

Biomanufacturing Kit – Teacher Links

What is Biomanufacturing?

<http://biomanufacturing.org/teacherresources/high-school-teacher-resources/what-is-biomanufacturing>

<https://www.youtube.com/watch?v=1UOV2Ae3thg>

MIT program: <https://www.youtube.com/watch?v=8VpUsUaLpyw>

NIIMBL: <https://www.youtube.com/watch?v=iJe0paANw88>

Good Manufacturing Practices

Short Video (12 min): <https://www.youtube.com/watch?v=XiOP7ihBOyM>

Miltenyi video (30 min): <https://www.youtube.com/watch?v=F-k2zHxt5Wo>

10 principles short video (7 min) (clenched fist image is problematic):
<https://www.youtube.com/watch?v=tf3GNp2L7Mk>

10 rules of GMP (2min) : <https://www.youtube.com/watch?v=LK8MO3Qx4J4>

History of GMP (Pharma) Part 1 (5 min) : <https://www.youtube.com/watch?v=OEP7mpS4q2g>

History of GMP (Pharma) Part 2 (4min): <https://www.youtube.com/watch?v=go3NmGYF0sl>

Virtual Manufacturing Site Tours

Amgen Breda Facility Tour

https://www.youtube.com/watch?v=xzRCM1K2Lys&list=PLc9zwY1sNwDK_Fzl1W8SCbIhfXE2rKHaw

Amgen Rhode Island Facility Tour

https://www.youtube.com/watch?v=C7tat4Mzilw&list=PLc9zwY1sNwDK_Fzl1W8SCbIhfXE2rKHaw&index=2

Amgen Singapore Facility Tour

https://www.youtube.com/watch?v=2-hZtR1lc08&list=PLc9zwY1sNwDK_Fzl1W8SCbIhfXE2rKHaw&index=3

Amgen Ireland (Dun Laoghaire) Facility Tour

<https://www.youtube.com/watch?v=KVzVcwgdrVg>

Amgen Virtual Field Trip (Amgen Thousand Oaks, CA) – 360 degree view of all parts of the bioman process

<https://www.youvisit.com/tour/amgen/117478>

Purifying RFP

ABE Video - https://www.youtube.com/watch?v=AklIY9_4rhA

Longer ABE Video: <https://www.youtube.com/watch?v=xcaXEdzEqgM>

Career Resources:

<http://www.ncabr.org/wp-content/uploads/2015/12/mapping-your-future.pdf>

For high school students/teachers. Has some good content.

<https://biotech-careers.org>

<https://biotech-careers.org/videos/quality-control-associate>

<https://biotech-careers.org/videos/quality-assurance-associate>

<https://biotech-careers.org/videos/process-technician>

<https://biotech-careers.org/videos/process-engineer>

<https://biotech-careers.org/videos/validation-specialist>

Careers at Amgen: <https://careers.amgen.com/>

Alternative careers in biotech/bioman

<https://blogs.lse.ac.uk/careers/2017/10/18/five-biotech-career-options-for-non-scientists/>

<https://www.stoodnt.com/blog/top-11-alternative-careers-for-biotechnology-life-science-graduates-hot-jobs-outside-the-lab-academia/>

<https://bitesizebio.com/301/alternative-careers-for-scientists/>

Interactive resources:

COVID Vaccine Manufacturing Interactive

<https://www.biotech-careers.org/sites/default/files/2021/02/18/mRNA-vaccine-supply-chain.svg#>

Bioman mistake scenario - Making the Call: Quality in Biomanufacturing

<https://www.franklinbiologics.org/>

Upstream Process

<https://atelearning.com/qcbio19/index.php>

User name = your own email Password = qcbtc

Downstream Process

https://www.mc3.edu/downstreamprocessing/story_html5.html

This is a webinar that walks you through the use of the Downstream Process virtual tool:

<https://innovatebio.org/video/webinar-3-virtual-tools-for-protein-purification-and-downstream-processing>

Diversity in Biotech

<https://citl.indiana.edu/teaching-resources/diversity-inclusion/managing-difficult-classroom-discussions/index.html>

<https://www.bio.org/blogs/black-history-month-20-black-trailblazers-science-and-biotechnology-you-need-know>

<https://www.bio.org/blogs/hispanic-heritage-month-25-hispanic-and-latinx-trailblazers-science-and-biotechnology-know>

<https://www.massbio.org/news/recent-news/diversity-equals-stronger-companies-how-do-we-get-there/>

Aligning Stars of All Colors: Nature Biotech Editorial (2018)

<https://www.nature.com/articles/nbt.4050>

Weaving Indigenous Knowledge into the Scientific Method – Nature (2022)

https://www.nature.com/articles/d41586-022-00029-2?utm_source=Nature+Briefing&utm_campaign=171f22bf98-briefing-dy-20220112&utm_medium=email&utm_term=0_c9dfd39373-171f22bf98-43782593

Recruitment of minorities for COVID-19 vaccine trials

https://jamanetwork.com/journals/jama/fullarticle/2769611?utm_source=twitter&utm_campaign=content-shareicons&utm_content=article_engagement&utm_medium=social&utm_term=081420&utm_source=Global+Health+NOW+Main+List&utm_campaign=d89dc44e09-EMAIL_CAMPAIGN_2020_08_13_04_23&utm_medium=email&utm_term=0_8d0d062dbd-d89dc44e09-3062733#.XzYtULEUv6o.twitter

Henrietta Lacks

<https://www.labroots.com/trending/cancer/22291/henrietta-lacks-donor-giving>

Vulnerable populations exploited in medical studies

<https://www.reliasmedia.com/articles/139953-heres-a-list-of-vulnerable-populations-historically-exploited-in-us-research-studies>

Access to health care

<https://www.theatlantic.com/health/archive/2019/06/health-care-human-right/592357/>

<https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/access-health-services>

<https://www.ajmc.com/view/5-vulnerable-populations-in-healthcare>

https://www.ama-assn.org/about/ama-center-health-equity?gclid=CjwKCAjwsfuYBhAZEiwA5a6CDDGGzUzy7QH57c6dhLYJeRBviGfiQQ_LzTEI-DAWLA-4xV5Lr390OxoCpfYQAvD_BwE

some good graphs - <https://www.kff.org/racial-equity-and-health-policy/issue-brief/disparities-in-health-and-health-care-5-key-question-and-answers/>

Drug costs

<https://www.commonwealthfund.org/blog/2021/case-drug-pricing-reform-cost-inaction>

<https://www.theatlantic.com/health/archive/2019/03/drug-prices-high-cost-research-and-development/585253/>