Our students are captivated by the characters, storylines, and gossip provided by pop culture (television, movies, magazines, books, sports, music, advertisements, and the Internet). They always seem more engaged when we incorporate examples and analogies from popular culture into our lectures. This seems especially true regarding non-majors biology students – a demographic group most instructors find challenging to teach because many of these students are frustrated and bored with the topic of biology. In accordance with these observations, I believe that pop culture references can be used as an effective pedagogical platform and have the potential to reshape the approach taken by many professors to teach introductory biology.

Why Refer to Pop Culture?

Many students find their first college biology class intimidating, confusing, or boring, and as a result, fail to retain much information or express an educated opinion on these topics. These frustrated students go elsewhere to learn more about the biological topics that interest them. Based on national polls (Media Central, 2000), college students are much more likely to use the Internet to retrieve information than go to the library. Whereas the Internet provides them with megabytes of biological information, it also provides megabytes of misinformation at the click of a button. With this in mind, we should aim to make our college classrooms an engaging, interactive, educational environment for these students. Of course, we should also strive to facilitate their learning, encourage their critical thinking, and improve their communication skills. Pop culture provides an ideal medium with which we can achieve these goals.

In my non-majors biology classes, I make sure I present the same vocabulary, hard facts, and concepts as do the other professors, but I do so via storytelling, role-playing, critique, and farce. At times, my classroom is much like a TV show in itself. (For example, to demonstrate exponential growth in my class, I refer to a classic episode of Star Trek ["The Trouble With Tribbles"] in which scientific Spock calculated the growth rate of fictitious, furry animals called Tribbles that were brought aboard the starship Enterprise. Details of this example can be found in Pryor [2003], and an online version is available at http://acsweb.fmarion.edu/ Pryor/tribbles.htm).

Figure 1. The Evolutionary Fitness Challenge.

In the late 1800s, the catch-phrase of Darwinism, "Survival of the fittest," was as popular as Paris Hilton's "That's hot!" and The Donald's "You're fired!" have been in recent years. The term "fittest," however, has a very different meaning to an evolutionary biologist than it does to the layperson. Evolutionary fitness is the reproductive success of an individual. It can be measured as the number of offspring produced in an individual's lifetime.

Let's submit some physically-fit action heroes to an Evolutionary Fitness Challenge. In Table 1, evolutionary fitness (number of children sired) is compared among various hunky heroes in Hollywood. Keep in mind that, as a relative measure of fitness, the average American woman has two children during her lifetime (U.S. Census Bureau, 2000).

How Appropriate Is a Pop Culture Approach?

Skeptics of this approach may be critical of the pop culture theme. Many believe that television rots the mind and is a poor substitute for the traditional presentation of biology in their courses. I counter by relating several cases in which non-majors students in my classes changed their major to biology because they became fascinated with the application of biology to their everyday lives. I also point out that some aspects of today's pop culture may become tomorrow's masterpieces, just as many literary, music, and film classics were pop culture phenomena in years past.

Further supporting this approach, a marked contrast exists between the average American's knowledge of pop culture and more academic topics. Statistically speaking (RealVision, 2007), nearly 60% of Americans can name all Three Stooges, yet fewer than 20% can name three Supreme Court Justices. Many more movies are rented each day in the U.S. than books are loaned out from libraries. In this generation, Herman Munster is better known than Herman Melville, Madonna is not recognized as the Virgin Mary but as an iconic singer who sang "Like a Virgin," and The Daily Show has replaced the daily newspaper.

Whether we agree with it or not, television has undeniable power and profound influence on our students. The average American watches over 28 hours of TV per week, and this number is rising. Surprisingly, there are more TVs (average = 2.73 per household) than Americans (average = 2.55 per household) in the United States (RealVision, 2007).
because pop culture is a rapidly-emerging theme in academic curricula. For example, Star Trek is the basis of a philosophy course at Georgetown University and the foundation of a religion course at Muhlenberg College. At Lebanon Valley College, philosophy is taught via The Simpsons. At Rutgers University, a post-WWII history course is taught with the help of James Bond movies. A physics course on Harry Potter is offered at Frostburg State University, “Buffyology” (the study of Buffy the Vampire Slayer) is available at Middle Tennessee State University, and the Elvish language Sindarin (from the Lord of the Rings) is taught at Turves Green Boys' Technical College. Even at Cornell, Brown, Berkeley, and other prestigious universities, pop culture is quickly becoming a fashionable course theme.

### Pop Culture in Print

To accompany these thematic courses, texts that integrate pop culture and academics are increasingly in demand. For example, some professors have now embraced the book The D’ohl of Homer (the Simpson) over The Iliad of Homer (the Greek). Open Court Publishing has published 11 volumes dealing with philosophy in pop culture, spanning from Semfield to The Sopranos. One of these, The Matrix and Philosophy, was critically acclaimed and reached The New York Times Top Ten Best Seller list in 2003. While pop culture continues to metastasize its way from academic curricula into print, one thing is clear: The field of biology has been immune from its attack. The only book I know that focuses on biology in pop culture is The Science of The X-Files (Cavelos, 1998), which is devoted to a single television series and is not a textbook, per se.

The field is thus wide open for a text that puts popular culture under the microscope of biological inquiry and critique.

Many biology textbooks, however, include at least one reference to pop culture. For example, Starr and Taggart (2006) discuss the genetic bases of earlobe attachment in actor Tom Cruise and basketball player Charles Barkley. Audesirk et al. (2005) present the “chin dimple” genetics in Lord of the Rings stars Viggo Mortensen and Orlando Bloom, and the sexy facial symmetry of Ben Affleck. Campbell et al. (2003) explain how Shakespeare enthusiasts in New York City were responsible for the spread of an invasive bird species across America. Belk and Borden (2007) ponder the genetics of Jurassic Park and Spider-Man, and relate the story of Magic Johnson’s battle with HIV/AIDS.

It is not surprising that these biology textbooks refer to examples from pop culture. Instructors often discover that teaching non-major biology students is facilitated by using examples from pop culture. We all do it. My goal is to kick it up a notch, engross the students in discussions and analyses of their favorite pop culture topics, and to teach them biology in the process.

This approach has tested favorably with other biology instructors, such as Borgwald and Schreiner (1994) and Edwards (1997). Edwards provides an excellent summary of this approach: “Pointing out the role of biology in such familiar

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Table 1. The Evolutionary Fitness Challenge. Illustration by Rick Simonson

On Darwin’s evolutionary playing field, Vin Diesel may be left in the dark (or, rather, Pitch Black) because — with only one child — he has below average evolutionary fitness. In contrast, Bruce Willis’ genes might Die Hard, since he has passed them on to three children. Arnold Schwarzenegger’s bulging biceps and prominent pecs have filled the big screen for almost three decades, from Pumping Iron to T3: Terminator 3 (Rise of the Machines). But at 60 years old, just how fit is this blockbuster barbarian? Clearly, the Governor of California has relatively high fitness (four kids), but he is not the fittest. Modestly-muscled Mel Gibson is even more fit, and has as many kids in real life as he did in the movie Patriot (in which he played Captain Benjamin Martin, a widower with seven children).

Darwin’s realm can be harsh on the male action hero’s ego. But if he talks the talk, shouldn’t Darwin walk the walk? How does the bearded sage measure up, in terms of evolutionary fitness? Well, not even promiscuous Mick Jagger, who has seven kids, meets the fitness of Charles Darwin. With 10 children, Chuck’s fitness makes the others seem weak in comparison. Who’s the girlie-man now, Arnold?

In final defense of this approach to teaching non-majors biology, I refer to the feedback of my students. In my classes, 100% of students filling out anonymous questionnaires at the end of the semester found the use of examples from pop culture interesting, and 97% found the examples helpful in learning and remembering the material. Furthermore, 76% said that they explained an aspect of biology to a family member or friend using an example from pop culture, as they learned in class. Regarding the standard biology textbooks I have used in class, 92% of students did not think they were helpful or interesting. Although my students clearly enjoyed the pop culture references and found them useful, a formal assessment of student learning in response to pop culture examples is warranted. I am eager to conduct or see the results of such an investigation.

On average, my non-major biology students claim they watch 14 hours of TV per week during the semester, but only four hours per week attending my classes and studying for them! To get their attention, it seems I can either compete against pop culture or embrace it. I choose the latter.

### Pop Culture Goes to College

Narratives and anecdotes from pop culture are powerful teaching tools that target interest and emotion in students. Apparently, I am not the only professor who believes this,
**Figure 2. Evolution of Spam by Natural Selection?**

Junk e-mail (spam) has become much more than a minor inconvenience in the electronic age. For example, America Online estimates that spam accounts for more than 30% of e-mail to its members, or roughly 24 million messages a day! But why is spam such a problem? How can it be getting worse, if the technological advances against it keep getting better? After all, companies offering anti-spam software have become overnight, multimillion-dollar industries that are determined to can spam.

In the early years of spam, spammers sent out large numbers of e-mail messages advertising almost anything imaginable (everything from nude pictures of celebrities to the infamous Nigerian business scam). Anything was fair game, and consumers were left to delete each piece of spam as it was received.

However, the battle against spam soon kicked into high gear. Prompted by a lust for the mighty dollar (roughly 25% of polled AOL users were willing to pay extra for spam-blocking), companies raced to create software that could filter spam before it reached the inbox. Software designed for this purpose was initially quite successful. How did it work? Content filters scanned the subject lines of incoming messages for common spam-like phrases, such as “Viagra.”

Many millions of spams were thus blocked, and many millions of dollars were lost. But spam producers did not take this lightly. They noticed that certain spam e-mails — those with innocent-sounding subject lines like “Re: your message,” or misspelled words like “Vaigra” — were still getting through. In accordance with these observations, spam perpetrators rebounded in force with more sophisticated, more resistant spam.

For example, some spammers avoid the e-mail filters by deliberately misspelling words that filters would otherwise block. Other spammers insert symbols or punctuation marks into the subject line words, for instance, “V1agra,” which allows them to pass the filters.

Such spam-resistance seems an apt example of Natural Selection (albeit in the electronic environment). Whereas the more vulnerable spam e-mails have been blocked and destroyed, those spams with the good fortune of filter-friendly subject lines have survived and have been further propagated.

But the evolution of spam doesn’t end there. Today, there are many different forms of spam, including instant messaging spam (“spim”), blog spam (“blam”), chat spam, mobile phone spam, and online gaming spam. This is similar to the concept of adaptive radiation, in which a single species gives rise to a variety of new species over time. In nature, the Galapagos finches (sometimes called Darwin’s finches) are represented by over a dozen species of finches that arose by adaptive radiation from a common ancestor that arrived on the isolated Galapagos Islands a long time ago.

and popular culture phenomena has proven very effective in reaching students who might otherwise have been intimidated by or prejudiced against science.” I couldn’t agree more.

**References**


