

Bridging the Gap Between Math and Science: Does the use of simple math instruction tools produce student growth in a physical science class?

Background:

Grand Valley High School is a traditional public high school located in Western Colorado. It was observed that students struggle with making cross curricular connections between physical science and mathematics. The purpose of this study is to examine how effective simple math instruction tools help students understand higher level science concepts.

Conceptual Framework:

- Students struggle with the application of math skills in science class; in return, this inhibits the formation of critical thinking and higher-level science learning. (Zapalska, McCarty, Young-McLean, & White, 2018)
- Real world problems are messy and combine all the facets of education students receive in our classrooms. (Roth, 1992)
- As new career possibilities open in the future being competent in math and science is incredibly important for professionals to find success. (Byers-Winston & Fouad, 2008)

How does the implementation of simple math instruction tools help students in the science classroom understand higher –level science concepts?

Research Sub-question 1:
How does the review of math skills help improve the understanding of the new science concept?

Research Sub-question 2:
How does the scaffolding of complex science concepts help improve the understanding of the concepts?

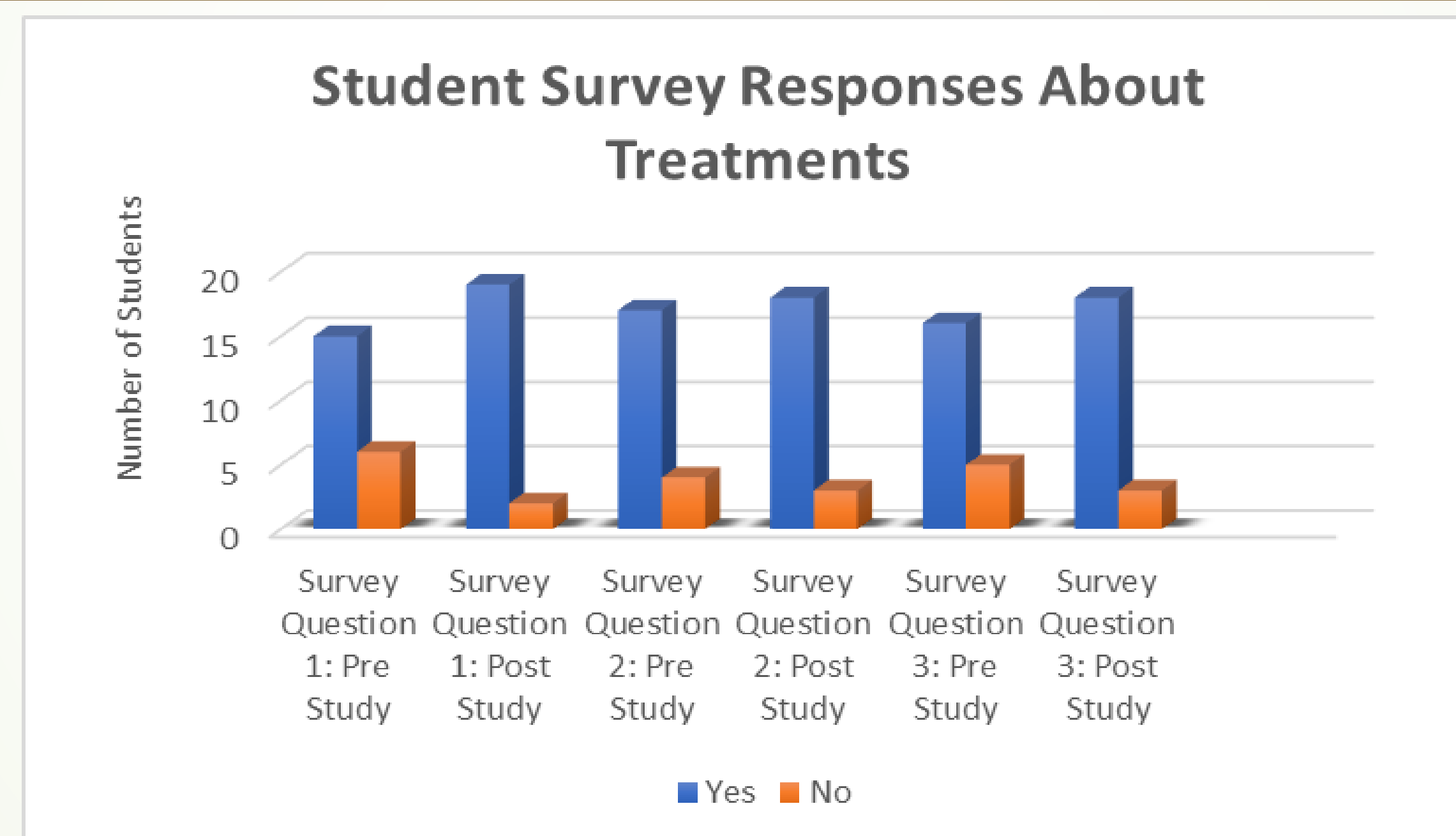
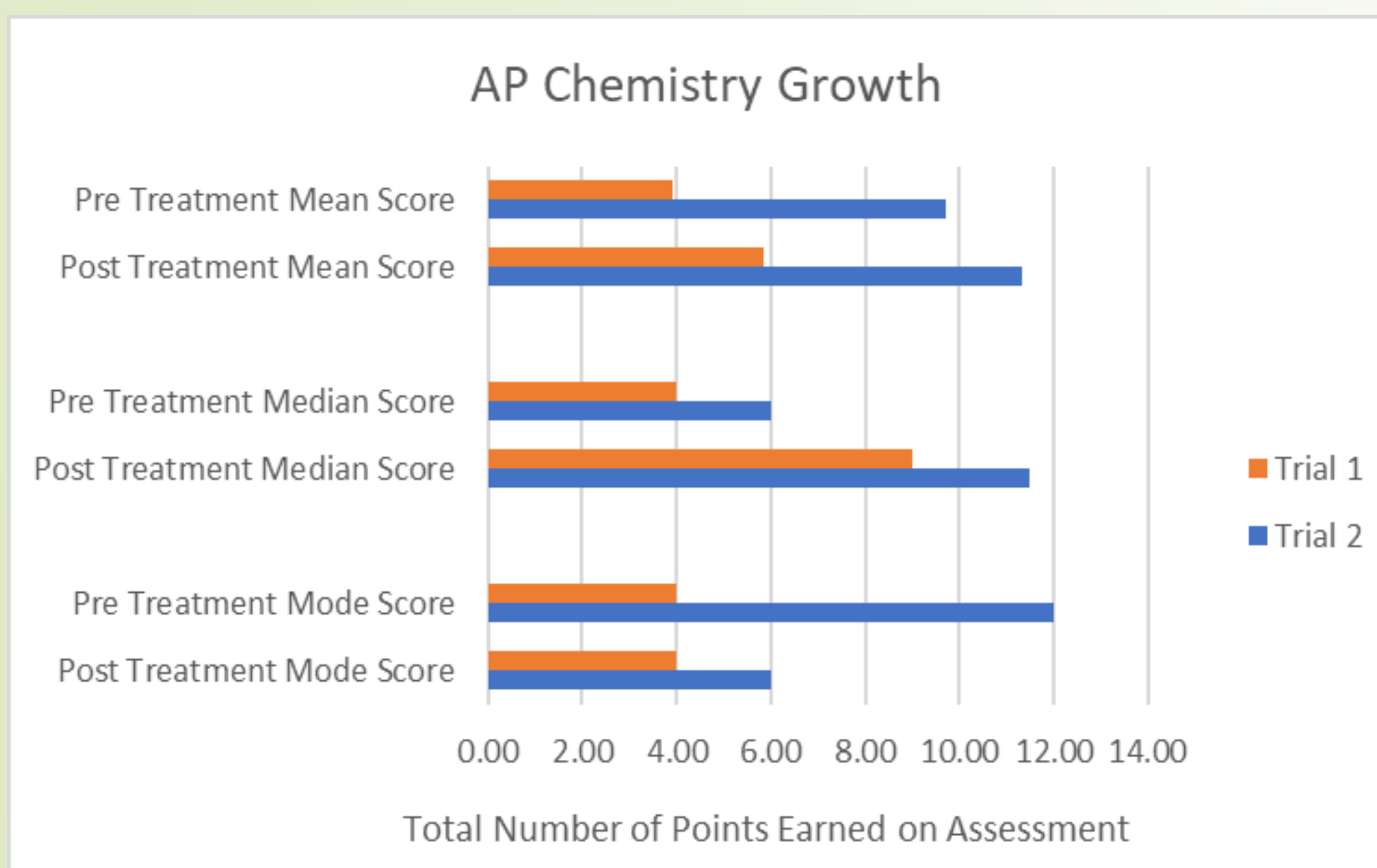
Research Sub-question 3:
How does the implementation of a mathematical graphic organizer help students find connections between math and science?

Methodology:

- Twenty-one physical science students from an AP Chemistry and AP Physics 1 classes were given three simple math instruction tools during two trials.
- Before and after the study students were given surveys about their views on math, science, and if they would find the simple math tools helpful with their learning
- Pre and post assessment data was collected to see if there was any growth during the study.

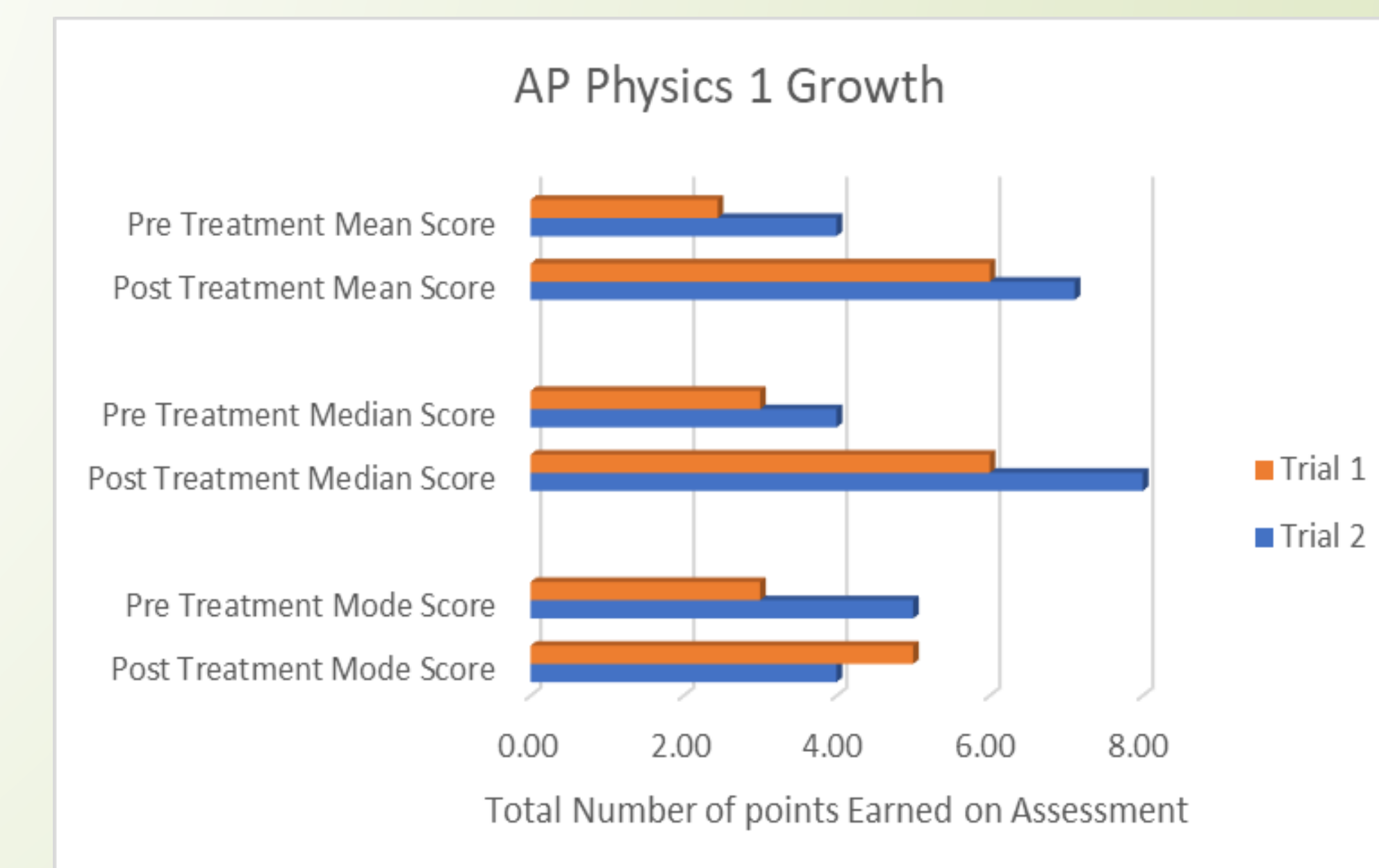
Data and Analysis:

- There was a 5-point gain in AP Chemistry assessment scores, and 3-point gain for AP Physics 1 assessment scores.
- Student responses to treatment were overall positive.
- 90% of students responded favorably to math warm-ups post treatment.
- 86% of students felt the scaffolding of math with complex science problems were helpful
- 86% of students felt that graphic organizers were helpful in their learning.



Results:

- Post assessment scores did show growth in physical science classes.
- Most students felt that the treatments were helpful with their learning.
- Using math warm-ups at the start of class benefitted all students of all math abilities.



Works Cited:

Byers-Winston, A. M., & Fouad, N. (2008). Math and Science Social Cognitive Variables in College Students. *Journal of Career Assessment*, 425-440.

Roth, W.-M. (1992). Bridging the gap between school and real life: toward an integration of science, mathematics, and technology in the context of authentic practice. *School of Science and Mathematics*, 307-318

Zapalska, A., McCarty, M., Young-McLean, K., & White, J. (2018). Design of Assignments Using 21st Century Bloom's Revised Taxonomy Model for Development of Critical Thinking Skills. *Problems and Perspectives in Management*, 291-305.



Irene Doyle

Grand Valley High School
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Parachute, Colorado

