

## PURPOSE

The Illinois Mathematics and Science Academy's Office of Institutional Research is conducting a three-year pilot study to enhance teaching and learning of complex biological concepts, as well as to improve student outcomes by **comparing and contrasting the effectiveness** of a new, one-year introductory Biology course, **Advanced Biological Systems (ABS)**, with the traditionally offered one-semester **Scientific Inquires – Biology (SI-Biology)** course.

## BACKGROUND

The Next Generation Science Standards and prior research call for teachers to utilize the following principles:

- **Inquiry-based instructional and assessment methods**, which are known to be more effective than traditional lecture-based approach
- Curriculum that develops a **deeper understanding** instead of breadth of content knowledge

The ABS course design allocates more time to meet the above principles and in addition emphasizes students':

- Interaction with **real world problems**
- Exploration of the **utility of science**

These principles have been proven to positively influence **students' attitudes** toward and **engagement** with science.

## METHODS

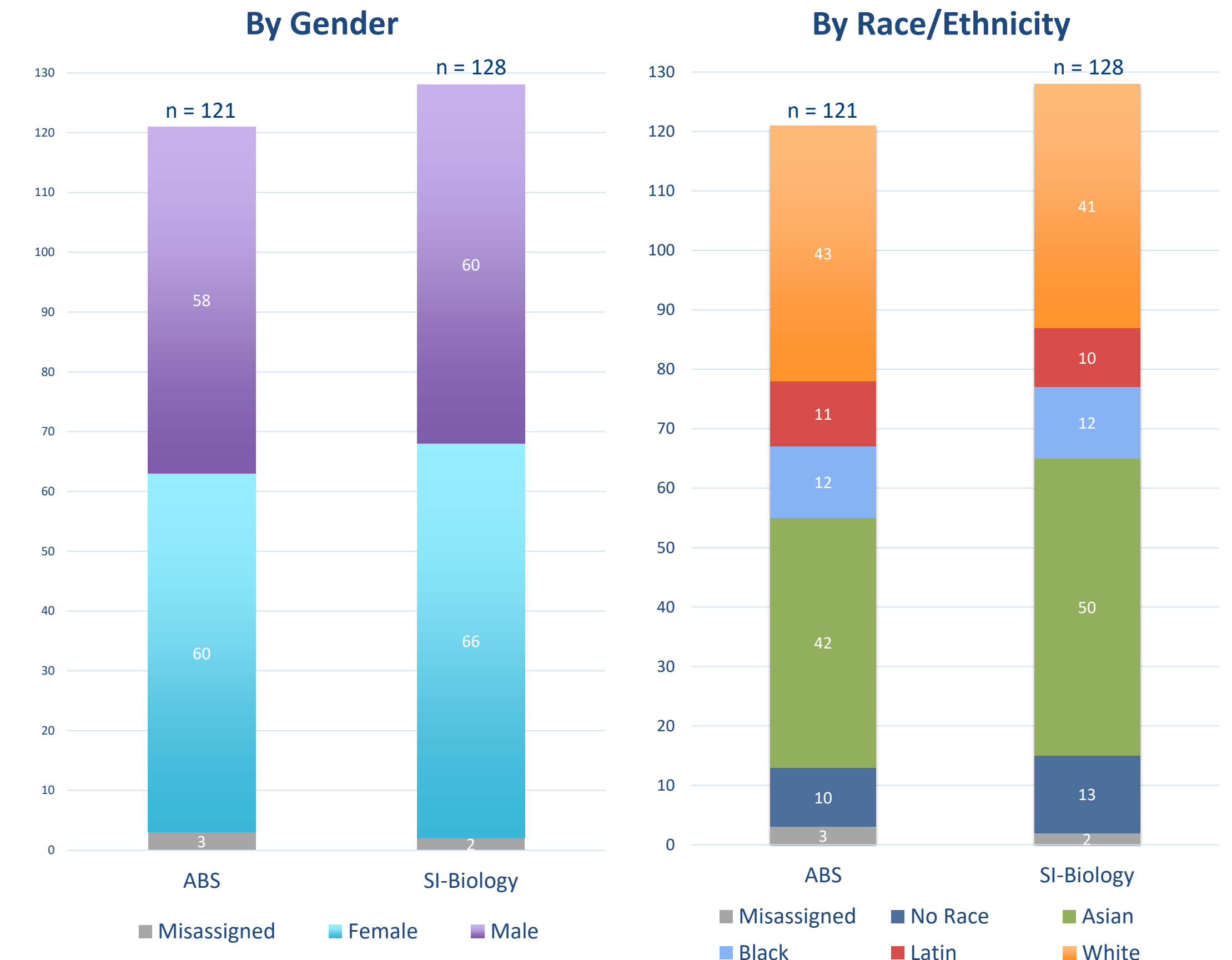
**Sampling Procedure:** Students in the Classes of 2020 and 2021 have been/will be randomly assigned to either the treatment group (ABS) or the control group (SI-Biology) using **stratified random sampling**. The strata of interest include the following:

- Gender
- Race/ethnicity

**Measures of Students' Incoming Skill Levels, Outcomes, and Engagement:**

- **Admissions portfolio** (SAT scores, GPA, Admissions score)
- Biology content knowledge pre- and post-test
- Biology Motivation Questionnaire II
- Course grades in biology & subsequent science classes
- CWRA+ (College Work & Readiness Assessment)
- Elective-taking patterns across the sciences
- Retention rate

## GROUP ASSIGNMENT – CLASS OF 2020 (N = 249)



## STRATIFIED RANDOM SAMPLING RESULTS

There were **no significant differences** between incoming skill levels for students in ABS and SI-Biology (SAT scores and GPA).

