

Ask A Biologist (<http://askabiologist.asu.edu/home>; Arizona State University)

Although one can certainly ask a question, *Ask A Biologist* offers more than just a life science Q&A. Staffed by volunteers, the website serves pre-K through 12th-grade students and teachers. More than 11,000 people visit every day, browsing its >32,000 answered questions. Examples of questions that have been asked include the following: “How did ancient fish make the jump from gills to lungs?” “Is a macadamia nut really a nut or a seed?” “If birds evolved from dinosaurs, does that make them reptiles, too?” Visitors can also ask new questions by filling out a simple electronic form.

In addition to questions and answers, visitors will find lesson plans, games, interactive activities, quizzes, and useful links to other websites. Most of the content targets middle school and early high school students. Nevertheless, a few sections might be of interest to upper-level high school classrooms. For example, the lesson called “Venom” begins with a story and a game about a man who gets stung by a deathstalker scorpion while hiking. The lesson’s content is focused on protein chemistry. Students learn that toxins bind to protein channels and prevent muscles from receiving messages to contract. The virtual game gives students a chance to use the antivenom treatment to bind to the toxin molecules before they can block the channels in the membrane. If the teacher wants students to learn about proteins in more depth, she can direct students to links that delve into more complex topics, such as protein structure, protein folding, and what membrane channels are.

Although relatively easy to navigate, the site requires some digging to get a full picture of all that is available. A link to the Teacher’s Toolbox allows visitors to set search

parameters by grade level, category (e.g., video, quiz, coloring page), and activity type (i.e., online or offline). If exploring the site seems daunting, the colorful home page includes featured stories that offer a taste of what you may find. Within the Teacher Toolbox, there is also a link to the Professional Learning Library created by the Mary Lou Fulton Teacher’s College. This site is also searchable by topic, age group, content area, standard, and provider.

I found some ideas for activities that I might use, especially for my freshman-level biology classes. Although you may have to dig a little more, there are some good activities for upper high school and honors students, as well.

Kathy Van Hoeck
York Community High School
355 W. St Charles Rd.
Elmhurst, IL 60126
kvanhoeck@elmhurst205.org

Encyclopedia of Life (<http://eol.org>)

Are you looking for an image or information about a particular species? Are you looking for ways to engage your students in ongoing research? If so, the Encyclopedia of Life (EOL) is your go-to website. With >2 million images and 285 partners supplying additional resources, this site provides life-science educators with ample visuals to demonstrate evolutionary relationships or particular characteristics of a taxon. The site offers information and contacts for citizen science projects and is readily accessible through Facebook, Twitter, Google, and Yahoo. The resources include photos, podcasts, and access to various collections.

EOL was developed in response to E. O. Wilson’s 2007 speech proposing that “we learn more about our biosphere – and build a networked encyclopedia of all the

world’s knowledge about life.” The request became a reality when EOL went live in 2008, funded by the John D. and Catherine T. MacArthur Foundation and the Alfred P. Sloan Foundation. The original supporting institutions are the Field Museum, Harvard University, the Marine Biological Laboratory, Missouri Botanical Garden, and the Smithsonian Institution. The current list of institutional supporters is international, including such organizations as NCB Naturalis—the Netherlands Centre for Biodiversity, Norwegian Biodiversity Information Centre, and the South African National Biodiversity Institute.

Upon entering the site, you will encounter a search box. Type the common or scientific name of any organism to discover photos and detailed descriptions, as well as specific facts about the characteristics of the organism. Similarly, clicking on the name of a group of organisms takes you to a page with images and a clear discussion of the classification of the group followed by a list of references and additional resources.

On the website, you will also find classroom-relevant answers to questions such as “What is a species?” The answer to this question includes a discussion of biodiversity and the following definition: “Most broadly, a species is a group of organisms with a shared, closed gene pool. . . . According to this definition, a species is made up of all the organisms that are able to mate with each other and produce fertile offspring.”

You may also want to involve your students in actual research. The makers of the site suggest public participation in scientific research (PPSR) and present inventories that are being completed through activities called “bioblitzes.” Frequently sponsored by environmental groups, bioblitzes are 24-hour events in which participants survey a specific location to count and identify the living

things in that location. In addition, EOL lists 14 citizen science websites, such as Project Noah, that can be accessed directly. These citizen science programs offer students opportunities to make real impacts on the scientific community.

There are other resources buried within the site. The "Gateway for Educators" is one (<http://education.eol.org>). The EOL Learning + Education Group provides a variety of activities for use with students. These include games, field guides, and ecological relationship activities, among others. The group is looking for worldwide

collaboration through which educators are encouraged to utilize the ideas provided and share results.

Quoting the EOL information page: "Our knowledge of the many life-forms on Earth...is scattered around the world in books, journals, databases, websites, specimen collections.... Imagine what it would mean if this information could be gathered together and made available to everyone, anywhere, and at a moment's notice." The goal of Encyclopedia of Life is to bring together this information for the currently identified 1.9 million species and meet E. O. Wilson's

request "to learn more about our biosphere." Take a look, join, and contribute! This is an active site worth your time to visit.

Pat Waller
NABT President 2007
wallerfp@enter.net

REMY DOU taught high school life science for eight years before becoming an Albert Einstein Distinguished Educator Fellow (2011–2013). Currently he works as a Graduate Assistant at Florida International University where he contributes to STEM education research.

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