

# BSCS BIOLOGY

## B UNDERSTANDING FOR LIFE

### Designed for the NGSS

*BSCS Biology: Understanding for Life* is BSCS Science Learning's new phenomenon-driven high school biology program. We developed this program to support teachers in meeting all of the performance expectations in A Framework for K-12 Science Education and the resulting Next Generation Science Standards for high school life science. But we didn't stop there. The program was designed with a greater purpose—to prepare and motivate all students to use science effectively in their current and future personal, professional, and civic lives. *BSCS Biology* introduces *Anchored Inquiry Learning* (AIL), a new instructional model that builds on the strengths of BSCS's globally-recognized 5E model while drawing on contemporary research about the social, cultural, and emotional aspects of the learning process.

### *Units are anchored in complex, real-world, relevant phenomena and problems.*

- Each of the four units in the course is focused on an important societal challenge.
- The units each begin with an example of a puzzling phenomenon that builds interest and establishes a motivation to learn more.
- Each unit equips students with the understanding they need to act on what they've learned in their personal, professional, and civic lives well beyond high school.

### *Learning is driven by students' own knowledge and questions.*

- The Anchor Lesson of each unit is designed to uncover students' initial ideas and knowledge about the phenomenon or problem.
- Students use gaps in their knowledge to help them ask questions about phenomena and to develop the class' Driving Question Board.
- Students conduct collaborative investigations driven by their own questions that collectively lead them to a deep understanding of core scientific ideas.
- Students discuss open-ended questions that focus on the strength of the evidence used to generate claims.
- Students have opportunities to share ideas and feedback with each other directly.

### *The program is organized around problems and phenomena, not topics.*

- Chapters are not sequenced according to the structure of a discipline. Instead, they are sequenced based on the nature of the complex problem that students are trying to explain and solve. As a result, students always understand the usefulness of what they are learning.
- All of the high school life sciences NGSS and half of the high school engineering design performance expectations are addressed in the program, but they are organized around how they appear in the real world, not an abstract disciplinary structure.



### ***Lessons and assessments are designed to leverage all three dimensions of the NGSS.***

- Throughout the lessons, students are supported to use elements of the Science and Engineering Practices and Crosscutting Concepts to figure out Disciplinary Core Ideas.
- Students use and connect these disciplinary core ideas to develop explanations for phenomena and design solutions to problems.
- The assessment system includes frequent and varied opportunities for formative, summative, self- and peer-assessment with guidance for tracking student progress across all three dimensions.

### ***Support for equitable instruction helps teachers in removing barriers to science learning.***

- The anchoring phenomena and problems are compelling to a broad spectrum of students.
- Students are provided multiple ways to experience phenomena and encouraged to express their understanding through multiple modalities.
- The diversity of science and scientists has been represented throughout the program in ways that support development of science identity and agency for all students.
- We placed special focus on language and literacy in the design of activities to remove barriers to science learning that have historically disadvantaged students who are emerging multilingual learners or who have not achieved academic success in English language arts previously.

## **Stories from the Classroom**

Field-test teachers and adopters believe *BSCS Biology* is a powerful program that will completely change the way students learn and use science throughout their lives. What makes the program so powerful? Here are some stories:

### ***The Anchored Inquiry Learning instructional model sparks interest, curiosity, and motivation.***

- “Anchor phenomena are different for me, and my students are really engaging with it. I’m seeing a shift in student responses like “I don’t know” and “I don’t care” to students continuously wanting to build on their initial ideas and come up with more complex questions. The Infectious Diseases unit is very relatable to students because we’ve all experienced illness. I have not had one student ask why we need to know this. I actually had a student that went to a doctor who ran the same immune response tests we had learned about. My student felt good about understanding what the doctor discussed.”-Faith Nelson, high school biology teacher in Illinois

### ***The learning is student-centered and provides space for all voices.***

- “We were in the heart disease unit, figuring out how LDL is processed by the body and what happens if receptors look different. Students were in a productive struggle task, feeling confused. Then something clicked for Jake – a student who typically struggles with participation. Jake has an IEP for writing and often feels frustrated because he has so many ideas in his head but can’t get them down on paper. But in this particular task, he felt empowered to express his ideas verbally. He said, “I’ve got it.” And suddenly, he’s at the front of the room leading a classroom discussion. This is the epitome of “student centered” learning.”-Rowan Driscoll, high school biology teacher in California

### ***The program is designed to engage learners from all backgrounds, and specifically integrates supports for emerging multilingual learners.***

- “I work with a small group of students who are all new to the country. All in all, the students have stepped up to use their English to explore the topics. Specifically, I have a student who arrived in the US five months ago; he has been able to understand the concepts and use his notes and word wall to participate in class. This is a huge win for a student brand new to learning English.”-Dani Booth, high school biology teacher in Colorado

### ***The program is changing how students learn and apply science.***

- “I’ve always done well in science class, but I usually didn’t have a very deep understanding of the concepts we learned. I could regurgitate the definitions we needed to know for a test but that was about it. I no longer think the subject is boring and I can appreciate how amazing our world is through science. I think that I will remember the things I have learned in this class for years and years, rather than just long enough to get an A on the unit test.” - high school student in Minnesota

## **Support for Effective Implementation**

*BSCS Biology* provides a variety of print and digital resources to support successful implementation of the program. Our robust professional learning program supports teachers and leaders in making the shifts in teaching and learning called for by the Framework and NGSS.

***BSCS Biology digital and print resources support teachers and students in attaining the program goals.***

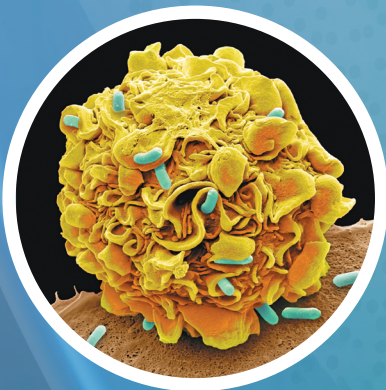
- All program materials are available digitally through Kendall Hunt's digital platform, *Flourish*. The Teacher Handbook, Teacher Edition, and Student Edition are available in print.
- The Teacher Handbook is an essential guide to implementing Anchored Inquiry Learning as well as classroom sensemaking and literacy strategies for equitable next generation science learning. It provides guidance for planning and using the course components.
- The Teacher Edition for each unit provides extensive background material, rationale for the design of each component, tips for implementation, educative callouts for teachers, and ideas for how to customize the instruction for various classroom contexts.
- Digital Teacher Resources include letters to parents/guardians for each unit as well as adult level learning resources to enhance teacher content background in the unit phenomenon/problem. Videos support teachers in navigating Flourish and the online Teacher Edition.
- The online Student eBook contains embedded links to digital Student Sheets, videos and images, and checklists to guide students through investigations.

***A well-designed professional learning program is essential to the successful implementation of a curriculum designed for the NGSS.***

- Professional learning (PL) programs developed by BSCS Science Learning are available to meet the needs of teachers and districts as they implement *BSCS Biology*. The PL programs deepen understanding of three-dimensional, phenomenon/problem-driven teaching and learning and Anchored Inquiry Learning. Through immersive experiences, participants enhance their understanding of literacy, emerging multilingual learners, and sensemaking strategies embedded in the curriculum. They increase their ability to use equitable teaching and learning strategies to support student construction of a coherent science content storyline.
- BSCS recommends in-person PL programs that range from five to ten days for adopting districts. One-day, two-day, and virtual offerings are available. Leadership development programs for district specialists and instructional coaches are available as well.

***Successful implementation is enhanced through the development of community.***

- BSCS is developing online resources to build community among program adopters. Users can share resources, access recorded webinars, and support each other to ensure every student receives the biology course they deserve.
- *BSCS Biology* is available from Kendall Hunt. Kendall Hunt publishes hands-on science, mathematics and gifted curricula for grades K-12, and is a leading partner in open educational resource offerings. Learn more at [k12.kendallhunt.com](http://k12.kendallhunt.com).



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