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Student Manual

Excellence In Higher Education for Liberian Development

Developed by:

The University of Michigan

PLAYLIST

Alternative Energy: List of Open Educational Resources

Creator: [Open.Michigan, University of Michigan](#) (Updated 28 Mar 2013)

Description:

Open Educational Resources are learning materials that are free, public, and shared under licenses that allow people to copy, translate, adapt, and share with others.

Tags: [Energy](#), [Alternative](#)

1. National Center for Learning and Teaching , [Lesson Plans: Clean Energy: Converting Light to Energy](#) [<http://nanosense.org/activities/cleanenergy/index.html>]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: This unit explores the issue of energy production as a pressing global issue and how nanoscience could enable important breakthroughs in energy generation and conversion. In particular, traditional and newer "nano" solar technologies are introduced and explored. Upon completing this unit, students will understand: Clean alternative energy technologies must be developed to provide sufficient energy to meet growing global demand, and must be sustainable both environmentally and economically; Nanoscience could enable important breakthroughs in solar energy technology through low cost, novel energy conversion mechanisms; Surface area to volume ratio is a function of particle size and shape. Increasing surface area normally increases the rate of reaction because there are more sites available for simultaneous reaction; Energy is neither created nor destroyed--it can only be converted into different forms. Length: 2 lessons, up to 3 50-minute classroom periods if all lessons are used. Not all lessons are required. Use the lessons most appropriate for your students

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2. Environmental Science Activities for the 21st Century, [Lesson Plan: Alternative Energy: Solar Energy](#) [<http://esa21.kennesaw.edu/activities/solar/solaractivity.doc>]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: This lesson provides an introduction to the use of the sun's energy. Topics include the history of solar energy usage and its more recent adaptations. There is also discussion of how the sun produces and radiates energy and what happens when it reaches Earth.

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3. University Of California, [Article: Renewable Energy Sources](#) [<http://cnx.org/content/m16731/latest/>]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: This unit explores the issue of energy production as a pressing global issue and how nanoscience could enable important breakthroughs in energy generation and conversion. In particular, traditional and newer "nano" solar technologies are introduced and explored. Upon completing this unit, students will understand: Clean alternative energy technologies must be developed to provide sufficient energy to meet growing global demand, and must be sustainable both environmentally and economically; Nanoscience could enable important breakthroughs in solar energy technology through low cost, novel energy conversion mechanisms; Surface area to volume ratio is a function of particle size and shape. Increasing surface area normally increases the rate of reaction because there are more sites available for simultaneous reaction; Energy is neither created nor destroyed--it can only be converted into different forms. Length: 2 lessons, up to 3 50-minute classroom periods if all lessons are used. Not all lessons are required. Use the lessons most appropriate for your students

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4. University of Hong Kong , [Interactive Chart: Keeping the Air Clean](#) [<http://www.learnactivity.com/lo/flash/solutions/index.htm>]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: This item presents information about alternative sources of energy, using industrial control techniques, and the role of trees and oceans in keeping the air clean. Includes great graphics.

Custom License: In this web site, you will find useful ideas and material. Be free to benefit from them for educational purposes.
5. Massachusetts Institute of Technology, [Course: Introduction to Electric Power Systems](#) [<http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-061-introduction-to-electric-power-systems-spring-2011/>]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: This course is an introductory subject in the field of electric power systems and electrical to mechanical

energy conversion. Electric power has become increasingly important as a way of transmitting and transforming energy in industrial, military and transportation uses. Electric power systems are also at the heart of alternative energy systems, including wind and solar electric, geothermal and small scale hydroelectric generation.

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6. University of Colorado at Boulder, **Activity: Renewables** [http://www.teachengineering.org/view_activity.php?url=http://www.teachengineering.com/collection/cub_/activities/cub_energy2/cub_energy2_lesson02_activity3.xml]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: Students form expert engineering teams working for the (fictional) alternative energy consulting firm, Renewables, Inc. Each team specializes in a form of renewable energy used to generate electrical power: passive solar, solar photovoltaic, wind power, low-impact hydropower, biomass, geothermal and (for more advanced students) hydrogen fuel cells. Teams produce poster presentations making a case for their technology and produce an accompanying PDF document using Adobe Acrobat that summarizes the presentation.

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7. Massachusetts Institute of Technology, **Course: Fueling Sustainability: Engineering Microbial Systems for Biofuel Production** [<http://ocw.mit.edu/courses/biology/7-347-fueling-sustainability-engineering-microbial-systems-for-biofuel-production-spring-2011/>]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: The need to identify sustainable forms of energy as an alternative to our dependence on depleting worldwide oil reserves is one of the grand challenges of our time. The energy from the sun converted into plant biomass is the most promising renewable resource available to humanity. This seminar will examine each of the critical steps along the pathway towards the conversion of plant biomass into ethanol.

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8. University of Colorado at Boulder, **Activity: Power to the People** [http://www.teachengineering.org/view_activity.php?url=http://www.teachengineering.com/collection/cub_/activities/cub_energy2/cub_energy2_lesson09_activity4.xml]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: Students read and evaluate descriptions of how people live "off the grid" using solar power and come to understand better the degree to which that lifestyle is or is not truly independent of technological, economic and cultural infrastructure and resources. In the process, students develop a deeper appreciation of the meaning of "community" and the need for human connection.

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9. Massachusetts Institute of Technology, **Course: Design for Sustainability, Fall 2004** [<http://dspace.mit.edu/handle/1721.1/39134>]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: This course on sustainability will cover the implications of this topic on engineering, design, and architecture. The course will begin with a general survey and discussion of current trends, followed by the introduction of the life cycle assessment (LCA) method as a rigorous, quantitative alternative to current popular sustainability measures for the built environment.

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10. University of Colorado at Boulder, **Activity: The Grid** [http://www.teachengineering.org/view_activity.php?url=http://www.teachengineering.com/collection/cub_/activities/cub_energy2/cub_energy2_lesson04_activity5.xml]
Notes: Source: <http://www.oercommons.org/search?f.search=alternative+energy>

Description: The class forms a "Presidential Task Force" for a week, empowered by the president to find answers and make recommendations concerning the future of the national power grid. Task force members conduct daily debriefings with their research team and prepare a report and presentation of their findings for the president, using an actual policy document as a guide.

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11. Open University UK, **Module: Energy resources: Alternative energy in perspective** [http://openlearn.open.ac.uk/course/view.php?name=S278_11]
Notes: Source: <http://ocwconsortium.org/en/courses>

Description: Alternative energy sources are seen by many people as potential solutions to the many economic and environmental challenges posed by the current dominance of world energy supply by fossil and nuclear fuels. Just how realistic are these hopes? This unit summarises the technical and geographic challenges posed by each alternative source. It is left to you to judge the feasibility of implementing these changes against the claims for 'alternative' solutions to global energy challenges that are regularly made.

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12. Open University UK, **Module: Energy resources: Geothermal energy**
[http://openlearn.open.ac.uk/course/view.php?name=S278_5]

Notes: Source: <http://ocwconsortium.org/en/courses>

Description: Energy from sources other than fossil and nuclear fuels is to a large extent free of the concerns about environmental effects and renewability that characterise those two sources. Each alternative source supplies energy continually, whether or not we use it. This unit considers one of these alternative sources, geothermal energy derived from the interior heat of the Earth, and the potential for this alternative to supplant fossil and nuclear fuel use to power social needs fast enough to avoid the likelihood of future global warming and other kinds of pollution.

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13. Open University UK, **Module: Energy resources: Solar energy** [http://openlearn.open.ac.uk/course/view.php?name=S278_6]

Notes: Source: <http://ocwconsortium.org/en/courses>

Description: Energy from sources other than fossil and nuclear fuels is to a large extent free of the concerns about environmental effects and renewability that characterize those two sources. Each alternative source supplies energy continually, whether or not we use it, and most have their origins in energy generated outside the Earth, yet the potential of each is limited by its total supply set against its rate of use. The Sun will radiate energy until it ceases thermonuclear fusion, in around 5 billion years. This unit explores the Sun as a potential source of usable energy.

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14. University of California - Berkeley, **Video Lecture: Renewable Energy & Alternative Fuels**
[<http://studentscircle.net/live/2011/11/renewable-energy-alternative-fuels/>, http://www.youtube.com/watch?list=PL214AD3BA0B8D3FBA&feature=player_embedded&v=r94xoS80ykk]

Notes: Source: <http://ocwconsortium.org/en/courses>

Description: The basic concepts underlying the economic regulation of energy. In addition, discussion, of three federal acts that form reference points for our national conversation about renewable energy.

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15. University of Applied Sciences, **Student Thesis: Renewable Energy as a Solution to Nigerian Energy Crisis**
[<http://studentscircle.net/live/2011/05/renewable-energy-as-a-solution-to-nigerian-energy-crisis/>]

Notes: Source: <http://ocwconsortium.org/en/courses>

Description: The aim of this study is to investigate the potentials of renewable energy sources in Nigeria and how to support, promote and courage the growth of renewable energy resources in Nigeria to close the gap of 60-70% of Nigerians that did not have access to energy that is environmentally friendly. Alternative energy sources are good and wonderful options because they are limitless. We will not run out of them as we may run out of the fossils fuels which are the major sources of energy in Nigeria. Also it is not only the declining levels of fossil fuels that is the only major concern that will make Nigeria to adapt and switch to the use of renewable energy sources. Climate change, which is cause as a result of carbon emissions and environmental pollution, is drawing world attention and forcing national governments to formulate policies that will make their nations adapt the use of renewable energy sources to cut environmental pollution to the bearest minimum because global warming has become a major issue and problem of the world today and in the future. Two different research methods were used in the empirical part of the study. At first, the structured questionnaire survey was carried out. Moreover interviews were executed. The use of both research methods proved to be useful in exploring the energy situation in Nigeria and receiving reliable results. Based on the empirical results, the energy problems are clear. The main conclusion of the research is potential of renewable energy resources in Nigeria are put at excess of 1.5 times that of fossil energy resources, in energy terms. Solar energy would be the best solution to the crisis followed by biomass and hydro which also have significant potentials to improve and make a difference on the low level of electricity in Nigeria, with emphasis on the rural areas, through the adoption and the use of these renewable energy resources for sustainable development.

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16. Open University UK, **Module: Living without Oil** [http://openlearn.open.ac.uk/course/view.php?name=S176_1]

Notes: Source: <http://ocwconsortium.org/en/courses>

Description: Crude oil is currently our most important global source of energy. It is vital in the manufacture of many modern materials. But the world's supply of oil is finite, its price is unstable and our reliance on oil has damaging environmental consequences. This unit explains why developing alternatives to oil is an essential and urgent task for humanity.

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17. TED Talks, **Video Lecture: William Kamkwamba on building a windmill**
[http://www.ted.com/talks/lang/en/william_kamkwamba_on_building_a_windmill.html]

Notes: Source: ted.com

Description: When he was just 14 years old, Malawian boy William Kamkwamba built his own electricity

Description: when he was just 14 years old, Malawian inventor William Kamkwamba built his family an electricity-generating windmill from spare parts, working from rough plans he found in a library book. To power his family's home, young William Kamkwamba built an electricity-producing windmill from spare parts and scrap -- starting him on a surprising journey detailed in the new book, "The Boy Who Harnessed the Wind."

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18. TED Talks, [Video Lecture: Donald Sadoway: The missing link to renewable energy](#)
[http://www.ted.com/talks/lang/en/donald_sadoway_the_missing_link_to_renewable_energy.html]
Notes: Source: ted.com

Description: What's the key to using alternative energy, like solar and wind? Storage -- so we can have power on tap even when the sun's not out and the wind's not blowing. In this accessible, inspiring talk, Donald Sadoway takes to the blackboard to show us the future of large-scale batteries that store renewable energy. As he says: "We need to think about the problem differently. We need to think big. We need to think cheap." Donald Sadoway is working on a battery miracle -- an inexpensive, incredibly efficient, three-layered battery using "liquid metal."

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19. TED Talks, [Video Lecture: Amory Lovins: A 40-year plan for energy](#)
[http://www.ted.com/talks/lang/en/donald_sadoway_the_missing_link_to_renewable_energy.html]
Notes: Source: ted.com

Description: In this intimate talk filmed at TED's offices, energy innovator Amory Lovins shows how to get the US off oil and coal by 2050, \$5 trillion cheaper, with no Act of Congress, led by business for profit. The key is integrating all four energy-using sectors-and four kinds of innovation. In his new book, "Reinventing Fire," Amory Lovins shares ingenious ideas for the next era of energy.

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20. TED Talks, [Video Lecture: Saul Griffith's kites tap wind energy](#)
[http://www.ted.com/talks/lang/en/saul_griffith_on_kites_as_the_future_of_renewable_energy.html]
Notes: Source: ted.com

Description: In this brief talk, Saul Griffith unveils the invention his new company Makani Power has been working on: giant kite turbines that create surprising amounts of clean, renewable energy. Inventor Saul Griffith looks for elegant ways to make real things, from low-cost eyeglasses to a kite that tows boats. His latest projects include open-source inventions and elegant new ways to generate power.

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21. TED Talks, [Video Lecture: Richard Sears: Planning for the end of oil](#)
[http://www.ted.com/talks/lang/en/richard_sears_planning_for_the_end_of_oil.html]
Notes: Source: ted.com

Description: As the world's attention focuses on the perils of oil exploration, we present Richard Sears' talk from early February 2010. Sears, an expert in developing new energy resources, talks about our inevitable and necessary move away from oil. Toward ... what? Richard Sears thinks hard about the post-oil world. He's a visiting scientist at MIT, after a long career as a VP at Shell.

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22. TED Talks, [Video Lecture: Bill Gross on new energy](#)
[http://www.ted.com/talks/lang/en/bill_gross_on_new_energy.html]
Notes: Source: ted.com

Description: Bill Gross, the founder of Idealab, talks about his life as an inventor, starting with his high-school company selling solar energy plans and kits. Learn here about a groundbreaking system for solar cells -- and some questions we haven't yet solved. Bill Gross founded Idealab, an incubator of new inventions, ideas and businesses.

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