**Biotechnology: Making Real-World Connections**

<http://goo.gl/UMoiC>

**Welcome**

* Resources from [KQED](http://www.kqed.org/education) and  [QUEST](http://science.kqed.org/quest/)

**Using Multimedia in the Classroom**

* [Why Use Multimedia in Science Education](http://science.kqed.org/quest/files/downloads/2011/06/QUESTWhyMedia.pdf)
* [How to Use Media Effectively for Teaching and Learning](http://science.kqed.org/quest/files/downloads/2011/06/QUESTMediaTips.pdf)

**Using Multimedia for Real-world Biotechnology Connections**

* [New Hope for Heart Repair](http://science.kqed.org/quest/video/science-on-the-spot-new-hope-for-heart-repair/) – focus questions (assign 1-2 to each student)
  + How many people in the U.S. every year have a new heart attack? *nearly 1 million*
  + When a vessel in the heart gets clogged, what happens to the muscle that normally gets blood supplied from that vessel? *it dies*
  + What kinds of cells are being “hijacked” and turned into muscle? *support cells that normally make scars*
  + In the mouse, where are the reprogrammed genes injected? *directly into the muscle of the heart*
  + What happens in the mouse? t*he scar cells are converted into new muscle; the heart’s function is greatly restored--almost back to normal*
  + How is the “first generation” of reprogramming technology different? *scientists used to convert a skin cell to a stem cell, then a stem cell to another (e.g. beating heart) cell; now they can bypass the first step--the stem cell stage--and take support cells and turn them directly into heart muscle cells*
  + What challenges still remain in this procedure? *make sure that it is scalable for a human heart--may need millions of cells--and that it is safe; figure out the best way to deliver the reprogramming genes into the cells of the heart*
* [Decoding Synthetic Biology](http://science.kqed.org/quest/video/decoding-synthetic-biology/)
  + Watch 6:09-8:07 with no sound and have students write down questions
  + Can also watch intro to 2:31 and then from segment to the end to discuss the social importance of the work
* [Synthetic Biologist Karmella Haynes](http://ca.pbslearningmedia.org/content/biot09.biotech.car.karmella/)or[Why I Do Science: Drew Endy](http://science.kqed.org/quest/video/why-i-do-science-drew-endy/)
* What did the scientist say that stood out or was memorable?
* What interested him/her in the particular field of study?
* What does he/she like about the job?
* What about this career interests you?
* What questions would you like to ask to learn more about this career?
* [Building Vaccines](http://ca.pbslearningmedia.org/resource/kqbio10.biotech.tools.hepcbio/building-vaccines/) (on PBS LearningMedia)
* [Biofuels: Beyond Ethanol](http://science.kqed.org/quest/video/biofuels-beyond-ethanol/)
  + Watch and take notes on the pros and cons/challenges
  + [Educator Guide](http://science.kqed.org/quest/files/imp/202b_BiofuelsBeyondEthanol.pdf)
* [Biotechnology blog posts](http://science.kqed.org/quest/results/?cx=016903106374557566950%3Avyimzdoztua&cof=FORID%3A11&q=biotechnology&sa=) and those by [Dr. Barry Starr](http://science.kqed.org/quest/author/dr-barry-starr/)
  + Use blog posts as a way to elicit discussion. As a class, you may want to comment or post a question in a blog’s comment box.

**The** [**QUEST Website**](http://science.kqed.org/quest/)

* [Biotechnology Science Education Collection](http://science.kqed.org/quest/education/curriculum/biotechnology/)
* [Education worksheets](http://science.kqed.org/quest/education/curriculum/) and [media-making toolkit](http://science.kqed.org/quest/education/media-making-toolkit/)
* [Multimedia Analysis](http://science.kqed.org/quest/files/downloads/2011/06/QUESTMediaAnalysis.pdf) - especially good for controversial issues

**In the Works at KQED**

* Biotechnology e-book and iTunes U course; includes new career-profile videos
* New ½-hour tv story on genetically engineered crops airing in May
* Radio piece on gene patenting in April

[**Biotechnology Resources on PBS LearningMedia**](http://ca.pbslearningmedia.org/content/#taxonomy=Science%3A%3AEngineering%3A%3ASystems+and+Technologies%3A%3ABiotechnologies) (just some examples below)

* Applications
  + [Tissue Engineering](http://ca.pbslearningmedia.org/resource/biot09.biotech.app.tissueeng/tissue-engineering/) (great for discussing scientific process)
  + [Killer Microbe](http://ca.pbslearningmedia.org/content/biot09.biotech.concpt.kmicrobe/)
  + [Therapeutic Uses of Stem Cells](http://ca.pbslearningmedia.org/content/biot09.sci.life.gen.stemcells/) (interactive) [on TD](http://www.teachersdomain.org/resource/biot09.sci.life.gen.stemcells/)
* Careers
  + [Synthetic Biologist Karmella Haynes](http://ca.pbslearningmedia.org/content/biot09.biotech.car.karmella/)
  + [Careers in Biotechnology](http://ca.pbslearningmedia.org/content/biot09.biotech.car.careers/) (interactive) [on TD](http://www.teachersdomain.org/resource/biot09.biotech.car.careers/)
* Concepts
  + [Animal Cloning 101](http://ca.pbslearningmedia.org/content/biot09.sci.life.gen.cloning/) (interactive) [on TD](http://www.teachersdomain.org/resource/biot09.sci.life.gen.cloning/)
* [Tools and Techniques](http://www.teachersdomain.org/special/biot/biot.tools/) (how to’s)on TD, ex. Pipetting Demo

[**Biotechnology Collection from Teachers’ Domain**](http://www.teachersdomain.org/special/biot/) (assets are also available in PBS LearningMedia through above link)

**Another Good Resource:** [Bio-Link](http://www.bio-link.org)

* [Biotech Careers](http://biotech-careers.org)

**Student Media Projects**

* [Media-Making Toolkit](http://science.kqed.org/quest/education/media-making-toolkit/)
* [Online Training Modules](http://education.kqed.org/edspace/2013/02/06/pd-module-2-implementing-science-based-media-projects/#more-4635) (with biotechnology examples)