

Science in the High School Years

Succeeding with science instruction at the high school level

DIANE SPEED
hcollegebound.com

In science, depth of learning requires three things:

- **analytical skills** to deduce the meaning of data;
- **verbal skills** to articulate the meaning;
- **imagination** to predict future outcomes.

Things to note when evaluating outside science programs:

- *Does the program use live instruction? Will my student be able to interact with the teacher and other students?* — **Key idea:** Learning science is difficult if the content is taught asynchronously or if the student is left on his/her own to watch videos.
- *Does the program teach my student how to study?* — **Key idea:** During the high school years, developing strong study skills is a vital learning objective best supported in *all* the student's courses.
- *Are the assignments engaging and meaningful?* — **Key idea:** The scope and sequence of science content should be designed around *how students learn*, so that the content can be learned effectively and efficiently, without undue struggle.

ADVANCED PLACEMENT

Before taking an AP in a particular science, a student should have a thorough foundation in that particular discipline.

- Upside of taking AP science: Your student demonstrates he/she is ready for college science & has a very strong transcript.
- Downside: Your student may place out* of the 101-level course in college and has to rise to the challenge of the 102-level while also adjusting to college life.
- Whether the student is awarded college credit rests on performance on AP test.

*Placing out of a course is at the discretion of the college.

LOCAL OR COMMUNITY COLLEGE

Upsides

- A student's strong performance in such classes validates the homeschool transcript.
 - Demonstrates that the student is college-ready and a motivated learner.
- Student gets a semester to learn and achieve for college credit (vs. AP test score).
- Student may form connections that prove helpful in college acceptance, e.g. LORs.

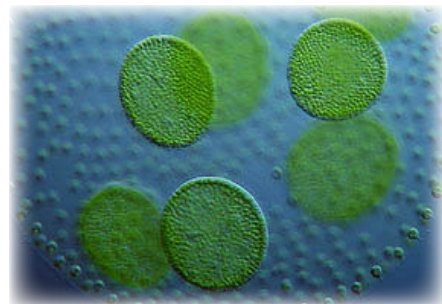
Downsides

- Quality of teaching varies greatly — use [RateMyProfessor.com](https://www.ratemyprofessor.com) to vet potential teachers.
- Content moves at a rapid pace: one college semester = 1 high school year.
- Maturity — If your student encounters any difficulties, he or she may have to approach the professor and even advocate for him- or herself.
- Placing out of 101-level course in college can lead to difficult academic challenges when your student is just a freshman.

RESOURCES FOR SCIENCE AT HOME

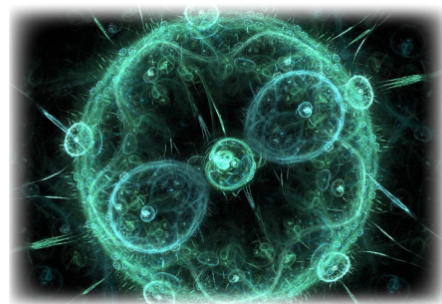
Biology

- Campbell Reece *Biology* — the standard text for AP biology
- *The Biology Coloring Book*
- *Exploring the Way Life Works* — a wonderful college-level text written by an artist and a scientist
- *Biology Inquiries* by Martin Shields



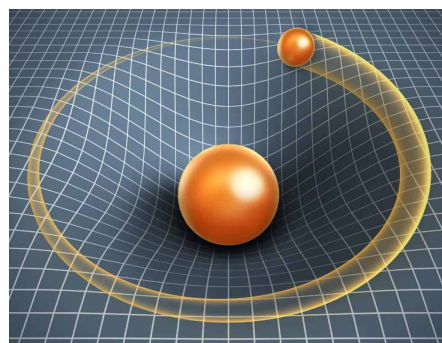
Chemistry

- *Introductory Chemistry* by Zumdahl
- *The Disappearing Spoon* by Sam Kean
- *Stuff Matters* by Mark Miodownik
- *Hands-On Chemistry Activities with Real-Life Applications* by Norman Herr & James Cunningham
- *Illustrated Guide to Home Chemistry Experiments* by Robert Bruce Thompson



Physics

- *Physics*—Sixth Edition, by Douglas C. Giancoli
- *Conceptual Physics*—Tenth Edition, by Paul G. Hewitt
- *Hands-On Physics Activities with Real-Life Applications* by Norman Herr & James Cunningham



Videos & simulations

- Textbook publishers have created wonderful videos of complex processes; some are available on YouTube, others at dedicated sites like Pearson's "Clutch" videos (e.g., clutchprep.com/biology ; clutchprep.com/chemistry ; etc.).

Independent teachers have created wonderful mini-lectures or demonstrations that students can watch. Two of my favorites:

- **For biology & chemistry:** Mr. Anderson of Bozeman Science.
- **For chemistry:** Tyler Dewitt of Socratic Science.

Additional resources you may want to consider:

- Crash Course Science videos are popular with teens (though some find that Hank Green talks too fast).
- Colleges and universities have videos — such as the University of Nottingham's *Periodic* videos. These take the student right into the lab with real scientists to learn about the elements.
- Computer simulations enable students to peer inside the microscopic or atomic world. Some great resources are available for free. I've found useful simulations at Froguts, pHet simulations, and Concord Consortium, as well as at many colleges & universities.

Online courses

Live & interactive

<https://hscollegebound.com/Online-Courses.htm>

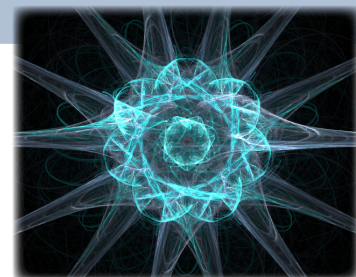
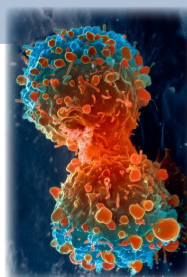
SCIENCE INTENSIVES — 8 weeks, 16 sessions

- **Ecology w/lab** — begins Sept. 26, 2022
- **Genetics w/lab** — begins Jan. 16, 2023
- **Botany w/lab** — begins March 27, 2023



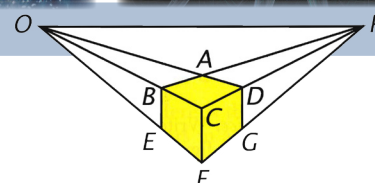
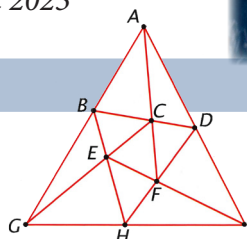
SCIENCE — Year-long, honors-level instruction

- **Honors Biology with lab** — begins Aug. 29, 2022
- **Honors Chemistry with lab** — begins Aug. 29, 2022
Includes instruction in writing lab reports
- **Honors Physics with lab** — *returning fall 2023*



MATH — Year-long courses

- **Geometry** — begins Aug. 30, 2022
Honors track available



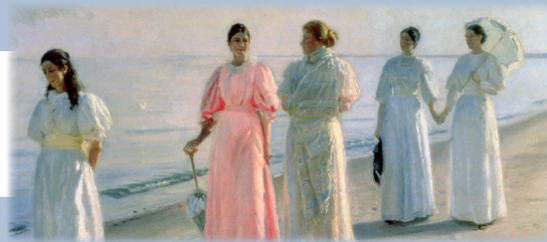
WRITING — Year-long, honors-level instruction

- **Writer's Guide to Grammar** — begins Aug. 31, 2022
- **Logical Communication** — two sections, beginning Aug. 29 & 30, 2022
- **Essay Writing & Appreciation** — begins Aug. 31, 2022



LITERATURE — Year-long, honors-level instruction

- **Novels by Women** — begins Aug. 30, 2022
- **History & Literature of the Middle Ages** — *returning 2023*



SHAKESPEARE INTENSIVES — 7–10 weeks' duration

- **Twelfth Night** — begins June 3, 2022 (4 weeks, 8 sessions)
- **Romeo & Juliet** — begins Aug. 31, 2022 (10 sessions)
- **Hamlet** — begins Nov. 30, 2022 (10 sessions)
- **Macbeth** — begins Mar. 8, 2023 (7 sessions)

