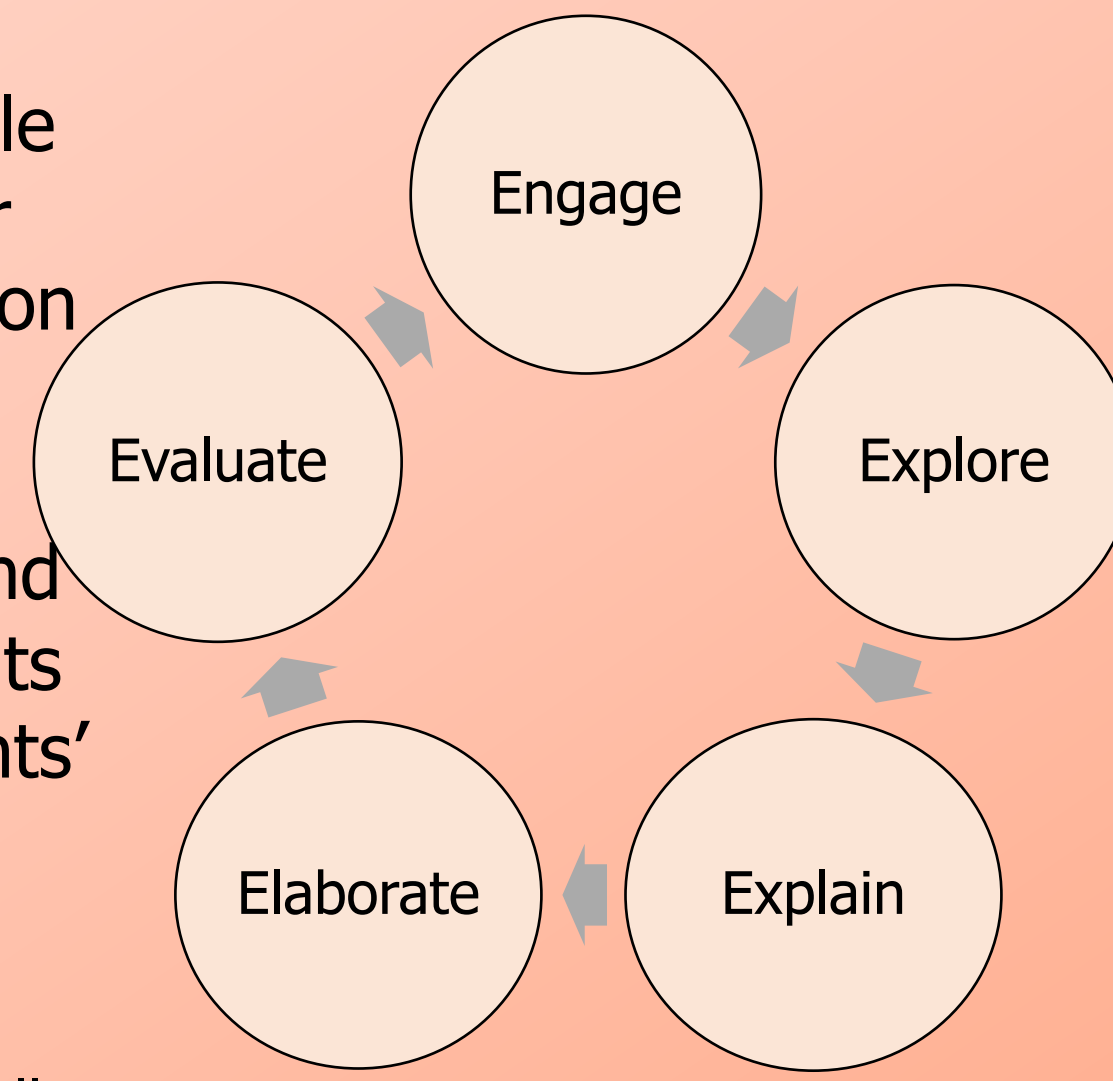


# 5E Instruction in a Biology Classroom

## Background

Historical research on learning cycles shows that students who were taught using the learning cycle approach showed greater gains in subject matter knowledge than students who received information in a “traditional” approach, defined as a lecture followed by an activity. They also developed scientific reasoning skills, such as inquiry skills and other general science skills, more so than students who were in a traditional style classroom. Students’ attitudes towards science were more positive if instruction used a learning cycle approach.<sup>1</sup>



The 5E instructional model<sup>2</sup>

<sup>1</sup>Bybee, R.W., Taylor, J. A., Gardner, A. Scotter, P. V., Powell, J. C., Westbrook, A., & Landes, N. (2006). The BSCS 5E instructional model: Origins and effectiveness. [PDF file]. Retrieved from [https://media.bsccs.org/bsccsmw/5es/bsccs\\_5e\\_full\\_report.pdf](https://media.bsccs.org/bsccsmw/5es/bsccs_5e_full_report.pdf)

<sup>2</sup>Llewellyn, D. (2013). *Teaching high school science through inquiry and argumentation*. Corwin.

## Methods

- This project spanned six-weeks from January 14 to February 25.
- 82 students in my four biology classes were exposed to traditional and 5E instruction during a unit covering genetics. The unit was broken down into two mini-units.
- Non-treatment: taught with traditional instruction
  - Mini-unit A on basic Mendelian genetics.
- Treatment: taught using the 5E instructional method
  - Mini-unit B on complex patterns of inheritance.

## Claim

- Students learned genetics concepts better from 5E instruction versus traditional style instruction.

## Evidence

- Treatment Group
  - Mean score: 84%
  - Median score: 87%
- Non-Treatment Group
  - Mean score: 74%
  - Median score: 76%

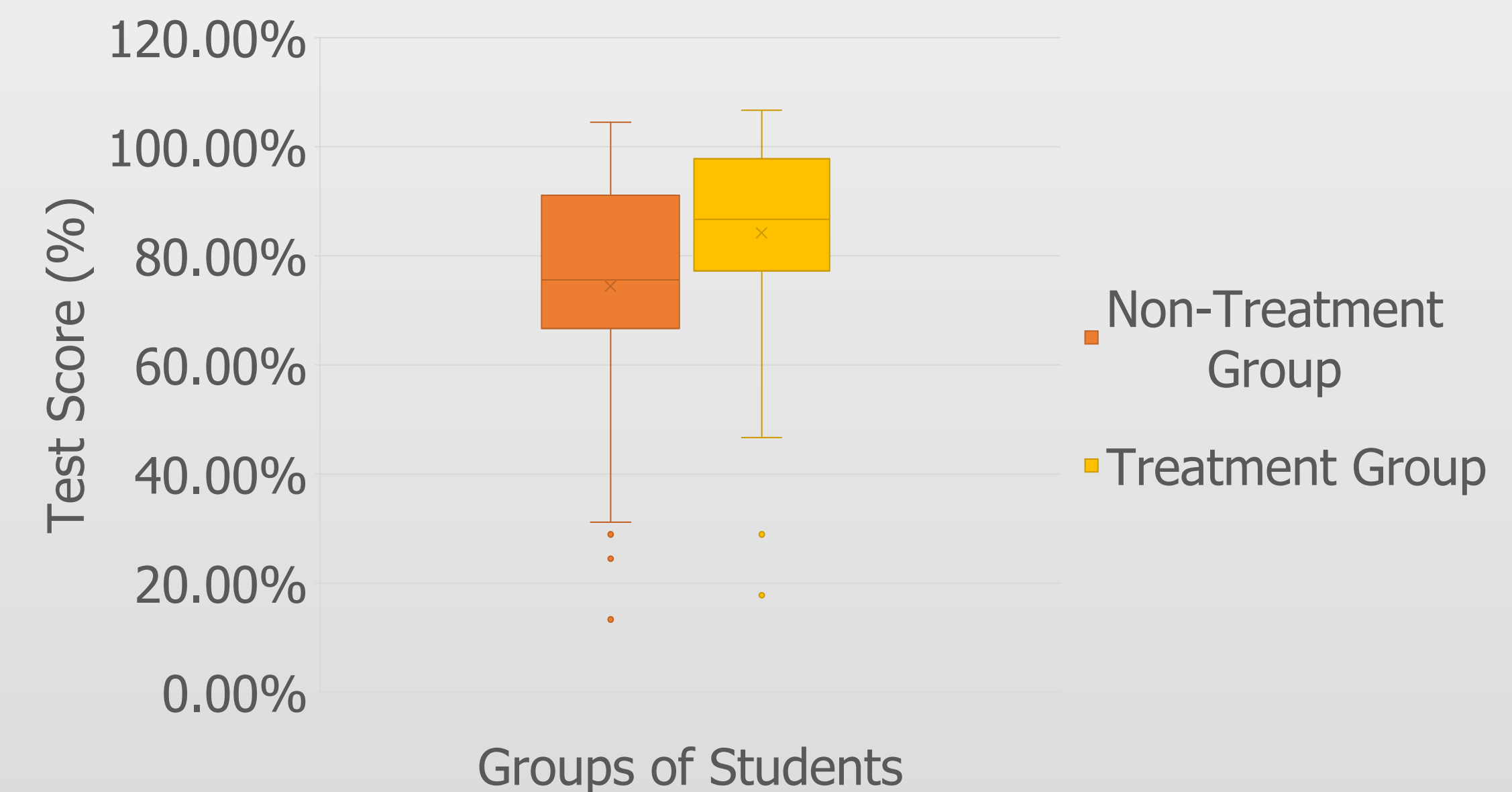
## Reasoning

- Students were more engaged in the instruction when taught using this approach.

Primary Question: Do students understand scientific concepts better through 5E instruction versus traditional science instruction in a high school biology classroom?	Genetics Pre-Test and Genetics Post-Test	Directed Paraphrase Assessment
Sub-Question: How do students’ attitudes towards science change after learning science through the 5E instructional model?	Student Pre-Survey and Student Post-Survey	Interview Questions
Sub-Question: How do students’ attitudes and engagement towards 5E instruction compare to traditional science instruction?	Student Pre-Survey and Student Post-Survey	Interview Questions

## Data Analysis

- Students Post-Test scores from the treatment and non-treatment group.



Genetic Unit Test scores from the non-treatment group ( $N=63$ ) and treatment group ( $N=82$ ).