

## *Interesting Sites for Science*

### *Medical Physics*

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#### **How Pandemics Spread**

In our increasingly globalized world, a single infected person can board a plane and spread a virus across continents. Mark Honigsbaum describes the history of pandemics and how that knowledge can help halt future outbreaks.

<http://ed.ted.com/lessons/how-pandemics-spread>

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#### **Is Biomedical Research Really Close to Curing Anything?**

A century ago, people would suffer and die from what we now consider routine bacterial infections. With the discovery of penicillin, a miracle occurred where it became possible to cure people who previously had been left for dead. We're now at the edge of a similar revolution due to remarkable innovations in the field of regenerative biology. In What's Up, Doc? Is Biomedical Research Really Close to Curing Anything?, Professor Douglas Melton introduces the astounding advances being made today to unlock the powerful potential hidden within our own cells

<http://floatinguniversity.com/lectures-melton>

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#### **The Story of You**

Ever since a monk called Mendel started breeding pea plants we've been learning about our genomes. In 1953, Watson, Crick and Franklin described the structure of the molecule that makes up our genomes: the DNA double helix. Then, in 2001, scientists wrote down the entire 3-billion letter code contained in the average human genome. Now they're trying to interpret that code; to work out how it's used to make different types of cells and different people. The ENCODE project, as it's called, is the latest chapter in the story of you.

<http://www.youtube.com/watch?v=TwXXgEz9o4w>

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#### **ENCODE: Encyclopedia Of DNA Elements**

ENCODE, the Encyclopedia of DNA Elements, is the most ambitious human genetics project to date. It takes the 3 billion letters described by the Human Genome Project in 2000, and tries to explain them. Remarkably, ENCODE scientists have managed to assign a biochemical function to 80% of the genome, including the genes and the parts of the genome that tell those genes what to do. This information is helping us understand how genomes are interpreted to make different types of cells and different people -- and crucially, how mistakes can lead to disease. In this video, ENCODE's lead coordinator, Ewan

Birney, and Nature editor Magdalena Skipper talk about the challenges of managing this colossal project and what we've learnt about our genomes.

<http://www.youtube.com/watch?v=Y3V2thsJ1Wc&feature=relmfu>

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### **Understanding ENCODE**

The Encyclopedia of DNA Elements (ENCODE) Consortium is an international collaboration of research groups funded by the National Human Genome Research Institute (NHGRI). The goal of ENCODE is to build a comprehensive parts list of functional elements in the human genome, including elements that act at the protein and RNA levels, and regulatory elements that control cells and circumstances in which a gene is active.

<http://www.youtube.com/watch?v=yjpW30z-SB8&feature=related>

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### **Science (and more) to Music**

This site offers many songs related to math, social studies, and science concepts. Science concepts include water & pollution, scientific inquiry, changes in matter, and much more. Math concepts range from order of operations to quadratic and exponential functions. After choosing a topic, you can listen to the song online, download the mp3, view lyrics, and possibly view an accompanying video.

<http://www.iamlodge.com/beans/>

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### **The story behind the science**

Thirty stories spanning five disciplines help students explore the development of key science concepts through the eyes of the scientists who were involved. Supplemental resources are provided for teachers to help achieve the greatest impact from the stories.

<http://www.storybehindthescience.org/>

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### **Study Of Ribosome Challenges 'RNA World' Hypothesis**

The "RNA world" hypothesis suggests that the first stages of molecular evolution involved RNA and not proteins, and that proteins (and DNA) emerged later. Now, researchers have found evidence that proteins were on the scene and interacting with RNA even before the ribosome's many working parts were recruited for protein synthesis.

[http://www.eurekalert.org/pub\\_releases/2012-03/uoia-sor030512.php](http://www.eurekalert.org/pub_releases/2012-03/uoia-sor030512.php)

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### **Flash animations for classroom use**

Cellular Respiration

DNA and Genetic Disorders

DNA to RNA to Protein - What does it all mean?

Electrophoresis - Separating by Length

Electrophoresis - What's in a Band?

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Photosynthesis

Polymerase Chain Reaction (PCR) - Virtual Lab

Protein Electrophoresis

AIDS, HIV and tRNA

Bacterial Homeostasis and Tooth Decay

<http://lifesciences.envmed.rochester.edu/media.html>

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### **Talking Glossary of Genetic Terms**

The National Human Genome Research Institute (NHGRI) created the Talking Glossary of Genetic Terms to help everyone understand the terms and concepts used in genetic research. In addition to definitions, specialists in the field of genetics share their descriptions of terms, and many terms include images, animation and links to related terms.

<http://www.genome.gov/Glossary/index.cfm>

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### **Symphony of Science - The Greatest Show on Earth! - The Greatest Show on Earth!**

A new Symphony of Science video featuring David Attenborough, Bill Nye, and Richard Dawkins.

<http://symphonyofscience.com/videos.html>

You can download all the audio tracks to the Symphony of Science videos for free at

<http://melodysheep.bandcamp.com/album/symphony-of-science-bundle-v11> . Just click the "Buy Now" button and enter 0.00 in the name your price box then click "checkout now". On the new page click "Download" and save the zip file to your computer.

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### **Building Blocks of Life Lab using Legos**

The shape of a protein determines its function. In this lab, students will be given a hypothetical DNA sequence for part of an enzyme. Using the Universal Genetic Code, they will then determine the amino acid sequence coded for by the DNA. Students will examine a “substrate” and predict the shape of an enzyme that could interact with that substrate. Differently shaped Lego! blocks will represent different amino acids.

[http://cibt.bio.cornell.edu/labs\\_and\\_activities/images/LegoLab.pdf](http://cibt.bio.cornell.edu/labs_and_activities/images/LegoLab.pdf)

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### **Evolution Is Written All Over Your Face**

Biologists working as "evolutionary detectives" studied the faces of 129 adult male primates from Central and South America, and found that the faces they studied evolved over at least 24 million years.

<http://newsroom.ucla.edu/portal/ucla/i-ve-just-seen-a-face-221465.aspx>

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### **The not-so-naked ape**

Human body hair, once thought to be an evolutionary relic, has a real job to do

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<http://www.economist.com/node/21541808>

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### **Neuroscience Gallery**

This is a collection of neuroscience-related imagery found on the web. All of these images originate from publically accessible websites. Includes animations.

<http://www.conncad.com/gallery/animated.html>

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### **1918 Flu Video from NOVA**

A virus that killed up to 50 million people is brought back to life to decipher its deadliness.

<http://www.pbs.org/wgbh/nova/body/1918-flu.html>

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### **The real reason for brains**

Neuroscientist Daniel Wolpert starts from a surprising premise: the brain evolved, not to think or feel, but to control movement. In this entertaining, data-rich talk he gives us a glimpse into how the brain creates the grace and agility of human motion.

[http://www.ted.com/talks/lang/en/daniel\\_wolpert\\_the\\_real\\_reason\\_for\\_brains.html](http://www.ted.com/talks/lang/en/daniel_wolpert_the_real_reason_for_brains.html)

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### **Antibody-Mediated Immune Response**

Antibody-Mediated Immune Response video animation

<http://www.youtube.com/watch?v=hQmaPwP0KRI>

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### **Cell Mediated Immune Response**

Cell Mediated Immune Response video animation

<http://www.youtube.com/watch?v=1tBOMG0QMbA>

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### **Brain Myths Busted by Science**

Brain games will make you smarter! The internet is making you dumber! Alcohol is killing your brain cells! The brain is a mystery we've been trying to solve for ages, and the desire to unlock its secrets has led to vast amounts of misinformation. Many of these false notions are more widely believed than the truth. We took our healthy skepticism and a bunch of brain research to find the truth behind some of the most common myths about intelligence and our brains.

<http://lifehacker.com/5867049/nine-stubborn-brain-myths-that-just-wont-die-debunked-by-science>

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### **The Blood Typing Game**

Match the correct blood with the patients to help them alive!

<http://www.nobelprize.org/educational/medicine/landsteiner/landsteiner.html>

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## **The Electrocardiogram Game**

<http://www.nobelprize.org/educational/medicine/ecg/index.html>

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## **The Virtual Autopsy**

Welcome to The Virtual Autopsy - a newly revised site based on the original Virtual Autopsy sites. If you are familiar with the previous sites, you will have no problems navigating this one as the layout is the same. If you are new to The Virtual Autopsy - do not fear, this site is very easy to navigate.

<http://www.le.ac.uk/pa/teach/va/titlpag1.html>

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## **Virtual Scanning Electron Microscopy**

The site has teamed up with award-winning electron microscopist Dr. Dennis Kunkel to produce a series of interactive Java tutorials that explore various aspects of virtual Scanning Electron Microscopy (vSEM). Use the tutorial below to discover how specimens appear when magnified in the virtual SEM.

<http://micro.magnet.fsu.edu/primer/java/electronmicroscopy/magnify1/index.html>

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## **Flu Attack! How A Virus Invades Your Body**

It starts very simply. A virus, just one, latches on to one of your cells and fools that cell into making lots more. Lots, lots more, like a million new viruses. This animation shows you how viruses trick healthy cells to join the dark side.

<http://www.npr.org/blogs/krulwich/2011/06/01/114075029/flu-attack-how-a-virus-invades-your-body>

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## **Obvious to you, amazing to others.**

A little video about the power of the mind. Something you should share with your students. Might make for good discussion.

<http://www.wimp.com/obviousoyou/>

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## **Biodiversity**

Four Prezi's on Biodiversity

<http://dpapbio.wikispaces.com/Presentations-Biodiversity>

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## **Science360 News**

News from wherever science is happening, including directly from scientists, college and university press offices, popular and peer-reviewed journals, dozens of National Science Foundation science and engineering centers, and funding sources that include government agencies, not-for-profit organizations and private industry.

You can subscribe to a daily email blast for a one-stop shop source of science news.

<http://news.science360.gov/files/>

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### **Free Science Videos**

Over 600 Free Science Videos ( Biology, Chemistry, Physics) from Brightstorm Science. Science help with teachers explaining concepts and sample problems.

<http://www.brightstorm.com/science/>

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### **Finding Your Science**

Finding Your Science is a National Science Foundation video series that's all about science passion, perspective, and inspiration.

<http://science360.gov/series/Finding+Your+Science/721b999b-1b3f-485a-aa29-4640e66f3fe0>

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### **Biotechnology Teacher Resources**

A page of biotechnology resources.

<http://www.cerhb.ufl.edu/education-center/resources/teacher-resources.aspx>

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### **Molecular Visualizations of DNA**

This never gets old. Amazing CGI visualization of molecular biology's central dogma. It shows animations of DNA coiling, replication, transcription and translation.

It was created by Drew Berry of the Walter and Eliza Hall Institute of Medical Research

<http://science-documentaries.com/?p=790>

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### **DNA for Teachers**

Here you can find a range of resources from Flash animations to paper and web based activities, which will support the teaching of topics such as DNA, genes and proteins, cancer and the Human Genome Project. The activities and animations are designed to complement the national curriculum and GCSE, AS and A-level Science specifications for 14-19 year olds and can be used during lessons and science clubs or used for setting homework tasks.

[http://www.yourgenome.org/landing\\_teachers.shtml](http://www.yourgenome.org/landing_teachers.shtml)

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### **Craft a DNA Bracelet**

Every living organism has DNA. Create your own DNA bracelet using colorful beads that correspond to a segment of DNA sequence from a domestic cat, platypus or a woolly mammoth, among other animals.

DNA Bracelet Instructions

<http://www.genome.gov/Pages/Education/Modules/DNABraceletInstructions.pdf>

DNA Bracelet Organism Sequence Templates

