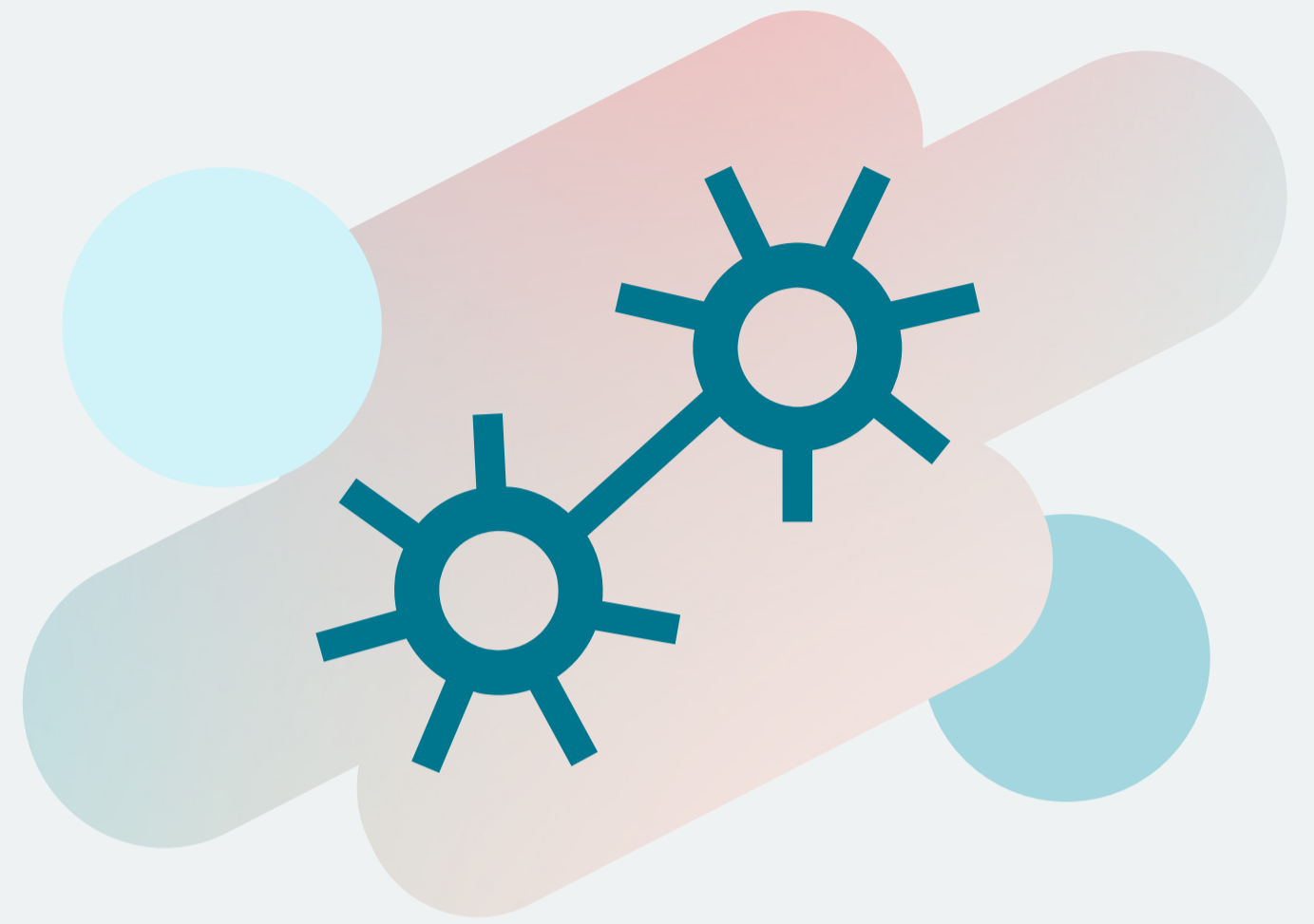


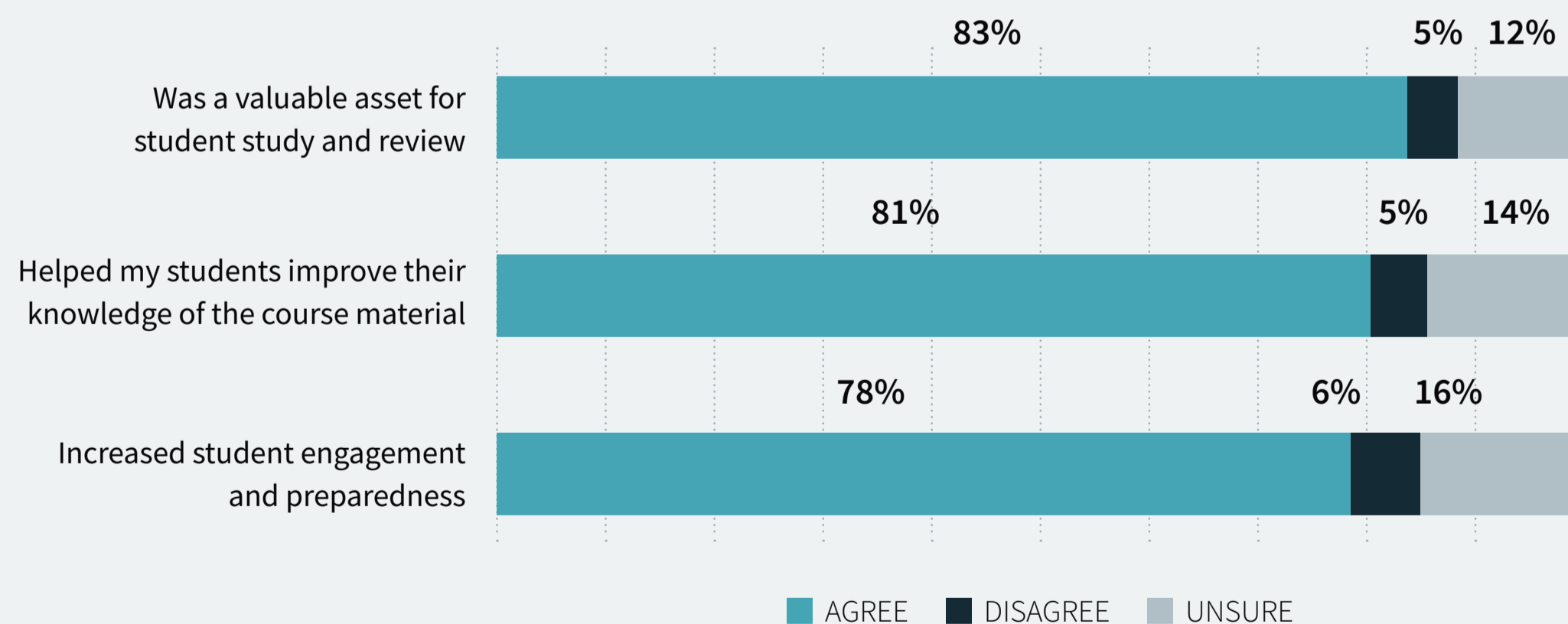
Biology Achieve Users:

What do they *really* think?



This year 10,218 instructors and 131,921 students used Achieve.*

Top Instructor Statistics:



83%

of Biology instructors agree that Achieve: Was a valuable asset for student study and review

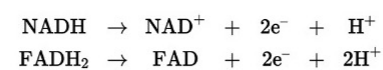
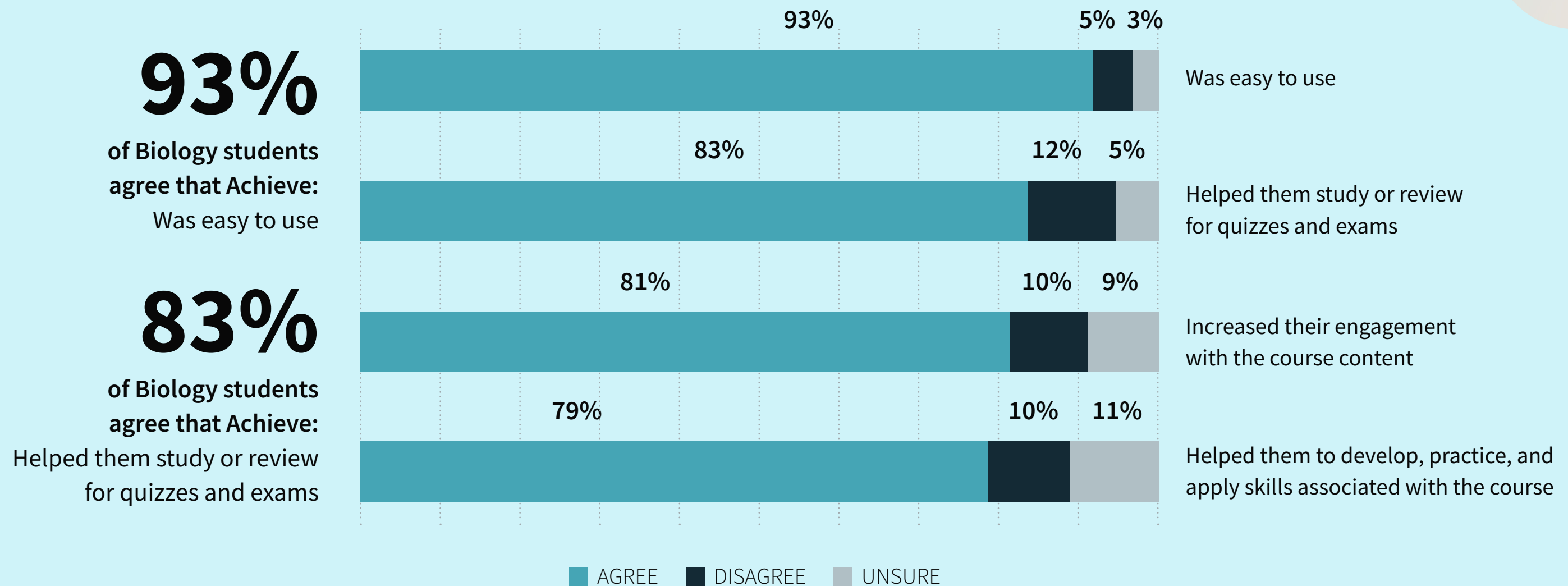
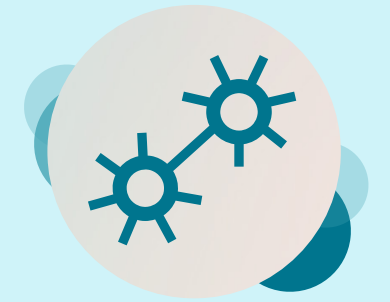
“Achieve is easy to use and provides lots of useful feedback for the instructors.”

– ERIN MCNALLY-GOWARD,
Grand Valley State University - Allendale Instructor

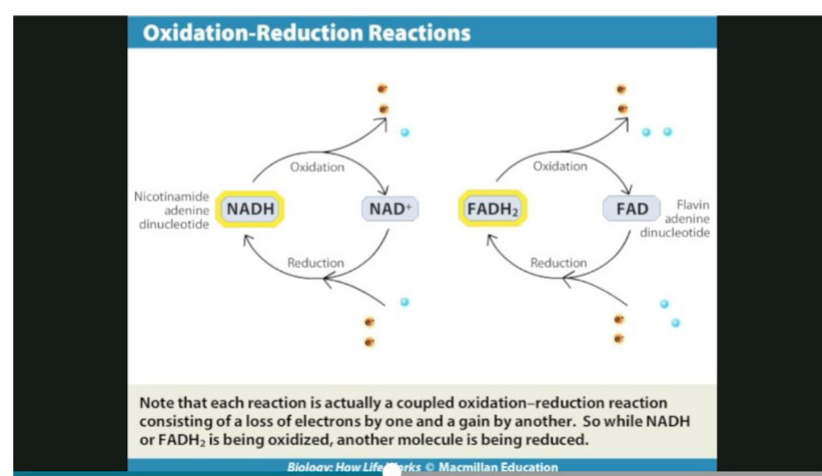
“Students like it and I think they actually learned more than when they were left to their own devices to learn the material.”

– JOHN GEISER, Western Michigan University Instructor

Top Student Statistics:



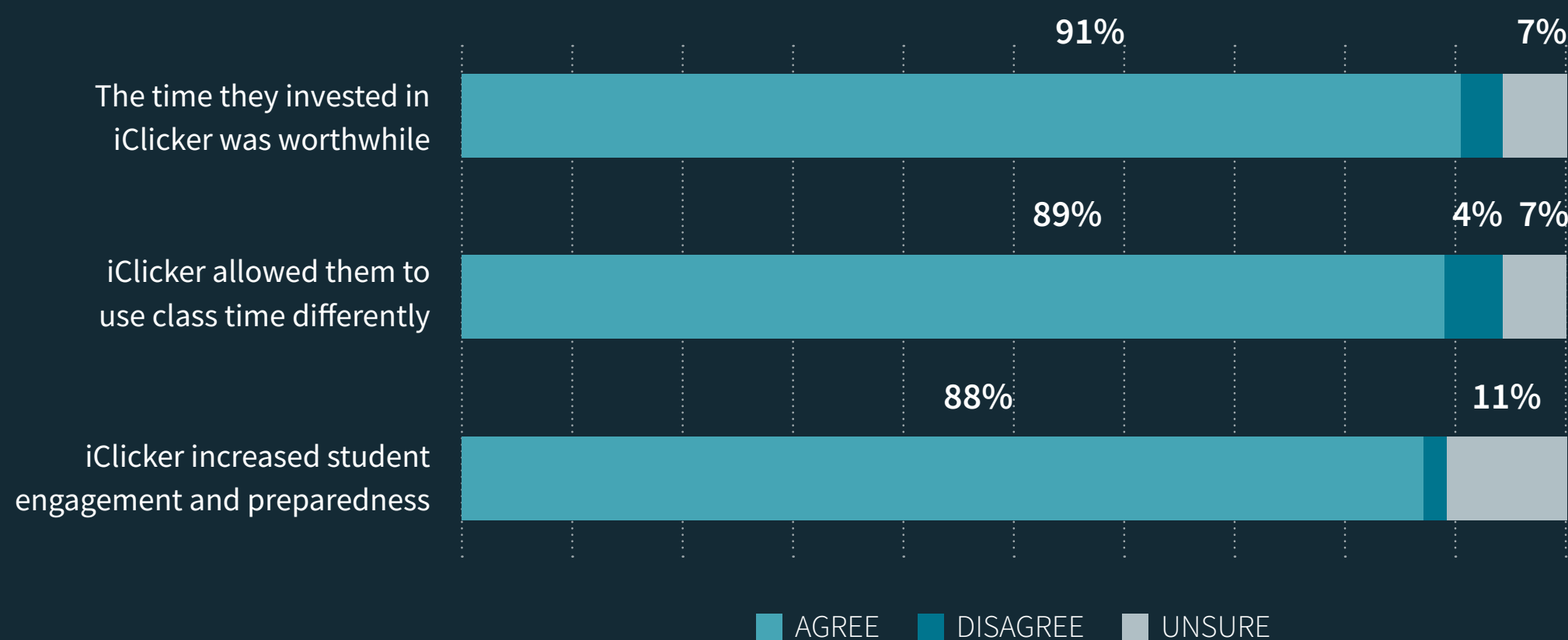
NAD⁺ and FAD can then accept electrons from the breakdown of fuel molecules. In this way, electron carriers act as shuttles, transferring electrons derived from the oxidation of fuel molecules such as glucose to the electron transport chain.



“ I absolutely loved the e-book and all of the graphics, visuals, and content that helped me learn biology this semester. Everything was really easy to understand and it was written to-the-point. I would definitely recommend Achieve to my friends!”

- SOPHIA GONZALEZ, College of Dupage Student

What Instructors Say about iClicker in Achieve:



91%

of Biology instructors shared that:

The time they invested in iClicker was worthwhile

“ I find them (Macmillan’s Instructor Activity Guides) to be a great student engagement tool foremost, but also for formative assessment. I don’t understand why more of my colleagues don’t use them. I have a mix of live and remote (zoom) students, it is great to have a tool that works in both modalities simultaneously.”

– BRIAN BLACK,
Bay de Noc Community College Instructor

Group Work, Model-Based Reasoning, and Clicker Questions

Instructor Activity Guide for Ch 7: Respiration Box-and-Arrow Activity V1

Best For: Any Class Size
Class Time: 15 minutes
Implementation Effort: Moderate
Bloom's Taxonomy: Evaluate

Activity Summary

This activity provides a systems view of cellular respiration and its stages (glycolysis, pyruvate oxidation, the citric acid cycle, oxidative phosphorylation/electron transport chain). Students build or manipulate simple models that encourage them to think about the inputs and outputs of each stage and to account for the transfers of energy and substrates between stages. The activity was designed as a response to observations that students have a tendency to get bogged down in attempting to memorize an overwhelming number of details without gaining a functional working understanding of the overall process. Students are encouraged or required to work in groups to complete the activity.

The first version has students build and label models for glycolysis, pyruvate oxidation, the citric acid cycle, and oxidative phosphorylation/the electron transport chain, and then complete a combined model connecting all four stages. Each model-building effort is followed by a few clicker questions, which provide accountability and formative feedback.

Resources for this Activity

- Download All Resources
- In-Class Presentation
 - Preview
 - Download

