

# YEARS OF LIVING DANGEROUSLY



## THE YEARS OF LIVING DANGEROUSLY - EDUCATIONAL COMPANION

Provided to you by the *National Wildlife Federation*

### INTRODUCTION

#### About the Series

This groundbreaking documentary event series explores the human impact of climate change. From the damage wrought by Hurricane Sandy to the upheaval caused by drought in the Middle East, YEARS OF LIVING DANGEROUSLY combines the blockbuster storytelling of top Hollywood movie makers with the reporting expertise of Hollywood's brightest stars and today's most respected journalists.

#### Purpose

As the educational partner for the *YEARS OF LIVING DANGEROUSLY*, *National Wildlife Federation*...

#### How To Get The Most Out Of This Educational Experience

Around the country our schools are providing students with unique, experiential, and applied learning opportunities. The Years of Living Dangerously is one of those opportunities you don't want to miss. As the series unfolds the biggest stories of our time students become emotional involved in the lives of those represented and through your instruction and facilitation will become agents of change, empowered by knowledge and evidence to create and solve our problems today and into the future.

### EPISODE 3

#### EPISODE SUMMARY: RISING TIDE

Lesley Stahl of '60 Minutes' travels to Greenland to investigate the effects of global warming in the Arctic. Down south, Ian Somerhalder travels to North Carolina to listen in on both sides of the evangelical community's debate over climate change and finds himself caught in the middle of not only a religious debate, but a familial one: the father is a megachurch preacher who doesn't believe in climate change; the daughter is an activist trying to shut down the local coal-fired power plant.

#### LESSON SUMMARY

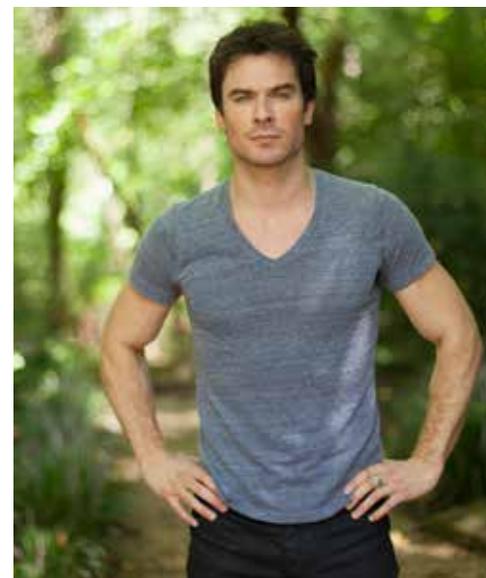
Students will use the stories in episode four to better understand the long term impacts of our energy choices especially its impacts on the Arctic; an Arctic like has never been seen before.

#### Story 1 – Preacher's Daughter

**Correspondent:** Ian Somerhalder

**Location:** Asheville and Charlotte, North Carolina, Apalachicola, Florida

**Story:** The father: a megachurch preacher who doesn't believe in climate change. The daughter: an activist trying to shut down the local coal-fired power plant. The daughter's hope: to eventually convince her father that global warming is happening, and even, just possibly, see if he'll make it the topic of his next sermon. Correspondent Ian Somerhalder listens in on both sides of the evangelical community's debate over climate change.



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### Story 2- Under the Ice

**Correspondent:** Lesley Stahl

**Location:** Greenland, Kirana, Sweden, Washington, D.C.,  
New York, New York

**Story:** No place on earth has seen the effects of global warming more than the vast mineral-rich Arctic. As the ice melts, oil companies are scrambling to drill vast quantities of oil and gas that used to be shrouded by impenetrable layers of ice. But what happens to the planet if the oil companies get their way and extract the Arctic's riches? Correspondent Lesley Stahl goes to Greenland to investigate.



### LEARNING OBJECTIVES EPISODE 4: LESSON 1

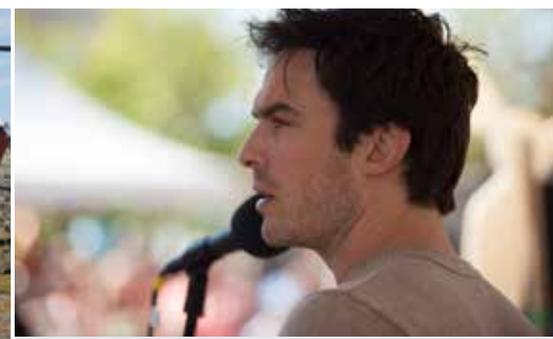
1. Students will analyze data from the Department of Energy's State Energy Data System.
2. Make observations regarding energy production and consumption in the U.S.
3. Summarize their findings and understanding of energy use in their state and justify support for or against their state's current energy practices.

### TEACHER BACKGROUND

Our energy needs have been met in many ways throughout history, from fire rings and wood burning hearth's, to oil burning lamps and steam powered engines. Today many students understand that our energy needs are met through the burning of fossil fuels and some may also understand that some of our energy needs are met through renewable energies such as solar and wind. It is most important for students who will become voters and the change-makers of tomorrow to have the facts and understand the role that all natural resources play in providing us with the lives we are accustomed to living. Realistically, at this point in time, we can't say, "I'm not going to use fossil fuels". Therefore, how can you best support your student's efforts to live more sustainably in light of our current and future energy needs and trends?

### MATERIALS

1. Science notebook
2. One-to-One or paired use of computer with internet access
3. Students will need access to YouTube to watch "EIA's State Energy Portal": <http://youtu.be/F-WBhulHTXs>
4. Student computers/tablets will need Flashplayer 11 (ask your school's technology administrator if you are not sure what version is currently in use).
5. Student handout: State Energy Profile, found on pages 12-16



## VOCABULARY

carbon footprint, carbon cycle, climate, climate change, consumption, correlation, energy budget, emissions, evidence, expenditure, fossil fuels, fuel mix, greenhouse gases, natural resources, qualitative data, quantitative data

## WHAT TO DO

Have students take our online quiz both before and after the lesson. If you'd rather print out a paper copy or project the quiz on your SMART Board see page 6.

### ENGAGE: 45-50 MINUTES

1. Go to the Carbon Cycle Game, from Windows 2 the Universe, [www.windows2universe.org/earth/climate/carbon\\_cycle.html](http://www.windows2universe.org/earth/climate/carbon_cycle.html)
2. Once there, students become a carbon atom and travel through different earth systems to better understand the role carbon dioxide plays. Along their journey students need to record their stops and take a note or two about carbon dioxide's behavior. Students will also answer several questions along the journey. The questions are random, therefore ask your students to write the question and answer they chose in their science notebook. The evidence and information the students collect will be used at the end of the Engage section.
3. When students complete the game they will have several options. Ask them to choose, "Learn more about the carbon cycle" and read about the journey their atom just took.
4. Students have played a game about the carbon cycle and read a short passage too. Now to help take this learning from short term to long term memory students will create an infographic on paper (later this work can be added in their science notebook) or using design software. Allow students to be creative as they design their infographic. Only provide students with these guidelines.
  - Neat, correct spelling, and free of grammatical errors
  - Each stop your carbon atom made needs to be documented in your infographic
  - Provide a few details about what's going on with carbon dioxide at each stop.
  - Provide an image of some kind that to go along with the atom's stop and details.
  - Utilize the questions you were asked in your infographic or come up with new questions.



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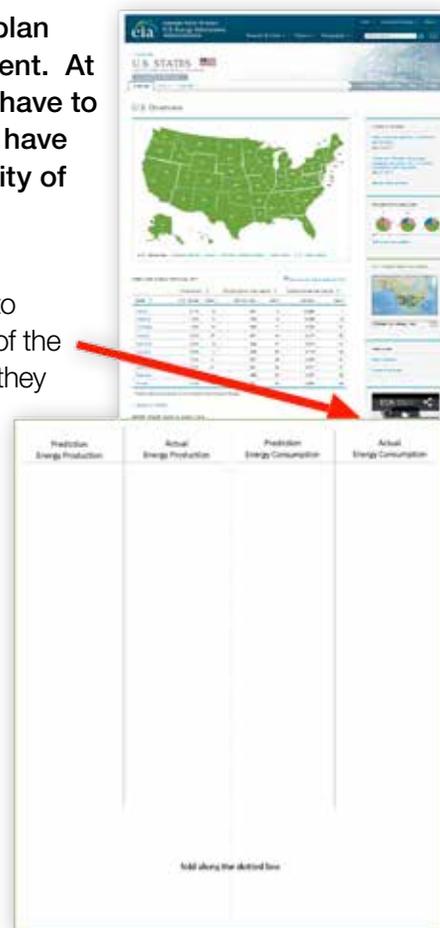
1. Watch episode 4. If you are unable to view episode 4 in its entirety then students will need to watch the following segments to support their learning experience. As students watch each segment have them stop and answer each of the questions below in their science notebook. At the conclusion of all segments, encourage students to add to or modify their thinking.
  - Minute 7:40 to 10:15
  - What is the goal of the Sierra Club's, Beyond Coal campaign?
  - At the time of filming in 2013, there were 500 coal plants in operation around the country. By 2015, if the campaign reaches its goal, what will the number of retired coal plants be?
  - Minute 37:41-40:03
  - How did you take Aleqa Hammond's interview? Surprised? Expected? Explain your response.
  - It is important to understand all points of view in a story, a debate, or argument. Why is understanding Greenland's culture and economy important when drawing conclusions about how they should address climate change?
  - Minute 48:40 to 53:07
  - Explain the effects volcanic eruptions have throughout the temperature record.
  - Explain Dr. Muller's process of understanding that lead to his jaw-dropping revelation.

**EXPLAIN: 2.5 CLASS PERIODS (based on 55-60 minute periods) Please plan accordingly. This section works best in a one to one computing environment. At the most you want no more than 2 students to a computer. Students will have to access YouTube to watch a video tutorial and each computer will need to have the most up-to-date version of Flashplayer (11 or higher) for the interactivity of the energy maps to work properly.**

For this section we will utilize tools from the Department of Energy's, U.S. Energy Information Administration, EIA site. Before introducing this section you may want to watch the tutorial video, 4:58, <http://youtu.be/F-WBhulHTXs> to get a better sense of the tool your students will be using. Your students will also be watching the tutorial as they prepare to gather data and learn more about energy production and consumption in the U.S. and their home state.

## PART 1 – 30 MINUTES

1. Explain to students they will be exploring energy production and consumption in the U.S and in their state. To collect data and make analyses we will be using the Department of Energy's, Energy Information Administration web tools.
2. Before viewing the tutorial have students make a top 10 list. Rank the top 10 states for energy production and energy consumption. Have students use the example to the right when they set up their page.
3. Have students go to the EIA site, <http://youtu.be/F-WBhulHTXs>. In the right hand navigation is the video tutorial where students will learn about the information and tools available for data collection.



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- Let's look at the U.S. before looking at our home state. Students will now compare their predictions for energy production and consumption against the actual data. Looking below the U.S. map students can use the blue toggle arrows to rank the states in order for production and then for consumption.
  - Write the top ten states for production and consumption next to your prediction.
  - Did any of your predictions align with the actual data?
  - Were you surprised by any of the state's positions for production or consumption? Explain.

### PART 2 – 2 CLASS PERIODS

In part 2, students will look specifically at their home state using the EIA U.S. States data analysis tool. Again students will need access to laptops or a computer lab where hardware is up-to-date, specifically Flashplayer. Options: You may want each student to investigate the state in which you all live, however you may also choose to have students draw a state to investigate. While it is important to understand the energy of our home state, having general knowledge about the energy use found around the nation provides students the opportunity to be better informed decision makers.

- Provide each student or each pair of students with the State Energy Profile student handout found on page.
- Go to [www.eia.gov/state/](http://www.eia.gov/state/) and have students choose the state in which they live.

### ELABORATE: 30-40 MINUTES

Allow students to choose one of the following articles to read. Provide students with the directions for diving deeper into their reading along with the rubric found on pages 17 and 18.

- Climate Change and Greenland: Where Ice Melt Could Raise Seas by 23 Feet  
[www.weather.com/news/science/environment/greenland-climate-change-23-feet-sea-level-rise-20140501](http://www.weather.com/news/science/environment/greenland-climate-change-23-feet-sea-level-rise-20140501)
- Judge Suspends Arctic drilling, orders new environmental report  
[www.latimes.com/nation/nationnow/la-na-nn-arctic-drilling-new-environmental-report-20140424-story.html](http://www.latimes.com/nation/nationnow/la-na-nn-arctic-drilling-new-environmental-report-20140424-story.html)
- Greenland's Prime Minister Looks on Global Warming's Bright Side  
[www.businessweek.com/articles/2014-05-01/greenland-prime-minister-expects-global-warming-mining-riches](http://www.businessweek.com/articles/2014-05-01/greenland-prime-minister-expects-global-warming-mining-riches)
- Climate assessment warns of dire effects in Alaska  
[www.newsminer.com/news/alaska\\_news/climate-assessment-warns-of-dire-effects-in-alaska/article\\_8d905f10-d562-11e3-8764-001a4bcf6878.html](http://www.newsminer.com/news/alaska_news/climate-assessment-warns-of-dire-effects-in-alaska/article_8d905f10-d562-11e3-8764-001a4bcf6878.html)
- Arctic Sea Ice Update: The Melt is on, How Low Will It Go?  
[www.huffingtonpost.com/bill-chameides/arctic-sea-ice-update-the\\_b\\_5187264.html](http://www.huffingtonpost.com/bill-chameides/arctic-sea-ice-update-the_b_5187264.html)



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### EVALUATE: 10-15 MINUTES

A. Justified True/False – see page 8

B. Online Pre/Post Quiz

#### *Take our online quiz:*

1. Albedo has to do with the rate at which carbon dioxide is put into the atmosphere. *True/False*
2. Coal is formed from the decomposition of inorganic materials that have been subjected to geologic heat and pressure over hundreds of years and is considered to be a renewable resources because it can be replenished in our lifetime. *True/False*
3. Soot and ash reflect the sun's radiation. *True/False*
4. In the United States, more than 40 percent of people live in areas with unhealthy levels of air pollution. *True/False*
5. Arctic sea ice melt only impacts those who live in Arctic regions. *True/False*
6. Coal and gas-fired power plants emit more than 2.3 billion metric tons per year of carbon pollution, approximately 40 percent of total U.S. energy-related carbon pollution. *True/False*
7. Sea ice, ice sheets, ice shelves, and icebergs are synonyms to describe what we see in the Arctic. *True/False*
8. There is no way to know what carbon in our atmosphere is natural or human caused. *True/False*
9. The deep blue of the Arctic oceans reflect the sun's solar rays, while the bright white of the Arctic sea ice absorbs the sun's solar radiation. *True/False*
10. The total water used for coal mining in the United States rages from 70 million to 260 million gallons a day. *True/False*



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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

## JUSTIFIED TRUE OR FALSE STATEMENTS

### EPISODE 101 – DRY SEASON

*Justified* True or False Statements provide a set of claims or statements that are examined by you. You are meant to draw on evidence from what you have learned to analyze the validity of the statements, and then describe the reasoning used to decide whether each claim is true or false.

**\*NOTE\*** Please use grade appropriate spelling and grammar.

STATEMENT	T	F	WHY I THINK SO...
1. Each state relies solely on one type of fuel to support its energy needs?			
2. Reducing your energy consumption and using alternative forms of energy is one way to lower your carbon footprint.			
3. The only concern over fossil fuel production and consumption is the fact that it cannot be renewed in relatively short period of time. We will run out at our current rate of consumption.			

Use this space to include more evidence to support your claim and or to draw a model if applicable.

## TAKING ACTIONS AND DESIGNING SOLUTIONS

Taking actions and/or designing solutions to our local, national, and global problems are a personal journey. Via **Facebook** and **Twitter @YEARSofliving #YEARSproject**, share how you are taking action to combat climate change or if you've designed potential solutions share those on **Instagram - @YEARSofliving** or make a **Vine**.

### Want to engage your school?

Check out these two programs of the National Wildlife Federation, Eco-Schools USA and Schoolyard Habitats [www.eco-schoolsusa.org](http://www.eco-schoolsusa.org), [www.nwf.org/schoolyardhabitats](http://www.nwf.org/schoolyardhabitats)

Want the opportunity to showcase your investigative reporting skills?

Check out National Wildlife Federation's Young Reporters for the Environment-USA [www.YRE-USA.org](http://www.YRE-USA.org)

## WRITER'S CORNER

Without language there is no science. To be practicing scientists and derive new knowledge, we need language – reading, writing, talking, listening, enacting, and visualizing. Writing is one way to communicate understanding of our learning while allowing us to be creative in our delivery and provide insight and possible solutions to problems.

1. As climate changes the habitats of many species are impacted. The focus of our work was around Alaska. There several species that are considered endangered or threatened in this part of the United States, including the iconic polar bear, Northern Sea otter, Stellar's Eastern and Western Sea Lion, and many other animal, fish, and plant species. Go to the U.S. Fish & Wildlife Service's Environmental Conservation Online System. [ecos.fws.gov/tess\\_public/pub/stateListingAndOccurrenceIndividual.jsp?state=AK&s8fid=112761032792&s8fid=112762573902](http://ecos.fws.gov/tess_public/pub/stateListingAndOccurrenceIndividual.jsp?state=AK&s8fid=112761032792&s8fid=112762573902) Choose a species to learn more about. Investigate how climate change is impacting its survival and look into what scientists are doing now to help save the species and create your own design solutions that can help the species adapt in their changing climate.
  2. Our energy practices from extraction to production and from transmission to consumption have a significant impacts on climate change. We see those effects quickest at the poles in the form of ice melt leading to global sea level rise. Go to the Energy Information Administration's site and choose your state. <http://www.eia.gov/state/> Write a summary profiling your states rank on total energy consumption, nonrenewable energy production, and carbon dioxide emissions. Then choose from any number of other pieces of information you feel are important for the public to aware of and better understand.
  3. Albedo is a rather foreign word to many people. Craft a 2 minute "elevator speech" that would allow you to effectively explain what albedo is, why it is a considered a cycle without an end, and why it is of concern to you. Your goal after the "elevator ride" is to leave the person wanting to know more about the topic. Education is and will continue to play a major role in how we as individuals and as a nation address climate change.
- \*Special Note\*** – an elevator speech reflects the idea that it should be possible to deliver your topic in the time span of an elevator ride, or approximately thirty seconds to two minutes.



### CAREERS – AGENTS OF CHANGE

Inspired by episode 4? Thinking about your future? You have the power to make a difference today and in the future. Check out our episode 3 profile on Dr. Charles H. Greene and look into other careers inspired by the issues presented in Episode 4: Ice and Brimstone.

#### Episode Career Profile

Dr. Heidi Cullen

#### Occupation:

Chief Climatologist for Climate Central, Visiting Lecturer at Princeton University and a Senior Research Fellow at the Wharton Risk Management and Decision Processes Center at the University of Pennsylvania

#### Education:

B.A in Industrial Engineering – Columbia University,  
Ph.D. in Climatology and Ocean-Atmosphere Dynamics –  
Lamont-Doherty Earth Observatory of Columbia University



**Why She's Involved:** "If we don't like the long-term climate forecast of a hotter, more extreme world – we can change it. We can choose to be smarter about the way we use energy, manage our natural resources and grow our food. We know how to protect our climate and slow the damage that has been done." Learn more about Dr. Heidi Cullen. [yearsoflivingdangerously.com/science-advisor/heidi-cullen-ph-d/](http://yearsoflivingdangerously.com/science-advisor/heidi-cullen-ph-d/)

- Climatologist or Atmospheric Scientist– [<http://www.bls.gov/ooh/life-physical-and-social-science/atmospheric-scientists-including-meteorologists.htm>] Atmospheric scientists study the weather and climate and how it affects human activity and the earth in general. They may develop forecasts, collect and compile data from the field, assist in the development of new data collection instruments, or advise clients on risks or opportunities caused by weather events and climate change.
- Glaciologist – [<http://www.eco.ca/occupationalprofiles/profiles/glaciologist/25/>] Glaciology is the study of snow and ice and their physical properties. More specifically, glaciologists analyze the formation, movement, and effects of the different kinds of glaciers, for example alpine and arctic glaciers, ice caps, ice sheets, and ice shelves. A large part of the research conducted by glaciologists analyzes how glaciers and ice caps move and change in response to climate change and how these changes in turn influence climate and the surrounding environment.
- Renewable Energy Engineer – [<http://www.oit.edu/academics/degrees/renewable-energy-engineering>] the promise of sustainable power depends on our ability to harness renewable resources like wind, sunlight, biofuels, geothermal heat and rivers. The technology needed to harness these natural energy is continually improving, but the demand for workers who can lead us toward a sustainable energy future has far exceeded the supply.

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NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

## STATE ENERGY PROFILE

Use [www.ipl.org/div/stateknow/popchart.html](http://www.ipl.org/div/stateknow/popchart.html) for your population and area data.

Use [www.eia.gov/tools/glossary/](http://www.eia.gov/tools/glossary/) to define terms.

Use [www.eia.gov/state/](http://www.eia.gov/state/) for all your energy data.

Use [powerscorecard.org/technologies.cfm](http://powerscorecard.org/technologies.cfm) for help with question 8.

### State:

Population and rank among 50 states: \_\_\_\_\_

Area and rank among the 50 states: \_\_\_\_\_

Define "per capita": \_\_\_\_\_

Define "BTU", what does it stand for and how is the term used in terms of energy?

### 1. Where does your state rank in the following areas?

\_\_\_\_\_ Total energy consumption per capita

\_\_\_\_\_ Total energy production

\_\_\_\_\_ Coal production

\_\_\_\_\_ Carbon dioxide emissions

### 2. Use the 5-tab graph, below the Quick Facts to answer the following questions.

\_\_\_\_\_ According to the consumption estimates of 2011 what type of energy was consumed the most?

Is this fuel a renewable or non-renewable? \_\_\_\_\_

\_\_\_\_\_ How many trillion BTU's total of renewable energy does your state consume?

What sector consumes the most energy and which sector consumes the least?

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Is this reasonable? Did you think percentages would be reflected differently?

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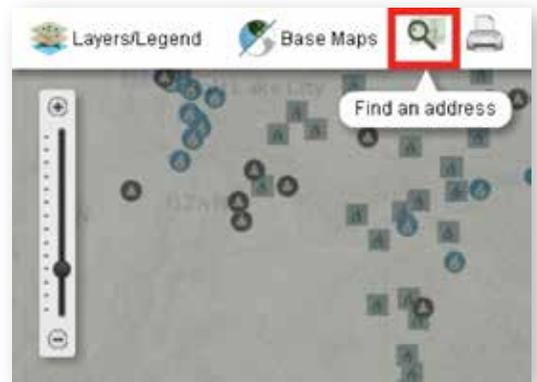
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4. Now go back up to the top and let's take a look at the data in the map.

- Go to Full Screen.
- Go to Layers/Legend.
- Click on "Remove All Layers"
- Click on "Toggle State Mask"
- Troubleshooting: Sometimes you might have to exit out of Full Screen to get the address tool to work or be in the minimized screen view to search another location.
- You are now ready to collect data and answer questions.



5. Scroll down the Layers/Legend menu until you find Fossil Resources. Click in the box next to Fossil Resources. What fossil resources are found in your state?

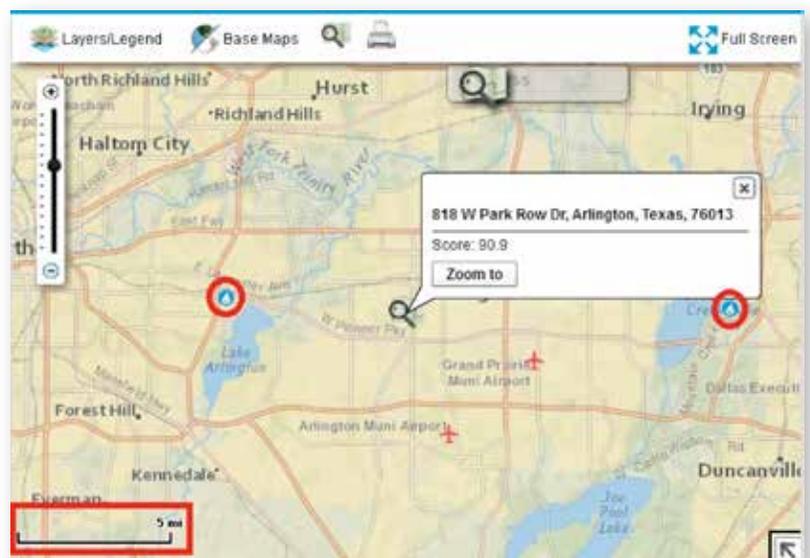
6. Using the information in number 5 is your state able to produce their own from the fossil resources seen in the graph or might they import it from other states?

7. Click off "Fossil Resources" and click on "Coal Mines". Within your state are there any surface or underground coal mines? Less than 50 or more than 50?

8. Click off "Coal Mines" and click on, under "All Power Plants", "Coal Power Plant", "Natural Gas Power Plant", and "Petroleum Power Plant" and under "Oil/Gas Refining and Processing", click on the box next to it. Now go up to the magnifying glass of the map icon in the upper left.

- Type in the address of your school, street number, name and zip code. Once your school shows up you can minimize that window so it is out of your way.
- Use the zoom in/zoom out toggle at the left to zoom out one map at a time. DO NOT USE THE SLIDE toggle feature. As soon as you see one of the features, a coal, natural gas, or petroleum plant or an oil/gas refining processing plant, STOP. Then you will need to measure the closest one's distance from your location using the scale at the bottom left.

**For example:** As I slowly, map by map zoomed out, (it took me 4 times) 2 natural gas plants came into view. Using a ruler I measure the distance from the school to the closest power plant was 8 cm. According to the scale about 6.75 cm equaled 5 miles. After creating an equation to solve this problem, I found that this power plant is about 6 miles from the school.





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10. Now we want to get a sense of the number of renewable energy plants and types found in your state.

- In Full Screen view, close the address box and zoom out to see your entire state.
- Under All Power Plants, click on biomass, geothermal, solar, wind, and wood power plants.
- As each source populates on your map, take a mental picture. Which plant type is most abundant in your state and what can you infer from this information?
- No add another layer, Photovoltaic Solar Potential. Do the two sets of data match up? For instance, if you have high solar potential in the southwest of your state, are there ample solar plants in place? Or vice versa, if the southwest of your state has low potential for solar power do you see several plants?
- Answer this question for Biomass Potential, Geothermal Potential, On Shore Potential, and Off Shore Potential (if you are a coastal state). Be sure to click off one energy potential layer before clicking on another, otherwise your data will not be accurate.

**Biomass:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Geothermal:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**On Shore Potential:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Off Shore Potential:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Optional:** Create an infographic for your state, profiling its energy production and consumption. For information on infographics go to, [www.schrockguide.net/infographics-as-an-assessment.html](http://www.schrockguide.net/infographics-as-an-assessment.html)

## A LOOK INSIDE SCIENTIFIC ARTICLES

### DIRECTIONS

#### REQUIREMENTS

1. Using the Student Reading Resources or articles that you allow students to use related to the topic; write a summary meeting the following guidelines.
  - a. Whole page
  - b. Double spaced
  - c. 12pt font size
  - d. Times New Roman/Calibri/Arial font
2. Do not print out the article. At the end of your summary write an endnote with the correct bibliographic information [www.easybib.com/](http://www.easybib.com/) for your article.

#### ARTICLE SUMMARY FORMAT

1. Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_ Period \_\_\_\_\_
2. Paragraph #1-Introduction
  - a. What is the title of the article (should be in quotes or italics)?
  - b. Who is the author?
  - c. What source or publication did the article come from?
  - d. What is the date of the article?
  - e. Write one to two sentences about what the article is about
3. Paragraph #2-Summary (Abstract) of Article
  - a. Give a summary of the article; what is the article about?
  - b. If necessary, you can write more than one paragraph summarizing the article
4. Paragraph #3- What did you think of the article (critique)
  - a. Do you agree or disagree with the author(s)?
  - b. Did it support or change your opinion of the topic; if not, why or if so, how?
  - c. Did the writer demonstrate that he/she did sufficient research?
  - d. What were some of the facts? Opinions? Any bias?
5. Paragraph #4-Conclusion
  - a. What are your reasons for choosing your particular article and how does it relate to what we are studying now?

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ARTICLE SUMMARY RUBRIC				
CATEGORY	4	3	2	1
<b>Requirements</b>	All written requirements completed accurately and turned in on time.	4 of the 5 requirements were met	3 of the 5 requirements were met.	Only 1 or 2 requirements met.
<b>Spelling, Grammar, and Punctuation</b>	There are no spelling, grammar, or punctuation errors in the summary. <i>Run spell check before printing!</i>	There are no more than 2 spelling, grammar, or punctuation errors in the summary.	There are 3-4 spelling, grammar, and punctuation errors in the summary.	The summary has 5 or more spelling, grammar, and punctuation errors in the summary.
<b>Summary of Article</b>	The summary covers all the main points of the article.	The summary covers all but one of the main points of the article.	The summary covers all but 2 of the main points of the article.	The article is not well summarized. Most main points are missing.
<b>Critique</b>	All four questions under "Critique" are answered clearly and completely.	Three questions under "Critique" are answered clearly and completely.	Two questions under "Critique" are answered clearly and completely.	One or none of the questions under "critique are answered.
<b>Overall Paragraph Construction</b>	All paragraphs include introductory sentence, explanations or details, and concluding sentence.	Most paragraphs include introductory sentence, explanations or details, and concluding sentence.	Paragraphs included related information, but were typically not constructed well.	Paragraphing structure was not clear, and sentences were not typically related within the paragraphs.

Self-Assessment: \_\_\_\_\_ Grade Equivalent: \_\_\_\_\_

Teacher Assessment: \_\_\_\_\_ Grade Equivalent: \_\_\_\_\_

Student and/or teacher comments:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Total Rubric Points	Grade Equivalent
16-20	A
11-15	B
6-10	C
1-5	F



## THE YEARS OF LIVING DANGEROUSLY - EDUCATIONAL COMPANION

21st CENTURY SKILLS	NGSS SCIENCE AND ENGINEERING PRACTICES
<b>LEARNING &amp; INNOVATION</b>	<b>1</b> Asking Questions & Defining Problems
• Creativity and Innovation	<b>2</b> Developing and Using Models
• Critical Thinking and Problem Solving	<b>4</b> Analyzing & Interpreting Data
• Communication and Collaboration	<b>5</b> Using Mathematics & Computational Thinking
<b>INFORMATION, MEDIA, &amp; TECHNOLOGY SKILLS</b>	<b>6</b> Constructing Explanations & Designing Solutions
• Information Literacy	<b>7</b> Engaging in Argument from Evidence
• Media Literacy	<b>8</b> Obtaining, Evaluating, & Communicating Information
• ICT (Information, Communications, and Technology Skills)	
<b>LIFE &amp; CAREER SKILLS</b>	
• Flexibility and Adaptability	
• Initiative and Self-Direction	
• Productivity and Accountability	
• Leadership and Responsibility	

NGSS - MIDDLE SCHOOL
<b>ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS</b>
<b>Students who demonstrate understanding can:</b>
<i>MS-LS2-3.</i> Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
<b>EARTH AND HUMAN ACTIVITY</b>
<b>Students who demonstrate understanding can:</b>
<i>MS-ESS3-5.</i> Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

# THE YEARS OF LIVING DANGEROUSLY - EDUCATIONAL COMPANION

## CCSS – ELA/LITERACY – MIDDLE SCHOOL – SCIENCE AND TECHNICAL SUBJECTS AND SOCIAL STUDIES

### KEY IDEAS AND DETAILS

*RST.6-8.3* Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.of the information.

### CRAFT AND STRUCTURE

*RST.6-8.4* Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

### INTEGRATIONS OF KNOWLEDGE AND IDEAS

*RST.6-8.7* Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually. (e.g. in a flowchart, diagram, model, graph, or table).

*RST.6-8.9* Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

### WRITING

#### Text Types and Purposes

*WHST.6-8.1* Write arguments focused on discipline-specific content.

*WHST.6-8.2* Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

### PRODCUTION AND DISTRIBUTION

*WHST.6-8.4* Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

### RESEARCH TO BUILD AND PRESENT KNOWLEDGE

*WHST.6-8.9* Draw evidence from informational texts to support analysis, reflection, and research.

### RANGE OF WRITING

*WHST.6-8.10* Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline- specific tasks, purposes, and audiences.

### ELA-HISTORY/SOCIAL STUDIES

#### Craft and Structure

*RH.6- 8.4* Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

### INTEGRATION OF KNOWLEDGE AND IDEAS

*RH.6-8.7* Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

# THE YEARS OF LIVING DANGEROUSLY - EDUCATIONAL COMPANION

## NCSS – MIDDLE SCHOOL

### CULTURE

#### Learner will understand:

- How culture influences the ways in which human groups solve the problems of daily living.

#### Learners will be able to:

- Evaluate how data and experiences may be interpreted differently by people from diverse cultural perspectives and frames of reference;
- Illustrate how holding diverse values and beliefs can contribute or pose obstacles to cross-cultural understanding;
- Draw inferences from data about the ways in which given cultures respond to persistent human issues, and how culture influences those responses.

### TIME, CONTINUITY, AND CHANGE

#### Learners will understand:

- That historical interpretations of the same event may differ on the basis of such factors as conflicting evidence from varied sources, national or cultural perspectives, and the point of view of the researcher.

### PEOPLE, PLACES, & ENVIRONMENTS

#### Learners will understand:

- The theme of people, places, and environments involves the study of the relationships between human populations in different locations and regional and global geographic phenomena, such as landforms, soils, climate, vegetation, and natural resources;
- Human modifications of the environment;
- Factors that contribute to cooperation and conflict among peoples of the nation and world; including language, religion, and political beliefs;
- The use of a variety of maps, globes, graphic representations, and geospatial technologies to help investigate spatial relations, resources, and population density and distribution, and changes in these phenomena over time.

#### Learners will be able to:

- Acquire, organize, and analyze geographic information from data sources, geographic tools and geospatial technologies such as aerial photographs, satellite images, geographic information systems (GIS) to determine patterns.

### INDIVIDUAL DEVELOPMENT AND IDENTITY

#### Learners will understand:

- How personal, social, cultural, and environmental factors contribute to the development and the growth of personal identity;
- That perceptions are interpretations of information about individuals and events, and can be influenced by bias and stereotypes.

#### Learners will be able to:

- Identify biases that can influence a person's perceptions of other individuals, including individuals belonging to groups with different physical, social, or cultural characteristics.

# THE YEARS OF LIVING DANGEROUSLY - EDUCATIONAL COMPANION

## NCSS – MIDDLE SCHOOL *Continued*

### INDIVIDUAL, GROUPS, AND INSTITUTIONS

#### Learners will understand:

- Groups and institutions change over time;
- That when two or more groups with differing norms and beliefs interact, accommodation or conflict may result;
- That groups and institutions influence culture in a variety of ways.

#### Learners will be able to :

- Understand examples of tensions between belief systems and governmental actions and policies.

### PRODUCTION, DISTRIBUTION, AND CONSUMPTION

#### Learners will understand:

- The economic choices that people make have both present and future consequences.

#### Learners will be able to:

- Ask and find answers to questions about the production and distribution of goods and services in the state and national, and in global context.

### SCIENCE, TECHNOLOGY, AND SOCIETY

#### Learners will understand:

- Society often turns to science and technology to solve problems;
- Our lives today are media and technology dependent;
- Science and technology have had both positive and negative impacts upon individuals, societies, and the environment in the past and present;
- Science and technology have changed peoples' perceptions of the social and natural world, as well as their relationship to the land, economy and trade, their concepts of security, and their major daily activities;
- Values, beliefs, and attitudes that have been influenced by new scientific and technological knowledge;
- How media are created and received depends upon cultural contexts;
- Science and technology sometimes create ethical issues that test our standards and values;

#### Learners will be able to:

- Use diverse types of media technology to read, write, create, and review a variety of messages;

### GLOBAL CONNECTIONS

#### Learners will understand:

- Spatial relationships that relate to ongoing global issues affect the health and well-being of Earth and its inhabitants;

#### Learners will be able to:

- Explore the causes, consequences, and possible solutions related to persistent, current, and emerging global issues, such as health, resource allocation, economic development, and environmental quality.

## NCSS CONTINUED

### CIVIC IDEALS AND PRACTICES

#### Learners will understand:

- The theme of civic ideals and practices helps us recognize where gaps between ideals and practices exist, and prepares us to work for social justice;
- The importance of becoming informed in order to make positive civic contributions.

#### Learners will be able to:

- Ask and find answers to questions about how to become informed and take civic action;
- Build background through research in primary and secondary sources, make decisions and propose solutions to address problems;
- Identify assumptions, misconceptions, and bias in sources, evidence, and argument used in presenting issues and positions;
- Develop a position on public policy issues, and defend it with evidence.

### Resources and Links

- Department of Labor Statistics. [www.bls.gov/ooh/home.htm](http://www.bls.gov/ooh/home.htm)
- Earth's Energy Budget. [http://science-edu.larc.nasa.gov/energy\\_budget/](http://science-edu.larc.nasa.gov/energy_budget/)
- Eco Canada: Environmental Careers Organization. [www.eco.ca/occupationalprofiles/profiles/glaciologist/25/](http://www.eco.ca/occupationalprofiles/profiles/glaciologist/25/)
- EPA: Coal. [www.epa.gov/cleanenergy/energy-and-you/affect/coal.html](http://www.epa.gov/cleanenergy/energy-and-you/affect/coal.html)
- Facts About Niagara Falls. [www.niagarafallslive.com/facts\\_about\\_niagara\\_falls.htm](http://www.niagarafallslive.com/facts_about_niagara_falls.htm)
- Kathy Schrock's Guide to Everything. Infographics. [www.schrockguide.net/infographics-as-an-assessment.html](http://www.schrockguide.net/infographics-as-an-assessment.html)
- My NASA Data – Live Access Server – Climate Change. <http://mynasadata.larc.nasa.gov/live-access-server/>
- National Snow & Ice Data Center. <http://nsidc.org/>
- Niagara Falls Geology Facts & Figures. [www.niagaraparks.com/about-niagara-falls/geology-facts-figures.html](http://www.niagaraparks.com/about-niagara-falls/geology-facts-figures.html)
- PBS LearningMedia – Earth's Albedo and Global Warming. [www.pbslearningmedia.org/resource/ipy07.sci.ess.watcyc.albedo/earths-albedo-and-global-warming/](http://www.pbslearningmedia.org/resource/ipy07.sci.ess.watcyc.albedo/earths-albedo-and-global-warming/)
- Power Scorecard. <http://powerscorecard.org/technologies.cfm>
- States Ranked by Population and Size. <http://powerscorecard.org/technologies.cfm>
- Union of Concerned Scientists: Water for Coal. [www.ucsusa.org/clean\\_energy/our-energy-choices/energy-and-water-use/water-energy-electricity-coal.html](http://www.ucsusa.org/clean_energy/our-energy-choices/energy-and-water-use/water-energy-electricity-coal.html)