

Summary of How-To Recreate this Research by Jamie Lutz

- **Traditional Unit:** Assign pre-test before the unit begins. Pre-test should be written in the same style and format as the post-test. The numbers can be different. Once the traditional unit is complete, assign the post-test in the same style and format as the pre-test.

Use a spreadsheet to find the average and standard deviation, then calculate the Effect Size as shown below in Table 1 from my full research paper. An Effect Size of 0.40 or greater over one years' time is the goal. Note that this research was done over a few months, if it was done over a longer time period you would expect a lower effect size.

Table 1

Cycle One Traditional Assessment Results

	January Pretest	March Posttest
Average of four classes	17.8% = AVERAGE(B5:B107)	87.6% = AVERAGE(B5:B107)
Spread (Standard Deviation)	10.0% = STDEV(B5:B107)	17.1% = STDEV(B5:B107)
Average Spread		13.55% = (10.0 + 17.1)/2
Effect Size		5.15 = (87.6 – 17.8)/13.55

Note. Excel was used to calculate the average and the standard deviation for each assessment using the formulas as shown where student scores for each assessment were in column B, rows 5 through 107.

- **Real-World Unit:**
 - **Pre-Unit:** Assign pre-test before the unit begins. Pre-test should be written in the same style and format as the post-test. The numbers can be different. Assign a pre-unit survey to determine student attitudes around applying real-world problems to mathematics.
 - **During the Unit:** Gradually incorporate real-world problems mixed with traditional lessons. Toward the end of the unit, I also assigned an all real-world assignment and had students create their own real-world problem (see [Lessons Link](#) for copies of both of these lessons). The create your own real-world problem lesson was used to measure students' Depth of Knowledge (DOK) around applying real-world problems to mathematics.
 - **Post-Unit:** Once the traditional unit is complete, assign the post-test in the same style and format as the pre-test. Use a spreadsheet to find the effect size in the same manner as it was found during the traditional unit. Assign the same survey to determine student attitudes around applying real-world problems to mathematics. Use a spreadsheet to determine the average for each survey question pre and post-unit.

*See full paper Appendices for copies of pre-tests and post-tests used along with the Depth of Knowledge assignment and the Survey used for this research.

*Note that this research was originally done during COVID-19 and all assignments and assessments were virtual. This led to a greater potential for cheating and inaccurate results.

