



Introductory Unit: **CLIMATE CHANGE, PEAK** **EVERYTHING, SUSTAINABILITY &** **YOUR JOB IN A GREEN ECONOMY**

NM Standards and Benchmarks

Social Studies:

Geography Strand, Content Standard II-C:

Analyze the impact of people, places, and natural environments upon the past and present in terms of our ability to plan for the future.

Performance Standard #2: Compare and contrast how different viewpoints influence policy regarding the use and management of natural resources.

Economics Strand, Content Standard IV-B:

Analyze and evaluate how economic systems impact the way individuals, households, businesses, governments, and societies make decisions about resources and the production and distribution of goods and services.

Performance Standard #8:

Evaluate economic systems by their ability to achieve broad societal goals (e.g., efficiency, equity, security, employment, stability, economic growth).

Performance Standard #10:

Interpret measurements of inflation and unemployment and relate them to the general economic “health” of the national economy.

Science:

Strand III, Science and Society, Content Standard I:

Examine and analyze how scientific discoveries and their applications affect the world, and explain how societies influence scientific investigations and applications.

Performance Standard #3:

Evaluate the influences of technology on society (e.g., communications, petroleum, transportation, nuclear energy, computers, medicine, genetic engineering) including both desired and undesired effects, and including some historical examples (e.g., the wheel, the plow, the printing press, the lightning rod).

Performance Standard #4:

Understand the scientific foundations of common technologies (e.g., kitchen appliances, radio, television, aircraft, rockets, computers, medical X-rays, selective breeding, fertilizers and pesticides, agricultural equipment).

Performance Standard #12:

Explain how societies can change ecosystems and how these changes can be reversible or irreversible.

Content

Climate change represents one of the most significant and serious environmental, economic and social challenges ever facing the global community. Climate change is the long-term change in average weather conditions, including temperature, precipitation and wind which can result in unpredictable and extreme weather events. According to the United Nations Intergovernmental Panel on Climate Change (IPCC), which is comprised of the world's leading scientific experts in the field of climate science, the global climate is undergoing dramatic changes as the direct result of greenhouse gas emissions from human activity. Climate change along with increasing natural resource scarcity (e.g., peak oil, peak water) and the need for energy independence have spurred global efforts to improve energy efficiency and transition to renewable energy and clean technologies to reduce greenhouse gas emissions, create jobs, and achieve energy security. The green economy holds tremendous promise for job creation in the U.S. and New Mexico. Federal, state and local incentives are needed in the short- and mid-term to facilitate the transition and associated job growth. Find out what efforts are underway in New Mexico to develop our green economy at the state level, regionally and locally. Is there a green job for your students? What are the workplace expectations and career readiness skills needed for employment in the green economy?

Vocabulary

greenhouse effect
global climate change
Peak Oil
fossil fuels
non-renewable energy
renewable energy
clean energy
carbon footprint
sustainability
climate mitigation
climate adaptation
resilience
green job
green economy
green product or service
environmental justice
social justice
career pathway
certificate program
apprenticeship
credentialed program
financial aid
workplace expectations
payroll deductions
employee benefits

Essential Questions

- How are climate change and the depletion of fossil fuels connected?
- How has human lifestyle since the Industrial Revolution affected the earth's environment?
- How can I develop a sustainable lifestyle that can meet the demands of the future?

Focus Questions

- What are the components of a green economy?
- What projects, systems and organizations do we already have in place to create a green economy?
- Is there a job for me in the local green economy?

Time Allocation

2 weeks

Introduction

(2 classes)

Objective:

Students will demonstrate understanding of the environmental, social, and economic implications of global climate change and peak oil, and the importance of sustainability.

Activities:

1. Demonstration of greenhouse effect. Leave your car in the sun for the afternoon with the windows closed. Take class to your car, offer three students a seat in the car and ask them to close the door. After a few minutes, have them get out and describe the difference between the environment inside the car and out. Why is it hotter/stuffier in the car than outside? Move the group inside to make connections between what they just experienced and the science of the greenhouse effect.
(*Alternative:* “Recreating the Greenhouse Effect”, although an elementary grade activity it has relevance and adaptability. See Appendix I.1)
2. Graph of Climate Change since 1500 C.E. (See Appendix I.2 Source: <http://maps.grida.no/go/graphic/historical-trends-in-carbon-dioxide-concentrations-and-temperature>). Ten minute discussion on why students think that both CO₂ levels and average temperatures have risen since the Industrial Revolution. What industrial by-products might have contributed to this rise?
3. Optional activity: Play interactive game about tradeoffs related to energy choices (e.g., economics, environmental impact, community acceptance) from National Science Teachers Association. <http://www.windows2universe.org/modules/energy/index.html>

Materials: sunlight, automobile, graph to be shown on screen from laptop, projection.

Resources:

- Climate Change Graphics from United Nations Environment Program <http://www.grida.no/publications/vg/climate/>
- *An Inconvenient Truth*, (2006, Video 93 min.)
- *A New Covenant with Nature*, Richard Heinberg (Theosophical Publishers, 1996)
- *The Transition Handbook: From Oil Dependency to Local Resilience*, Rob Hopkins (Chelsea Green Publishers, 2010).
- *Cradle to Cradle*, Bill McDonough (Farrar, Straus and Giroux, 2002)
- *Getting a Grip: Clarity, Creativity, and Courage in a World Gone Mad*, Francis Moore Lappé, (Small Media Press, 2007)
- Peter Gleick on Peak Water <http://www.youtube.com/watch?v=Rm7lxwKgO5I>
- Carbon Cycle Graphic - <http://maps.grida.no/go/graphic/the-carbon-cycle>

Homework: None

Assessment: participation, pro-active involvement in coursework and discussion.

4. Review the vocabulary. Introduce the film by distributing the study guide (see Appendix I.3). Show film, *The End of Suburbia* (2004, 78 min.) Discuss study questions on hand out, “Scenarios for Life Beyond the Oil Peak,” *The Transition Handbook* (Hopkins, 2009. See Appendix I.3)

Materials: laptop, DVD, screen, speakers, study guide, blank footprint graph (Appendix I.4).

Homework: Take the “What is your Carbon Footprint?” Test at www.myfootprint.org. Fill in the graph. (See Appendix I.4) (If you have students who don’t have access to the internet at home, you will need to make this a classroom activity. If this is done in class, it takes an entire class.)

Resources:

- *The End of Suburbia*, (2004 film, 78 min.)
- *The Party’s Over*, Richard Heinberg, (New Society Publishers, 2003)

Assessment: Completed *End of Suburbia* study guide, participation in discussion, completed carbon footprint graph (appendix I.4).

Creation of a Green Economy

(1 class)

Objective:

Students will demonstrate understanding of the environmental, social, and economic implications of climate change and the green economy.

Activities:

- 1) View Green For All’s short film, “The Dream Reborn: A Green Economy is Coming” (Applied Research Center, 2008, <http://www.youtube.com/watch?v=HHvveUKh-sw>)
- 2) Post chart paper with “Rules for a Green Economy” (see Appendix I.5). Discuss what each item means (e.g., manage wisely limited resources), pointing out the overlap between social justice issues and environmental issues. Who has suffered most from environmental degradation, pollution, unemployment and underemployment? What is environmental justice? How may climate change disproportionately impact communities of color, low-income communities and Indigenous Peoples? Compare “minimum wage” to “living-wage”. What are “fair working conditions”? Were the rules different throughout much of the Industrial Revolution?

Resources:

- New Mexico Green Jobs Report 2011
www.greenjobs.state.nm.us/pdf/GreenJobsReport-Final5-16-11.pdf
- 10 Principles for Just Climate Change Policies in the U.S.
www.ejnet.org/ej/climatejustice.pdf
- Environmental Justice Network
www.ejnet.org/ej/
- Green for All
www.greenforall.org
- Blue-Green Alliance
www.bluegreenalliance.org
- Environmental Defense Fund
www.edf.org
- “Congress’ New Chance for Clean Energy,”(Gordon and Caldwell,
<http://www.cnn.com/2010/OPINION/11/08/caldwell.gordon.energy/index.html>
11/16/2010)
- *Natural Capitalism: Creating the Next Industrial Revolution*, Hawkin, Lovins, and Lovins, (Back Bay Publishers, 2000)

- 3) The Department of Workforce Solutions NM Green Jobs Report 2011 identified approximately 25 federal and 30 state tax credits related to green activities, approximately \$94 million in ARRA funds for green-related activities, and five pieces of current state legislation addressing related to the green economy. How do federal, state and local incentives and investments create a green economy in New Mexico? What other efforts are underway to create a green economy in the state? What is the importance of regulations, incentives and investments to create a market for green products and services?

Resources:

- NM Green Jobs Report 2011
<http://www.greenjobs.state.nm.us/pdf/GreenJobsReport-Final5-16-11.pdf>
- Enhancing the Renewable Portfolio Standards – became law in 2007
<http://www.emnrd.state.nm.us/ECMD/LawsRegulationsExecutiveOrders/documents/SB418-RPS-Fact-Sheet-final-03-07.pdf>
- New Mexico Clean Energy Incentives
<http://www.emnrd.state.nm.us/ECMD/CleanEnergyTaxIncentives/cleanenergytaxincentives.htm>
- DSIRE – Database of State Incentives for Renewables and Efficiency
<http://www.dsireusa.org/>
- PNM Algodones Solar Facility
<http://www.youtube.com/watch?v=3ZHQjZfFXM0>

The Local Green Economy

(1 class)

Objective:

The student will recognize efforts being made locally to begin moving towards a green economy right here at home.

Activities:

1. Guest Speaker from NM Green Chamber of Commerce or local green business - The Teacher of Record will need to do his/her homework for this activity. What task forces or committees are already working on organizing local efforts to transition to a green economy? Who are the community leaders who are on the cutting edge of this movement? For example, invite a member of the local chapter of the New Mexico Green Chamber of Commerce to visit your class. Learn about green businesses and plans for future green businesses in your area by perusing green business directories. Give students the focus questions below and ask the class guest to bring examples of local efforts toward greening the economy. Post the chart on the “Rules for a Green Economy” (Appendix I.5) on the board. Write two titles on the board, “Local Renewable Resources” and “Local Limited Resources.”
- 2) Have the class brainstorm a list of local energy resources and help them to put each in the correct category. Turn it over to your guest, whom you’ve asked to bring concrete examples (with pictures if possible) of some of the local efforts already in place trying to utilize local renewable energy resources and/or wisely manage local limited energy resources.

Focus Questions

- What projects, systems and organizations do we already have in place to create a local green economy?
- What are the funding sources for some of these projects? State? Federal? Private investment?
- What plans are in place for the future to further develop the local green economy?

Resources:

- Check with your city and county governments. Local planning offices, parks and recreation and public works are good departments to start with to see how city operations may be working to become more energy efficient and promote green practices. Make a phone call to the mayor to see how your community may be participating in regional green economy initiatives.
- Check with the NM Green Chamber of Commerce to contact your local chapter or a Green Chamber member in your area. www.nmgreenchamber.com
- Does your community have an Office of Sustainability or a local blog on “greening” the economy?
- Check with local environmental groups to see how non-governmental organizations are helping to transition to a green economy.

- “Questions for Community Leaders on the “Transition to a Green Economy” (Appendix I.6)
- NM Green Business Directories:
 - Viva Verde Guide for Southern New Mexico Bilingual Edition
www.vivaverdenm.com
 - Sustainable Santa Fe
<http://www.earthcare.org/resources/sustainable-guide/>
 - New Mexico Solar Energy Association Solar and Sustainable Directory
<http://www.nmsea.org/Directory/index.php>

Materials: “Rules for a Green Economy” chart (Appendix I.5), white board, markers, extra copies of “Rules for a Green Economy” chart for guest speaker and for class on which to write notes.

Assessment: on-task behavior, participation in discussion, questioning, completing the question page in Appendix I.6

Employment and Training Prospects in the Green Economy (1 - 2 classes)

Objective:

The student will identify green jobs, training resources and skill sets necessary for a career in these occupations.

Activity:

Invite a guest from your local office of the Department of Workforce Solutions (DWS) to provide information on green job career pathways, expected pay for green occupations, green jobs outlook, availability of state-funded training programs in the green sector, educational and training opportunities, and green jobs career planning tools. Check to see when the Mobile Green Jobs Workforce Center will be in your town. The RV includes "Green Recovery Workstations" through which students can access the Green Jobs Portal website for green job information and data. The van includes solar panels and a wind turbine to provide power for the workstations. DWS staff can answer your questions about green jobs and education and training opportunities and resources. What is the range of educational and training opportunities from certificates, to degree programs to apprenticeship programs? How do they differ? Why is making sure that a program is credentialed so important? What are stackable certificates and how are these important to career pathways?

There are approximately 124 educational institutions in New Mexico providing education or education/apprenticeship programs related to primary green occupations. Many of the institutions and apprenticeship programs offer specific green programs such as

sustainable technologies, green building, solar, wind, and biofuels that aren't captured in the larger traditional programs. Many of these programs provide related certifications and associate degrees. The major programs at institutions around the state (NMDWS, 2011) are as follows:

Eastern New Mexico University

Solar photovoltaic
Fuel cell programs

New Mexico State University

Solar, wind, and energy
Sustainability design
Environmental engineering & sciences

Central NM Community College (CNM)

Solar panel installation
LEED design and practices
Solar, wind and photovoltaic technician
Alternative energy system design
Green business practices & management
Environmental engineering & sciences

University of New Mexico

Environmental engineering & sciences
Sustainability

Navajo Technical College

Energy systems program

Luna Community College

Alternative and sustainable energy
Environmental sciences

Mesalands Community College

Wind energy technology
Environmental sciences

NMSU-Carlsbad

Green building & energy efficiency

NMSU-Doña Ana

Renewable energy
Alternative fuels
Green building
Solar, wind and geothermal

Northern New Mexico Community College

Solar and other renewable energies

San Juan College

Renewable energy

Environmental engineering & sciences

Santa Fe Community College

Environmental technologies

Green building

Solar and other renewable energies

Energy efficiency – rating and weatherization

Western New Mexico University

Sustainability Studies

Resources:

- Mobile Green Jobs Workforce Center
<http://www.greenjobs.state.nm.us/mobile.html>
- NM Green Job Portal
www.greenjobs.state.nm.us
- O*Net On-line tool for career exploration and job analysis
<http://online.onetcenter.org>
- What are Green Jobs? New Mexico definition/green industry core areas:
<http://www.greenjobs.state.nm.us/definitiongreenjob.html>
- Green Jobs Outlook - NM Green Jobs Guidebook
<http://newenergyeconomy.org/wp-content/uploads/2011/03/nmGreenJobsGuidebook.pdf>
- List of top green jobs in New Mexico
<http://www.greenjobs.state.nm.us/topgreenjobs.html>
- NM Green Job Career Pathways
<http://www.greenjobs.state.nm.us/pdf/GreenPathways.pdf>
- States' Career Clusters Initiative
<http://www.careerclusters.org/index.php>
- Green skills for the top 25 green occupations in New Mexico
<http://www.greenjobs.state.nm.us/greenskills.html>
- NM Green Jobs Educational Opportunities
<http://www.greenjobs.state.nm.us/education.html>
- NM Green Certifications
<http://www.greenjobs.state.nm.us/pdf/GreenCertificates.pdf>
- Apprenticeship programs in New Mexico
<http://www.dws.state.nm.us/dws-apprentice.html>

Assessment: on-task behavior, asking appropriate questions (minimum of one) for guest speaker.

Homework: Introduce the guest speaker who will be visiting the next class. Write down two questions you would like to ask this guest about obtaining a green job.

Expectations in the Workplace I (1 class)

Objective:

Students will become familiar with Equal Opportunity Employer requirements, payroll tax, Unemployment Insurance, FICA, Social Security Tax, Workers' Compensation, and retirement so that they understand their rights in the workplace and benefits of employment.

Activities:

- 1) Invite a local business person to make a presentation to explain the deductions found in a typical paycheck and clarify the employee's benefits and rights in the workplace. A PowerPoint Presentation clarifying payroll tax, Unemployment Insurance, FICA, SSI, and Workers' Compensation, Equal Opportunity Employment is recommended. Q and A should follow.

Resources:

- "A Developmental Perspective on Workplace Readiness: Preparing High School Students for Success", (Child Trends, 2009) (See Appendix I.7)

Assessment: on-task behavior, appropriate questions, engagement in subject.

Expectations in the Workplace II (1 – 2 classes)

Objective:

Students will identify the components and importance of safety, reliability, integrity, and interpersonal skills in the workplace.

Activities:

According to the NM Green Jobs Guidebook, employers look for the following characteristics in job applicants to show they are job ready:

- Sense of responsibility
- Basic presentation, listening, communication, and literacy skills
- Positive attitude
- Strong work ethic
- Consistent punctuality

- Ability to work independently and as part of a team

1) Discussion of Workplace Expectations

What constitutes safety, reliability, integrity and their importance in getting and keeping jobs? Why are these attributes important to the employer and the workplace team? A discussion of what constitutes “interpersonal skills” should include a discussion about knowing when to be a team-player and when to step into a leadership role. Accepting leadership from your employer is an important point of discussion. Role-plays work well for this.

2) Practice interview communication skills

Guide the class through understanding the importance of a positive image. How do you make the right first impression in your interview? How do you “dress for success”? Conduct role playing to practice interview skills (see Scholastic lesson plan below in Resources).

Resources:

- Top skills by proficiency level for 25 green jobs
<http://www.greenjobs.state.nm.us/greenskills.html>
- “A Developmental Perspective on Workplace Readiness: Preparing High School Students for Success” (April 2009, www.childtrends.org)
- Check with your local office of Department of Workforce Solutions for training videos in “Workplace Readiness”
- “Employers Pickier about Job Applicants’ Skills” (Kaufman, <http://www.npr.org/2010/11/15/131342946/employers-pickier-about-job-applicants-skills> 11/16/2010).
- Scholastic Lesson Plan – Practice completing a job application and participating in a job interview
<http://www2.scholastic.com/browse/lessonplan.jsp?id=177>

Materials: screen, laptop, internet

Formal Weekly Assessment

Objective:

Student will demonstrate with a 70% proficiency or better, his/her understanding of concepts and employment opportunities in this career cluster.

Assessment: weekly assessment based on Weekly Grading Rubric (See Appendix I.8)