

Integrated Biology & Chemistry

“If neither nature, nor science, nor technology is constrained by single disciplines, why is science education still compartmentalized?”

Dr. Sandy Simon, Lab Head, Cellular Biophysics, The Rockefeller University

Why Integrate?

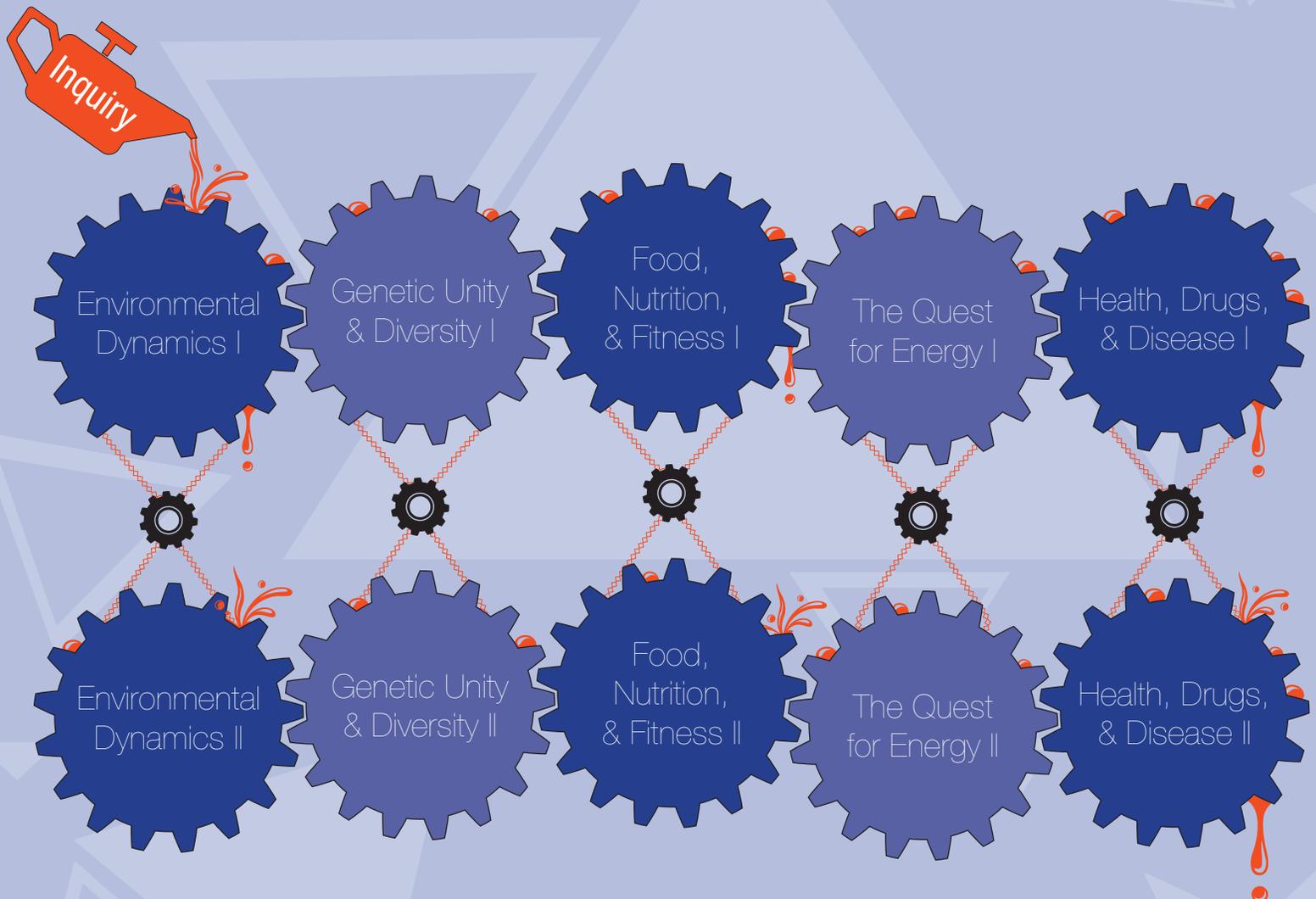
- Deepens conceptual connections
- Encourages authentic inquiry
- Promotes readiness for advanced coursework
- Ties to high-interest topics

What's Stopping You?

- Too much time and effort to create from scratch?
- Unknown outcomes?
- Not enough internal expertise?
- Can't find published integrated science programs?

Not Any Longer!

Our team of educators, researchers, and scientists have spent the past decade developing and implementing a world-class, rigorous, integrated, two-year science experience for secondary, undergraduate, and adult learners. And now we're inviting the world to join our inquiry into 5 real-world contexts!



Join Our Inquiry

This lab-driven program is suitable for learners who are comfortable reading autonomously at a 13-year-old level. Schools typically implement in Grades 9-14 (to include Community College). **No prior experience with biology or chemistry, or with lab techniques, is required.** It's a great replacement for regular Biology I and Chemistry I courses in schools, and also provides adult learners with a fun and interesting way to better appreciate the science that is relevant to their work and daily lives.

Integrated Biology and Chemistry is based on the premise that teaching, learning and science are commonly grounded in the process of inquiry. Traditionally, science has been presented "by the book" as "facts from experts" that are "non-negotiable." This couldn't be further from the way science is practiced or understood. So, **we invite learners to co-create their own understanding of the natural world, according to their own individual learning preferences.** Each learner's digital "textbook" is partly incomplete, allowing for a personal response to and interaction with various text, images, animations, videos, databases, laboratory equipment, results, natural materials, other learners in the class, and the instructor(s). Ultimately, learners create an individualized digital product representing their experience in the program.

Over 35 laboratory experiences drive 5 real-world contexts that span 2 years:

- Environmental Dynamics
- Genetic Unity and Diversity
- Food, Nutrition & Fitness
- The Quest for Energy
- Health, Drugs & Disease

We provide instructors and learners with:

- enough digital learner materials to cover two years of coursework
- scientifically accurate and current information
- researched-based pedagogy
- workable lab protocols
- copious preparation guidance for instructors
- reasonable timeframes for implementation within your organizational calendar.

At your request, we can provide virtual support for instructors, a comprehensive alignment to your chosen standards, and curriculum planning maps & docs (i.e., Rubicon Atlas, ManageBac, etc.).



“This well-conceived program offers an exciting glimpse of what the future of secondary school science could look like.”

The National Science Foundation, USA

Main Features of the Program

- **Spirals and Integrates Concepts & Scientific Practices**— Conceptual development and laboratory work spiral gradually from the beginning, allowing instructors and learners to grow accustomed to the formats and collaborative processes that have been carefully designed.



- **Incorporates Local and Global Contexts**—Throughout the program, learners are exposed to current research and issues relevant to their locale (part of our customization for each region), as well as those relevant internationally.
- **Prepares Learners for IB Diploma, AP and Other Advanced Courses**—We understand that the pressure of national, state and programmatic exams heighten teacher and learner anxiety. One principal comments: *“It’s very strong in terms of content and intellectual rigor, in terms of asking kids to make choices and decisions in collecting and evaluating data. They’re really figuring things out.”* Increasing rigor earlier decreases stress later.
- **Builds Authentic Digital Competencies Skills**—While many struggle to determine ways to successfully integrate ICT into the curriculum, this program provides an intact model that invites students to engage productivity, scientific and visual media tools frequently and purposefully.
- **Promotes Peer Collaboration**—Learners work in pairs, in small groups, and with the whole group to critique, analyze, present, prepare and question. Verbal, written and hands-on collaboration is part of every lab.
- **Embeds Reading Strategies**—Strategies are provided for two main kinds of texts in the program: an anchor text (the lab document itself) that coordinates the program, and authentic science texts that exemplify current research and perspectives in the field. Note that we construe “text” broadly, to include visual texts such as videos; animations; prose; equations; charts/graphs/tables; diagrams/images; and other scientific or mathematical models. Students link out to these hand-selected resources.
- **Provides Rich Formative Assessments**—Teachers and learners have continual opportunities to offer evidence of learning and improved competencies. Learners are metacognitive and reflect on their progress.

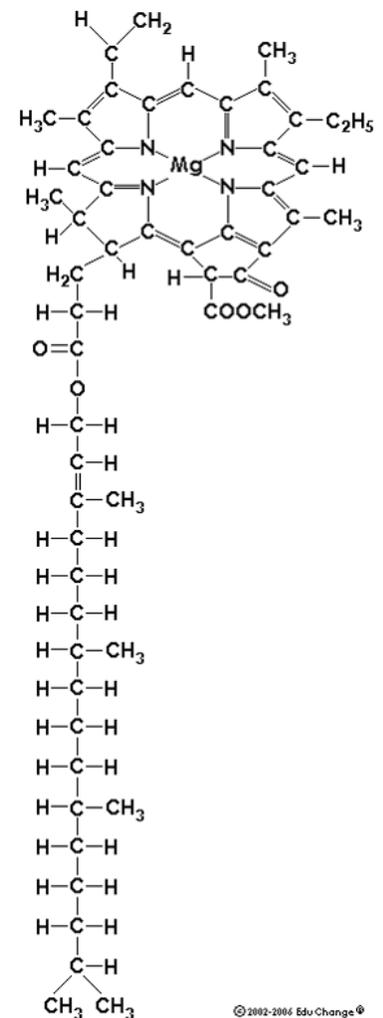


Figure 6: Structure of Chlorophyll a

“I haven’t experienced a day of something that I didn’t want to learn.”

Learner, Age 16, New York City, USA

Eligibility

We have implemented this program in the USA with thousands of learners and over 50 instructors with varying levels of experience and science background. Based on this experience, the participating organization must be able to supply:

- **Standard Laboratory Equipment**— You probably already have what you need. We provide a full supply list for review and consideration. The organization must ensure that all necessary materials are procured prior to the delivery of the program.
- **Password-protected Server or Intranet**—We provide all materials on Google Docs, Microsoft Word for Windows/Mac, or other standard applications as requested. The organization must ensure that access to these materials is password-protected.
- **Two or More Participating Instructors**—Collaboration is paramount, as is program stability. Sole participation is not sustainable. At least one instructor must be experienced, with solid classroom management & lab facilitation skills.

Our Commitment

- **Digital delivery** of all documents on the platform of your choice
- **Updates to content** as they become available
- The first Strand, ***Environmental Dynamics I, customized to your local region***. For example, in São Paulo the school asked us to focus on the Itaipu hydroelectric dam and related issues. Students visit the dam on a field trip.
- Recommended 3-day on-site **instructor ramp-up institute** for each level
- Optional **virtual training and support** throughout implementation
- Optional comprehensive **alignment to your standards** of choice & development of **curriculum planning maps/docs** (i.e., Rubicon Atlas, ManageBac, etc.).

Your Commitment

Organizations are most successful when they make the following commitments:

- **4 Years of Implementation Minimum**—The first 2 years allow instructors to implement the entire program once as intended. The second 2 years allow for adaptation, and for instructors of successive courses to appreciate the increased levels of readiness and performance shown by learners who have successfully completed the program!
- **Adherence to Our Academic Honesty Policy**—We take our work seriously, and your community should do the same. Visit http://educhange.com/academic_honesty.htm for more information.

Contact and Pricing Info:

Consider this program a textbook replacement cost, purchased as a per-learner annual subscription. Volume discounts are available. Write to info@educhange.com for a free consultation.