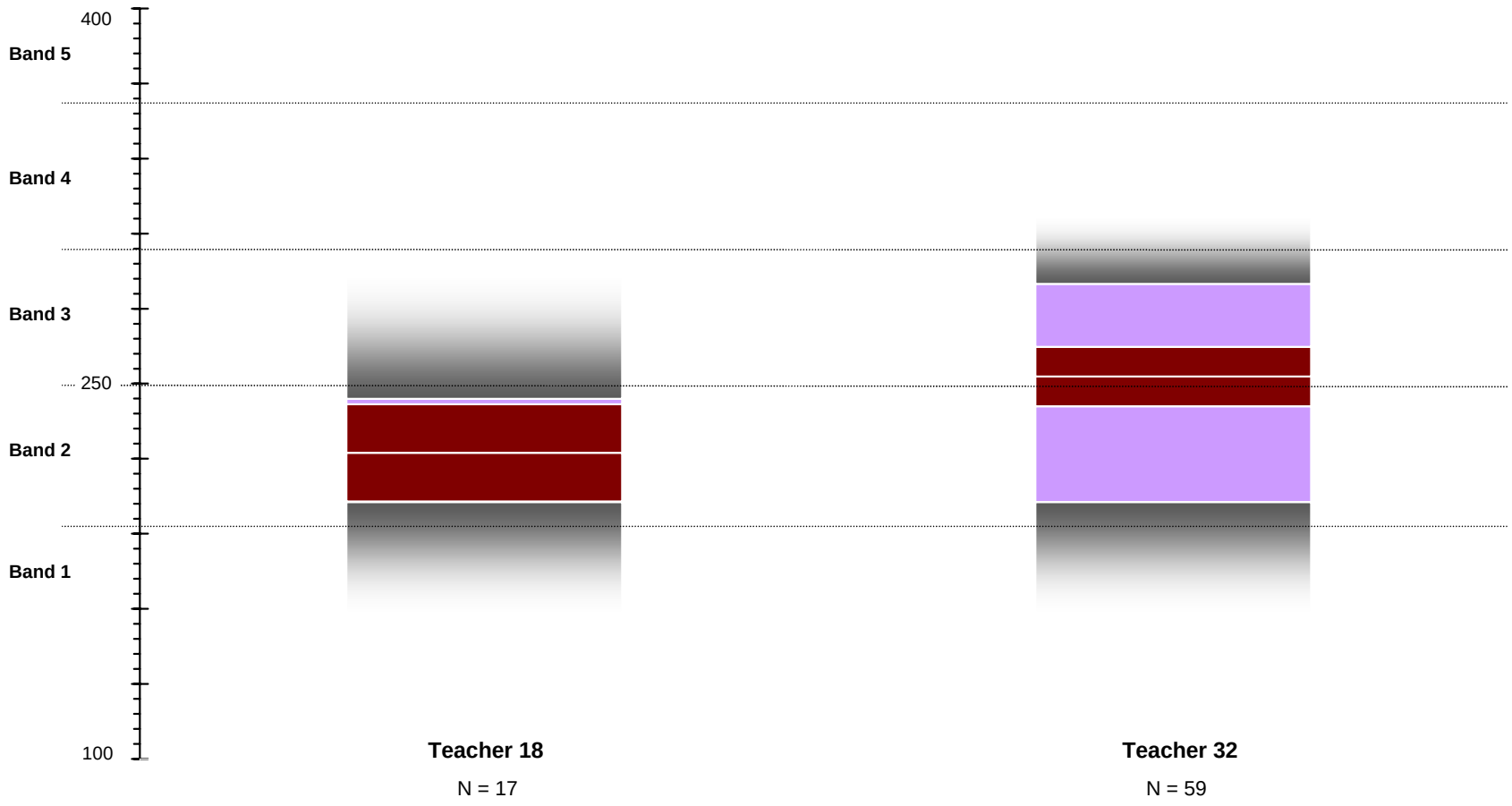


Figure 11. Distribution of Classroom Achievement in 1997-1998, in Geometry, Conventional Classrooms in District 1, Grade 6, by Teacher

Table 1.6.11

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Statistics, District 1, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
18	17	220.6	43.4	200.0	241.2	287.6	248.2	206.5	153.0
32	59	243.2	35.3	234.2	252.2	295.4	260.0	222.5	185.9

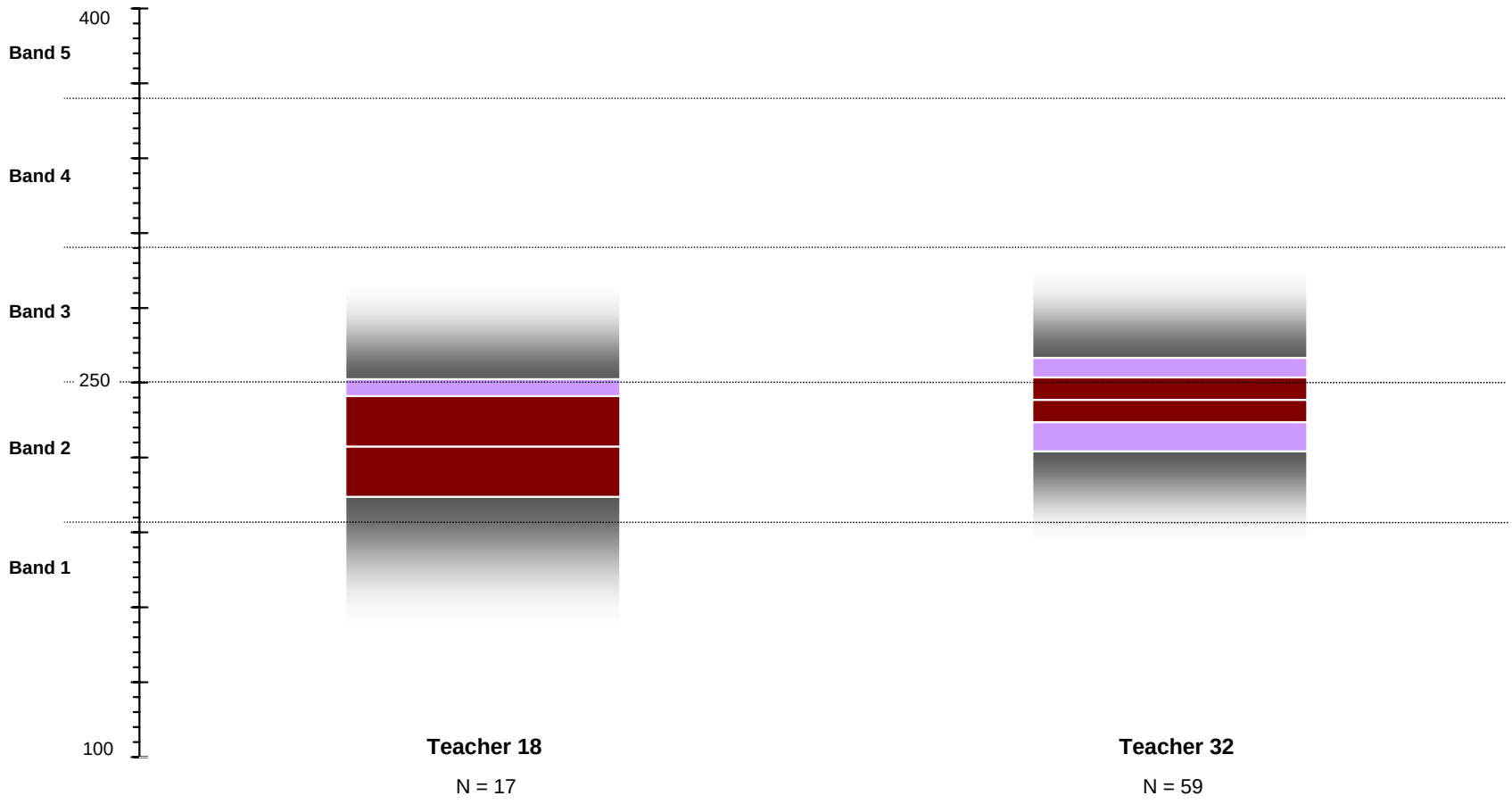


Figure 12. Distribution of Classroom Achievement in 1997-1998, in Statistics, Conventional Classrooms in District 1, Grade 6, by Teacher

District 2

Table 1.6.12
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 2, Grade 6, by Gender, by Ethnic Group, and by Content Strand*

				Confidence Interval		Score distribution percentiles			
	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	48	208.8	43.5	196.5	221.1	268.5	244.2	175.4	132.4
Male	28	212.6	44.6	196.1	229.1	274.8	247.1	175.4	132.4
Female	20	203.5	42.5	184.9	222.2	259.5	236.4	182.2	150.5
White	3	233.8	61.7	163.9	303.6	281.6	268.0	208.2	173.8
African American	12	190.5	46.3	164.3	216.8	240.7	215.5	162.3	110.3
Hispanic	21	207.4	43.3	188.9	225.9	259.0	247.1	175.4	153.4
Other	12	223.4	32.9	204.9	242.0	267.8	248.1	202.9	175.8
Number	48	201.6	50.4	187.3	215.8	261.7	238.1	176.0	91.8
Algebra	48	228.6	46.9	215.3	241.8	295.3	261.0	218.3	133.0
Geo & Meas	48	224.4	45.9	211.4	237.4	289.9	270.7	202.7	158.7
Prob & Stat	48	213.0	50.8	198.7	227.4	282.8	248.2	185.9	109.6

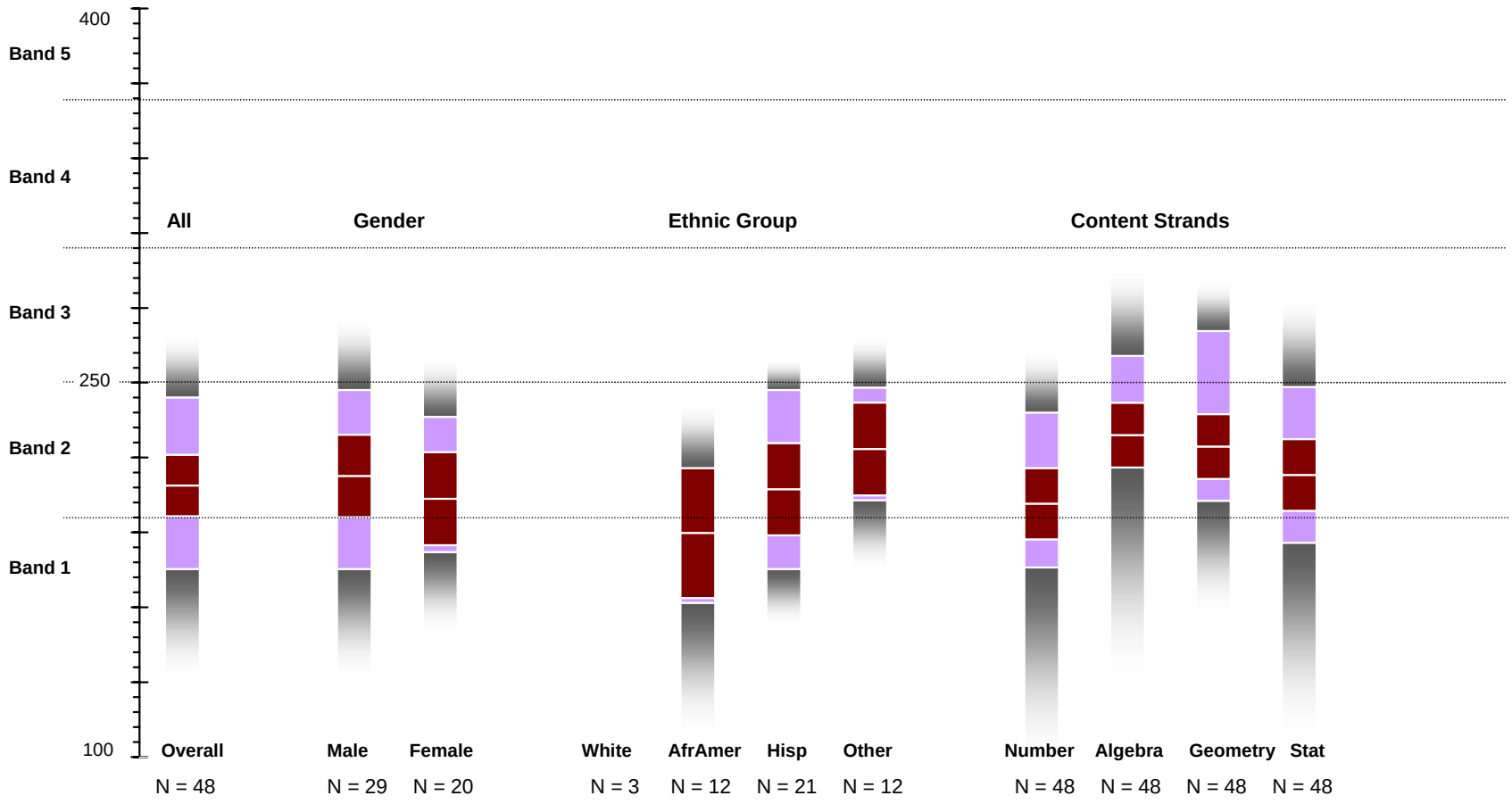


Figure 13. Distribution of Classroom Achievement in Conventional Classrooms in 1997-1998, in District 2, Grade 6, by Gender, by Ethnic Group, and by Content Strand

Table 1.6.13

Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 2, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
10	27	193.2	40.7	177.8	208.5	251.1	221.1	165.2	130.8
21	21	229.0	39.2	212.2	245.7	279.3	259.0	206.5	175.4

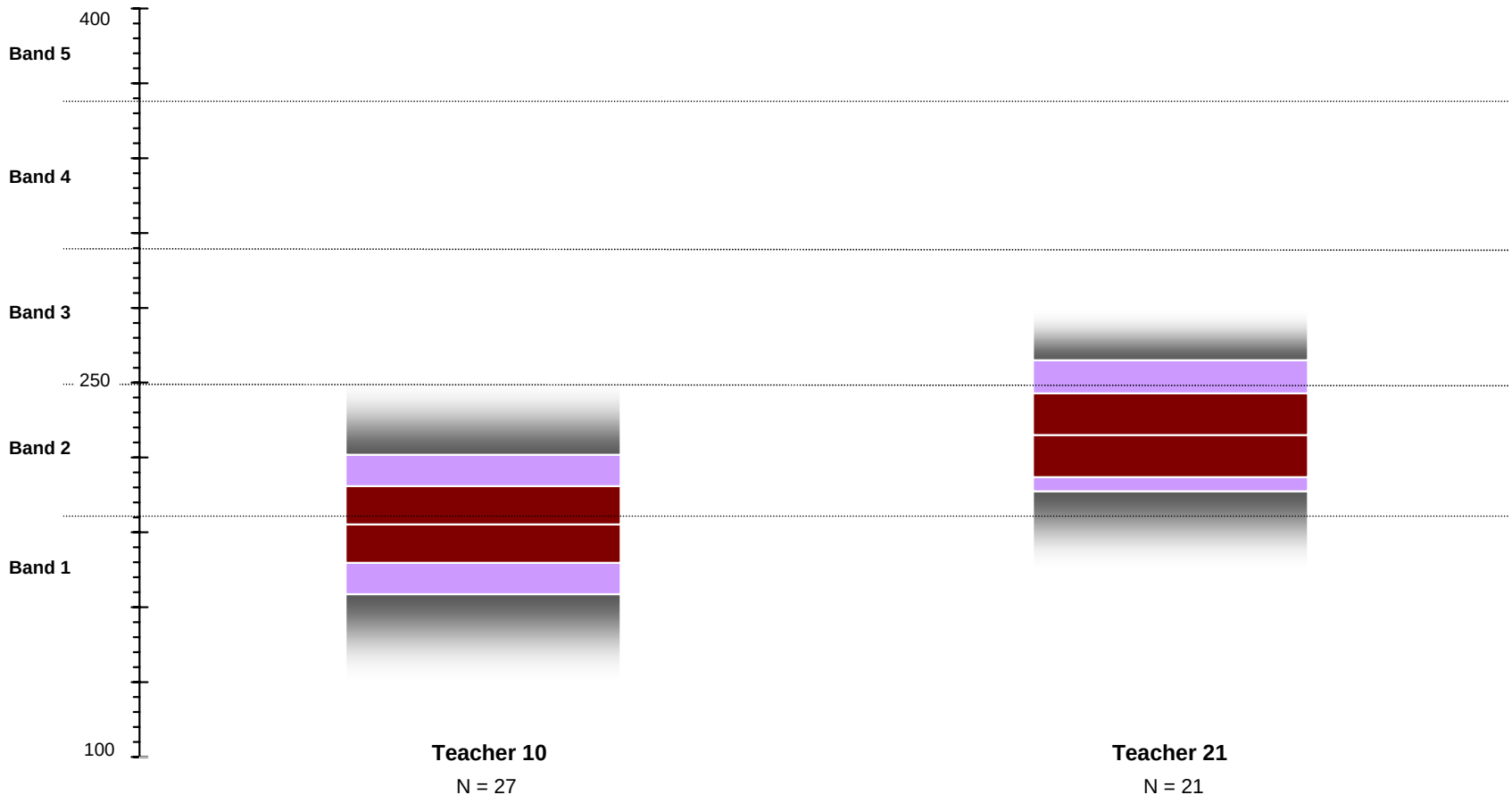


Figure 14. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 2, Grade 6, by Teacher

Table 1.6.14

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Number, District 2, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
10	27	178.3	50.3	159.3	197.3	244.3	220.8	139.1	91.8
21	21	231.4	31.8	217.8	245.0	268.1	254.8	214.4	176.0

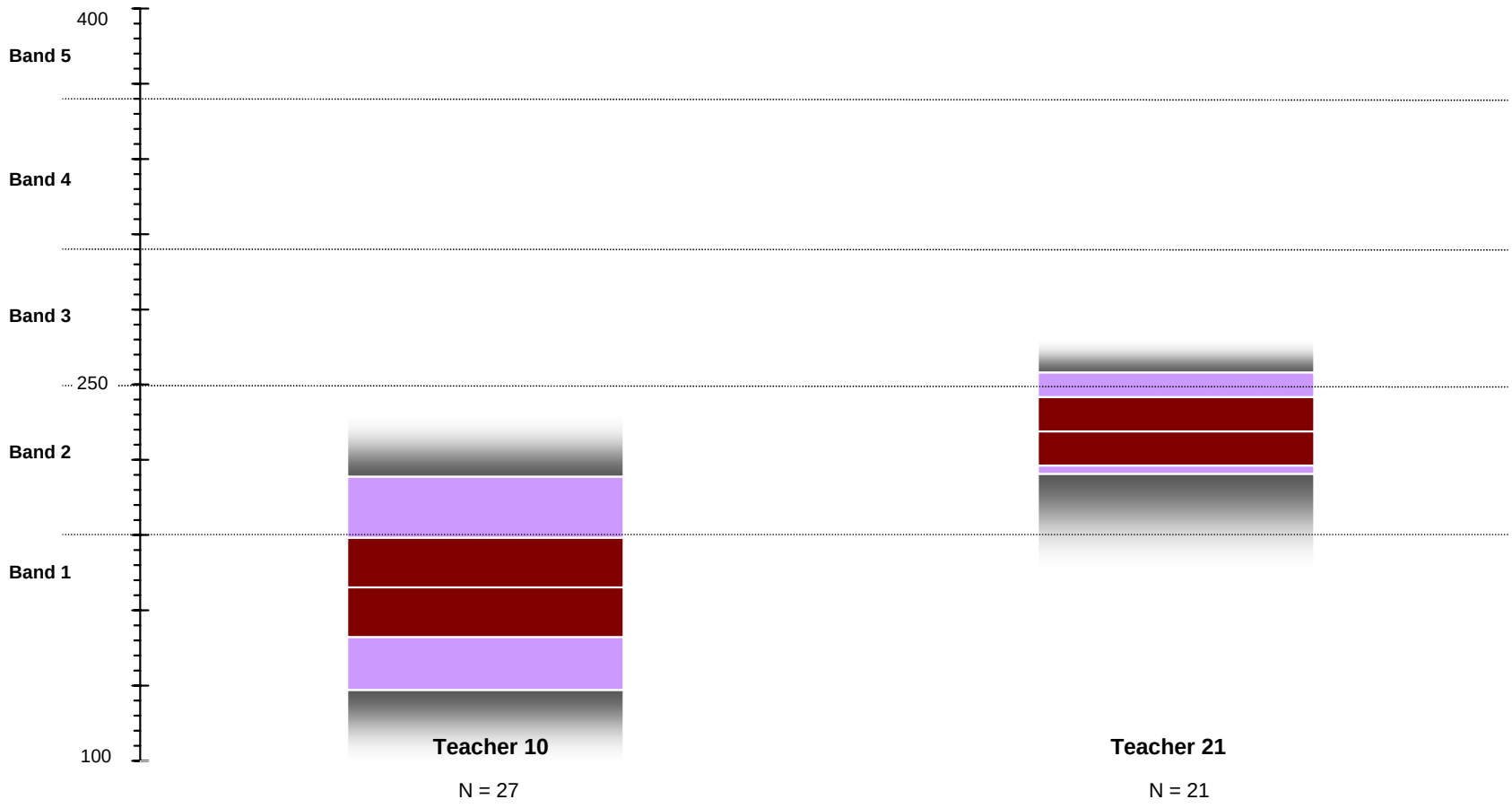


Figure 15. Distribution of Classroom Achievement in 1997-1998, in Number, Conventional Classrooms in District 2, Grade 6, by Teacher

Table 1.6.15

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Algebra, District 2, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
10	27	225.0	36.1	211.4	238.6	275.6	242.7	218.3	147.1
21	21	233.2	58.6	208.1	258.2	316.9	288.1	218.3	133.0

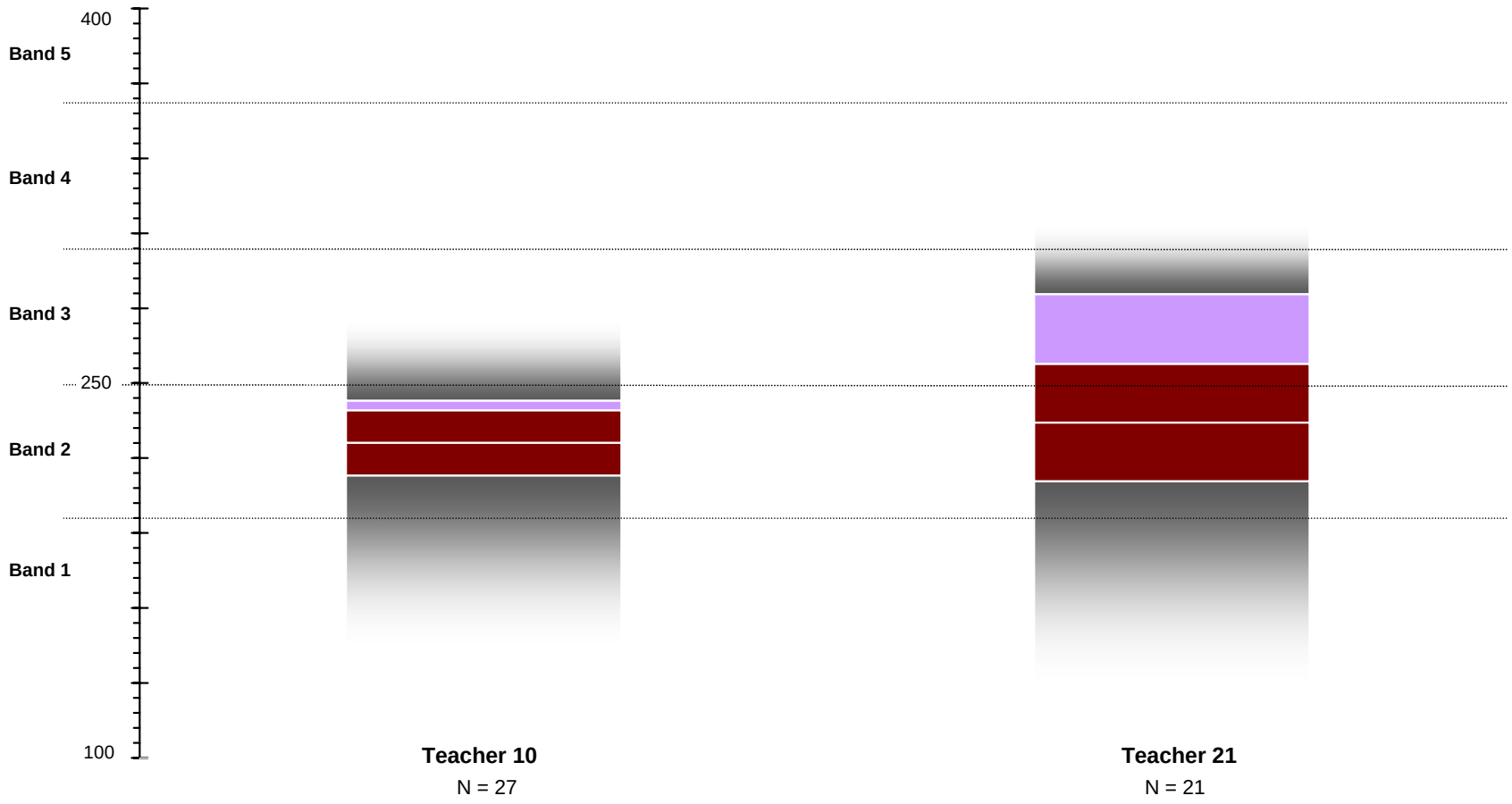


Figure 16. Distribution of Classroom Achievement in 1997-1998, in Algebra, Conventional Classrooms in District 2, Grade 6, by Teacher

Table 1.6.16

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Geometry, District 2, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
10	27	210.6	43.2	194.3	226.9	270.7	243.9	158.7	158.7
21	21	242.2	44.1	223.3	261.0	304.7	270.7	202.7	158.7

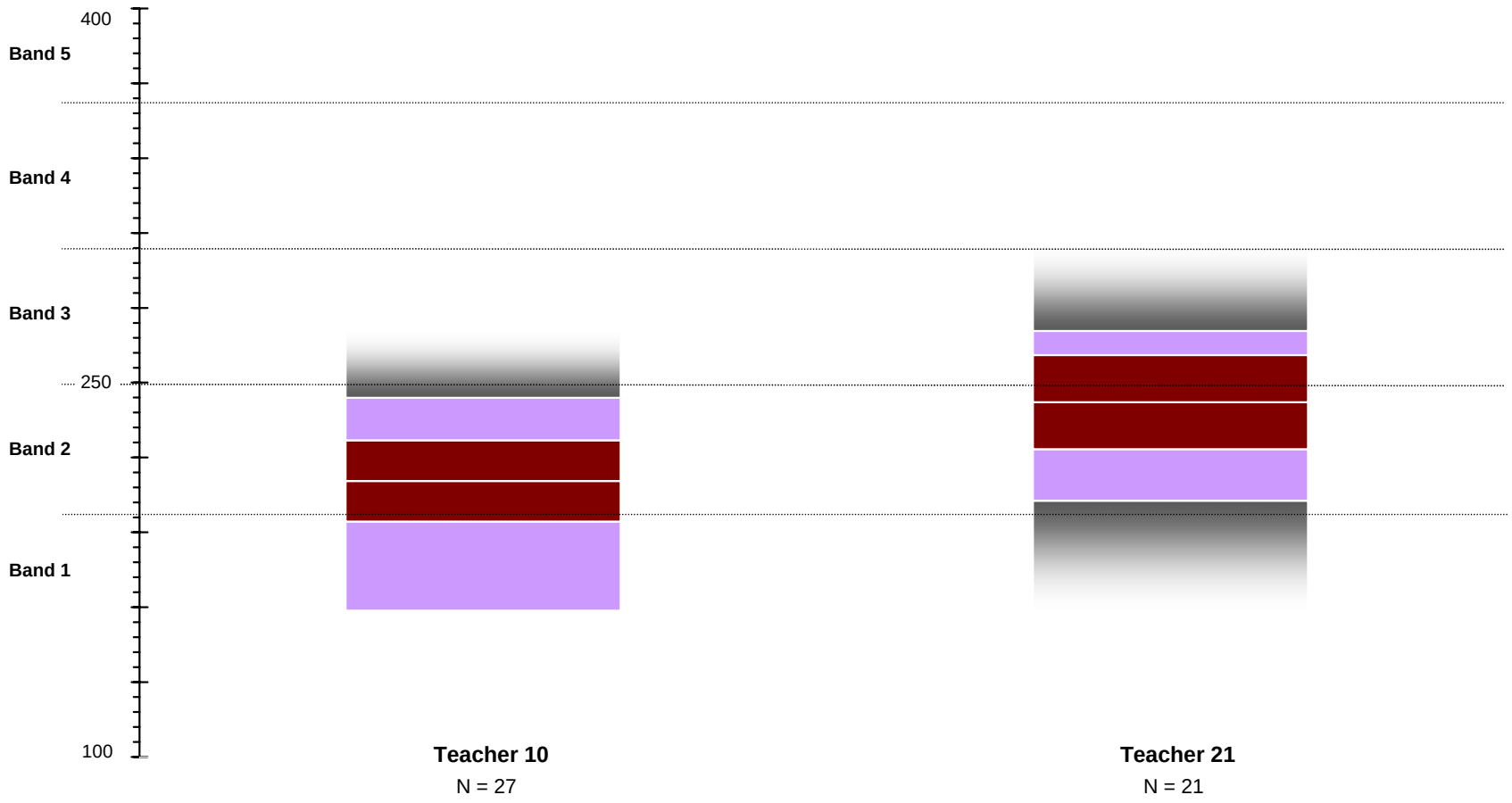


Figure 17. Distribution of Classroom Achievement in 1997-1998, in Geometry, Conventional Classrooms in District 2, Grade 6, by Teacher

Table 1.6.17

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Statistics, District 2, Grade 6, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
10	27	203.6	56.0	182.4	224.7	279.4	248.2	169.5	109.6
21	21	225.2	41.4	207.5	242.9	248.2	248.2	185.9	153.0

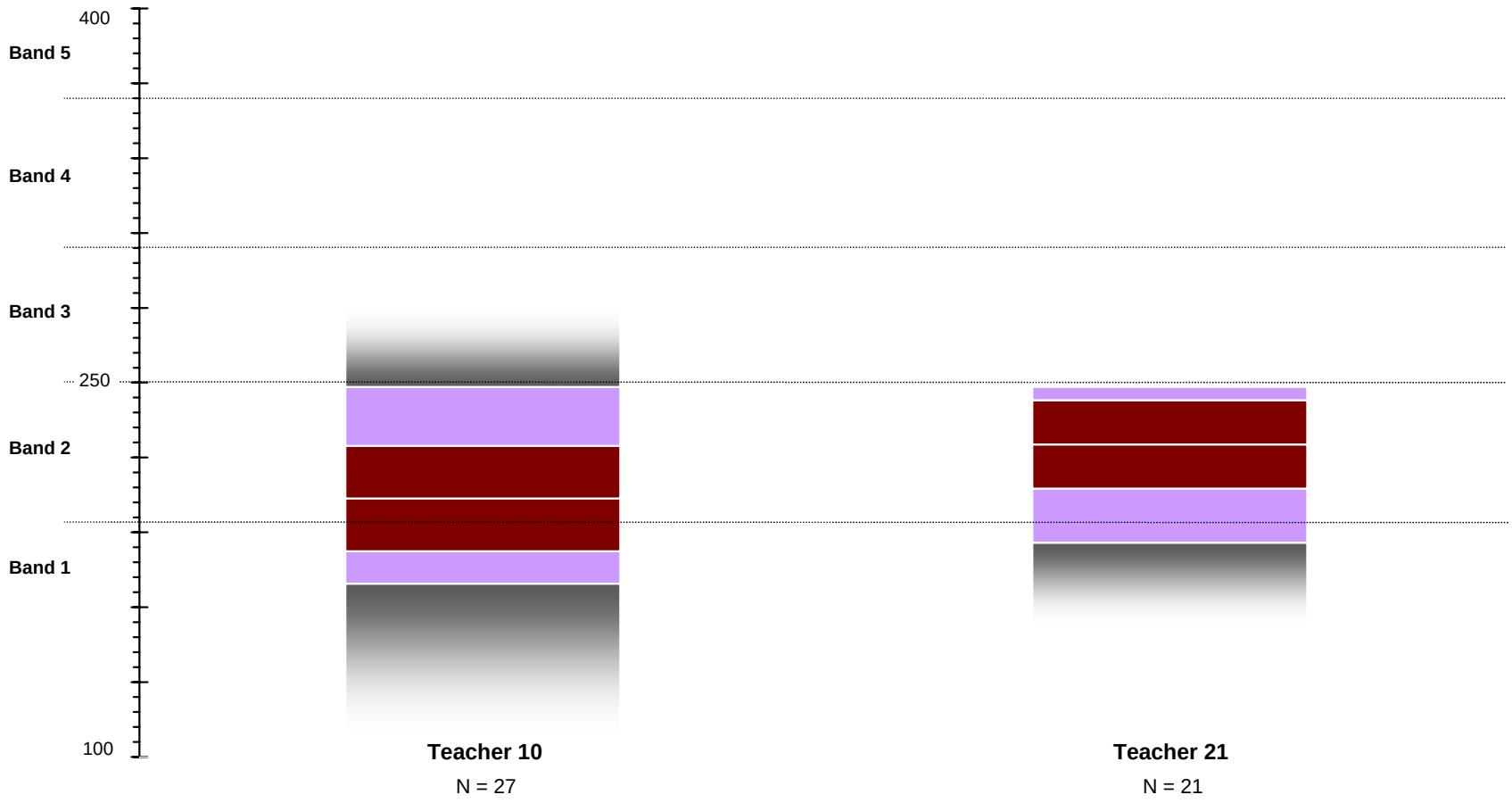


Figure 18. Distribution of Classroom Achievement in 1997-1998, in Statistics, Conventional Classrooms in District 2, Grade 6, by Teacher

Grade 7

All Districts

Table 1.7.1
Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 7, by Gender, by Ethnic Group, and by Content Strand*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	107	236.3	45.3	227.7	244.8	303.6	269.7	213.2	159.0
Male	44	226.7	47.5	212.7	240.8	302.4	249.8	188.9	147.0
Female	63	242.9	42.8	232.3	253.5	303.6	273.1	216.1	171.3
White	58	251.2	36.9	241.7	260.7	305.1	273.1	226.8	203.6
African-American	27	211.0	45.4	193.8	228.1	289.8	235.8	180.5	149.1
Hispanic	12	204.5	38.1	182.9	226.0	250.6	233.0	184.3	144.8
Other	10	256.3	51.1	224.6	288.0	312.0	293.4	221.1	178.7
Number	107	233.4	52.6	223.4	243.3	310.5	270.6	212.5	153.3
Algebra	107	240.4	42.5	232.3	248.4	299.0	263.6	209.9	173.4
Geometry	107	238.5	43.5	230.2	246.7	304.1	266.9	205.1	169.2
Statistics	107	241.9	45.4	233.3	250.5	312.7	275.2	209.1	174.9

Figure 2. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 7, by Gender, by Ethnic Group, and by Content Strand

Table 1.7.2

Classroom Achievement in Conventional Classrooms, in 1997-1998*, in Grade 7, by District*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	107	236.3	45.3	227.7	244.8	303.6	269.7	213.2	159.0
District 1	84	246.3	42.7	237.2	255.5	303.6	273.8	221.7	180.5
District 2	23	199.4	34.7	185.3	213.6	248.8	221.7	175.4	146.3

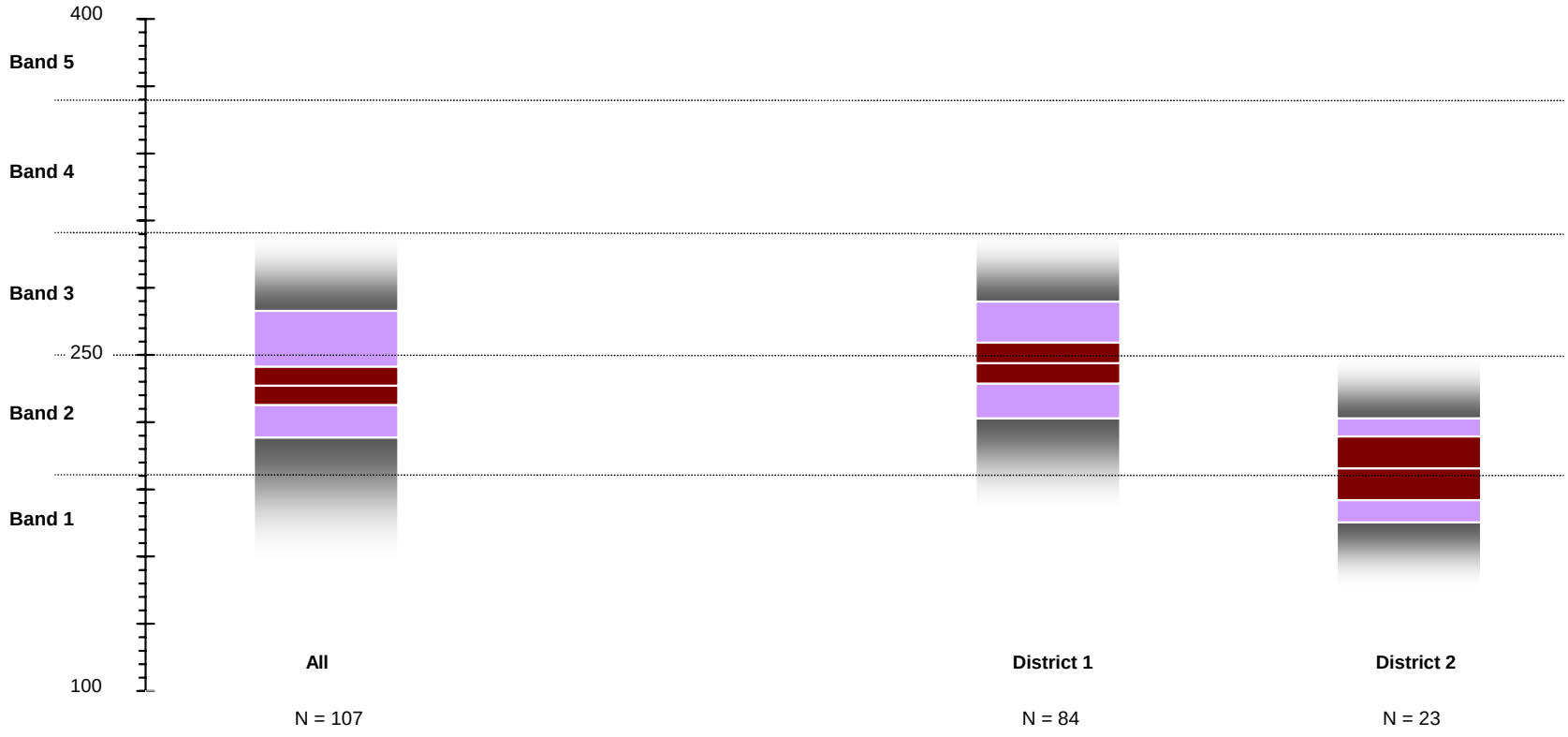


Figure 3. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms, Grade 7, by District

Table 1.7.3
Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 7, by Gender*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
Male	44	226.7	47.5	212.7	240.8	302.4	249.8	188.9	147.0
Female	63	242.9	42.8	232.3	253.5	303.6	273.1	216.1	171.3
District 1									
Male	34	236.0	45.5	220.7	251.3	307.2	267.2	217.5	166.4
Female	50	253.4	39.5	242.4	264.3	303.6	280.6	226.8	203.6
District 2									
Male	10	195.2	41.9	169.2	221.2	248.8	229.3	172.9	135.3
Female	13	202.7	29.3	186.8	218.6	245.6	216.1	188.9	159.0

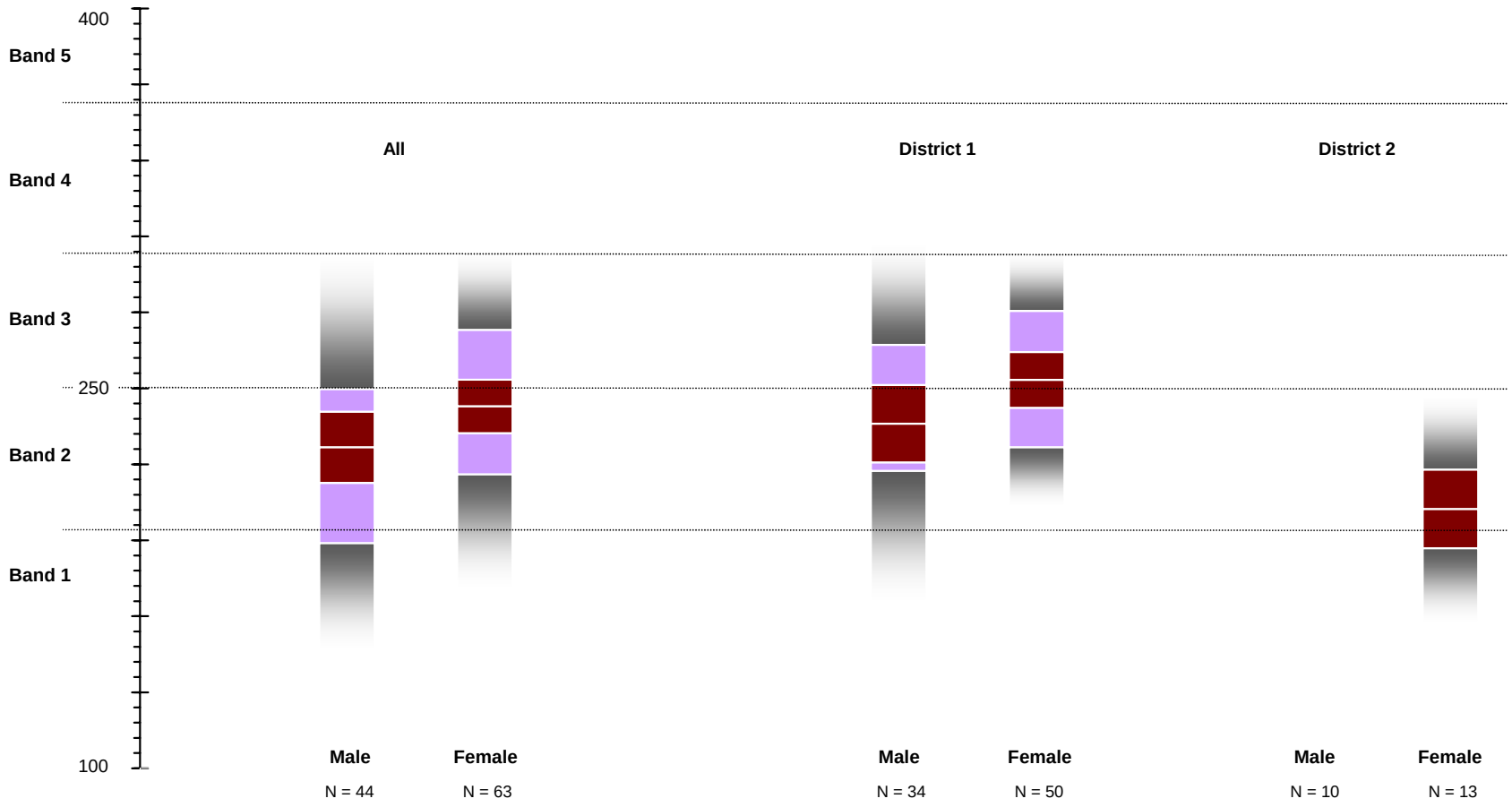


Figure 4. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 7, by Gender

Table 1.7.4

Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 7, by Ethnic Group*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
White	58	251.2	36.9	241.7	260.7	305.1	273.1	226.8	203.6
African-American	27	211.0	45.4	193.8	228.1	289.8	235.8	180.5	149.1
Hispanic	12	204.5	38.1	182.9	226.0	250.6	233.0	184.3	144.8
Other	10	256.3	51.1	224.6	288.0	312.0	293.4	221.1	178.7
District 1									
White	57	251.2	37.3	241.5	260.9	305.6	273.1	226.8	203.6
African American	17	224.6	49.7	201.0	248.2	293.2	266.3	188.9	152.7
Hispanic	2	244.6	11.6	228.5	260.6	251.9	248.7	240.5	237.2
Other	8	258.3	57.4	218.5	298.1	313.5	296.0	209.3	176.8
District 2									
White	1	248.8				248.8	248.8	248.8	248.8
African American	10	187.8	24.9	172.3	203.2	219.2	207.0	172.9	151.3
Hispanic	10	196.5	36.5	173.8	219.1	241.2	220.3	175.0	141.6
Other	2	248.0	16.4	225.3	270.7	258.4	253.8	242.2	237.5

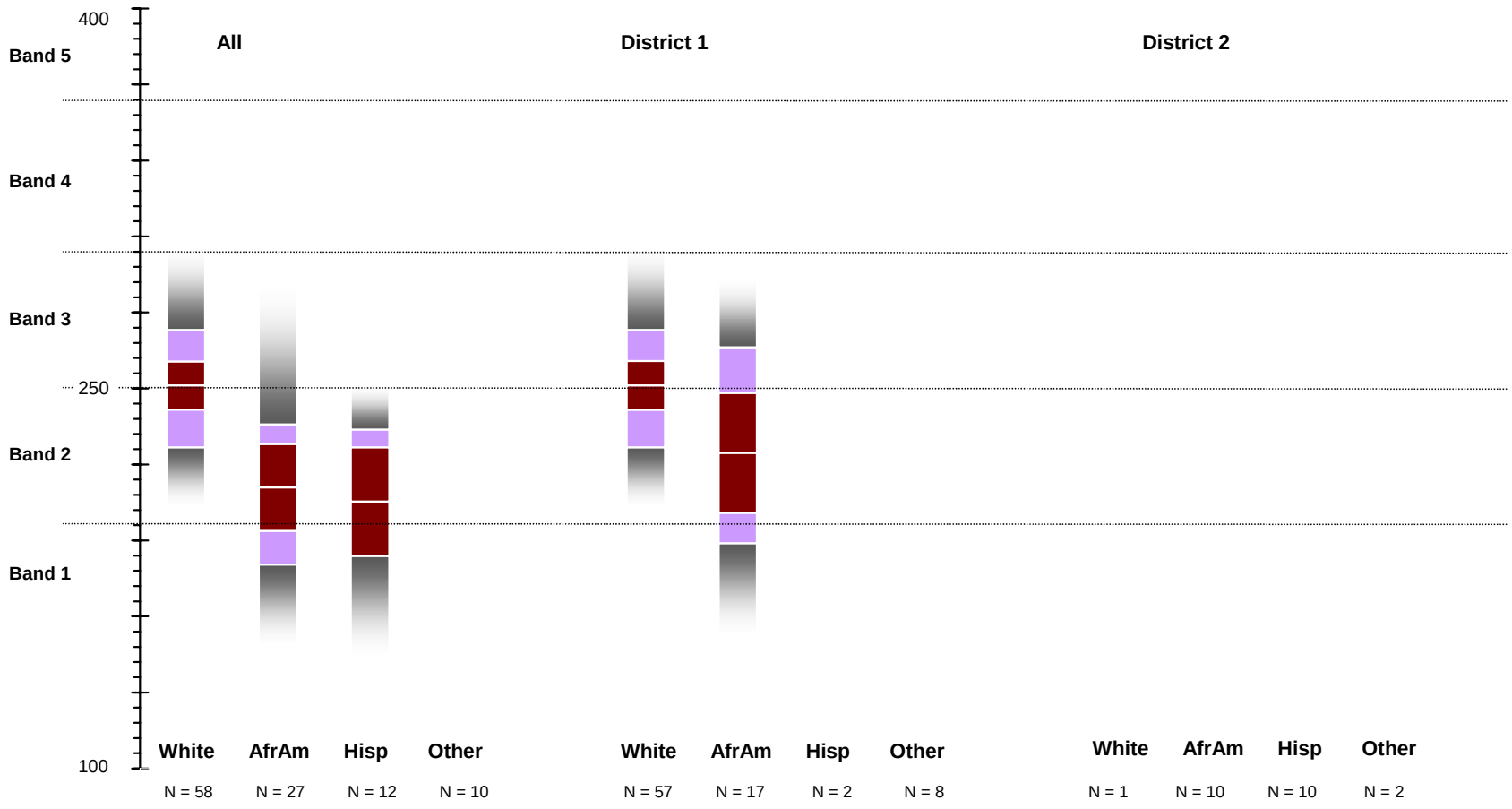


Figure 5. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in All Districts, Grade 7, by Ethnic Group

Table 1.7.5

Classroom Achievement in Conventional Classrooms in 1997-1998*, in All Districts, Grade 7, by Content Strand*

				95% Confidence Interval		Score distribution percentiles			
	N	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall									
Number	107	233.4	52.6	223.4	243.3	310.5	270.6	212.5	153.3
Algebra	107	240.4	42.5	232.3	248.4	299.0	263.6	209.9	173.4
Geometry	107	238.5	43.5	230.2	246.7	304.1	266.9	205.1	169.2
Statistics	107	241.9	45.4	233.3	250.5	312.7	275.2	209.1	174.9
District 1									
Number	84	245.1	48.5	234.7	255.4	317.2	279.0	212.5	153.3
Algebra	84	248.5	37.9	240.4	256.6	301.4	275.2	233.0	173.4
Geometry	84	244.6	44.1	235.2	254.1	314.7	269.4	227.2	169.2
Statistics	84	250.3	44.3	240.8	259.8	312.7	287.8	231.0	174.9
District 2									
Number	23	190.7	44.8	172.4	209.0	259.7	220.3	153.3	106.8
Algebra	23	210.8	45.8	192.0	229.5	262.3	250.3	173.4	124.1
Geometry	23	216.1	33.2	202.5	229.7	265.9	227.2	205.1	169.2
Statistics	23	211.3	35.8	196.7	225.9	260.7	247.8	174.9	174.9

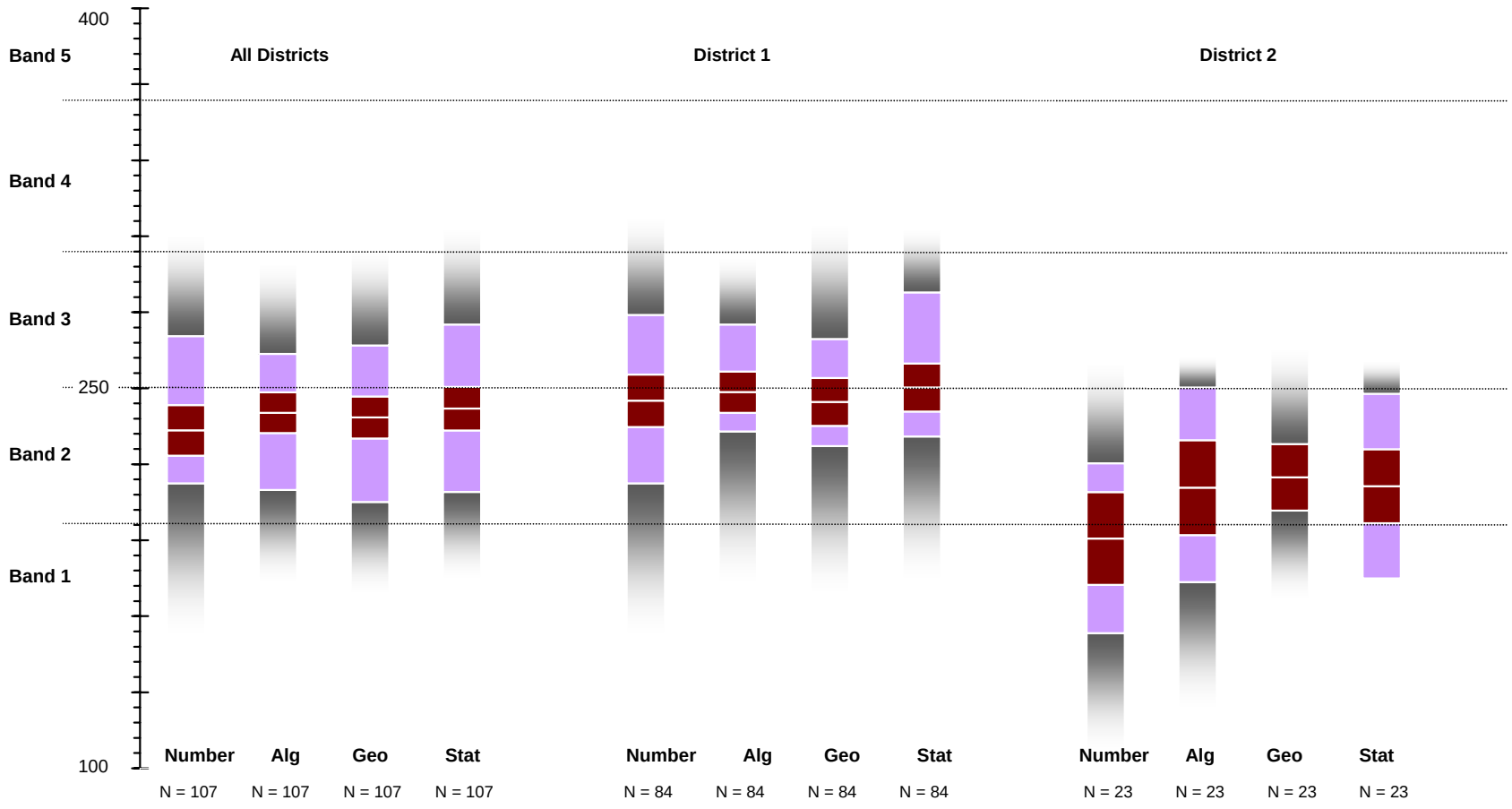


Figure 6. Distribution of Classroom Achievement in 1997-1998, in *Conventional Classrooms in All Districts, Grade 7, by Content Strand*

District 1

Table 1.7.6
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 1, Grade 7, by Gender, by Ethnic Group, and by Content Strand*

				Confidence Interval		Score distribution percentiles			
	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	84	246.3	42.7	237.2	255.5	303.6	273.8	221.7	180.5
Male	34	236.0	45.5	220.7	251.3	307.2	267.2	217.5	166.4
Female	50	253.4	39.5	242.4	264.3	303.6	280.6	226.8	203.6
White	57	251.2	37.3	241.5	260.9	305.6	273.1	226.8	203.6
African American	17	224.6	49.7	201.0	248.2	293.2	266.3	188.9	152.7
Hispanic	2	244.6	11.6	228.5	260.6	251.9	248.7	240.5	237.2
Other	8	258.3	57.4	218.5	298.1	313.5	296.0	209.3	176.8
Number	84	245.1	48.5	234.7	255.4	317.2	279.0	212.5	153.3
Algebra	84	248.5	37.9	240.4	256.6	301.4	275.2	233.0	173.4
Geo & Meas	84	244.6	44.1	235.2	254.1	314.7	269.4	227.2	169.2
Prob & Stat	84	250.3	44.3	240.8	259.8	312.7	287.8	231.0	174.9

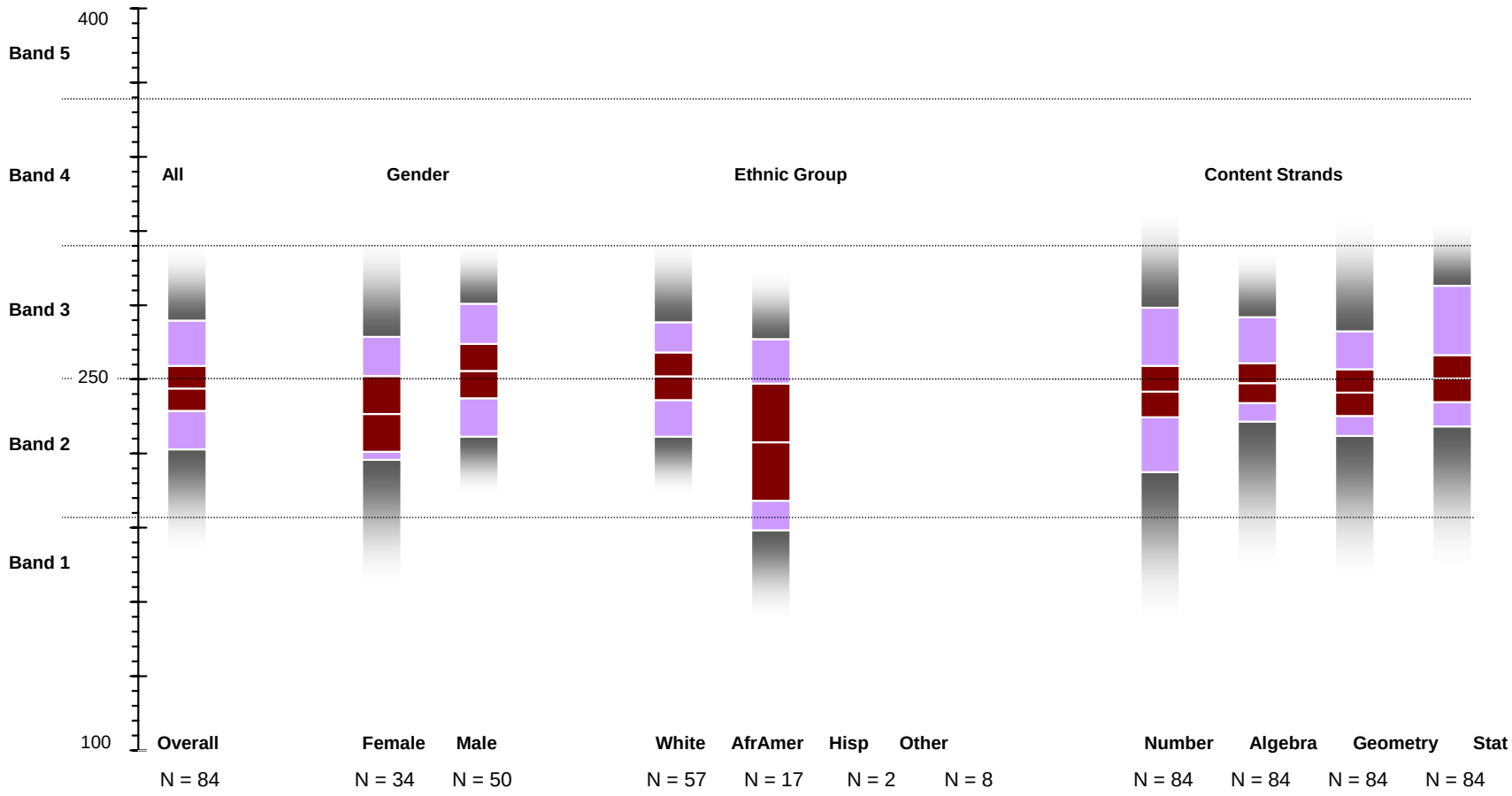


Figure 7. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 1, Grade 7, by Gender, Ethnic Group, and by Content Strand

Table 1.7.7

Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 1, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
13	39	268.6	41.1	255.7	281.5	319.3	293.4	252.8	216.6
53	45	227.1	34.0	217.1	237.0	284.4	244.9	216.1	180.5

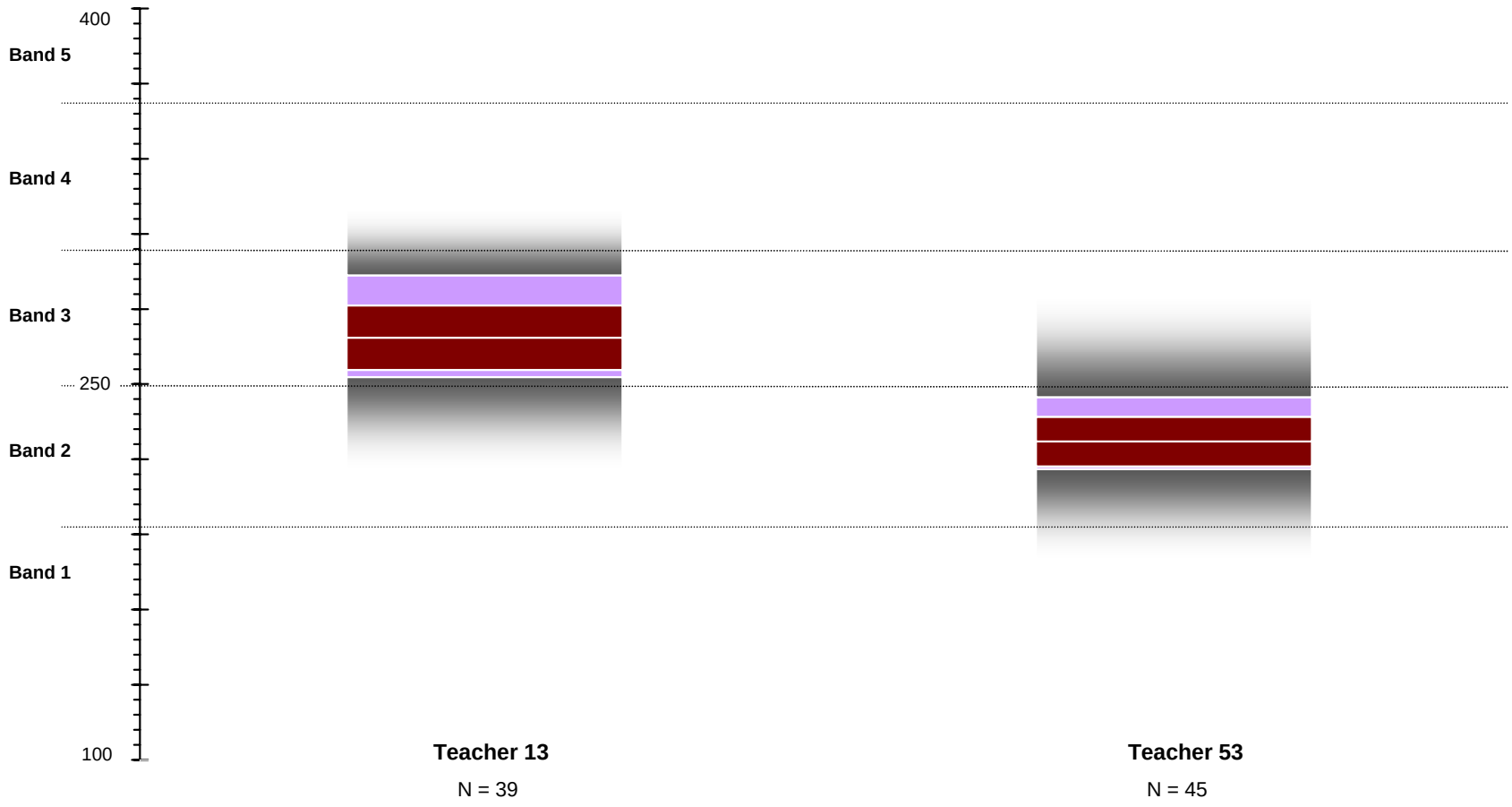


Figure 8. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 1, Grade 7, by Teacher

Table 1.7.8

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Number, District 1, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
13	39	270.2	43.5	256.6	283.8	335.1	298.7	251.9	206.6
53	45	223.3	42.0	211.0	235.5	285.3	241.0	212.5	153.3

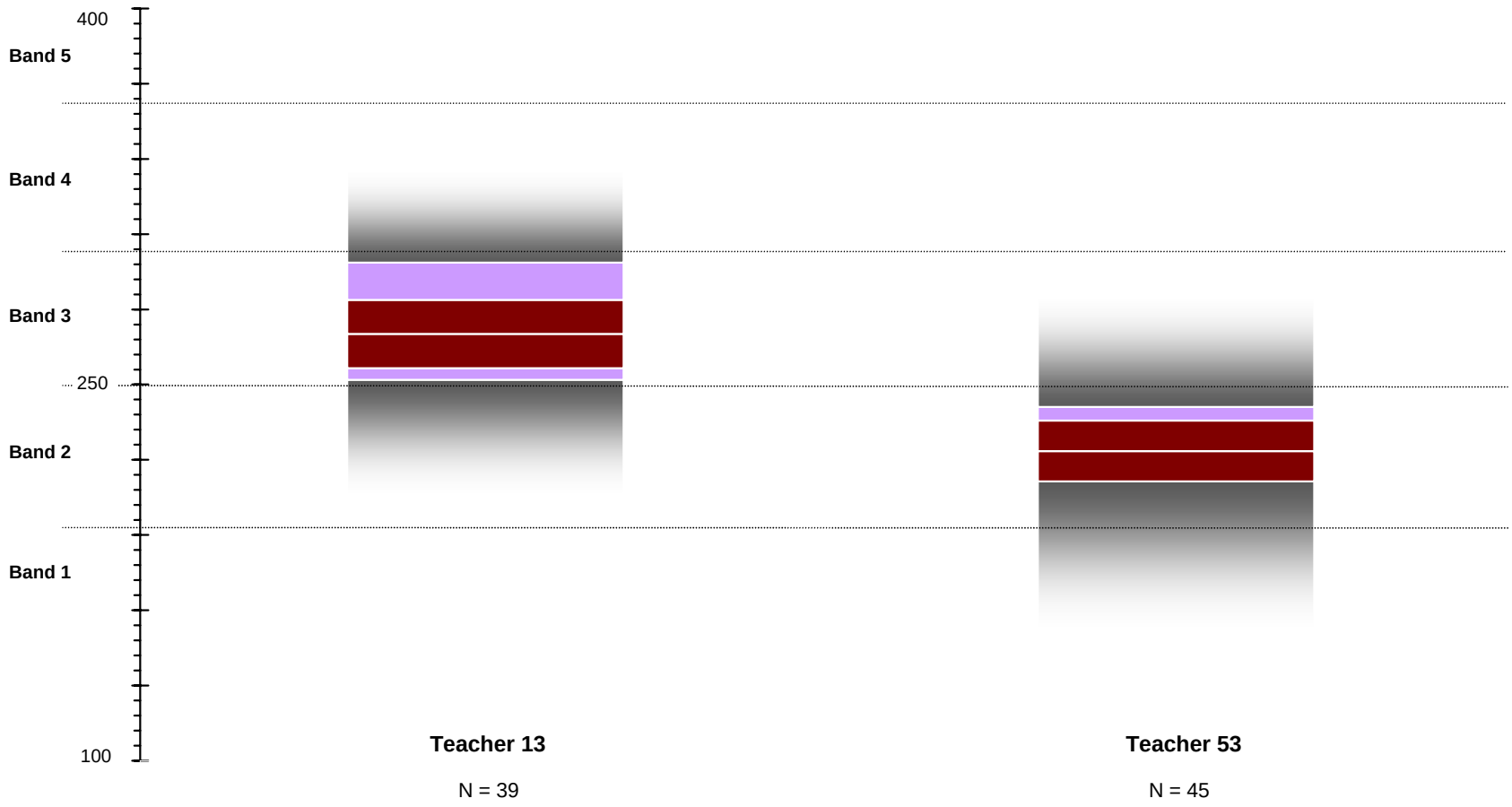


Figure 9. Distribution of Classroom Achievement in 1997-1998, in Number, Conventional Classrooms in District 1, Grade 7, by Teacher

Table 1.7.9

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Algebra, District 1, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
13	39	263.1	39.3	250.8	275.5	302.1	293.4	250.3	206.2
53	45	235.8	32.0	226.4	245.1	275.2	263.6	209.9	173.4

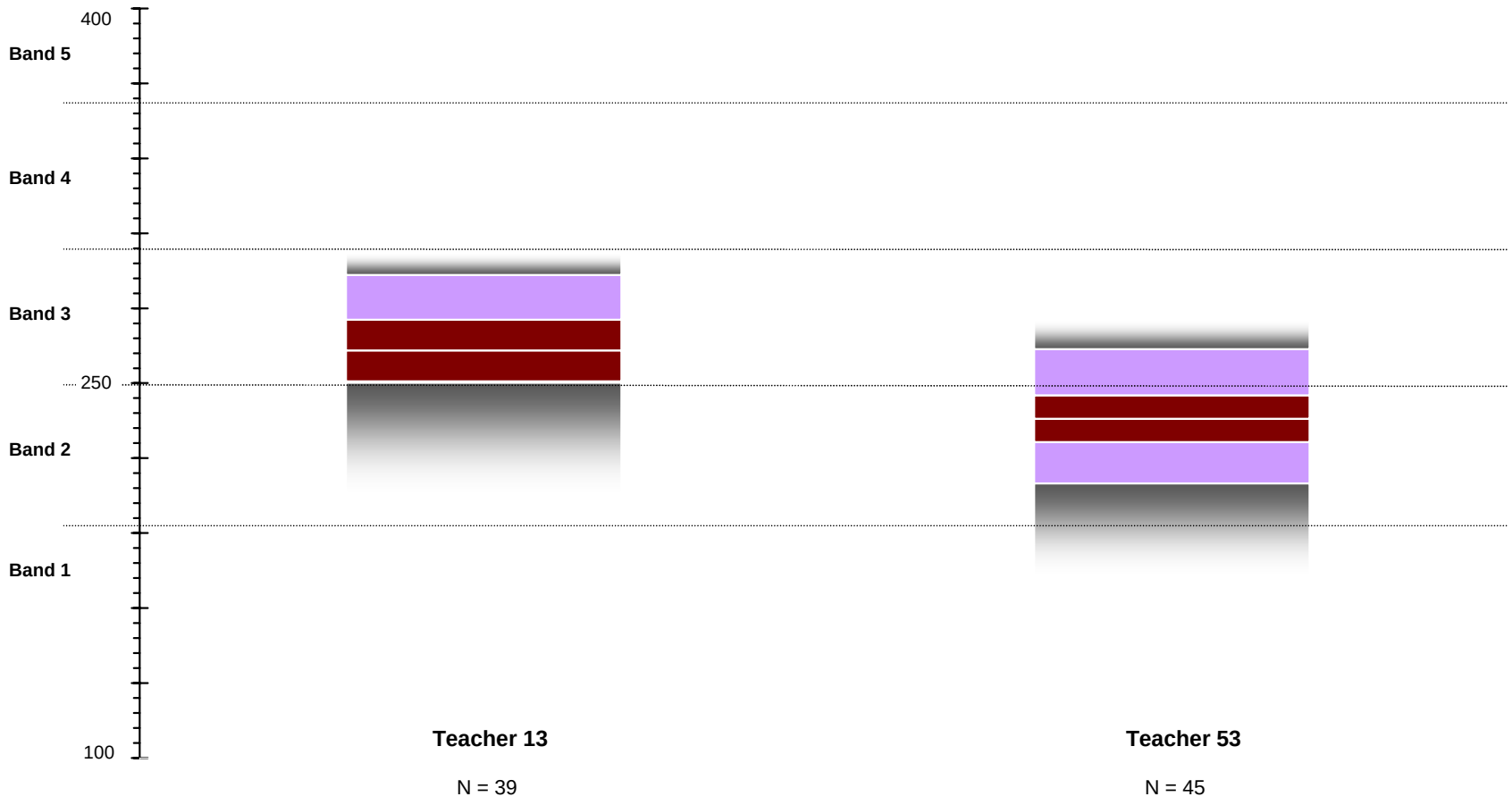


Figure 10. Distribution of Classroom Achievement in 1997-1998, in Algebra, Conventional Classrooms in District 1, Grade 7, by Teacher

Table 1.7.10

Classroom Achievement in Conventional Classrooms in 1997-1998, *in Geometry, District 1, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
13	39	262.8	41.3	249.8	275.7	323.8	281.3	249.7	169.2
53	45	228.9	40.6	217.0	240.8	283.9	256.4	205.1	169.2

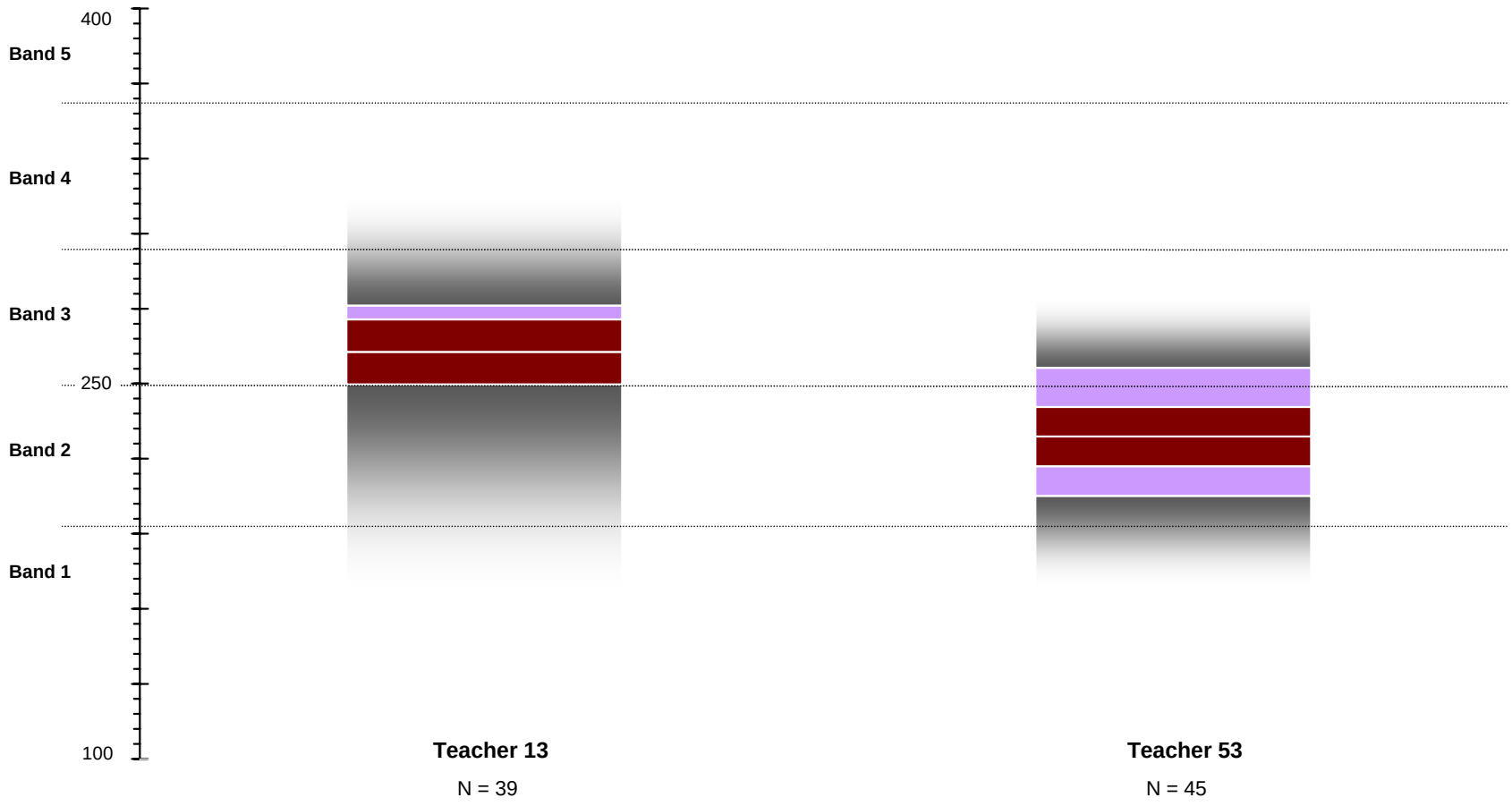


Figure 11. Distribution of Classroom Achievement in 1997-1998, in Geometry, Conventional Classrooms in District 1, Grade 7, by Teacher

Table 1.7.11

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Statistics, District 1, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
13	39	268.5	38.7	256.3	280.6	314.0	300.1	247.8	205.6
53	45	234.6	43.1	222.0	247.1	287.8	262.1	209.1	130.7

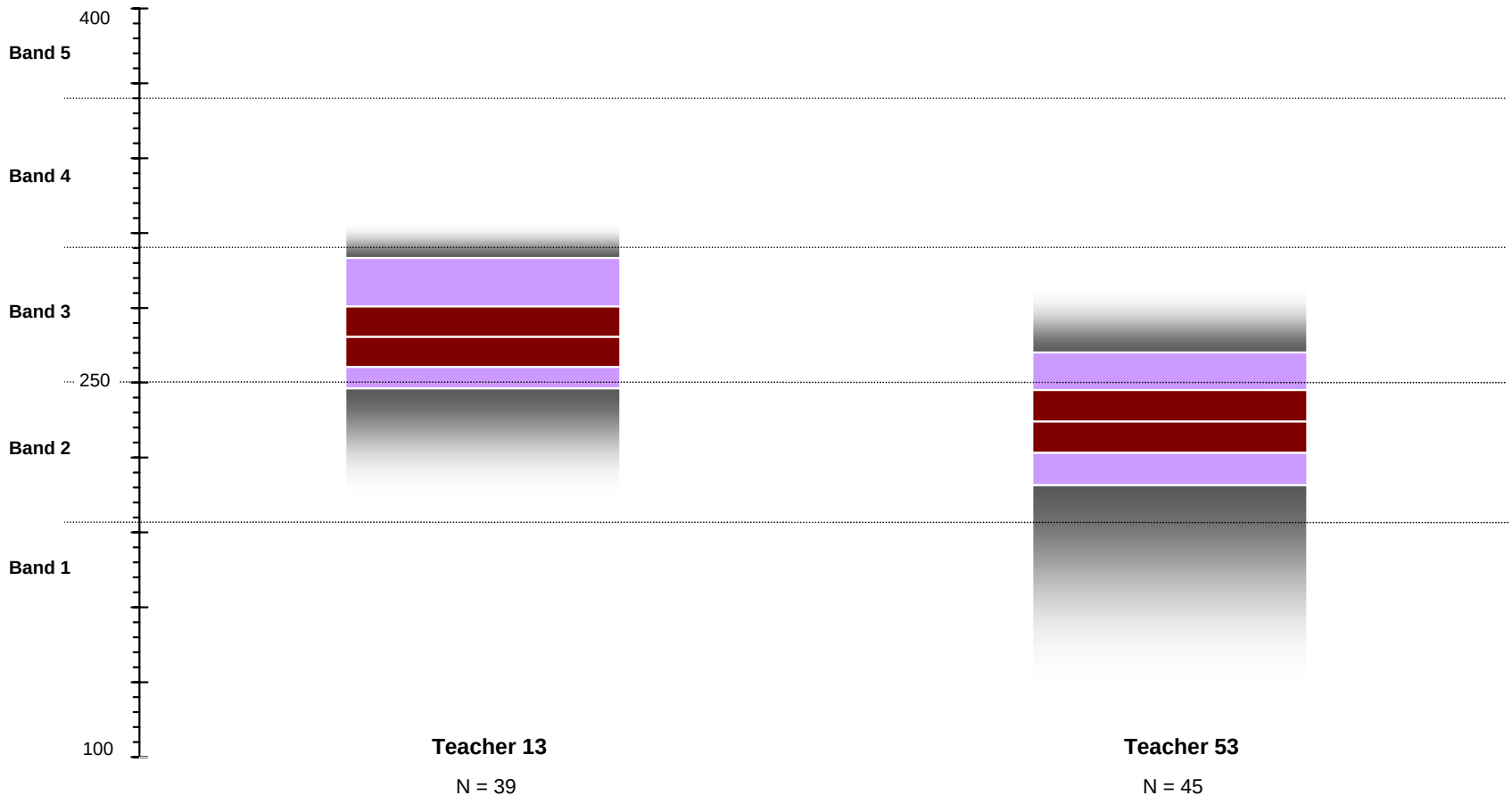


Figure 12. Distribution of Classroom Achievement in 1997-1998, in Statistics, Conventional Classrooms in District 1, Grade 7, by Teacher

District 2

Table 1.7.12
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 2, Grade 7, by Gender, by Ethnic Group, and by Content Strand*

				Confidence Interval		Score distribution percentiles			
	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
Overall	23	199.4	34.7	185.3	213.6	248.8	221.7	175.4	146.3
Male	10	195.2	41.9	169.2	221.2	248.8	229.3	172.9	135.3
Female	13	202.7	29.3	186.8	218.6	245.6	216.1	188.9	159.0
White	1	248.8				248.8	248.8	248.8	248.8
African American	10	187.8	24.9	172.3	203.2	219.2	207.0	172.9	151.3
Hispanic	10	196.5	36.5	173.8	219.1	241.2	220.3	175.0	141.6
Other	2	248.0	16.4	225.3	270.7	258.4	253.8	242.2	237.5
Number	23	190.7	44.8	172.4	209.0	259.7	220.3	153.3	106.8
Algebra	23	210.8	45.8	192.0	229.5	262.3	250.3	173.4	124.1
Geometry	23	216.1	33.2	202.5	229.7	265.9	227.2	205.1	169.2
Statistics	23	211.3	35.8	196.7	225.9	260.7	247.8	174.9	174.9

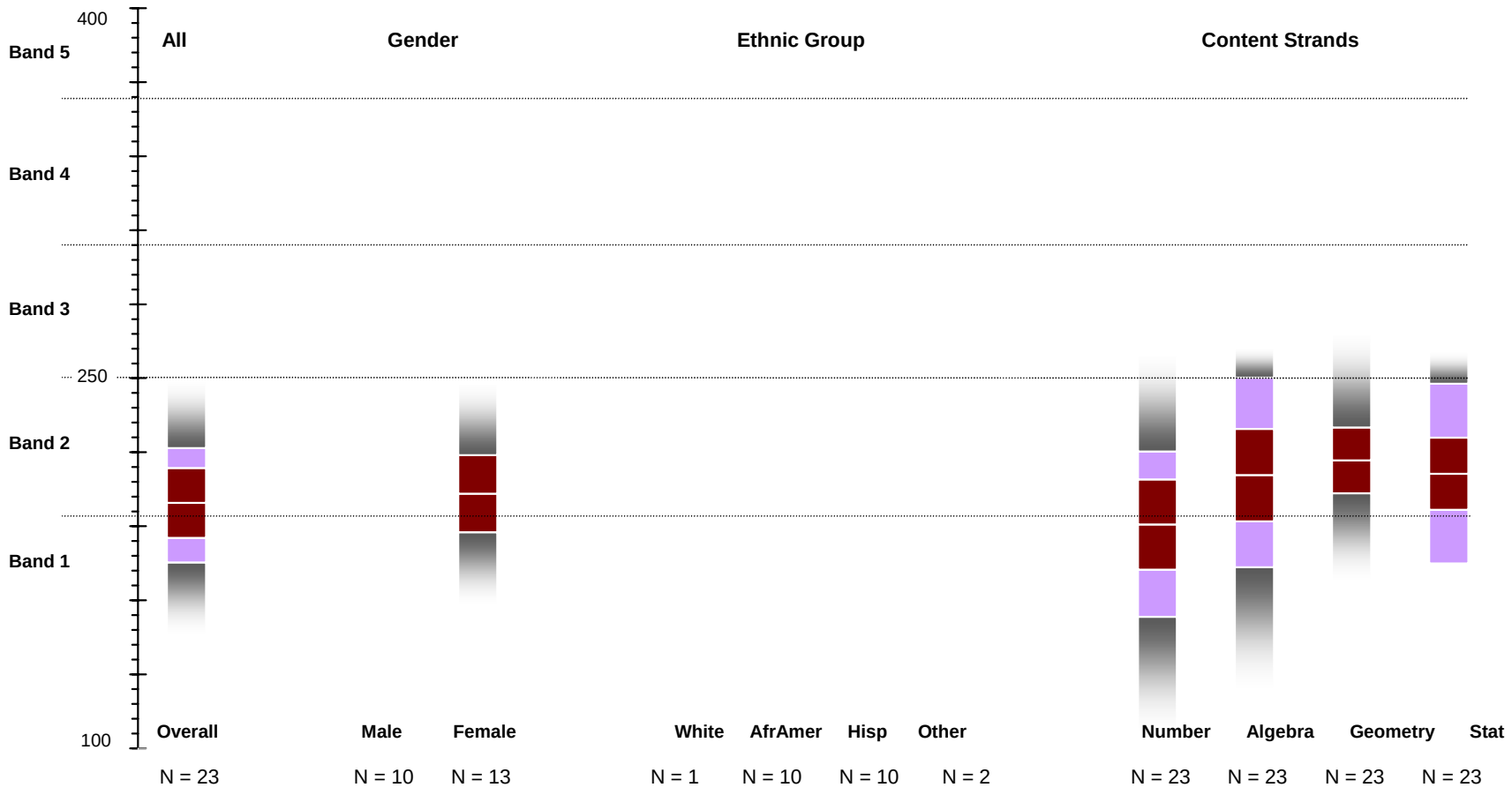


Figure 13. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 2, Grade 7, by Gender, by Ethnic Group, and by Content Strand

Table 1.7.13
Classroom Achievement in Conventional Classrooms in 1997-1998*, in District 2, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
5	22	197.8	34.5	183.3	212.2	248.8	220.3	172.9	145.6
24	1	236.4				236.4	236.4	236.4	236.4

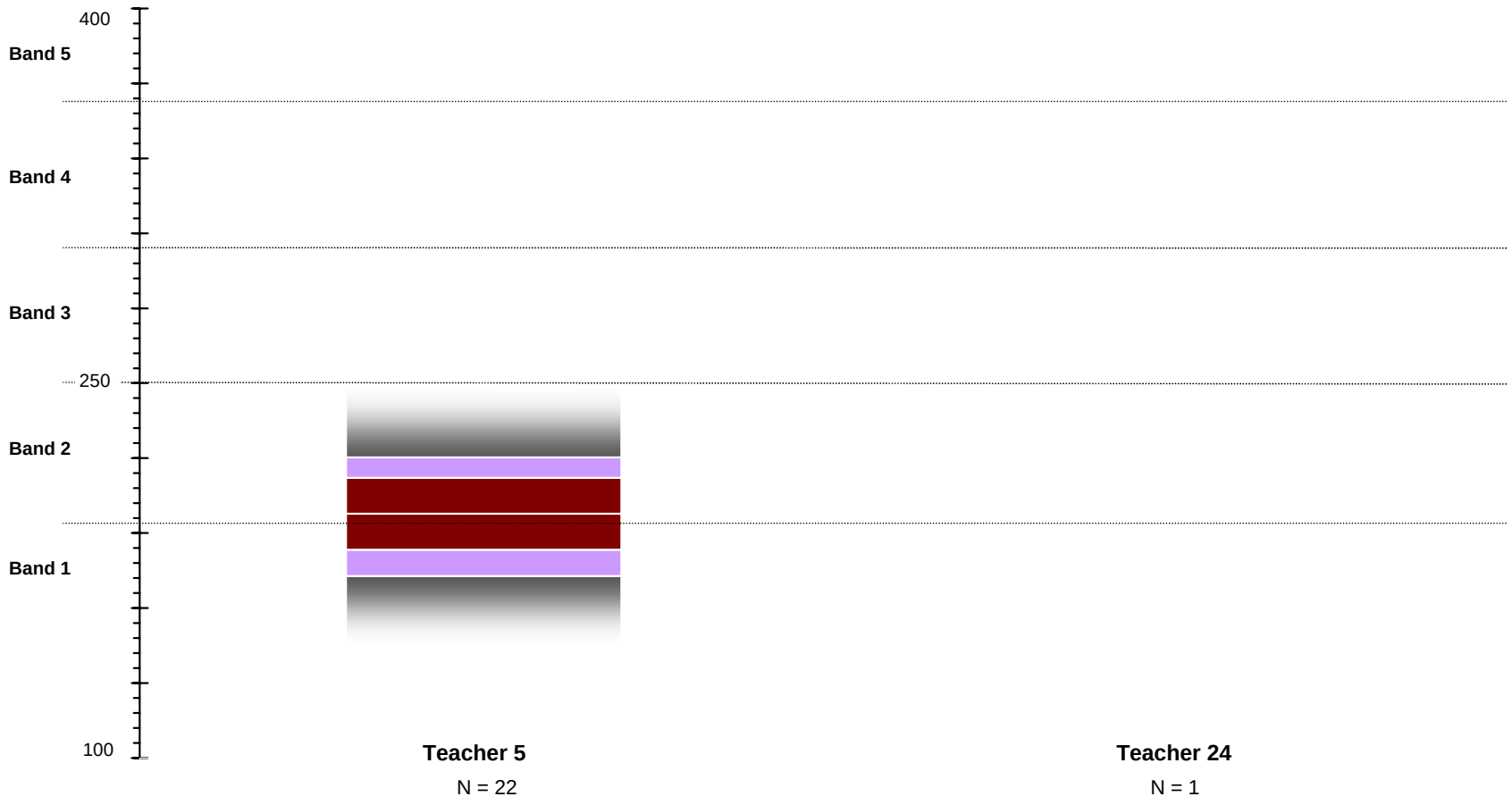


Figure 14. Distribution of Classroom Achievement in 1997-1998, in Conventional Classrooms in District 2, Grade 7, by Teacher

Table 1.7.14

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Number, District 2, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
5	22	187.5	43.0	169.5	205.5	241.0	212.5	153.3	104.2
24	1	261.7				261.7	261.7	261.7	261.7

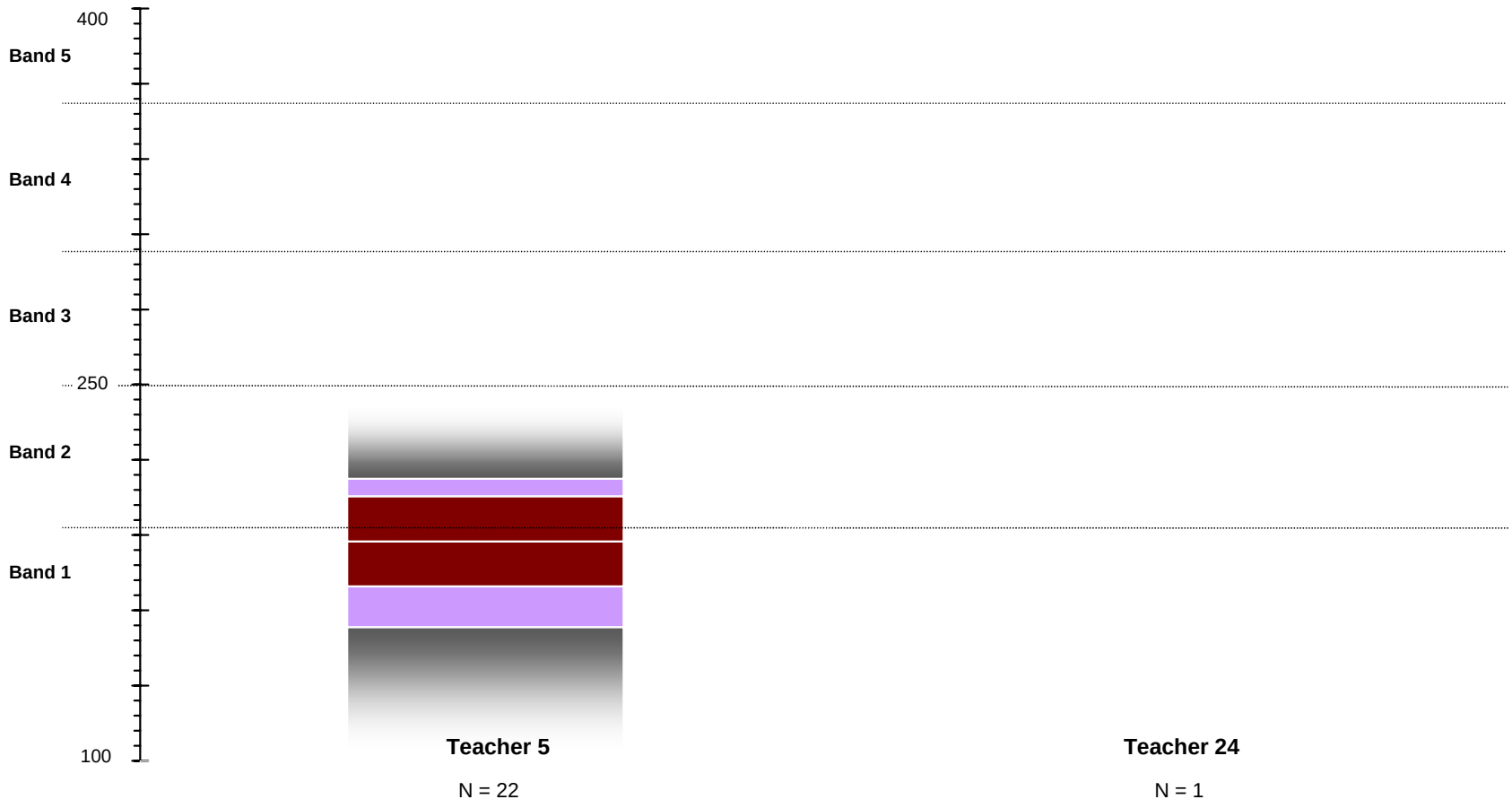


Figure 15. Distribution of Classroom Achievement in 1997-1998, in Number, Conventional Classrooms in District 2, Grade 7, by Teacher

Table 1.7.15

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Algebra, District 2, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
5	22	208.4	45.4	189.4	227.3	250.3	246.0	173.4	124.1
24	1	263.6				263.6	263.6	263.6	263.6

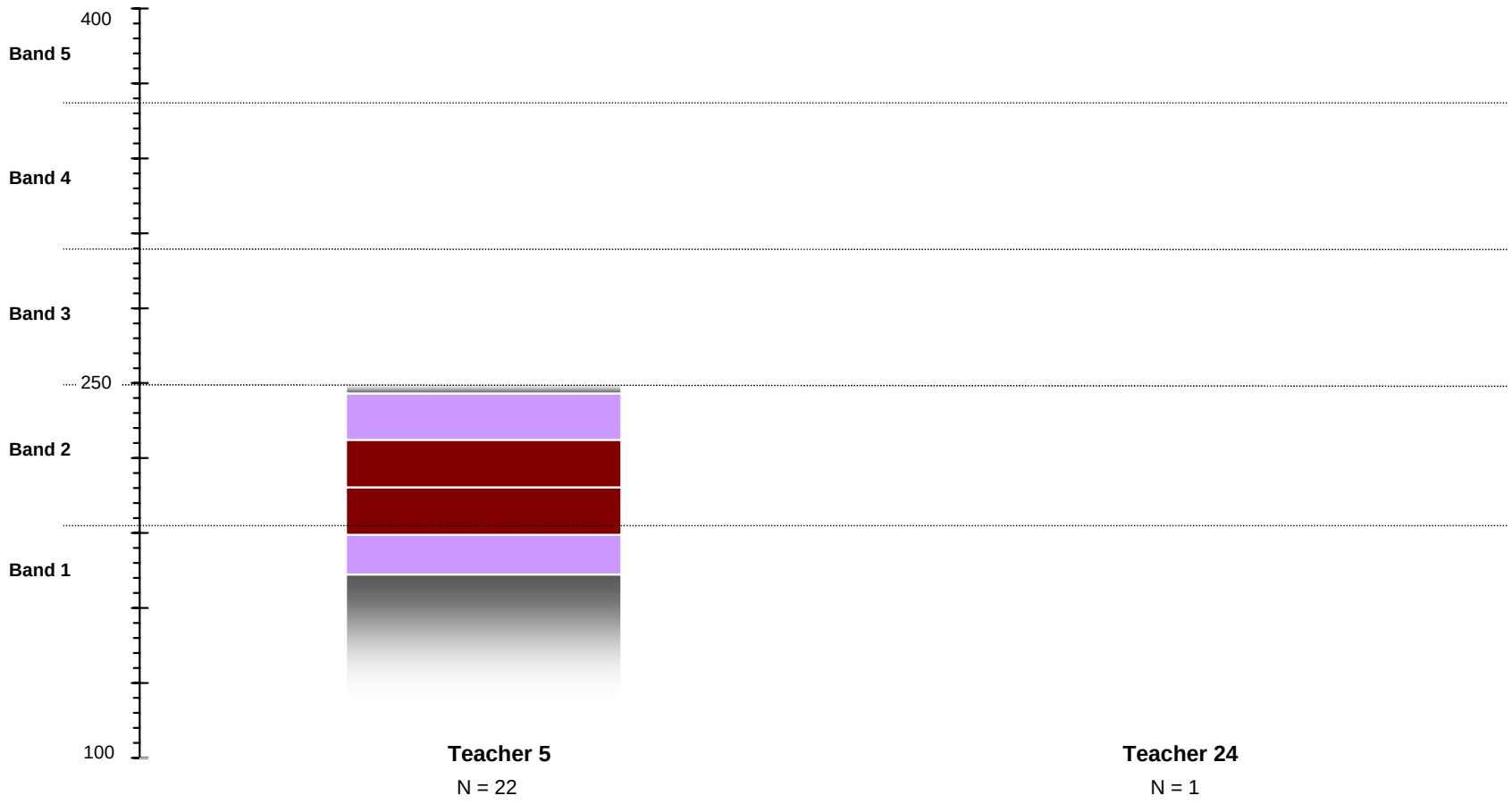


Figure 16. Distribution of Classroom Achievement in 1997-1998, in Algebra, Conventional Classrooms in District 2, Grade 7, by Teacher

Table 1.7.16

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Geometry, District 2, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
5	22	216.6	33.9	202.4	230.7	266.4	227.2	205.1	169.2
24	1	205.1				205.1	205.1	205.1	205.1

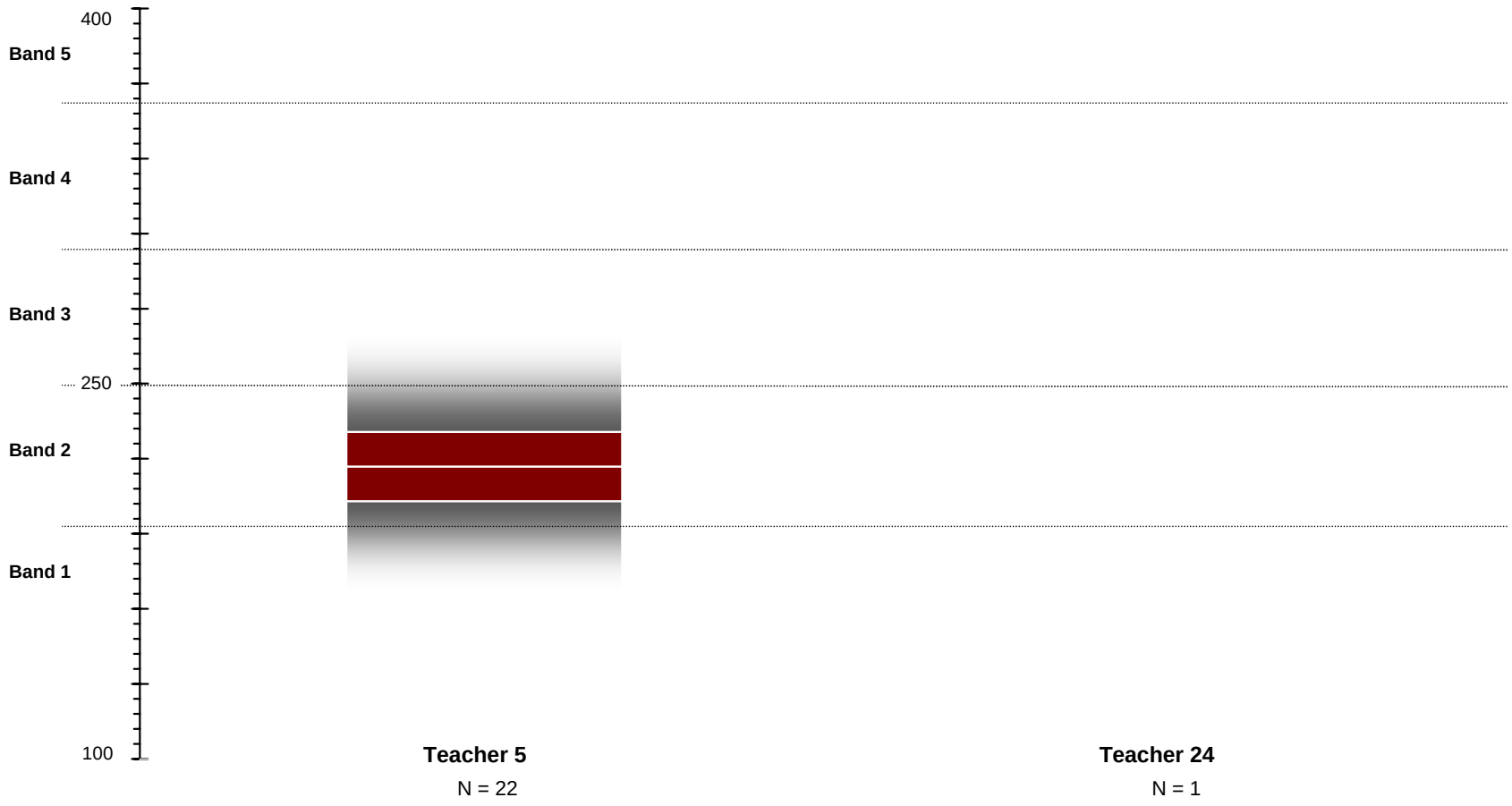


Figure 17. Distribution of Classroom Achievement in 1997-1998, in Geometry, Conventional Classrooms in District 2, Grade 7, by Teacher

Table 1.7.17

Classroom Achievement in Conventional Classrooms in 1997-1998*, in Statistics, District 2, Grade 7, by Teacher*

				Confidence Interval		Score distribution percentiles			
Teacher ID	Sample	Mean	*SD*	Lower	Upper	95%tile	75%tile	25%tile	5%tile
5	22	211.4	36.6	196.1	226.7	261.4	247.8	174.9	174.9
24	1	209.1				209.1	209.1	209.1	209.1

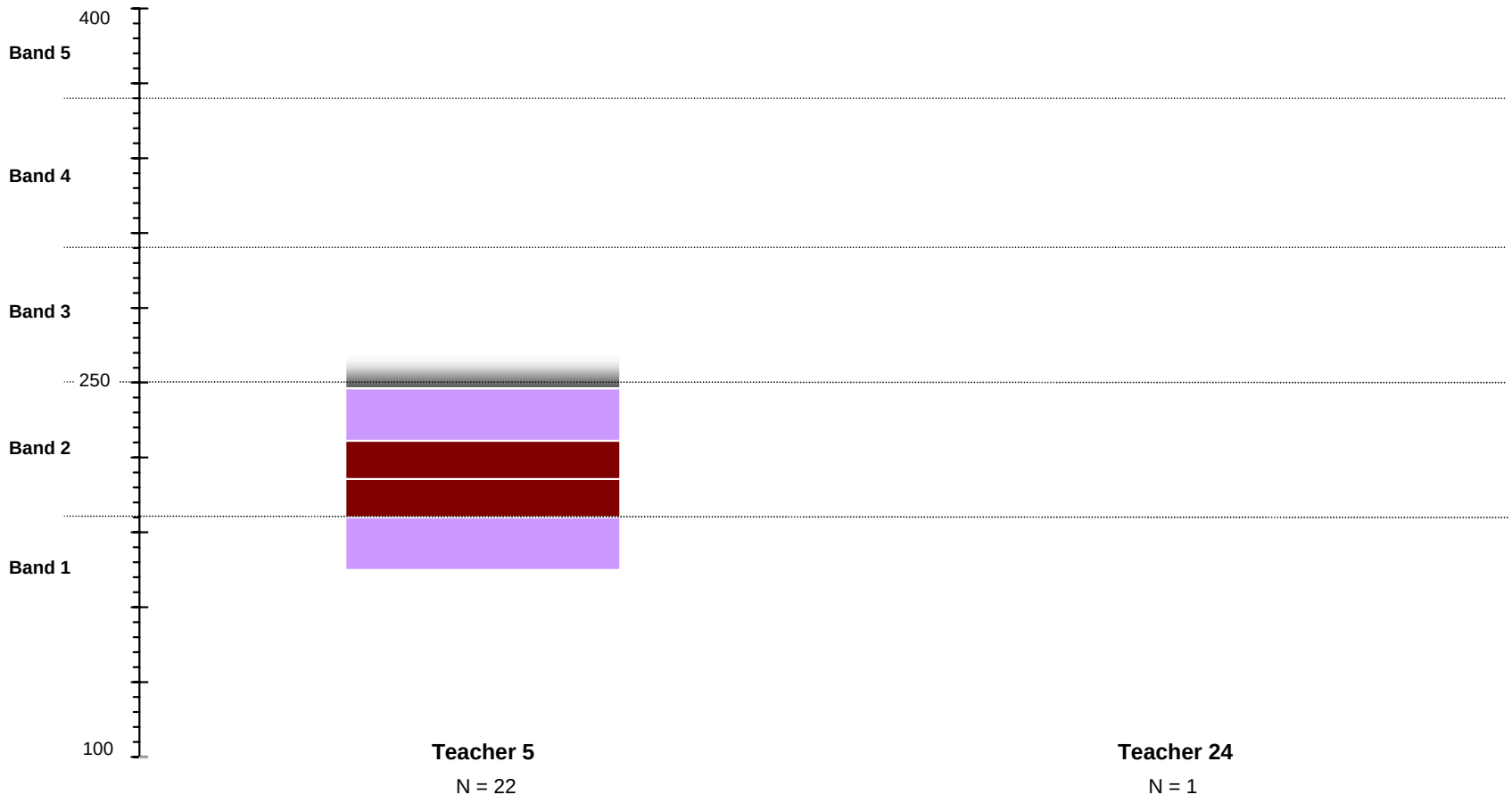


Figure 18. Distribution of Classroom Achievement in 1997-1998, in Statistics, Conventional Classrooms in District 2, Grade 7, by Teacher

Appendix A

The purposes of the longitudinal/cross-sectional study of the impact of *Mathematics in Context* (MiC) on student performance were (a) to determine the mathematical knowledge, understanding, attitudes, and levels of student performance as a consequence of studying MiC for over three years; and (b) to compare student knowledge, understanding, attitudes, and levels of performance of students using MiC with those using conventional mathematics curricula. The research model for this study was an adaptation of a structural model for monitoring changes in school mathematics (Romberg, 1987, described in Chapter 2). The outcome variables for this model are - knowledge and understanding, and application. For analytic purposes we assumed that variation in classroom achievement based on the measures developed for these variables can be captured in progress maps for classroom achievement.

There were three questions that the study was designed to answer:

1. What is the impact of the MiC instructional approach on student performance?

2. How is this impact different from that of traditional instruction on students performance?

3. What variables associated with classroom instruction account for variation in student performance?

To answer these questions an analysis plan involving seven steps has been planned.

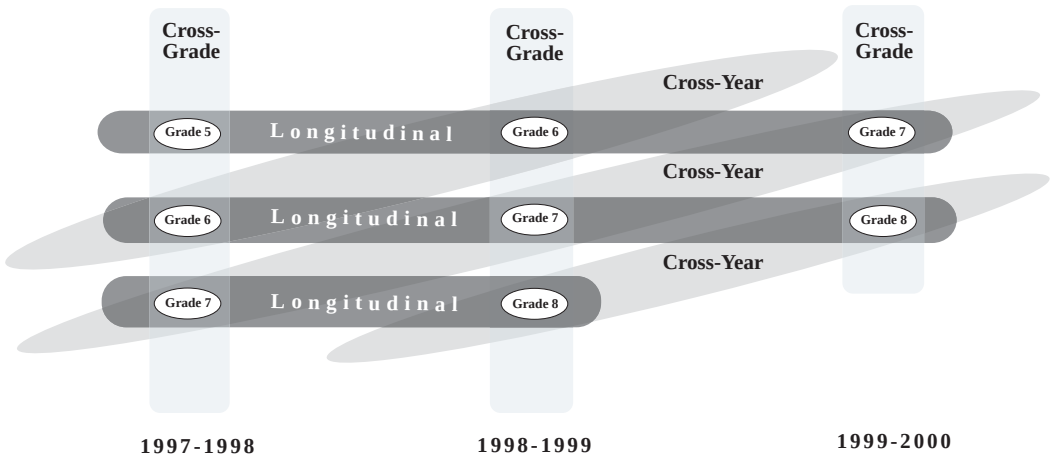
Step One: Creating an Overall Progress Map

The dependent variable used to answer each of the questions is an index of "Classroom Achievement (CA)" derived from data from student responses to eight tests {four External Assessments (EA) based on NAEP and TIMSS items, and four Problem Solving Assessments (PSA) developed by the staff of the Freudenthal Institute.

One form of each test was given to students at each of the grades 5, 6, 7 and 8. From the raw scores on these tests the CA index was derived by the research team at the Australian Council for Educational Research (ACER) using "Rasch measurement models" that allow one to combine information from different tests administered at different times onto a single scale. The product of this step is a single CA scale.

Step Two: Answering Question #1 – Grade-Level-by-Year

As shown in Figure 1, the overall study involves seventeen studies: eight grade-level-by year studies that can be related for cross-sectional comparisons, three cross-grade studies, three cross-year studies, and three longitudinal comparisons.



To answer "Question 1" the CA index was used to examine the performance of all MiC students in the four sites at each grade level (the eight grade-level-by-year descriptions of performance of all MiC students). Comparisons of performance on CA then was derived for the different sites, classes, teachers, gender of students, ethnicity of students, etc.

Step Three: Answering Question #1 – Cross-Grade, Cross-Year

From the analyses done in Step Two we made the three cross-grade comparisons, and the three cross-year cross-sectional studies indicated in Figure 1. These comparisons yield pictures of general student progress in performance as a consequence of instruction using MiC.

Step Four: Answering Question #1 – Longitudinally

Next we examined the three longitudinal descriptions also shown in Figure 1. However, since the student data-base must be restricted to those MiC students that participated in two or three years of the study (study transiency was high), several cohorts of students examined over the two (or three) years with respect to the overall index (CA).

Step Five: Answering Question #2

To answer Question 2 only the MiC data from the two sites where similar data from students in classes using conventional instructional materials was gathered. The comparisions were with respect to the eight grade-level-by-year studies, followed by the cross-grade, cross-year, and longitudinal comparisions.

Step Six: Answering Question #3 – Creating Composite Indices

Data for both MiC and conventional students at the two sites were used to examine the relationship between variation in classroom achievement (CA), aggregated by strand, test, or total performance can be attributed to variations in opportunity to learn with understanding (OTL_u), preceding achievement (PA), method of instruction (I), and school context (SC).

Step Seven: Answering Question #3 – Analyses

Since indices for each of these composite variables was constructed three different analyses were planned. First, for the grade-level-by-year studies we compared similar groups of students on CA. Second, linear regression was used to examine this relationship for the eight grade-level-by-year studies. Third, since the composite variables were constructed from several sources that reflect the original 14 variables structural model, we calculated path coefficients relating most of the variables in the model using structural equations.