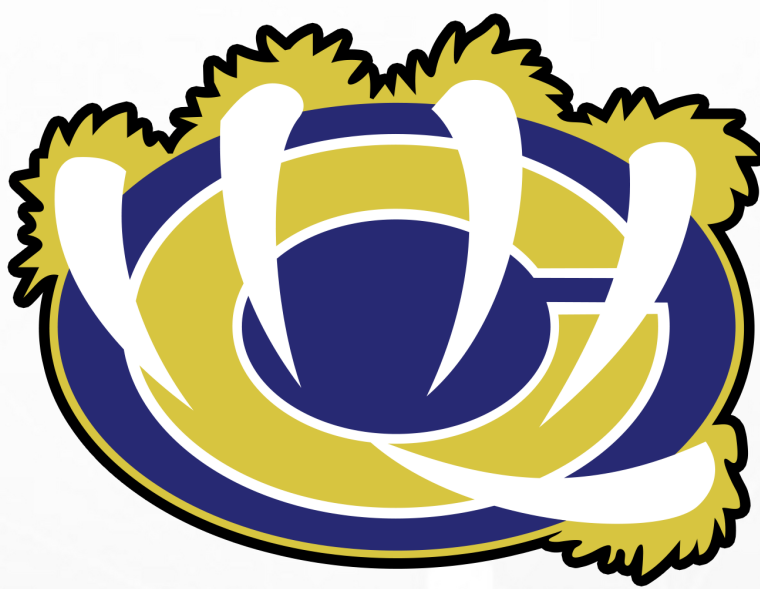




Ashley Myers, July 2023

Use of Pre-existing Data from William Chrisman High School in Independence, MO

FOCUS QUESTION

What is the effectiveness of implementing pre- and post-test data usage to enhance a science teachers' lesson planning?

METHODOLOGY

This investigation took place at a Title I school with a variety of socioeconomic students. This study used four Earth Science classrooms that included a mix of sophomores to seniors.

For this research, I analyzed five units of pre- and post-test data of student scores, question scores, and Missouri learning standards scoring. Based on this data, I chose specific formative assessments to better guide my lesson planning for the unit of study. For example, I focused on questions associated with Missouri standards ESS1.A.1 & ESS1.B.1 and chose assessments to help the students learn the concepts (Figure 3 & 4).

DATA ANALYSIS

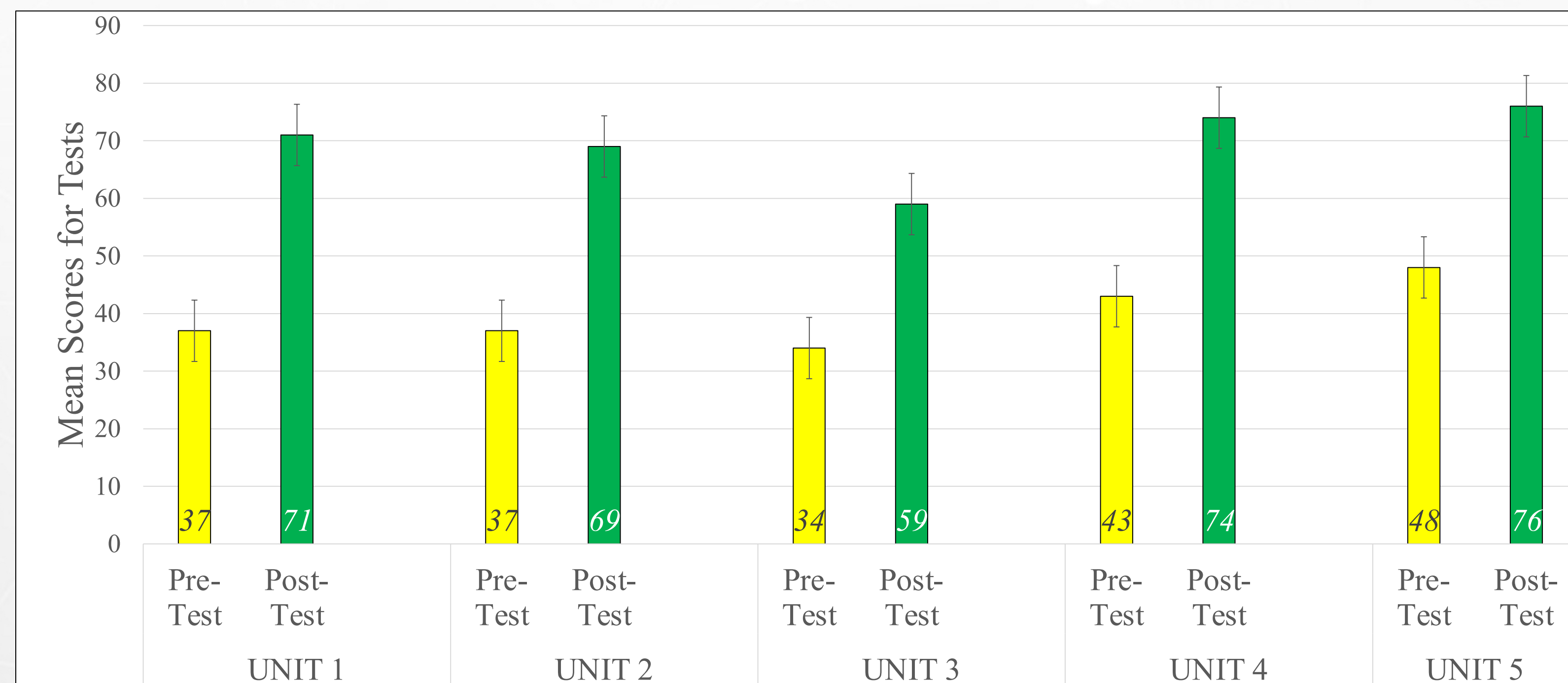


Figure 1. Mean score differences between all five-unit tests, ($N=68$ for Unit 1, $N=46$ for Unit 2, $N=38$ for Unit 3, $N=21$ for Unit 4, and $N=25$ for Unit 5). Note. Unit 1 Astronomy, Unit 2 Earth's History, Unit 3 Plate Tectonics, Unit 4 Geology, and Unit 5 Meteorology.

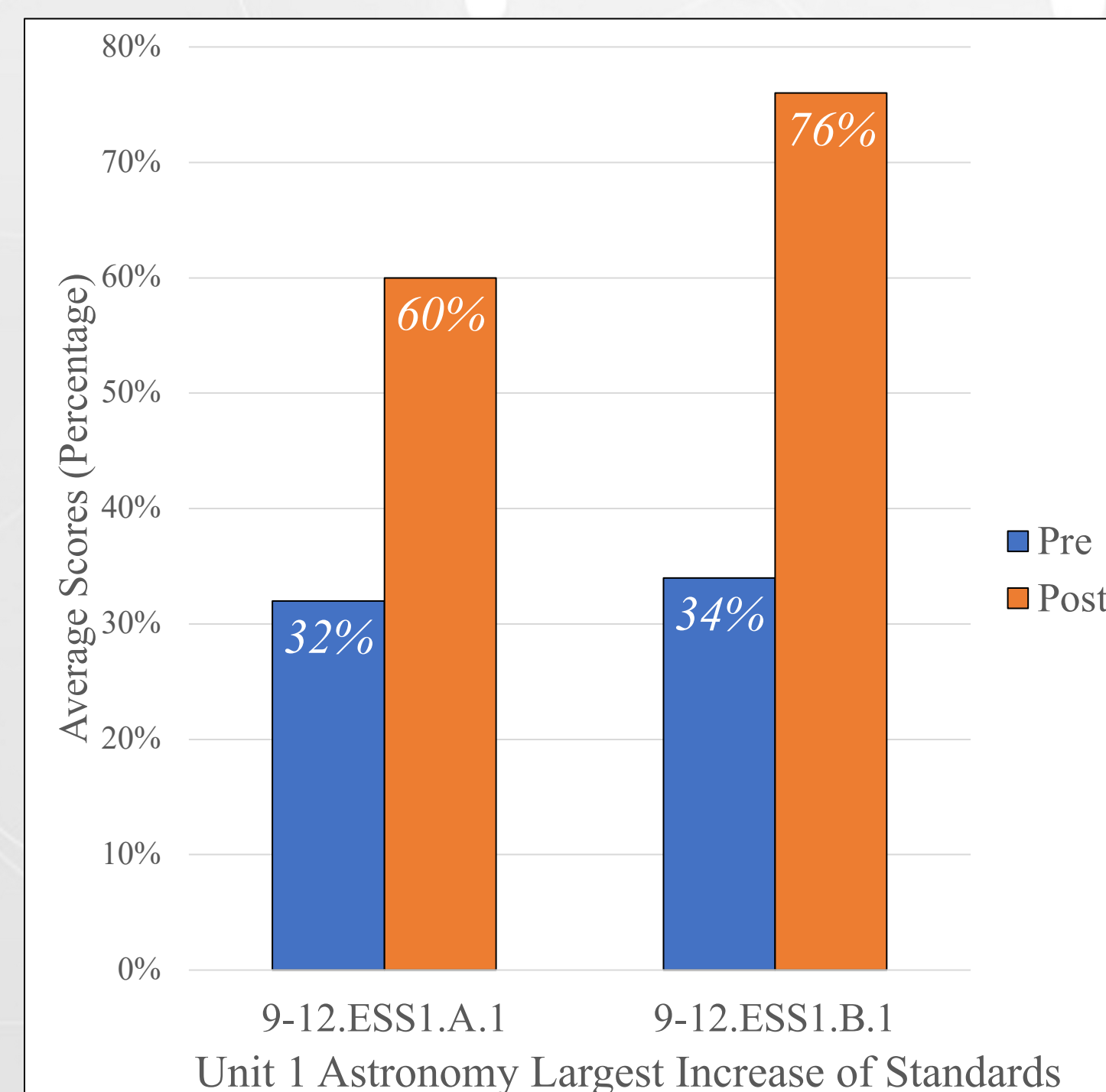


Figure 2. Unit 1 Astronomy science standards between pre- and post-tests with largest increase, ($N=68$). Note. 9-12 ESS1.A.1 states to develop a model based on evidence to illustrate the life span of the Sun and the role of nuclear fusion in the Sun's core to release energy in the form of radiation, and 9-12 ESS1.B.1 states to use Kepler's Law to predict the motion of orbiting objects in the solar system.

NAME: _____

BACKGROUND KNOWLEDGE PRE-CHECK

- How many planets are in OUR solar system? _____
- List ALL the planets you know that are in our solar system: _____
- What do you think is a Jovian Planet? _____
- What would be a Terrestrial Planet? _____
- What 2-3 rules would define a planet? _____

NAME: _____ HOUR: _____

SUN & STARS: HEXAGON VOCAB ACTIVITY

Directions: You will use the following vocabulary terms and definitions for all the matching fun

- You will match EACH term with their CORRECT definition! Once you think you have all your terms and definitions correctly matched, raise your hand and I will check!
Myers Initial _____
- Now you will ONLY use the terms for this round - move the definitions outta the way! You will match the terms that MATCH together - i.e. you will place "H-R Diagram" and "Main Sequence Star" together. Once you think you've got them all matched together, raise your hand and I will check!
a. HINT: You could have 3 separate groups!
Myers Initial _____

NAME: _____ HOUR: _____

SUN & STARS: VOCAB REFLECTION

Directions: For the following questions, answer honestly about how the activity went!

- How do you feel you did with the vocabulary matching and definitions? Confident? Need work? Explain.

- Did you find this activity to be helpful in review vocabulary and key concepts? Explain your reasoning.

- How would you improve this activity for next time?

Figure 3. Background Knowledge Pre-Check Formative Assessment for Unit 1 Astronomy About Planets.

Figure 4. Sun & Stars Matching Vocabulary Activity and Reflection Formative Assessment.

CONCLUSION

Overall, the claim had a strong, positive correlation between using pre- and post-test data to create effective lesson plans for student achievement throughout an Earth science curriculum. By using this data and picking specific formative assessments to better guide student learning, there was student growth in every unit and every Missouri learning standard (Figure 1 & 2).

VALUE & IMPACT

Using pre- and post-test data to create an effective lesson plan may be time consuming in the beginning, but the outcomes are so worth it. This data gives a deeper look into what students know and don't know, so you can better plan the unit. This in turn gives a more personalized approach to planning, along with using student reflections which shows them you care about their learning process. This helped me to dig deeper into my creative side of planning while also helping my students.