Brussels Study Tour 2019
K-12 Teacher Unit Planning Template

Name: Dina DiSantis	Unit Plan: Climate Change and Human Impact
	Subject/Grade Level: 11 and 12th Grades

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	Subject/Grade Level: 11 and 12th Grades
	Target Courses: • AP Environmental Science • IB Environmental Systems and Society • AP Human Geography • IB Individuals and Society: Geography

Unit Title:	Introduction to Countries of the European Union, Energy Consumption and Choices, Climate Change, Policy, and Impacts
Unit Narrative:	Climate Change and Human Impact
Standards:	**Pennsylvania State Standards: Environment and Ecology**

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Pennsylvania State Standards: Environment and Ecology

- 4.3.10.A. - Evaluate factors affecting the use of natural resources. Evaluate the effect of consumer demands on the use of natural resources. Analyze how technologies such as modern mining, harvesting, and transportation equipment affect the use of our natural resources. Describe how local and state agencies manage natural resources.

- 4.3.12.A. - Evaluate the advantages and disadvantages of using renewable and nonrenewable resources. Explain how consumption rate affects the sustainability of resource use. Evaluate the advantages and disadvantages of using renewable resources such as solar power, wind power, and biofuels.

- 4.3.10.B. - Analyze how humans manage and distribute natural resources. Describe the use of a natural resource with an emphasis on the environmental consequences of extracting, processing, transporting, using, and disposing of it. Analyze the impact of technology on the management, distribution, and disposal of natural resources.

- 4.3.12.B. - Analyze factors that influence the local, regional, national, and global availability of natural resources. Compare the use of natural resources in different countries. Analyze the social, economic, and political factors that affect the distribution of natural resources (e.g., wars, political systems, classism, racism).

AP Environmental Science Core Content
- Humans Alter Natural Systems.
- Environmental Problems Have a Cultural and Social Context.

AP Human Geography Core Content
- The Role of Climate Change and Environmental Abuses in Shaping the Human Landscape on Earth.
- Human Survival Depends on Developing Practices That Will Achieve Sustainable Systems.

IB Environmental Science and Society Core Content
- Climate Change and Energy Production
- Human Systems and Resources Use

IB Individual and Societies: Geography Core Content:
- Global Climate – Vulnerability and Resilience
- Global Resource Consumption and Security

Next Generation Science Standards
- HS-ESS3-5 – Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts on Earth.

	- HS-ESS3-3 – Create a computational simulation to illustrate the relationship among the management of natural resources, the sustainability of human populations, and biodiversity.

Objectives

→ The lesson is composed of two parts. In Part I, students will build a foundation of understanding by researching background information about the European Union (EU) in reference to energy consumption and choices, climate change, and the Eu's role in climate policy. In Part II, students will be given the opportunity to explore a Member Country within the EU in more depth. Students will research one EU Member Country's population size, socio-economic ideology, geography and climate, natural resources, energy use, and consumption; as well as country specific energy and climate policies. Students will produce a short documentary about their specific country of interest, addressing the topics above.

Big Ideas

- → Understanding the greenhouse effect and climate change.
- → Understanding the causes of climate change, both natural and anthropogenic.
- → Getting to know the EU.
- → Understanding the EU's energy policy and climate change Initiatives.

Essential Questions

- → What is the greenhouse effect and how does it Impact climate change?
- → What are the causes of climate change, both natural and anthropogenic?
- → How many member countries are in the EU and what countries are they?
- → What are the EU's energy policy and climate change Initiatives?

Learning Acquisition and Assessment

Students will know… (content/concepts)	Students will be able to… (skills, performance tasks)
→ What causes the greenhouse effect (both natural and anthropogenic, and the Impacts of climate change. → How many member countries are in the EU and what countries are members. → What the EU's energy policies and climate change Initiatives are and how they are implemented.	→ Use the videos, internet, and references supplied to research information about climate change and the EU to address important questions regarding the impacts of climate change, the EU's energy policy and climate change legislation and initiatives. → explore deeper an EU member country by researching one EU member country's population size, socio-economic ideology, geography and climate, natural resources, energy use, and consumption as well as country specific energy and climate policies. →To produce a short documentary about their specific country of interest, addressing the topics above.
Formative Assessments →Tests and quizzes	Summative Assessments →Answering questions in the lesson plan and producing a short documentary video of a specific EU member country.

Learning Activities (7 – 10 days): Lesson introduction, body, and closing

Day 1	→ **Activity 1** – Understanding the Greenhouse Effect and Climate Change. Watch the Videos below and answer the questions that follow. **Video 1 Questions:** Climate 101 - Causes and Effects of Climate Change	National Geographic https://www.youtube.com/watch?v=G4H1N_yXBiA

	1. What is the main cause of climate change? 2. Explain what the greenhouse effect is and list 5 greenhouse gases. 3. What human activity contributes to the greenhouse effect? 4. What is the current level of carbon dioxide (ppm) today? 5. Describe in detail the consequences climate change is having on our Oceans, Weather, Food, and Health. 6. How can humans help combat climate change? **Video 2 Questions:** – Vice Medea presents Shane Smith's travel to Greenland with climate scientist Jason Box to investigate why the glaciers are melting, and how the resulting rise in sea level will devastate our world. https://www.youtube.com/watch?v=7Yq-sfWSWLg 1. Explain in detail the relationship between climate change, ice sheet melting, and sea level rise. 2. How much of Greenland is covered by the Qassimiut Glacier in Southern Greenland? 3. Approximately how many feet/meters of ice is melting each year? 4. Describe how increase pollution results in the acceleration of the ice sheet melting 5. If all of Greenland's ice melted, how much would sea level rise and what impact would that have on the world's cities? Summarize NASA Climatologist, Dr. Gavin Schmidt's comments on the global scientific consensus of the Intergovernmental Panel on Climate Change (IPPC) 2013 report. 6. In Dr. Schmidt's professional opinion, how much of the crisis is man-made?
Day 2	→ **Activity 2**– Getting to know the EU. Visit the website below to answer the questions that follow. The European Union (EU) and Countries in the EU. https://www.schengenvisainfo.com/eu-countries/ **Activity 2 - Questions** 1. Describe what the EU is, how many Member Countries there are, and when was it founded. 2. On the map provided, locate and label the EU Member Countries; color the map and prepare a map legend. https://carleton.ca/ces/eulearning/wp-content/uploads/colouringmap.pdf Color coded interactive reference map of Europe https://carleton.ca/ces/eulearning/introduction/what-is-the-eu/activities-1-and-2-map/

Day 3	→ **Activity 3 – Questions**
	1. What is the energy union about? Read the information and watch the video. Describe what the energy union is and why it is needed.
	2. What energy is available in the EU?
	    a. Where does the EU's Energy come from?
	    b. What are the 5 different sources of energy in the EU?
	    c. What types of energy is produced in the EU?
	    d. List the percentage of EU energy production by source.
	    e. How does the production of energy differ from one Member State to another, give 4 examples of production differences? What are the main imported products and from what counties are they imported from?
	    f. In order to support the EU's energy needs, energy is imported from third countries. Who are the top suppliers outside the EU and what products are being supplied to the EU?
	    g. What are the top 5 EU countries dependent on outside energy sources?
	3. What type of energy is consumed most in the EU?
	    a. What is the main source of electricity consumed in the EU?
	    b. How much does energy consumption cost? Give 4 examples of different Member States.
	    c. Watch the video to help reinforce your learning.
	      https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-3.html
	4. What are the links between energy and the environment?
	    a. How are the greenhouse gas emissions (GHG) in the EU evolving?
	    b. Other than burning fossil fuels, name two other sources of GHS's.

	c. Look at the graph of GHG emissions. What is the GHG trend from 1990 to 2015? Give 3 reasons for this trend.
	d. How efficient are the EU Member States as a whole in energy consumption? What Member States used the least amount of energy relative to their overall economies (based on GDP)?
	e. What countries were the most energy intensive EU Members? How does economic structure play a role in determining energy intensity?
	f. What is the share of renewable energy to total energy in the EU? What Member States have the highest share of renewable energy to total energy? What member States have the lowest? What accounts for the differences among Member States?
	g. How many Member States have reached the 2020 target of a 20% renewable energy share?
	
	5. Watch the video and answer the questions.
	https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-4c.html
	    a. What is meant by renewable energies?
	    b. What is one way to consume renewable energy directly?
	    c. In the EU, what are the sources of burned renewable sources?
	    d. What are the types of renewable energy sources and the percentages that make up EU energy?
	    e. Is the use of renewable energy in the EU increasing or decreasing? What are the 2020 and 2030 goals?

Day 4	→ **Activity 4** – Greenhouse Gas Emissions Statistics – Emissions Inventory. Use the following link https://ec.europa.eu/eurostat/statistics-explained/pdfscache/1180.pdf to explore GHG emissions further and to answer the Activity 4 Questions. **Activity 4 Questions** 1. Rank in order with their percentages the top 5 industries responsible for GHG in Europe: Agriculture, Residential/Commercial, Manufacturing/Construction, Energy, and Transport. 2. What is the EU's target reduction of GHG by 2020 and 2030 respectfully? 3. How much did the EU's GHG emissions drop from 1990 to 2016? 4. What are the top 5 GHG emitting EU Member Countries and what is their percent share of all of the EU? 5. Based on the Intergovernmental Panel on climate change (IPCC), what are the 5 main emission source sectors? 6. What does the term "climate" cover? 7. What is meant by "anthropogenic effects"? 8. List the major EU initiatives to reduce greenhouse gas emissions. 9. What is the EU emissions trading system (EU ETS)? 10. Explain in detail how the EU ETS will work. 11. How will ETS reduce GHG? 12. Do you see any possible problems associated with the implementation of ETS?
Day 5	→ **Activity 5** – EU's Climate Change Initiative and Goals – Watch the video and answer the questions that follow. https://www.youtube.com/watch?v=6nMVZWtcFHw **Activity 5 Questions** 1. Summarize the European commission's targets and goals to combat climate change. Make sure you include examples of how this will be accomplished. 2. What opportunities will there be developing sectors of the economy to become profitable? Give examples of these sectors. 3. How will climate action help reduce the EU's dependence on imported energy?
Day 6	→ **Activity 6** – The EU and Climate Change Policy: Not all countries are on board. There has been some push back from some Member States to the EU's climate policy. Read through the following articles to answer the questions that follow.

	• Off Target: Ranking of EU Countries' Ambition and Progress in fighting Climate Change http://www.caneurope.org/docman/climate-energy-targets/3357-off-target-ranking-of-eu-countries-ambition-and-progress-in-fighting-climate-change/file
	• Climate Change Policy in the European Union, Oxford Research Encyclopedia, Climate Science https://www.oxfordre.com/climatescience/abstract/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e-47
	• Germany, Italy, Poland snub call for net-zero carbon EU by 2050 https://www.climatechangenews.com/2019/05/08/germany-italy-poland-snub-call-net-zero-carbon-eu-2050/
	Activity 6 – Questions 1. According to the "Off Target" reading, what countries score very poorly at fighting climate change and what countries rank the best? 2. For each of the top 5 best countries, describe what it is they are doing well and where they are lagging behind. 3. For the bottom 5 countries, describe what it is they are doing well and where they are lagging behind. 4. Do the countries who oppose stricter climate regulations have anything in common? If so, please elaborate on geographic location, energy sources used by each country, historical socio-political affiliations, and governance. Why do you think these countries oppose the EU's climate policy?
Day 7-10	→ **Part II Producing a Short Documentary on an EU Member Country:** In Part II, students will explore an EU Member Country in more depth. Students will research one EU Member Country's population size, socio-economic ideology, geography and climate, natural resources, energy use, and consumption; as well as country specific energy and climate policies. Students will produce a short documentary about their specific country of interest while addressing the topics above.

Resources and Materials

- National Geographic Europe Resources https://www.nationalgeographic.org/encyclopedia/europe-resources/
- National Geographic Human Geography https://www.nationalgeographic.org/encyclopedia/europe-human-geography/
- European Union https://europa.eu/european-union/about-eu/countries/member-countries/italy_en
- European Union Environment https://europa.eu/european-union/topics/environment_en
- Central Intelligence Agency World Fact book https://www.cia.gov/library/publications/resources/the-world-factbook/index.html
- Encyclopedia Britannica https://www.britannica.com/place/Europe
- Key Figures on Europe 2017 https://ec.europa.eu/eurostat/documents/3217494/8309812/KS-EI-17-001-EN-N.pdf/b7df53f5-4faf-48a6-aca1-c650d40c9239
- European Union Countries in Brief https://europa.eu/european-union/about-eu/countries/member-countries_en
- World Population Preview http://worldpopulationreview.com/european-union-countries/
- Europe: Map of Member States https://www.nationsonline.org/oneworld/europe_map.htm
- European Commission https://ec.europa.eu/commission/index_en
- Ranking of EU Countries Ambition and Progress in Fighting Climate Change http://www.caneurope.org/docman/climate-energy-targets/3357-off-target-ranking-of-eu-countries-ambition-and-progress-in-fighting-climate-change/file