



# Cluster Analysis of Milwaukee Schools

## Contents

<b>Introduction</b>	<b>2</b>
Data . . . . .	2
Clustering Variables . . . . .	2
<b>Analysis</b>	<b>2</b>
Number of clusters . . . . .	2
<b>Without Geo</b>	<b>4</b>
With Geo . . . . .	5
Comparing Differences . . . . .	6

## Introduction

The purpose of this analysis is to cluster Milwaukee K12 schools using a k-means clustering algorithm. We will evaluate two clustering methods:

- Method A will not account for the physical location of the school
- Method B will account for the physical location of the school

## Data

The data used in this analysis is sourced primarily from the Wisconsin School Report Cards, though the physical school location is sourced from DPI School Directories.

## Clustering Variables

The variables used as inputs are those regarding the student body composition, i.e. racial subgroups, students with disabilities, English learner status, and economic status, all represented as a percentage of total school enrollment. Two racial subgroups were omitted from this analysis: 1) American Indian or Alaskan Native and 2) Native Hawaiian/Other Pacific Islander. These groups were omitted because they make up very small proportions of school enrollment citywide, so small differences had an outsized impact on clustering.

The following variables were included:

- Percent Asian
- Percent Black
- Percent Latino
- Percent two or more races
- Percent white
- Percent students with disabilities
- Percent limited English proficiency
- Percent economically disadvantaged
- Latitude of school (Method B only)
- Longitude of school (Method B only)

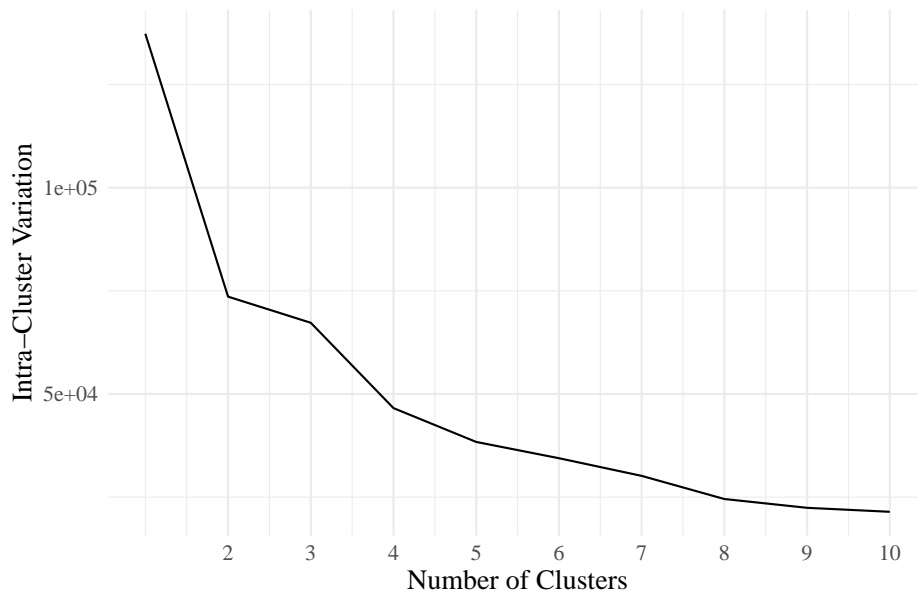
## Analysis

### Number of clusters

To determine the number of clusters, we will use the elbow and the silhouette methods. Both of these methods provide a way to evaluate how well clusters are made so we can compare the outcomes of different numbers of clusters.

The plot below shows the total within-cluster sum of squares (i.e. the intra-cluster variation) on the y axis, and the number of clusters on the x axis. We are looking to minimize the variation while keeping the number of clusters as small as we can. In other words, we want to find the point at which adding more clusters doesn't decrease variation enough to warrant adding that additional cluster.

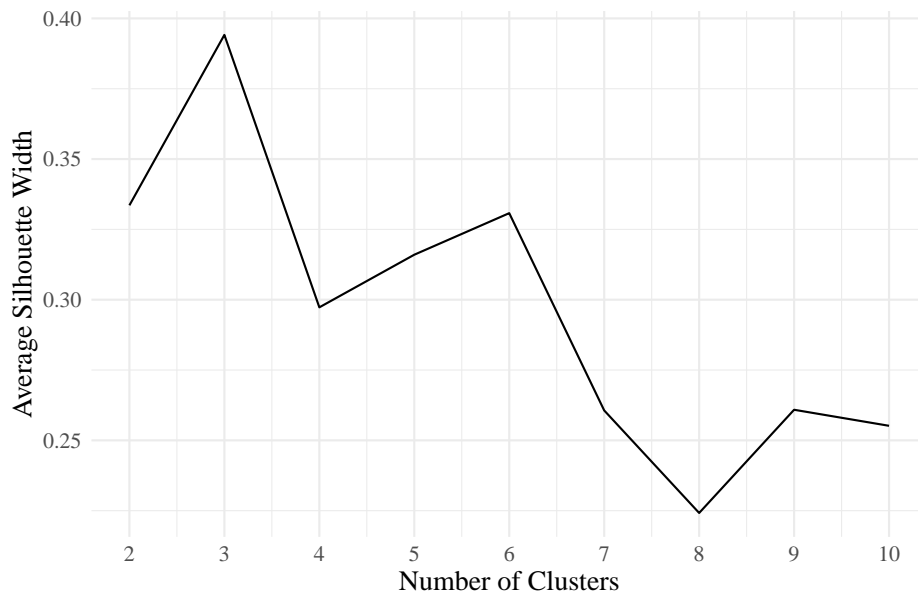
### Elbow method



When examining the plot, the optimum number of clusters is observed as an “elbow” in the line. For our case here, four clusters seems to be that point. Now let’s see what the silhouette shows us.

The silhouette method will evaluate how well points fall within their clusters, and we are looking to maximize this measure, shown as the y axis on the plot below.

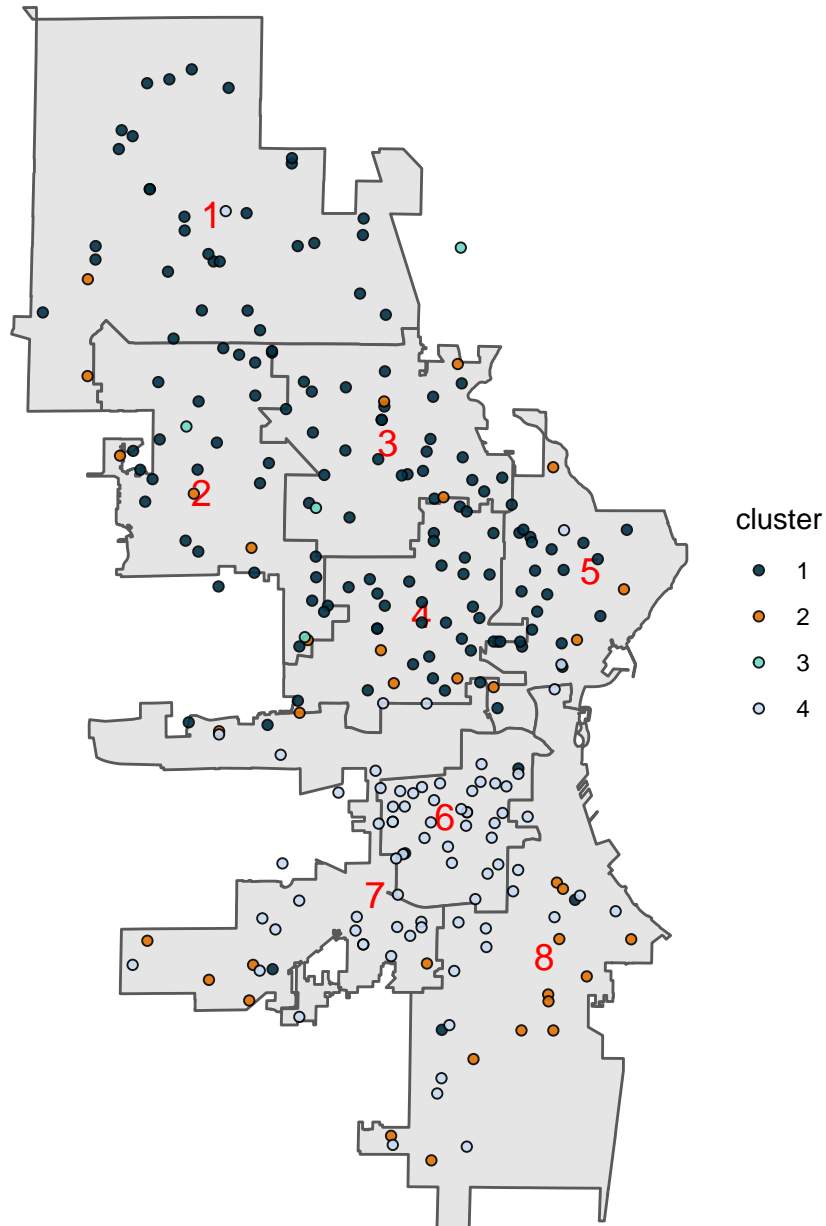
### Silhouette Method



Based on this method, the optimal number of clusters is three instead of four. By default, we should be inclined towards fewer rather than more clusters, for the sake of interpretability. Further, doing a quick test of what the results would be with four clusters, we see one cluster only has

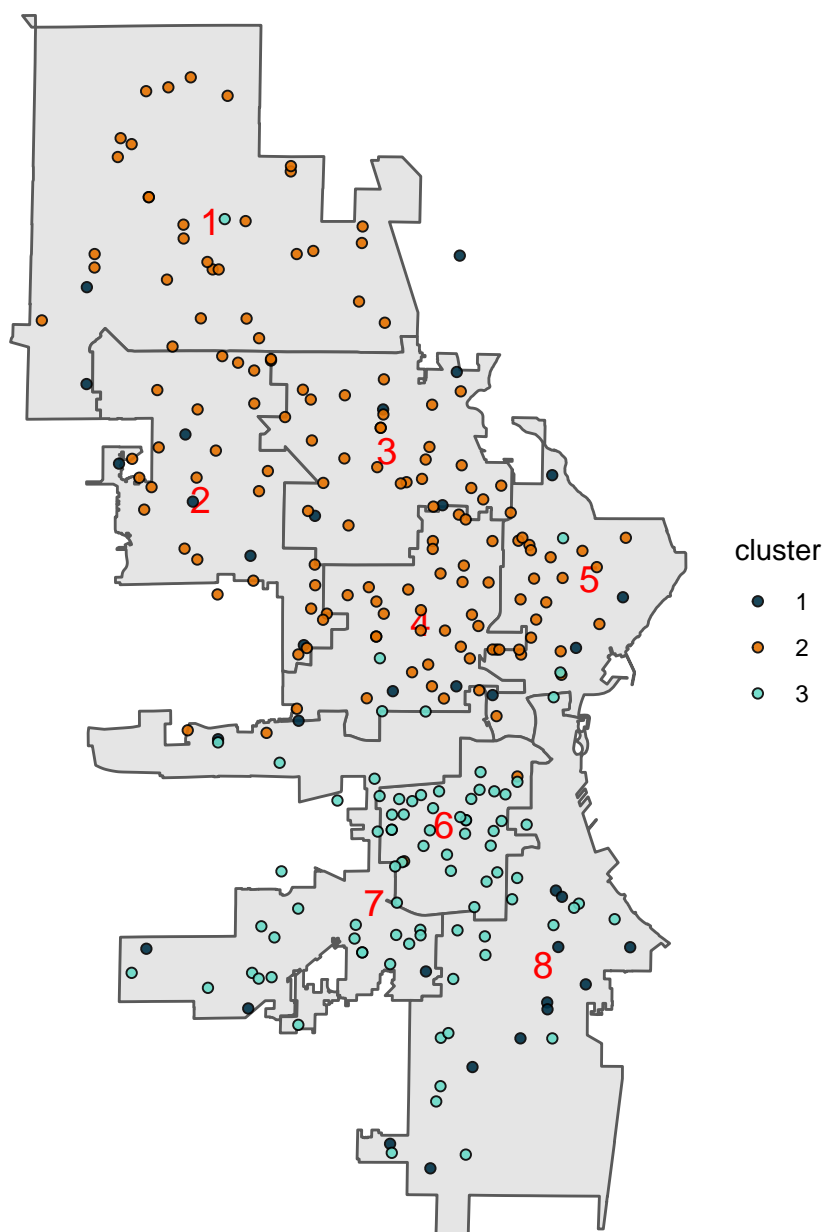
## Without Geo

Cluster	N	Black	Hisp/Lat	White	Asian	SwD	ECD
1	145	84.3%	6.2%	3.3%	2.4%	15.1%	92.1%
2	36	29.9%	25.1%	28.2%	10.3%	7.3%	55.2%
3	4	7.8%	3.1%	57.6%	25.0%	2.2%	63.2%
4	74	11.9%	72.7%	8.4%	4.1%	13.2%	88.6%



## With Geo

Cluster	N	Black	Hisp/Lat	White	SwD	ECD
1	35	27%	23%	32.0%	5.64%	52.1%
2	143	85%	6%	3.2%	14.80%	92.0%
3	81	13%	69%	9.5%	13.85%	88.1%



## Comparing Differences

##	dpi_true_id
## 1	0000_1652
## 2	0000_1745
## 3	0000_1263
## 4	0000_1303
## 5	0000_1304
## 6	0000_1507
## 7	8123_0100
## 8	0000_1382
## 9	0000_0309
## 10	8105_1211
## 11	0000_1384
## 12	0000_1305
## 13	0000_1776
## 14	0000_1044
## 15	0000_1712
## 16	0000_1489
## 17	8109_0100
## 18	0000_1491
## 19	0000_1702
## 20	0000_0510
## 21	8101_1056
## 22	8127_0400
## 23	0000_1158
## 24	0000_1218
## 25	8131_0400
## 26	0000_0740
## 27	0000_1165
## 28	0000_1345
## 29	0000_1180
## 30	0000_1408
## 31	0000_1703
## 32	0000_1729
## 33	0000_1439
## 34	0000_1315
## 35	0000_1656
## 36	0000_1527
## 37	0000_1684
## 38	0000_1774
## 39	0000_1221
## 40	0000_1374
## 41	0000_1770
## 42	0000_1606
## 43	3619_0316
## 44	3619_0162
## 45	3619_0075
## 46	3619_0073
## 47	3619_0413
## 48	3619_0215
## 49	3619_1063
## 50	3619_0434
## 51	3619_0041

*Comparing Differences*

---

## 52	3619_0077
## 53	3619_0432
## 54	3619_0188
## 55	3619_0081
## 56	3619_0012
## 57	3619_0112
## 58	3619_0356
## 59	3619_0014
## 60	3619_0089
## 61	3619_0092
## 62	3619_0093
## 63	3619_0094
## 64	3619_0095
## 65	3619_0098
## 66	3619_0407
## 67	3619_0451
## 68	3619_0213
## 69	3619_0444
## 70	3619_0108
## 71	3619_0178
## 72	3619_0104
## 73	3619_0110
## 74	3619_0114
## 75	3619_0113
## 76	3619_0116
## 77	3619_0117
## 78	3619_0501
## 79	3619_0122
## 80	3619_0820
## 81	3619_0125
## 82	3619_0143
## 83	3619_0148
## 84	3619_0150
## 85	3619_0152
## 86	3619_0155
## 87	3619_0158
## 88	3619_0170
## 89	3619_0173
## 90	3619_0179
## 91	3619_0182
## 92	3619_0185
## 93	3619_0191
## 94	3619_0176
## 95	3619_0192
## 96	3619_0410
## 97	3619_0193
## 98	3619_0196
## 99	3619_0454
## 100	3619_0202
## 101	3619_0236
## 102	3619_0018
## 103	3619_0205
## 104	3619_0880
## 105	3619_0208

## 106	3619_0211
## 107	3619_0212
## 108	3619_0214
## 109	3619_0217
## 110	3619_0852
## 111	3619_0218
## 112	3619_0334
## 113	3619_0253
## 114	3619_0223
## 115	3619_0165
## 116	3619_0377
## 117	3619_0409
## 118	3619_0232
## 119	3619_0235
## 120	3619_0237
## 121	3619_0020
## 122	3619_0210
## 123	3619_0199
## 124	3619_0337
## 125	3619_1121
## 126	3619_0296
## 127	3619_0238
## 128	3619_0241
## 129	3619_0250
## 130	3619_0006
## 131	3619_0256
## 132	3619_0257
## 133	3619_0870
## 134	3619_0265
## 135	3619_0267
## 136	3619_0008
## 137	3619_0268
## 138	3619_0525
## 139	3619_0103
## 140	3619_0123
## 141	3619_0111
## 142	3619_0145
## 143	3619_0121
## 144	3619_0315
## 145	3619_0118
## 146	3619_0885
## 147	3619_0140
## 148	3619_0146
## 149	3619_0038
## 150	3619_0362
## 151	3619_0071
## 152	3619_0226
## 153	3619_0167
## 154	3619_0274
## 155	3619_0277
## 156	3619_0052
## 157	3619_0283
## 158	3619_0289
## 159	3619_0419



```
## 160 3619_1072
## 161 3619_0840
## 162 3619_0301
## 163 3619_0325
## 164 3619_0458
## 165 3619_0026
## 166 3619_0435
## 167 3619_0313
## 168 3619_0194
## 169 3619_0029
## 170 3619_0307
## 171 3619_0177
## 172 3619_0059
## 173 3619_1074
## 174 3619_0319
## 175 3619_0107
## 176 3619_0442
## 177 3619_0032
## 178 3619_1086
## 179 3619_0312
## 180 3619_0343
## 181 3619_0344
## 182 3619_0360
## 183 3619_0154
## 184 3619_0365
## 185 3619_0433
## 186 3619_0368
## 187 3619_0387
## 188 3619_0390
## 189 3619_0448
## 190 3619_0033
## 191 3619_0204
## 192 3619_0130
## 193 3619_0397
## 194 3619_0398
## 195 3619_0424
## 196 3619_0399
## 197 3619_0295
## 198 8106_1251
## 199 0000_1870
## 200 8128_0800
## 201 8129_0100
## 202 0000_1873
## 203 0000_1910
## 204 0000_1980
## 205 0000_1996
## 206 0000_1327
## 207 0000_1575
## 208 0000_2030
## 209 0000_1095
## 210 0000_2240
## 211 8139_8139
## 212 8138_8138
## 213 0000_2291
```

```
## 214 0000_2300
## 215 0000_1205
## 216 0000_1351
## 217 8002_8133
## 218 8002_8140
## 219 0000_2750
## 220 0000_3100
## 221 0000_3410
## 222 0000_3455
## 223 0000_3935
## 224 0000_4210
## 225 0000_2850
## 226 0000_4655
## 227 0000_4950
## 228 0000_8224
## 229 0000_5640
## 230 0000_5710
## 231 0000_5720
## 232 0000_5830
## 233 0000_6690
## 234 0000_7400
## 235 0000_1302
## 236 0000_1200
## 237 0000_7670
## 238 0000_7720
## 239 0000_7980
## 240 0000_3160
## 241 0000_8075
## 242 0000_8080
## 243 8001_8121
## 244 8001_8115
## 245 8001_8124
## 246 0000_1704
## 247 0000_8217
## 248 8136_8136
## 249 0000_1048
## 250 0000_8379
## 251 0000_1631
## 252 8137_8137
## 253 0000_1253
## 254 0000_8720
## 255 8113_8728
## 256 8132_0100
## 257 0000_0320
## 258 0000_8740
```

```
## school_name
## 1 Academy of Excellence
## 2 Achieving Educational Excellence Inc
## 3 Atlas Preparatory Academy
## 4 Believers in Christ Christian Academy
## 5 Blessed Sacrament Grade School
## 6 Blessed Savior Catholic School
## 7 Bruce Guadalupe
## 8 Carter's Christian Academy
```

## 9	Catholic East Elementary
## 10	Central City Cyberschool
## 11	Christian Faith Academy of Higher Learning
## 12	Christ-St Peter Lutheran School
## 13	City School
## 14	Clara Mohammed School
## 15	Cristo Rey Jesuit Milwaukee High
## 16	Cross Trainers Academy
## 17	Darrell Lynn Hines Academy
## 18	Destiny High
## 19	Divine Destiny School
## 20	Divine Savior Holy Angels High
## 21	Downtown Montessori
## 22	Dr Howard Fuller Collegiate Academy
## 23	Early View Academy of Excellence
## 24	Eastbrook Academy
## 25	Escuela Verde
## 26	Garden Homes Lutheran School
## 27	Granville Lutheran School
## 28	Greater Holy Temple Christian Academy
## 29	Holy Redeemer Christian Academy
## 30	Hope Christian High
## 31	Hope Christian School: Caritas
## 32	Hope Christian School: Fidelis
## 33	Hope Christian School: Fortis
## 34	Hope Christian School: Prima
## 35	Hope Christian School: Semper
## 36	Inst of Technology & Academics
## 37	Jo's Learning Academy
## 38	Kingdom Prep Lutheran High School
## 39	King's Academy Christian Sch
## 40	Malaika Early Learning Center
## 41	Marquette University High
## 42	Messmer Catholic Schools
## 43	Academy of Accelerated Learning
## 44	ALBA - Academia de Lenguaje y Bellas Artes
## 45	Alcott Elementary
## 46	Allen-Field Elementary
## 47	Alliance School of Milwaukee
## 48	Andrew S Douglas Middle
## 49	ASSATA High
## 50	Audubon Technology and Communication High
## 51	Audubon Technology and Communication Middle
## 52	Auer Avenue Elementary
## 53	Banner Preparatory School of Milwaukee
## 54	Barbee Elementary
## 55	Barton Elementary
## 56	Bay View High
## 57	Bay View Montessori School
## 58	Bethune Academy
## 59	Bradley Technology High
## 60	Brown Street Academy
## 61	Browning Elementary
## 62	Bruce Elementary

## 63	Bryant Elementary
## 64	Burbank Elementary
## 65	Burdick Elementary
## 66	Carmen High School of Science and Technology South Campus
## 67	Carmen High School of Science and Technology Southeast Campus
## 68	Carmen Middle School of Science and Technology South Campus
## 69	Carmen Middle/High School of Science and Technology Northwest Campus
## 70	Carson Academy
## 71	Carver Academy
## 72	Cass Street Elementary
## 73	Clarke Street Elementary
## 74	Clemens Elementary
## 75	Clement Avenue Elementary
## 76	Congress Elementary
## 77	Cooper Elementary
## 78	Craig Montessori School
## 79	Curtin Elementary
## 80	Daniels University Preparatory Academy
## 81	Doerfler Elementary
## 82	Eighty-First Street Elementary
## 83	Elm Creative Arts Elementary
## 84	Emerson Elementary
## 85	Engleburg Elementary
## 86	Fairview Elementary
## 87	Fernwood Montessori
## 88	Fifty-Third Street Elementary
## 89	Forest Home Elementary
## 90	Franklin Elementary
## 91	Fratney Elementary
## 92	Gaenslen Elementary
## 93	Garland Elementary
## 94	Golda Meir School
## 95	Goodrich Elementary
## 96	Grandview High
## 97	Grant Elementary
## 98	Grantosa Drive Elementary
## 99	Green Tree Preparatory Academy
## 100	Greenfield Bilingual
## 101	Groppi High
## 102	Hamilton High
## 103	Hampton Elementary
## 104	HAPA-Hmong American Peace Academy K3-12
## 105	Hartford Avenue Elementary
## 106	Hawley Environmental School
## 107	Hawthorne Elementary
## 108	Hayes Bilingual School
## 109	Hi-Mount Elementary
## 110	Highland Community School
## 111	Holmes Elementary
## 112	Honey Creek Elementary
## 113	Hopkins Lloyd Community School
## 114	Humboldt Park Elementary
## 115	IDEAL Individualized Developmental Educational Approaches to Learning
## 116	Jackson Elementary

## 117	James Madison Academic Campus
## 118	Kagel Elementary
## 119	Keefe Avenue Elementary
## 120	Kilbourn Elementary
## 121	King International
## 122	King International Baccalaureate Middle
## 123	King Jr Elementary
## 124	Kluge Elementary
## 125	La Causa Charter School
## 126	Lad Lake Synergy School
## 127	LaFollette Elementary
## 128	Lancaster Elementary
## 129	Lincoln Avenue Elementary
## 130	Lincoln Middle
## 131	Longfellow Elementary
## 132	Lowell International Elementary
## 133	MacDowell Montessori School K3-12
## 134	Manitoba Elementary
## 135	Maple Tree Elementary
## 136	Marshall High
## 137	Maryland Montessori
## 138	Metcalfe Elementary
## 139	Milwaukee Academy of Chinese Language
## 140	Milwaukee College Preparatory School -- 36th Street Campus
## 141	Milwaukee College Preparatory School -- 38th Street
## 142	Milwaukee College Preparatory School -- Lloyd Street
## 143	Milwaukee College Preparatory School: Lola Rowe North Campus
## 144	Milwaukee County Youth Education Center
## 145	Milwaukee Environmental Science Academy
## 146	Milwaukee Excellence Charter School
## 147	Milwaukee French Immersion
## 148	Milwaukee German Immersion
## 149	Milwaukee High School of the Arts
## 150	Milwaukee Parkside School
## 151	Milwaukee School of Languages
## 152	Milwaukee Sign Language Elementary
## 153	Milwaukee Spanish Immersion
## 154	Mitchell Elementary
## 155	Morgandale Elementary
## 156	Morse Mid
## 157	Neeskara Elementary
## 158	Ninety-Fifth Street Elementary
## 159	North Division High
## 160	NOVA-Northwest Opportunities Vocational Academy
## 161	Obama School of Career and Technical Education
## 162	Parkview Elementary
## 163	Pratt Elementary
## 164	Project STAY-Supporting Teachers and Youth
## 165	Pulaski High
## 166	Reagan College Preparatory High
## 167	Riley Elementary
## 168	River Trail Elementary
## 169	Riverside High
## 170	Riverwest Elementary

## 171	Rogers Street Academy
## 172	Roosevelt Middle
## 173	Shalom High
## 174	Sherman Elementary
## 175	Siefert Elementary
## 176	South Accelerated Academy
## 177	South Division High
## 178	Southeastern
## 179	Starms Discovery
## 180	Story Elementary
## 181	Stuart Elementary
## 182	Thoreau Elementary
## 183	Thurston Woods Elementary
## 184	Townsend Street Elementary
## 185	Transition High
## 186	Trowbridge Street School of Great Lakes Studies
## 187	Victory Elementary
## 188	Vieau Elementary
## 189	Vincent Accelerated Academy
## 190	Vincent High
## 191	Wedgewood Park School
## 192	Westside Academy
## 193	Whitman Elementary
## 194	Whittier Elementary
## 195	WHS Information Technology
## 196	Wisconsin Conservatory of Lifelong Learning
## 197	Zablocki Elementary
## 198	Milwaukee Academy of Science
## 199	Milwaukee Lutheran High
## 200	Milwaukee Math and Science Academy
## 201	Milwaukee Scholars Charter School
## 202	Milwaukee Seventh Day Adventist School
## 203	Mother of Good Counsel Grade School
## 204	Mount Lebanon Lutheran School
## 205	Nativity Jesuit Academy
## 206	New Testament Christian Academy
## 207	Northwest Catholic
## 208	Northwest Lutheran Grade School
## 209	Notre Dame School of Milwaukee
## 210	Our Lady Queen of Peace Grade School
## 211	Pathways High
## 212	Penfield Montessori Academy
## 213	Pilgrim Lutheran School
## 214	Pius XI Catholic High
## 215	Prince of Peace School Escuela Principe de Paz
## 216	Risen Savior Evangelical Lutheran School
## 217	Rocketship Southside Community Prep
## 218	Rocketship Transformation Prep
## 219	Saint Adalbert Catholic School
## 220	Saint Anthony School
## 221	Saint Catherine School
## 222	Saint Charles Borromeo Catholic School
## 223	Saint Gregory the Great Parish School
## 224	Saint Joan Antida High

## 225							Saint John Paul II School
## 226							Saint Johns Evangelical Lutheran School
## 227							Saint Josaphat Parish School
## 228							Saint Joseph Academy
## 229							Saint Lucas Lutheran School
## 230							Saint Marcus Lutheran School
## 231							Saint Margaret Mary Grade School
## 232							Saint Martini Lutheran Grade School
## 233							Saint Matthias School
## 234							Saint Peter Immanuel Lutheran School
## 235							Saint Philips Lutheran School
## 236							Saint Rafael the Archangel North & South Campus
## 237							Saint Roman Grade School
## 238							Saint Sebastian Grade School
## 239							Saint Thomas Aquinas Academy
## 240							Saint Vincent Pallotti School
## 241							Salam School
## 242							Salem Lutheran School
## 243							Seeds of Health Elementary Program
## 244							Tenor High
## 245							Veritas High
## 246							Shining Star Christian Schools
## 247							Siloah Lutheran School
## 248							Stellar Collegiate Charter School
## 249							Tamarack Waldorf School Community School of Milwaukee Inc
## 250							Torah Academy of Milwaukee
## 251							TransCenter for Youth/El Puente High
## 252							United Community Center Acosta Middle School
## 253							Victory Christian Academy
## 254							Wisconsin Lutheran High
## 255							Woodlands School
## 256							Woodlands School - State Street Campus
## 257							Word of Life Lutheran School
## 258							Yeshiva Elementary
##	per_b_aa	per_hisp_lat	per_white	per_asian	per_ed	per_swd	cluster_nogeo
## 1	0.284	0.405	0.147	0.141	0.765	0.015	4
## 2	0.045	0.911	0.025	0.002	0.909	0.070	4
## 3	0.270	0.610	0.018	0.079	0.843	0.025	4
## 4	0.916	0.034	0.000	0.000	0.990	0.000	1
## 5	0.060	0.820	0.042	0.018	0.970	0.042	4
## 6	0.916	0.022	0.015	0.006	0.972	0.011	1
## 7	0.004	0.977	0.017	0.000	0.713	0.084	4
## 8	0.985	0.007	0.007	0.000	0.989	0.000	1
## 9	0.545	0.178	0.209	0.005	0.770	0.016	1
## 10	0.969	0.028	0.000	0.000	1.000	0.113	1
## 11	0.957	0.000	0.000	0.000	1.000	0.000	1
## 12	0.145	0.659	0.089	0.089	0.762	0.014	4
## 13	1.000	0.000	0.000	0.000	0.993	0.000	1
## 14	0.980	0.000	0.000	0.020	0.467	0.000	1
## 15	0.060	0.918	0.011	0.007	0.957	0.007	4
## 16	0.986	0.000	0.014	0.000	0.986	0.008	1
## 17	0.822	0.013	0.000	0.142	0.924	0.058	1
## 18	0.061	0.939	0.000	0.000	1.000	0.000	4
## 19	1.000	0.000	0.000	0.000	1.000	0.000	1

*Comparing Differences*

## 20	0.278	0.577	0.124	0.021	0.330	0.000	2
## 21	0.072	0.158	0.685	0.021	0.158	0.045	2
## 22	0.987	0.006	0.003	0.000	0.779	0.160	1
## 23	0.961	0.013	0.000	0.009	0.944	0.000	1
## 24	0.661	0.080	0.128	0.026	0.106	0.004	2
## 25	0.076	0.807	0.092	0.000	0.924	0.210	4
## 26	0.917	0.036	0.016	0.000	0.842	0.004	1
## 27	0.938	0.035	0.004	0.000	0.980	0.004	1
## 28	0.961	0.011	0.004	0.000	0.948	0.006	1
## 29	1.000	0.000	0.000	0.000	NA	NA	2
## 30	0.984	0.012	0.000	0.000	0.951	0.000	1
## 31	0.976	0.018	0.002	0.000	0.976	0.002	1
## 32	0.962	0.011	0.000	0.000	0.983	0.011	1
## 33	0.976	0.008	0.006	0.000	0.984	0.004	1
## 34	0.969	0.005	0.000	0.013	0.984	0.013	1
## 35	0.945	0.032	0.000	0.000	0.995	0.000	1
## 36	1.000	0.000	0.000	0.000	1.000	0.000	1
## 37	1.000	0.000	0.000	0.000	0.738	0.024	1
## 38	0.909	0.055	0.018	0.006	1.000	0.000	1
## 39	0.947	0.026	0.000	0.000	1.000	0.011	1
## 40	1.000	0.000	0.000	0.000	1.000	0.032	1
## 41	0.168	0.579	0.200	0.042	0.547	0.000	4
## 42	0.845	0.073	0.002	0.056	0.849	0.013	1
## 43	0.101	0.308	0.282	0.217	0.768	0.163	2
## 44	0.000	0.991	0.004	0.000	0.940	0.166	4
## 45	0.164	0.378	0.305	0.069	0.796	0.182	4
## 46	0.072	0.876	0.029	0.000	0.946	0.280	4
## 47	0.644	0.163	0.100	0.013	0.913	0.375	1
## 48	0.913	0.026	0.013	0.010	0.984	0.262	1
## 49	0.980	0.000	0.000	0.000	0.961	0.167	1
## 50	0.153	0.627	0.148	0.023	0.922	0.306	4
## 51	0.219	0.649	0.050	0.037	0.989	0.249	4
## 52	0.928	0.024	0.006	0.000	0.982	0.180	1
## 53	0.943	0.029	0.000	0.029	0.971	0.143	1
## 54	0.785	0.057	0.073	0.025	1.000	0.139	1
## 55	0.820	0.040	0.024	0.060	0.940	0.184	1
## 56	0.468	0.312	0.125	0.036	0.903	0.276	1
## 57	0.052	0.206	0.635	0.021	0.346	0.092	2
## 58	0.600	0.023	0.003	0.357	0.993	0.190	2
## 59	0.764	0.144	0.035	0.032	0.898	0.221	1
## 60	0.944	0.016	0.004	0.004	0.992	0.258	1
## 61	0.886	0.032	0.021	0.025	0.968	0.243	1
## 62	0.799	0.040	0.026	0.047	0.971	0.190	1
## 63	0.866	0.019	0.000	0.057	1.000	0.282	1
## 64	0.340	0.221	0.123	0.250	0.909	0.223	4
## 65	0.077	0.361	0.451	0.051	0.604	0.133	2
## 66	0.022	0.968	0.005	0.005	0.976	0.090	4
## 67	0.043	0.921	0.026	0.004	0.933	0.118	4
## 68	0.070	0.879	0.030	0.005	0.935	0.085	4
## 69	0.858	0.077	0.028	0.018	0.917	0.145	1
## 70	0.947	0.015	0.005	0.005	0.956	0.160	1
## 71	0.936	0.034	0.007	0.000	0.995	0.227	1
## 72	0.848	0.063	0.032	0.003	0.953	0.193	1
## 73	0.940	0.026	0.004	0.000	1.000	0.279	1



## Comparing Differences

## 74	0.932	0.032	0.003	0.000	1.000	0.181	1
## 75	0.080	0.420	0.341	0.019	0.745	0.187	2
## 76	0.945	0.021	0.006	0.008	0.925	0.194	1
## 77	0.142	0.386	0.330	0.084	0.644	0.187	4
## 78	0.850	0.041	0.034	0.024	0.745	0.153	1
## 79	0.127	0.601	0.118	0.097	0.894	0.181	4
## 80	0.949	0.013	0.000	0.000	0.981	0.115	1
## 81	0.089	0.837	0.032	0.023	0.986	0.243	4
## 82	0.710	0.079	0.066	0.053	0.799	0.287	1
## 83	0.877	0.051	0.008	0.000	0.988	0.170	1
## 84	0.839	0.028	0.009	0.083	0.940	0.253	1
## 85	0.834	0.046	0.033	0.046	0.930	0.262	1
## 86	0.101	0.393	0.404	0.038	0.645	0.244	4
## 87	0.038	0.216	0.661	0.010	0.231	0.089	2
## 88	0.899	0.031	0.020	0.003	0.953	0.218	1
## 89	0.151	0.771	0.047	0.005	0.953	0.319	4
## 90	0.948	0.014	0.003	0.003	0.984	0.281	1
## 91	0.210	0.663	0.093	0.002	0.861	0.120	4
## 92	0.813	0.082	0.054	0.006	0.963	0.441	1
## 93	0.117	0.232	0.418	0.207	0.905	0.160	4
## 94	0.598	0.134	0.167	0.054	0.638	0.091	1
## 95	0.684	0.056	0.040	0.146	0.876	0.229	1
## 96	0.125	0.730	0.070	0.015	0.970	0.145	4
## 97	0.114	0.599	0.069	0.187	0.948	0.168	4
## 98	0.912	0.016	0.015	0.020	0.925	0.282	1
## 99	0.869	0.036	0.028	0.020	0.972	0.175	1
## 100	0.053	0.917	0.015	0.012	0.990	0.170	4
## 101	0.857	0.105	0.019	0.000	0.952	0.162	1
## 102	0.357	0.386	0.124	0.089	0.872	0.261	1
## 103	0.799	0.037	0.016	0.063	0.974	0.270	1
## 104	0.004	0.010	0.003	0.977	0.875	0.045	3
## 105	0.889	0.034	0.020	0.005	0.966	0.149	1
## 106	0.632	0.138	0.043	0.076	0.888	0.227	1
## 107	0.884	0.064	0.004	0.000	0.978	0.213	1
## 108	0.008	0.974	0.014	0.002	0.962	0.226	4
## 109	0.854	0.076	0.000	0.006	1.000	0.146	1
## 110	0.366	0.115	0.392	0.014	0.500	0.131	2
## 111	0.869	0.080	0.017	0.003	0.990	0.343	1
## 112	0.145	0.413	0.290	0.040	0.853	0.212	2
## 113	0.917	0.030	0.000	0.000	0.970	0.174	1
## 114	0.085	0.200	0.266	0.432	0.828	0.141	2
## 115	0.187	0.483	0.228	0.037	0.918	0.191	4
## 116	0.943	0.024	0.004	0.020	0.984	0.263	1
## 117	0.894	0.041	0.014	0.030	0.977	0.256	1
## 118	0.142	0.802	0.033	0.009	0.995	0.241	4
## 119	0.957	0.027	0.000	0.000	1.000	0.130	1
## 120	0.894	0.035	0.008	0.039	0.922	0.216	1
## 121	0.552	0.148	0.150	0.112	0.751	0.133	1
## 122	0.918	0.022	0.007	0.007	0.957	0.150	1
## 123	0.944	0.033	0.007	0.000	1.000	0.189	1
## 124	0.795	0.047	0.021	0.091	0.953	0.326	1
## 125	0.013	0.983	0.001	0.001	0.886	0.140	4
## 126	0.578	0.333	0.067	0.022	1.000	0.267	1
## 127	0.969	0.010	0.000	0.000	0.990	0.277	1

## Comparing Differences

## 128	0.898	0.031	0.006	0.040	1.000	0.183	1
## 129	0.156	0.772	0.018	0.009	0.982	0.246	4
## 130	0.687	0.238	0.021	0.015	0.988	0.238	1
## 131	0.145	0.788	0.041	0.008	0.933	0.243	4
## 132	0.233	0.485	0.165	0.063	0.840	0.180	1
## 133	0.544	0.095	0.261	0.024	0.660	0.190	1
## 134	0.160	0.505	0.107	0.135	0.851	0.256	4
## 135	0.822	0.055	0.017	0.059	0.936	0.148	1
## 136	0.902	0.040	0.009	0.024	0.907	0.301	1
## 137	0.152	0.087	0.596	0.073	0.275	0.119	2
## 138	0.905	0.034	0.024	0.000	0.980	0.214	1
## 139	0.664	0.035	0.007	0.241	0.982	0.116	4
## 140	0.932	0.016	0.000	0.000	0.816	0.110	1
## 141	0.892	0.041	0.016	0.000	0.843	0.157	1
## 142	0.927	0.050	0.002	0.000	0.915	0.137	1
## 143	0.960	0.016	0.000	0.000	0.878	0.118	1
## 144	0.800	0.200	0.000	0.000	NA	NA	2
## 145	0.866	0.085	0.012	0.017	0.945	0.099	1
## 146	0.955	0.008	0.008	0.008	0.921	0.136	1
## 147	0.611	0.071	0.187	0.025	0.667	0.062	1
## 148	0.270	0.047	0.554	0.022	0.326	0.069	2
## 149	0.551	0.206	0.105	0.108	0.878	0.200	1
## 150	0.169	0.447	0.216	0.100	0.795	0.251	4
## 151	0.494	0.187	0.233	0.046	0.624	0.153	1
## 152	0.800	0.087	0.026	0.043	0.968	0.217	1
## 153	0.241	0.613	0.097	0.001	0.725	0.124	4
## 154	0.134	0.785	0.029	0.018	0.967	0.248	4
## 155	0.101	0.722	0.078	0.080	0.907	0.216	4
## 156	0.803	0.045	0.041	0.077	0.953	0.245	1
## 157	0.798	0.082	0.029	0.038	0.941	0.276	1
## 158	0.585	0.118	0.113	0.072	0.741	0.161	1
## 159	0.915	0.062	0.000	0.008	0.964	0.350	1
## 160	0.842	0.053	0.021	0.011	0.979	0.232	1
## 161	0.945	0.025	0.009	0.000	0.947	0.283	1
## 162	0.486	0.042	0.024	0.415	0.856	0.152	2
## 163	0.911	0.039	0.000	0.004	0.932	0.136	1
## 164	0.818	0.088	0.029	0.015	0.883	0.219	1
## 165	0.327	0.512	0.052	0.089	0.884	0.269	4
## 166	0.079	0.518	0.309	0.068	0.562	0.115	4
## 167	0.097	0.789	0.083	0.000	0.753	0.181	4
## 168	0.783	0.063	0.017	0.085	0.991	0.171	1
## 169	0.612	0.235	0.029	0.104	0.879	0.216	1
## 170	0.766	0.128	0.028	0.000	0.975	0.174	1
## 171	0.073	0.863	0.034	0.002	0.969	0.181	4
## 172	0.916	0.035	0.017	0.009	0.959	0.238	1
## 173	0.941	0.020	0.029	0.000	0.941	0.245	1
## 174	0.936	0.020	0.028	0.000	0.980	0.199	1
## 175	0.926	0.032	0.004	0.000	0.989	0.191	1
## 176	0.500	0.500	0.000	0.000	NA	NA	2
## 177	0.237	0.548	0.027	0.165	0.974	0.279	4
## 178	0.938	0.000	0.063	0.000	NA	NA	2
## 179	0.920	0.035	0.007	0.007	0.990	0.282	1
## 180	0.695	0.046	0.023	0.205	0.959	0.126	1
## 181	0.645	0.029	0.018	0.219	0.910	0.211	1

## Comparing Differences

## 182	0.851	0.075	0.010	0.022	0.949	0.173	1
## 183	0.916	0.051	0.010	0.003	0.949	0.208	1
## 184	0.925	0.034	0.000	0.000	0.960	0.239	1
## 185	0.929	0.051	0.010	0.000	0.939	0.131	1
## 186	0.231	0.423	0.212	0.014	0.870	0.274	4
## 187	0.127	0.275	0.219	0.331	0.963	0.104	2
## 188	0.018	0.949	0.016	0.007	0.904	0.198	4
## 189	0.978	0.000	0.000	0.000	0.913	0.283	1
## 190	0.895	0.028	0.011	0.031	0.915	0.292	1
## 191	0.243	0.538	0.114	0.067	0.877	0.179	4
## 192	0.908	0.031	0.015	0.020	0.990	0.245	1
## 193	0.153	0.392	0.339	0.053	0.811	0.211	4
## 194	0.119	0.347	0.342	0.067	0.565	0.114	2
## 195	0.892	0.036	0.019	0.034	0.933	0.320	1
## 196	0.851	0.050	0.018	0.025	0.989	0.306	1
## 197	0.121	0.621	0.128	0.079	0.883	0.234	4
## 198	0.977	0.018	0.002	0.000	0.974	0.078	1
## 199	0.863	0.032	0.037	0.024	0.815	0.005	1
## 200	0.985	0.010	0.000	0.000	0.951	0.108	1
## 201	0.876	0.044	0.005	0.011	0.899	0.090	1
## 202	0.212	0.693	0.011	0.078	0.034	0.000	2
## 203	0.701	0.096	0.037	0.021	0.834	0.000	2
## 204	0.863	0.048	0.048	0.004	0.974	0.000	1
## 205	0.000	1.000	0.000	0.000	0.931	0.020	4
## 206	0.979	0.007	0.014	0.000	0.542	0.007	1
## 207	0.766	0.102	0.024	0.018	0.976	0.024	1
## 208	0.916	0.013	0.004	0.004	0.930	0.018	1
## 209	0.006	0.983	0.011	0.000	0.976	0.009	4
## 210	0.030	0.899	0.024	0.047	0.970	0.018	4
## 211	0.556	0.052	0.281	0.007	0.659	0.148	1
## 212	0.608	0.077	0.200	0.062	0.808	0.223	1
## 213	0.905	0.017	0.000	0.008	1.000	0.008	1
## 214	0.294	0.444	0.175	0.006	0.600	0.000	4
## 215	0.011	0.979	0.003	0.000	1.000	0.024	4
## 216	0.468	0.453	0.026	0.015	0.864	0.072	1
## 217	0.030	0.920	0.032	0.002	0.839	0.121	4
## 218	0.827	0.120	0.010	0.010	0.928	0.091	1
## 219	0.002	0.998	0.000	0.000	1.000	0.027	4
## 220	0.010	0.985	0.005	0.001	0.885	0.015	4
## 221	0.961	0.008	0.016	0.000	0.992	0.000	1
## 222	0.008	0.303	0.403	0.269	0.605	0.034	2
## 223	0.028	0.713	0.180	0.017	0.713	0.017	4
## 224	0.344	0.604	0.019	0.019	0.987	0.000	4
## 225	0.004	0.970	0.025	0.000	0.772	0.021	4
## 226	0.025	0.155	0.329	0.445	0.643	0.004	2
## 227	0.006	0.958	0.012	0.000	0.939	0.024	4
## 228	0.016	0.853	0.074	0.009	0.717	0.022	4
## 229	0.045	0.246	0.582	0.052	0.590	0.045	2
## 230	0.887	0.036	0.006	0.002	0.798	0.013	1
## 231	0.784	0.057	0.023	0.034	1.000	0.000	1
## 232	0.087	0.876	0.012	0.019	1.000	0.037	4
## 233	0.041	0.463	0.446	0.008	0.727	0.008	2
## 234	0.770	0.080	0.023	0.069	0.977	0.000	1
## 235	0.661	0.185	0.081	0.008	0.847	0.008	1

Comparing Differences

## 236	0.000	0.983	0.006	0.009	0.977	0.014	4
## 237	0.013	0.657	0.066	0.234	0.762	0.043	4
## 238	0.308	0.115	0.302	0.022	0.599	0.011	3
## 239	0.020	0.450	0.477	0.000	0.383	0.013	2
## 240	0.063	0.938	0.000	0.000	NA	NA	2
## 241	0.181	0.002	0.339	0.467	0.893	0.000	2
## 242	0.614	0.078	0.199	0.024	0.831	0.072	1
## 243	0.061	0.866	0.059	0.005	0.993	0.139	4
## 244	0.304	0.575	0.096	0.008	0.951	0.102	4
## 245	0.012	0.936	0.048	0.000	0.976	0.060	4
## 246	0.896	0.068	0.007	0.002	0.855	0.017	1
## 247	0.913	0.043	0.000	0.000	0.145	0.014	2
## 248	0.163	0.745	0.054	0.000	0.975	0.172	4
## 249	0.102	0.237	0.548	0.000	0.723	0.000	2
## 250	0.000	0.000	1.000	0.000	NA	NA	3
## 251	0.098	0.826	0.065	0.000	0.967	0.011	4
## 252	0.014	0.953	0.028	0.000	0.782	0.185	4
## 253	0.099	0.782	0.106	0.000	0.894	0.000	4
## 254	0.455	0.165	0.306	0.023	0.622	0.006	1
## 255	0.254	0.144	0.447	0.032	0.323	0.095	2
## 256	0.645	0.121	0.070	0.026	0.480	0.084	2
## 257	0.066	0.487	0.184	0.145	0.618	0.026	2
## 258	0.000	0.000	1.000	0.000	0.421	0.010	3
##	overall_rating cluster_geo						
## 1	Fails to Meet Expectations						3
## 2	Significantly Exceeds Expectations						3
## 3	NR-DATA						3
## 4	Meets Expectations						2
## 5	Exceeds Expectations						3
## 6	Exceeds Expectations						2
## 7	Exceeds Expectations						3
## 8	Fails to Meet Expectations						2
## 9	Significantly Exceeds Expectations						2
## 10	Meets Few Expectations						2
## 11	NR-DATA						2
## 12	Exceeds Expectations						3
## 13	Exceeds Expectations						2
## 14	NR-DATA						2
## 15	Exceeds Expectations						3
## 16	Meets Expectations						2
## 17	Meets Expectations						2
## 18	Meets Few Expectations						3
## 19	Meets Expectations						2
## 20	Exceeds Expectations						1
## 21	Significantly Exceeds Expectations						1
## 22	Meets Few Expectations						2
## 23	Fails to Meet Expectations						2
## 24	Exceeds Expectations						1
## 25	Meets Few Expectations						3
## 26	Exceeds Expectations						2
## 27	Exceeds Expectations						2
## 28	Exceeds Expectations						2
## 29	NR-DATA						1
## 30	Meets Expectations						2

## 31	Exceeds Expectations	2
## 32	Exceeds Expectations	2
## 33	Meets Expectations	2
## 34	Exceeds Expectations	2
## 35	Exceeds Expectations	2
## 36	NR-DATA	2
## 37	NR-DATA	2
## 38	Meets Expectations	2
## 39	Exceeds Expectations	2
## 40	NR-DATA	2
## 41	Significantly Exceeds Expectations	3
## 42	Meets Expectations	2
## 43	Alternate Rating - Needs Improvement	3
## 44	Exceeds Expectations	3
## 45	Meets Expectations	3
## 46	Meets Expectations	3
## 47	Alternate Rating - Needs Improvement	2
## 48	Alternate Rating - Needs Improvement	2
## 49	Alternate Rating - Needs Improvement	2
## 50	Meets Few Expectations	3
## 51	Fails to Meet Expectations	3
## 52	Meets Few Expectations	2
## 53	Alternate Rating - Needs Improvement	2
## 54	Meets Few Expectations	2
## 55	Alternate Rating - Needs Improvement	2
## 56	Fails to Meet Expectations	3
## 57	Significantly Exceeds Expectations	1
## 58	Meets Expectations	3
## 59	Meets Few Expectations	2
## 60	Meets Few Expectations	2
## 61	Meets Few Expectations	2
## 62	Fails to Meet Expectations	2
## 63	Exceeds Expectations	2
## 64	Meets Few Expectations	3
## 65	Exceeds Expectations	3
## 66	Significantly Exceeds Expectations	3
## 67	Meets Expectations	3
## 68	Meets Expectations	3
## 69	Meets Expectations	2
## 70	Fails to Meet Expectations	2
## 71	Exceeds Expectations	2
## 72	Meets Few Expectations	2
## 73	Meets Expectations	2
## 74	Meets Expectations	2
## 75	Meets Expectations	1
## 76	Meets Expectations	2
## 77	Exceeds Expectations	3
## 78	Meets Expectations	2
## 79	Meets Expectations	3
## 80	Meets Few Expectations	2
## 81	Meets Expectations	3
## 82	Alternate Rating - Needs Improvement	2
## 83	Fails to Meet Expectations	2
## 84	Meets Few Expectations	2

## 85	Exceeds Expectations	2
## 86	Exceeds Expectations	3
## 87	Exceeds Expectations	1
## 88	Meets Expectations	2
## 89	Meets Expectations	3
## 90	Meets Expectations	2
## 91	Meets Few Expectations	3
## 92	Meets Expectations	2
## 93	Alternate Rating - Needs Improvement	3
## 94	Exceeds Expectations	2
## 95	Meets Expectations	2
## 96	Fails to Meet Expectations	3
## 97	Meets Few Expectations	3
## 98	Meets Expectations	2
## 99	Alternate Rating - Needs Improvement	2
## 100	Meets Expectations	3
## 101	Alternate Rating - Needs Improvement	2
## 102	Meets Few Expectations	3
## 103	Exceeds Expectations	2
## 104	Exceeds Expectations	1
## 105	Meets Expectations	2
## 106	Meets Few Expectations	2
## 107	Meets Few Expectations	2
## 108	Exceeds Expectations	3
## 109	Meets Few Expectations	2
## 110	Exceeds Expectations	1
## 111	Meets Expectations	2
## 112	Meets Few Expectations	3
## 113	Fails to Meet Expectations	2
## 114	Meets Expectations	1
## 115	Exceeds Expectations	3
## 116	Fails to Meet Expectations	2
## 117	Fails to Meet Expectations	2
## 118	Exceeds Expectations	3
## 119	Meets Few Expectations	2
## 120	Exceeds Expectations	2
## 121	Meets Expectations	2
## 122	Meets Few Expectations	2
## 123	Exceeds Expectations	2
## 124	Meets Expectations	2
## 125	Meets Expectations	3
## 126	Alternate Rating - Satisfactory Progress	2
## 127	Meets Expectations	2
## 128	Fails to Meet Expectations	2
## 129	Meets Expectations	3
## 130	Meets Few Expectations	2
## 131	Meets Expectations	3
## 132	Fails to Meet Expectations	3
## 133	Meets Expectations	2
## 134	Meets Few Expectations	3
## 135	Fails to Meet Expectations	2
## 136	Fails to Meet Expectations	2
## 137	Significantly Exceeds Expectations	1
## 138	Meets Expectations	2

## 139	Exceeds Expectations	3
## 140	Meets Expectations	2
## 141	Meets Expectations	2
## 142	Meets Expectations	2
## 143	Exceeds Expectations	2
## 144	Alternate Rating - Satisfactory Progress	1
## 145	Meets Expectations	2
## 146	Significantly Exceeds Expectations	2
## 147	Meets Expectations	2
## 148	Exceeds Expectations	1
## 149	Meets Few Expectations	2
## 150	Exceeds Expectations	3
## 151	Meets Expectations	2
## 152	Exceeds Expectations	2
## 153	Meets Few Expectations	3
## 154	Meets Expectations	3
## 155	Meets Expectations	3
## 156	Meets Few Expectations	2
## 157	Meets Expectations	2
## 158	Fails to Meet Expectations	2
## 159	Fails to Meet Expectations	2
## 160	Alternate Rating - Needs Improvement	2
## 161	Fails to Meet Expectations	2
## 162	Exceeds Expectations	1
## 163	Significantly Exceeds Expectations	2
## 164	Alternate Rating - Needs Improvement	2
## 165	Fails to Meet Expectations	3
## 166	Exceeds Expectations	3
## 167	Meets Expectations	3
## 168	Meets Expectations	2
## 169	Meets Few Expectations	2
## 170	Meets Few Expectations	2
## 171	Meets Expectations	3
## 172	Meets Expectations	2
## 173	Alternate Rating - Needs Improvement	2
## 174	Fails to Meet Expectations	2
## 175	Meets Expectations	2
## 176	Alternate Rating - Needs Improvement	1
## 177	Fails to Meet Expectations	3
## 178	Alternate Rating - Satisfactory Progress	1
## 179	Meets Expectations	2
## 180	Meets Expectations	2
## 181	Meets Expectations	2
## 182	Meets Few Expectations	2
## 183	Meets Expectations	2
## 184	Meets Few Expectations	2
## 185	Alternate Rating - Satisfactory Progress	2
## 186	Meets Expectations	3
## 187	Meets Expectations	1
## 188	Meets Expectations	3
## 189	Alternate Rating - Needs Improvement	2
## 190	Meets Few Expectations	2
## 191	Exceeds Expectations	3
## 192	Meets Expectations	2

## 193	Meets Expectations	3
## 194	Exceeds Expectations	1
## 195	Fails to Meet Expectations	2
## 196	Fails to Meet Expectations	2
## 197	Meets Expectations	3
## 198	Meets Few Expectations	2
## 199	Meets Few Expectations	2
## 200	Exceeds Expectations	2
## 201	Meets Expectations	2
## 202	Meets Few Expectations	1
## 203	Exceeds Expectations	1
## 204	Significantly Exceeds Expectations	2
## 205	Significantly Exceeds Expectations	3
## 206	Exceeds Expectations	2
## 207	Exceeds Expectations	2
## 208	Meets Expectations	2
## 209	Exceeds Expectations	3
## 210	Exceeds Expectations	3
## 211	Meets Expectations	2
## 212	Alternate Rating - Satisfactory Progress	2
## 213	Exceeds Expectations	2
## 214	Meets Expectations	3
## 215	Exceeds Expectations	3
## 216	Significantly Exceeds Expectations	2
## 217	Exceeds Expectations	3
## 218	Alternate Rating - Satisfactory Progress	2
## 219	Significantly Exceeds Expectations	3
## 220	Meets Expectations	3
## 221	Meets Few Expectations	2
## 222	Significantly Exceeds Expectations	1
## 223	Exceeds Expectations	3
## 224	Meets Expectations	3
## 225	Exceeds Expectations	3
## 226	Significantly Exceeds Expectations	1
## 227	Significantly Exceeds Expectations	3
## 228	Meets Expectations	3
## 229	Exceeds Expectations	1
## 230	Significantly Exceeds Expectations	2
## 231	Meets Expectations	2
## 232	Exceeds Expectations	3
## 233	Meets Expectations	1
## 234	Meets Expectations	2
## 235	Exceeds Expectations	2
## 236	Exceeds Expectations	3
## 237	Exceeds Expectations	3
## 238	Exceeds Expectations	1
## 239	Significantly Exceeds Expectations	1
## 240	NR-DATA	1
## 241	Significantly Exceeds Expectations	1
## 242	Significantly Exceeds Expectations	2
## 243	Fails to Meet Expectations	3
## 244	Exceeds Expectations	3
## 245	Meets Expectations	3
## 246	Meets Expectations	2



##	247	Fails to Meet Expectations	1
##	248	Fails to Meet Expectations	3
##	249	NR-DATA	1
##	250	NR-DATA	1
##	251	NR-DATA	3
##	252	Meets Expectations	3
##	253	Meets Expectations	3
##	254	Exceeds Expectations	2
##	255	Exceeds Expectations	1
##	256	Exceeds Expectations	1
##	257	Significantly Exceeds Expectations	1
##	258	Exceeds Expectations	1

