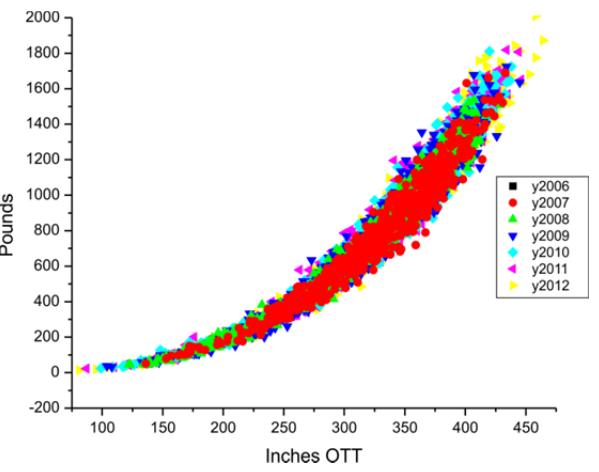
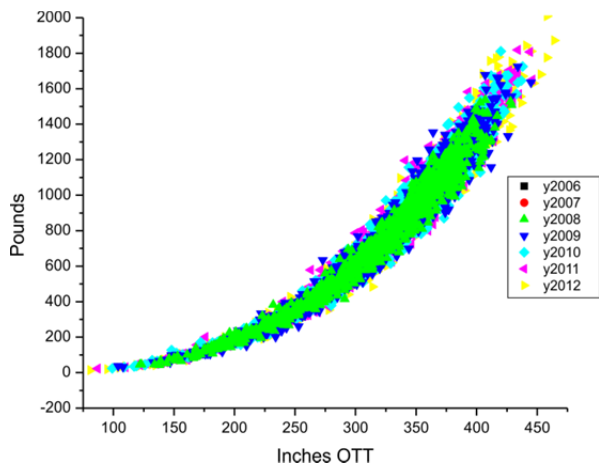
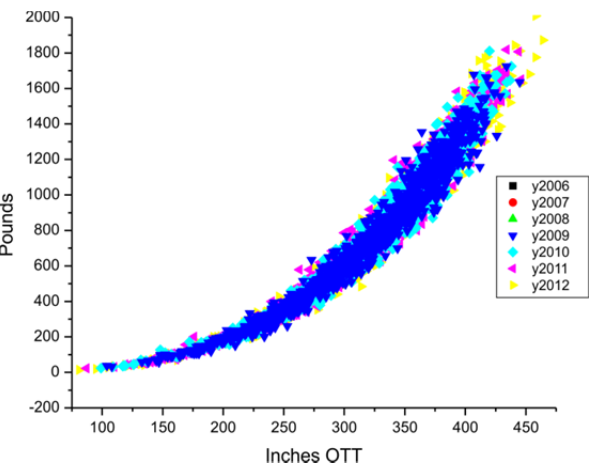
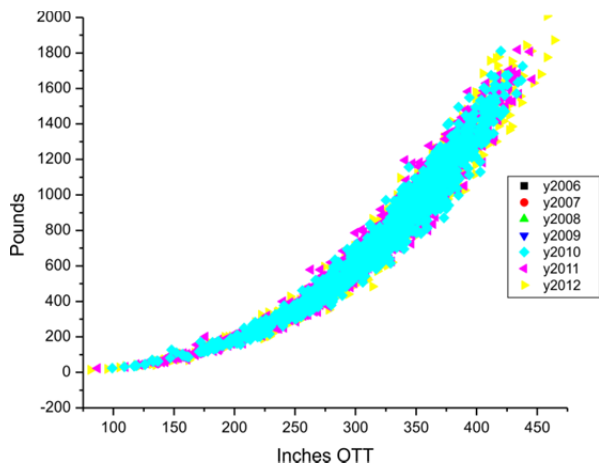
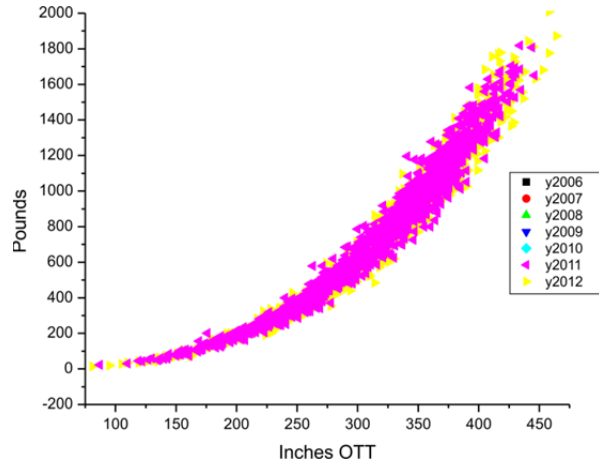
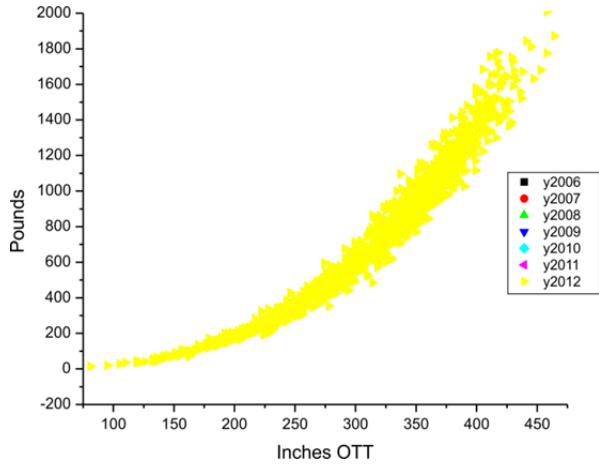


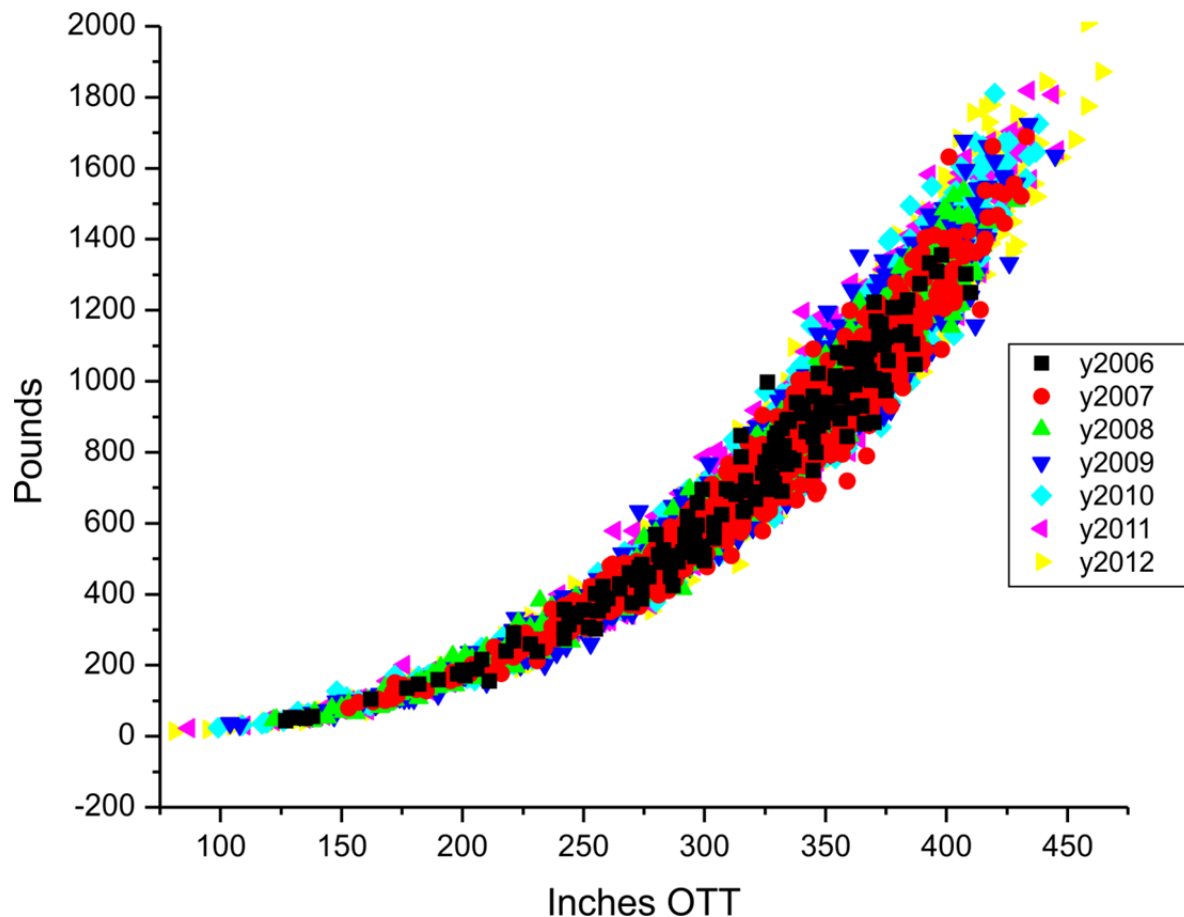
Team-Pumpkin 2013 Enhanced OTT Table for Estimating Pumpkin Weights

Many growers in recent years have voiced the complaint that too many pumpkins seem to be 'lite to the chart'. This has been especially noticeable at the upper range of the available charts. It appears the form of the equation for the recent charts has changed from earlier years. A better chart is needed so I decided it would be a fine winter project to produce one for Team-Pumpkin.

There are a number of issues that contribute to the problem of finding the best fit which will allow extrapolation beyond the sample data with confidence. An inherent problem of the data is the index we use to evaluate the weight is itself a sum of other measurements. Each of these is done by an array of growers. While they try to follow guidelines for measuring, the shape of the pumpkins can be challenging to get consistent measurements. If you have 3 people measure a pumpkin it is most likely they will all get slightly different values. This adds to the problem of finding a curve fit to the data due to scatter. With more scatter a larger sample population is required to get the fit.

How large does the sample population need to be and which samples to use is a question. It has been suggested our pumpkin genetics have changed over the years so we need to use current genetic data for the sample so it will represent our current pumpkins. It's a reasonable question and something to consider. The integrity of the data itself was addressed by using only data from sanctioned weigh offs as recorded by BigPumpkins.com. With most data sets of this type there are data entry errors and anomalies. I began with a large scatter plot of pumpkins from 2006 through 2012. After removing obvious errors and extreme outliers there are approximately 6500 pumpkins. Once the data was purged of these points I proceeded to run the analysis to find the best curve fit for each year's data. If the genetics are changing we should see a progressive change in the equations that fit the various sample populations. The best fit equation form was always the same. There was no progressive change in the plotted equations as they vary with each year's sample population. Our pumpkins are getting bigger but the relationship of OTT to Weight has not changed. This is easily shown in the following scatter plots. I begin with the most recent (2012) and overlay each preceding year. Each preceding year fits neatly within the previous year's population.





Pumpkin shape is always a question. Long ones vs. wide ones or simply more normal ones. I wanted to know if the shape of the pumpkins would alter the curve fits. As you know most pumpkins are almost equal in OTT from end to end vs. side to side. I looked at the ratio ee/ss as an indicator of shape. I arbitrarily defined normal pumpkins as having this ratio equal to the mean plus or minus 1 standard deviation. This permitted me to separate pumpkins into long, normal and wide. In short, long pumpkins have a fit almost exactly the same as normal pumpkins. Wide pumpkins have a slightly different equation. The wide equation is not an especially good fit because the number of samples is too small. By my definition the 2009 Wallace was a 'wide' pumpkin which was confirmed by asking an experienced grower who has seen it first hand to describe whether he thought it was 'normal', 'long' or 'wide'. The reply was 'high' but if he had to choose from my groups then it would be wide. The estimate for that pumpkin using the equation for wide pumpkins was especially bad. In the future perhaps I will have enough wide pumpkins to re-evaluate that group. It's interesting to note that when the long and wide pumpkins are removed from the sample population the fit for normal pumpkins becomes unreliable. I have not yet looked to see if there is a relationship between the weights of the pumpkins and their shape. Are the biggest pumpkins longer or wider etc.? Pumpkin

height would be an interesting parameter to look at but I couldn't find a way to look at that from the existing data.

I used the equation fit for each year's data to estimate the weights for all the years. The sum of the errors of the estimates (% heavy or lite) should be zero in a perfect fit. The sums of the errors are better with some equations than others but never as good as when all the data was used.

The Standard Team-Pumpkin Table when used to estimate all of the pumpkins from 2006 to 2012 yields

Sum of the errors = **0.05%**

When used to estimate only 2012 pumpkins yields

Sum of the errors = **0.3%**

Examples

a) WR 2009 estimates at 2021.1

b) The smallest pumpkin recorded in 2012 on BP weighs 2 pounds with an estimate =1.9

By comparison, the available table for use in 2012 for all pumpkins from 2006 to 2012 yields

Sum of the errors = **-0.8%**

When used to estimate only 2012 pumpkins yields

Sum of the errors = **-1.1%** (this means more pumpkins went lite)

Examples

a) WR 2009 estimates at 2045.5

b) The smallest pumpkin recorded in 2012 on BP weighs 2 pounds with an estimate =11.8

The scatter plots above show while the genetics may be changing the population is the same only we are growing bigger pumpkins giving us more data points in the higher range. The increase in sample size with better distribution yields a better fit for use in the standard table. In spite of that the curve fit could be better. The Team-Pumpkin Standard table is an improvement over the existing table but is not created from the equation that is more likely to fit the population. It is more likely the curve should become sigmoidal. There are suggestions in the sample population that this may be starting but there simply are not enough data points at the higher end. In fact when the data is fit to a sigmoidal equation form the fit is poor. The current table is a compromise between what should be and what works.

We use the estimate for two reasons. First is to provide an estimate of how the pumpkin is growing during the season. Later we use the estimate to give insight into which pumpkin seeds to plant based on their relationship to the normal curve. We all want to grow the ones that are heavier for their size. The percent heavy or lite has influence so the better the estimate for all pumpkins the better it will be to tease out the ones that are truly heavier than the rest for their size. So what is heavy to the chart? With as much scatter as we have in the data it's difficult to be precise which leads us to the Team-Pumpkin Enhanced Table. For a pumpkin to be truly heavier for its size it needs to be above the range of the table error. The scatter in pounds increases as the pumpkins get heavier. When calculating % heavy you need to consider the number of pounds above the range of error. For example, if the OTT has an error of plus or minus 50 pounds then a pumpkin that is 49 pounds heavier than the standard chart will be ZERO percent heavy. This is the basis for the enhanced chart. The error range in the chart is a compromise from the statistical error range which growers wouldn't like but it's a fair evaluation and a starting place. If used for 2012 pumpkins many more would be 'to the chart' and others would have significantly smaller heavy or lite %. (nobody likes lite pumpkins except you competition when it's yours).

Even with the enhanced chart method you should use caution when interpreting you pumpkin based on the highest ranges (gray background). Extrapolation is risky and there is suggestion the form of the curve/equation may change with new data.

Team-Pumpkin, 2013 Standard OTT Chart for Estimating Pumpkin Weights

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| Inches | Pounds | Inches | Pounds | Inches | Pounds | Inches | Pounds | Inches | Pounds | Inches | Pounds | Inches | Pounds | Inches | Pounds | Inches | Pounds | Inches | Pounds | Inches | Pounds |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 100 | 25 | 136 | 60 | 172 | 119 | 208 | 206 | 244 | 326 | 280 | 486 | 316 | 690 | 352 | 943 | 388 | 1250 | 424 | 1617 | 460 | 2047 |
| 101 | 25 | 137 | 61 | 173 | 121 | 209 | 208 | 245 | 330 | 281 | 491 | 317 | 696 | 353 | 951 | 389 | 1260 | 425 | 1628 | 461 | 2060 |
| 102 | 26 | 138 | 63 | 174 | 123 | 210 | 211 | 246 | 334 | 282 | 496 | 318 | 703 | 354 | 959 | 390 | 1269 | 426 | 1639 | 462 | 2073 |
| 103 | 27 | 139 | 64 | 175 | 125 | 211 | 214 | 247 | 338 | 283 | 501 | 319 | 709 | 355 | 967 | 391 | 1278 | 427 | 1650 | 463 | 2086 |
| 104 | 28 | 140 | 65 | 176 | 127 | 212 | 217 | 248 | 342 | 284 | 507 | 320 | 716 | 356 | 974 | 392 | 1288 | 428 | 1661 | 464 | 2099 |
| 105 | 28 | 141 | 67 | 177 | 129 | 213 | 220 | 249 | 346 | 285 | 512 | 321 | 722 | 357 | 982 | 393 | 1297 | 429 | 1672 | 465 | 2112 |
| 106 | 29 | 142 | 68 | 178 | 131 | 214 | 223 | 250 | 350 | 286 | 517 | 322 | 729 | 358 | 990 | 394 | 1307 | 430 | 1684 | 466 | 2125 |
| 107 | 30 | 143 | 69 | 179 | 133 | 215 | 226 | 251 | 354 | 287 | 522 | 323 | 735 | 359 | 998 | 395 | 1317 | 431 | 1695 | 467 | 2138 |
| 108 | 31 | 144 | 71 | 180 | 135 | 216 | 229 | 252 | 358 | 288 | 527 | 324 | 742 | 360 | 1006 | 396 | 1326 | 432 | 1706 | 468 | 2152 |
| 109 | 32 | 145 | 72 | 181 | 137 | 217 | 232 | 253 | 362 | 289 | 533 | 325 | 748 | 361 | 1015 | 397 | 1336 | 433 | 1718 | 469 | 2165 |
| 110 | 32 | 146 | 74 | 182 | 140 | 218 | 235 | 254 | 367 | 290 | 538 | 326 | 755 | 362 | 1023 | 398 | 1346 | 434 | 1729 | 470 | 2178 |
| 111 | 33 | 147 | 75 | 183 | 142 | 219 | 239 | 255 | 371 | 291 | 544 | 327 | 762 | 363 | 1031 | 399 | 1356 | 435 | 1741 | 471 | 2192 |
| 112 | 34 | 148 | 77 | 184 | 144 | 220 | 242 | 256 | 375 | 292 | 549 | 328 | 769 | 364 | 1039 | 400 | 1366 | 436 | 1753 | 472 | 2205 |
| 113 | 35 | 149 | 78 | 185 | 146 | 221 | 245 | 257 | 379 | 293 | 554 | 329 | 775 | 365 | 1047 | 401 | 1375 | 437 | 1764 | 473 | 2219 |
| 114 | 36 | 150 | 80 | 186 | 149 | 222 | 248 | 258 | 384 | 294 | 560 | 330 | 782 | 366 | 1056 | 402 | 1385 | 438 | 1776 | 474 | 2232 |
| 115 | 37 | 151 | 81 | 187 | 151 | 223 | 251 | 259 | 388 | 295 | 565 | 331 | 789 | 367 | 1064 | 403 | 1395 | 439 | 1788 | 475 | 2246 |
| 116 | 38 | 152 | 83 | 188 | 153 | 224 | 255 | 260 | 392 | 296 | 571 | 332 | 796 | 368 | 1073 | 404 | 1405 | 440 | 1800 | 476 | 2260 |
| 117 | 39 | 153 | 84 | 189 | 156 | 225 | 258 | 261 | 397 | 297 | 577 | 333 | 803 | 369 | 1081 | 405 | 1416 | 441 | 1811 | 477 | 2274 |
| 118 | 40 | 154 | 86 | 190 | 158 | 226 | 261 | 262 | 401 | 298 | 582 | 334 | 810 | 370 | 1090 | 406 | 1426 | 442 | 1823 | 478 | 2287 |
| 119 | 41 | 155 | 88 | 191 | 161 | 227 | 265 | 263 | 405 | 299 | 588 | 335 | 817 | 371 | 1098 | 407 | 1436 | 443 | 1835 | 479 | 2301 |
| 120 | 42 | 156 | 89 | 192 | 163 | 228 | 268 | 264 | 410 | 300 | 594 | 336 | 824 | 372 | 1107 | 408 | 1446 | 444 | 1847 | 480 | 2315 |
| 121 | 43 | 157 | 91 | 193 | 166 | 229 | 272 | 265 | 414 | 301 | 599 | 337 | 831 | 373 | 1115 | 409 | 1456 | 445 | 1859 | 481 | 2329 |
| 122 | 44 | 158 | 93 | 194 | 168 | 230 | 275 | 266 | 419 | 302 | 605 | 338 | 838 | 374 | 1124 | 410 | 1467 | 446 | 1872 | 482 | 2343 |
| 123 | 45 | 159 | 94 | 195 | 171 | 231 | 279 | 267 | 424 | 303 | 611 | 339 | 846 | 375 | 1133 | 411 | 1477 | 447 | 1884 | 483 | 2357 |
| 124 | 46 | 160 | 96 | 196 | 173 | 232 | 282 | 268 | 428 | 304 | 617 | 340 | 853 | 376 | 1142 | 412 | 1488 | 448 | 1896 | 484 | 2372 |
| 125 | 47 | 161 | 98 | 197 | 176 | 233 | 286 | 269 | 433 | 305 | 623 | 341 | 860 | 377 | 1150 | 413 | 1498 | 449 | 1908 | 485 | 2386 |
| 126 | 48 | 162 | 100 | 198 | 178 | 234 | 289 | 270 | 438 | 306 | 629 | 342 | 868 | 378 | 1159 | 414 | 1509 | 450 | 1921 | 486 | 2400 |
| 127 | 49 | 163 | 101 | 199 | 181 | 235 | 293 | 271 | 442 | 307 | 635 | 343 | 875 | 379 | 1168 | 415 | 1519 | 451 | 1933 | 487 | 2414 |
| 128 | 50 | 164 | 103 | 200 | 183 | 236 | 296 | 272 | 447 | 308 | 641 | 344 | 882 | 380 | 1177 | 416 | 1530 | 452 | 1945 | 488 | 2429 |
| 129 | 52 | 165 | 105 | 201 | 186 | 237 | 300 | 273 | 452 | 309 | 647 | 345 | 890 | 381 | 1186 | 417 | 1540 | 453 | 1958 | 489 | 2443 |
| 130 | 53 | 166 | 107 | 202 | 189 | 238 | 304 | 274 | 457 | 310 | 653 | 346 | 897 | 382 | 1195 | 418 | 1551 | 454 | 1970 | 490 | 2458 |
| 131 | 54 | 167 | 109 | 203 | 192 | 239 | 307 | 275 | 461 | 311 | 659 | 347 | 905 | 383 | 1204 | 419 | 1562 | 455 | 1983 | 491 | 2472 |
| 132 | 55 | 168 | 111 | 204 | 194 | 240 | 311 | 276 | 466 | 312 | 665 | 348 | 912 | 384 | 1213 | 420 | 1573 | 456 | 1996 | 492 | 2487 |
| 133 | 56 | 169 | 113 | 205 | 197 | 241 | 315 | 277 | 471 | 313 | 671 | 349 | 920 | 385 | 1222 | 421 | 1584 | 457 | 2008 | 493 | 2501 |
| 134 | 58 | 170 | 115 | 206 | 200 | 242 | 319 | 278 | 476 | 314 | 677 | 350 | 928 | 386 | 1232 | 422 | 1595 | 458 | 2021 | 494 | 2516 |
| 135 | 59 | 171 | 117 | 207 | 203 | 243 | 322 | 279 | 481 | 315 | 684 | 351 | 935 | 387 | 1241 | 423 | 1606 | 459 | 2034 | 495 | 2531 |

Team-Pumpkin, 2013 Enhanced OTT Chart for Estimating Pumpkin Weights

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| Inches | EST | Inches | EST | Inches | EST | Inches | EST | Inches | EST | Inches | EST |
|--------|---------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|
| 100 | 22 - 26 | 135 | 53 - 63 | 170 | 104 - 124 | 205 | 179 - 214 | 240 | 284 - 338 | 275 | 421 - 501 |
| 101 | 23 - 27 | 136 | 54 - 65 | 171 | 106 - 126 | 206 | 182 - 217 | 241 | 287 - 342 | 276 | 425 - 506 |
| 102 | 23 - 28 | 137 | 56 - 66 | 172 | 108 - 128 | 207 | 185 - 220 | 242 | 290 - 346 | 277 | 430 - 512 |
| 103 | 24 - 29 | 138 | 57 - 68 | 173 | 110 - 131 | 208 | 187 - 223 | 243 | 294 - 350 | 278 | 434 - 517 |
| 104 | 25 - 30 | 139 | 58 - 69 | 174 | 111 - 133 | 209 | 190 - 226 | 244 | 297 - 354 | 279 | 439 - 522 |
| 105 | 25 - 30 | 140 | 59 - 71 | 175 | 113 - 135 | 210 | 192 - 229 | 245 | 301 - 358 | 280 | 443 - 528 |
| 106 | 26 - 31 | 141 | 60 - 72 | 176 | 115 - 137 | 211 | 195 - 232 | 246 | 305 - 363 | 281 | 448 - 533 |
| 107 | 27 - 32 | 142 | 62 - 73 | 177 | 117 - 140 | 212 | 198 - 236 | 247 | 308 - 367 | 282 | 453 - 539 |
| 108 | 28 - 33 | 143 | 63 - 75 | 178 | 119 - 142 | 213 | 201 - 239 | 248 | 312 - 371 | 283 | 457 - 544 |
| 109 | 28 - 34 | 144 | 64 - 77 | 179 | 121 - 144 | 214 | 203 - 242 | 249 | 315 - 376 | 284 | 462 - 550 |
| 110 | 29 - 35 | 145 | 66 - 78 | 180 | 123 - 147 | 215 | 206 - 245 | 250 | 319 - 380 | 285 | 467 - 556 |
| 111 | 30 - 36 | 146 | 67 - 80 | 181 | 125 - 149 | 216 | 209 - 249 | 251 | 323 - 385 | 286 | 471 - 561 |
| 112 | 31 - 37 | 147 | 68 - 81 | 182 | 127 - 151 | 217 | 212 - 252 | 252 | 327 - 389 | 287 | 476 - 567 |
| 113 | 32 - 38 | 148 | 70 - 83 | 183 | 129 - 154 | 218 | 215 - 255 | 253 | 330 - 393 | 288 | 481 - 573 |
| 114 | 32 - 39 | 149 | 71 - 85 | 184 | 131 - 156 | 219 | 217 - 259 | 254 | 334 - 398 | 289 | 486 - 579 |
| 115 | 33 - 40 | 150 | 72 - 86 | 185 | 133 - 159 | 220 | 220 - 262 | 255 | 338 - 403 | 290 | 491 - 584 |
| 116 | 34 - 41 | 151 | 74 - 88 | 186 | 135 - 161 | 221 | 223 - 266 | 256 | 342 - 407 | 291 | 496 - 590 |
| 117 | 35 - 42 | 152 | 75 - 90 | 187 | 137 - 164 | 222 | 226 - 269 | 257 | 346 - 412 | 292 | 501 - 596 |
| 118 | 36 - 43 | 153 | 77 - 91 | 188 | 140 - 166 | 223 | 229 - 273 | 258 | 350 - 416 | 293 | 506 - 602 |
| 119 | 37 - 44 | 154 | 78 - 93 | 189 | 142 - 169 | 224 | 232 - 276 | 259 | 354 - 421 | 294 | 511 - 608 |
| 120 | 38 - 45 | 155 | 80 - 95 | 190 | 144 - 171 | 225 | 235 - 280 | 260 | 358 - 426 | 295 | 516 - 614 |
| 121 | 39 - 46 | 156 | 81 - 97 | 191 | 146 - 174 | 226 | 238 - 284 | 261 | 362 - 431 | 296 | 521 - 620 |
| 122 | 40 - 47 | 157 | 83 - 98 | 192 | 148 - 177 | 227 | 241 - 287 | 262 | 366 - 435 | 297 | 526 - 626 |
| 123 | 40 - 48 | 158 | 84 - 100 | 193 | 151 - 179 | 228 | 244 - 291 | 263 | 370 - 440 | 298 | 531 - 632 |
| 124 | 41 - 49 | 159 | 86 - 102 | 194 | 153 - 182 | 229 | 247 - 295 | 264 | 374 - 445 | 299 | 536 - 639 |
| 125 | 42 - 51 | 160 | 87 - 104 | 195 | 155 - 185 | 230 | 251 - 298 | 265 | 378 - 450 | 300 | 541 - 645 |
| 126 | 43 - 52 | 161 | 89 - 106 | 196 | 158 - 188 | 231 | 254 - 302 | 266 | 382 - 455 | 301 | 547 - 651 |
| 127 | 44 - 53 | 162 | 91 - 108 | 197 | 160 - 190 | 232 | 257 - 306 | 267 | 386 - 460 | 302 | 552 - 657 |
| 128 | 46 - 54 | 163 | 92 - 110 | 198 | 162 - 193 | 233 | 260 - 310 | 268 | 390 - 465 | 303 | 557 - 664 |
| 129 | 47 - 56 | 164 | 94 - 112 | 199 | 165 - 196 | 234 | 263 - 314 | 269 | 395 - 470 | 304 | 563 - 670 |
| 130 | 48 - 57 | 165 | 95 - 114 | 200 | 167 - 199 | 235 | 267 - 318 | 270 | 399 - 475 | 305 | 568 - 676 |
| 131 | 49 - 58 | 166 | 97 - 116 | 201 | 169 - 202 | 236 | 270 - 322 | 271 | 403 - 480 | 306 | 573 - 683 |
| 132 | 50 - 59 | 167 | 99 - 118 | 202 | 172 - 205 | 237 | 273 - 326 | 272 | 408 - 485 | 307 | 579 - 689 |
| 133 | 51 - 61 | 168 | 101 - 120 | 203 | 174 - 208 | 238 | 277 - 330 | 273 | 412 - 491 | 308 | 584 - 696 |
| 134 | 52 - 62 | 169 | 102 - 122 | 204 | 177 - 211 | 239 | 280 - 334 | 274 | 416 - 496 | 309 | 590 - 702 |

Team-Pumpkin, 2013 Enhanced OTT Chart for Estimating Pumpkin Weights

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| Inches | EST | Inches | EST | Inches | EST | Inches | EST | Inches | EST | Inches | EST |
|--------|-----------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|
| 310 | 595 - 709 | 345 | 812 - 967 | 380 | 1074 - 1279 | 415 | 1386 - 1651 | 450 | 1753 - 2087 | 485 | 2178 - 2593 |
| 311 | 601 - 716 | 346 | 819 - 975 | 381 | 1082 - 1289 | 416 | 1396 - 1662 | 451 | 1764 - 2101 | 486 | 2191 - 2608 |
| 312 | 607 - 722 | 347 | 826 - 983 | 382 | 1091 - 1299 | 417 | 1406 - 1674 | 452 | 1776 - 2114 | 487 | 2204 - 2624 |
| 313 | 612 - 729 | 348 | 832 - 991 | 383 | 1099 - 1308 | 418 | 1416 - 1686 | 453 | 1787 - 2128 | 488 | 2217 - 2640 |
| 314 | 618 - 736 | 349 | 839 - 1000 | 384 | 1107 - 1318 | 419 | 1426 - 1697 | 454 | 1798 - 2141 | 489 | 2230 - 2655 |
| 315 | 624 - 743 | 350 | 846 - 1008 | 385 | 1116 - 1328 | 420 | 1435 - 1709 | 455 | 1810 - 2155 | 490 | 2243 - 2671 |
| 316 | 629 - 750 | 351 | 853 - 1016 | 386 | 1124 - 1338 | 421 | 1445 - 1721 | 456 | 1822 - 2169 | 491 | 2257 - 2687 |
| 317 | 635 - 756 | 352 | 861 - 1025 | 387 | 1132 - 1348 | 422 | 1455 - 1733 | 457 | 1833 - 2183 | 492 | 2270 - 2703 |
| 318 | 641 - 763 | 353 | 868 - 1033 | 388 | 1141 - 1359 | 423 | 1465 - 1745 | 458 | 1845 - 2196 | 493 | 2283 - 2719 |
| 319 | 647 - 770 | 354 | 875 - 1042 | 389 | 1150 - 1369 | 424 | 1475 - 1757 | 459 | 1856 - 2210 | 494 | 2297 - 2735 |
| 320 | 653 - 777 | 355 | 882 - 1050 | 390 | 1158 - 1379 | 425 | 1485 - 1769 | 460 | 1868 - 2224 | 495 | 2310 - 2751 |
| 321 | 659 - 784 | 356 | 889 - 1059 | 391 | 1167 - 1389 | 426 | 1496 - 1781 | 461 | 1880 - 2238 | 496 | 2324 - 2767 |
| 322 | 665 - 792 | 357 | 896 - 1067 | 392 | 1175 - 1399 | 427 | 1506 - 1793 | 462 | 1892 - 2252 | 497 | 2337 - 2783 |
| 323 | 671 - 799 | 358 | 904 - 1076 | 393 | 1184 - 1410 | 428 | 1516 - 1805 | 463 | 1904 - 2267 | 498 | 2351 - 2799 |
| 324 | 677 - 806 | 359 | 911 - 1085 | 394 | 1193 - 1420 | 429 | 1526 - 1817 | 464 | 1916 - 2281 | 499 | 2365 - 2816 |
| 325 | 683 - 813 | 360 | 918 - 1094 | 395 | 1202 - 1431 | 430 | 1537 - 1830 | 465 | 1928 - 2295 | 500 | 2379 - 2832 |
| 326 | 689 - 820 | 361 | 926 - 1102 | 396 | 1210 - 1441 | 431 | 1547 - 1842 | 466 | 1940 - 2309 | | |
| 327 | 695 - 828 | 362 | 933 - 1111 | 397 | 1219 - 1452 | 432 | 1557 - 1854 | 467 | 1952 - 2324 | | |
| 328 | 701 - 835 | 363 | 941 - 1120 | 398 | 1228 - 1462 | 433 | 1568 - 1867 | 468 | 1964 - 2338 | | |
| 329 | 708 - 842 | 364 | 948 - 1129 | 399 | 1237 - 1473 | 434 | 1578 - 1879 | 469 | 1976 - 2353 | | |
| 330 | 714 - 850 | 365 | 956 - 1138 | 400 | 1246 - 1484 | 435 | 1589 - 1892 | 470 | 1988 - 2367 | | |
| 331 | 720 - 857 | 366 | 963 - 1147 | 401 | 1255 - 1495 | 436 | 1600 - 1905 | 471 | 2001 - 2382 | | |
| 332 | 726 - 865 | 367 | 971 - 1156 | 402 | 1264 - 1505 | 437 | 1610 - 1917 | 472 | 2013 - 2397 | | |
| 333 | 733 - 872 | 368 | 979 - 1165 | 403 | 1274 - 1516 | 438 | 1621 - 1930 | 473 | 2025 - 2411 | | |
| 334 | 739 - 880 | 369 | 987 - 1175 | 404 | 1283 - 1527 | 439 | 1632 - 1943 | 474 | 2038 - 2426 | | |
| 335 | 746 - 888 | 370 | 994 - 1184 | 405 | 1292 - 1538 | 440 | 1642 - 1956 | 475 | 2050 - 2441 | | |
| 336 | 752 - 895 | 371 | 1002 - 1193 | 406 | 1301 - 1549 | 441 | 1653 - 1969 | 476 | 2063 - 2456 | | |
| 337 | 759 - 903 | 372 | 1010 - 1203 | 407 | 1310 - 1560 | 442 | 1664 - 1981 | 477 | 2075 - 2471 | | |
| 338 | 765 - 911 | 373 | 1018 - 1212 | 408 | 1320 - 1571 | 443 | 1675 - 1994 | 478 | 2088 - 2486 | | |
| 339 | 772 - 919 | 374 | 1026 - 1221 | 409 | 1329 - 1583 | 444 | 1686 - 2008 | 479 | 2101 - 2501 | | |
| 340 | 778 - 927 | 375 | 1034 - 1231 | 410 | 1339 - 1594 | 445 | 1697 - 2021 | 480 | 2113 - 2516 | | |
| 341 | 785 - 935 | 376 | 1042 - 1240 | 411 | 1348 - 1605 | 446 | 1708 - 2034 | 481 | 2126 - 2531 | | |
| 342 | 792 - 943 | 377 | 1050 - 1250 | 412 | 1358 - 1616 | 447 | 1719 - 2047 | 482 | 2139 - 2547 | | |
| 343 | 798 - 951 | 378 | 1058 - 1260 | 413 | 1367 - 1628 | 448 | 1730 - 2060 | 483 | 2152 - 2562 | | |
| 344 | 805 - 959 | 379 | 1066 - 1269 | 414 | 1377 - 1639 | 449 | 1742 - 2074 | 484 | 2165 - 2577 | | |

