

Global Climate Change Unit February-March, 2016 Honors Chemistry			Major Due Dates: Day 4 Rough draft of I Day 14 Infographic on	01		· •
Dr. Rose D	Davidson					
Essential (	Questions:	:				
• How ha	as the com	bustion of fos	sil fuels impacted the carl	bon cycle	and changed	d the flow of energy in
the env	vironment?					
• How is	global clin	mate change n	nodeled and predictions for	or the fut	ure made?	
Date O	bjectives o	overed on th	e Unit Assessment	Activiti	es	Homework
Days St	udents will	l be able to pro	ovide evidence of global	Researc	h project	Team research and
			oact on global systems.	Trend, Evidence, Impact		infographic creation.
St	udents will	l be able to co	mmunicate their			
			ng an infographic.			
•		ts will be able to communicate their			Walk	Revise infographic
	0	•	Walk presentation of			and submit it for
	eir infogra					teacher feedback.
-		s will be able to describe how they			Footprint	Read and take notes
the	emselves c	contribute to G	lobal Climate Change.	calculator		on 22.5 and 24.1 in
						text on carbon
	1 4 '1				1 1 1	chemistry
-		s will be able to describe how changes			nd guided	Begin team research
	-		nd individual level can	discussi	on	
	mitigate human impact on the carbon cycle.				hahamaaa	Taona nagaonah
		ts will be able to describe how changes t the global, local and individual level can			h changes be made	Team research
	-		the carbon cycle.	that can	be made	
		•		Complete research		Research and
-		s will prepare an infographic to nicate the changes needed at the global,				infographic creation.
			to mitigate human	and prepare infographic		
		e carbon cycle		mogra	Sille	
	-		nfographic and prepare	Finalize I		Finalize infographic
				infographic		I manife mographie
		ir presentation for the Gallery Walk dents will communicate the findings of their		Gallery walk		Read and take notes
-		rch in an infographic.				on next unit in text
Academic						
photosynth		sil fuels	solid waste		glacier	
respiration		coal dissolved carbon dioxide		Ū.		
combustion	n pro	propane organic carbon compound		ds	acidificatio	on
carbohydra	ate octa	ane	fossil fuels		ice core	
	met	thane	coal			
propane, octane, methane						
Assessmen	nt: The tw	<u>o infographic</u>	s created will comprise	the asses	<u>sment for th</u>	nis unit.







# Trends, Evidence and Impacts of Global Climate Change Infographic Project Dr. R. Davidson, 2016

Objective:

You will understand and be able to describe how human combustion of fossil fuels has impacted the climate of planet Earth and the long term consequences of that impact on the environment and ecological communities.

Outcomes:

- You will locate global scientific climate data, analyze trends in the data and then determine if the • trends in the data support the hypothesis that global climate change is occurring and impacting Earth's biosphere.
- You will be able to describe the impact which global climate change events are having on the environment and natural systems of Earth.
- You will represent your understandings about trends in global data, evidence of global climate change and the impacts that it is having on natural systems using an infographic which contains images, statistical information in the form of graphics and minimal text.
- You will defend your understanding during a Gallery Walk of the infographics prepared by the members of the class.

**Student Directions:** 

- 1. Begin by reading the online booklet *Climate Change: Evidence, Impacts, and Choices* by the National Research Council which is available at:
  - http://nas-sites.org/americasclimatechoices/files/2012/06/19014 cvtx R1.pdf
- 2. Watch the video, Climate Change: Lines of evidence from the National Academies of Sciences, Engineering and Medicine Available at: https://www.youtube.com/watch?v=gIUN5ziSfNc
- 3. Working with a partner or alone you will choose one of the evidences of global climate change to research. Each group or student working alone must have a unique topic. These are listed in the table below and will be selected first come, first served on through the google doc link which was sent to you via email. You are asked not to change or delete anyone else's name beside your own on this shared document.
- 4. You and your partner will research your chosen topic using credible sources and then prepare a one page infographic on that topic to present to the class during a gallery walk.
- 5. Your research gathered and presented on the infographic should contain the following content about the evidence chosen:
  - a. The trend in the evidence over time is determined and clearly and correctly described.
  - b. The change over time for that evidence is correctly illustrated graphically.
  - c. The impact which that event is having on Earth's systems is fully represented graphically, pictorially or with succinct descriptions. Earth systems include the biosphere, the atmosphere, the lithosphere and hydrosphere.
- 6. Your research findings are creatively composed into a one page infographic which is 8.5 x 11 inches in size. Make your infographic interesting and eye catching. The final infographic will be saved as a PDF and then uploaded through Blackboard.







- 7. The Venngage program will be used to create the infographic, the final submitted project must be PDF file formatted to 8.5 x 11 inches with all students' last names provided in the file name. You should have your login information for the educational version of Venngage which was used in the fall.
- 8. The sources of the information and images, besides being attributed on the infographic itself, are to be cited on a separate word document which is also uploaded through Blackboard on the due date.
- 9. The quality of the sources used for your information, the quality of the information presented and the quality of the infographic itself are all features which will impact your grade on this project. Specifics are detailed on the Specification Sheet.
- 10. It is your team's responsibility to insure that all members have access to the final product and are prepared for their presentation during the gallery walk which will take place on **February 29**.

Cho	Choices for Evidences to Examine:			
А	Carbon Dioxide levels in Ice Cores from Antarctica and Greenland			
В	Sea Level measurements			
С	Global Temperatures			
D	Ocean Temperatures			
E	Great Lake Temperatures			
F	Size of ice sheets in Antarctica and Greenland			
G	Size of arctic sea ice			
Η	Size, length of glaciers			
Ι	Number of extreme weather events: heavy downpours			
J	Number of extreme weather events: floods			
Κ	Number of extreme weather events: tornados			
L	Number of extreme weather events: hurricanes			
Μ	Number of extreme weather events: droughts			
Ν	Number of extreme events related to weather: forest fires			
0	Number of extreme events related to weather: heat waves			
Р	Ocean acidification			
Q	Amount of snow cover			
R	Changes in seasonal migration patterns			
S	Changes in animal or plant populations: extinctions and near extinctions			
Т	Extent of deserts: desertification			
U	Increase in insect borne diseases			
V	Spring's arrival: length of the frost free season			
W	The Maldives Islands in crisis			

### Additional Resources:

http://www.nrdc.org/globalwarming/climatebasics.asp http://www.ucsusa.org/global\_warming#.VrjZmfkrLrc http://climate.nasa.gov/evidence/ http://nca2014.globalchange.gov/ https://www.skepticalscience.com/evidence-for-globalwarming.htm https://www.ncdc.noaa.gov/indicators/ http://www.ipcc.ch/





Trends, Evidence and Impacts Infographic Scoring (	Guide				
Excellent: meets all described features completely and shows originality and creater					
that add to the presentation. The information is presented at the honors, high school level of rigor.					
Adequate: meets all the described features but is lacking in originality, creativity	, or rigor.				
Needs Improvement: the coverage is lacking key facets of the material or formatting features.					
Missing: the presence of that particular feature is not found and all points will be	deducted.				
Content Features	20 Points possible				
• The science content represented in the infographic has significance and is	Excellent $= 20$				
appropriate to the topic. Extraneous, nonessential or nonscientific information	Adequate $= 16-19$				
which detracts is not included. All content is from credible sources.	Needs Improvement= 12-16				
• The trend in the evidence is clearly and correctly stated; what it shows about	Missing = < 12				
changes over time.					
• The changes over time are correctly illustrated using a graph.					
• The impact which that trend is having on earth's systems which include the					
biosphere, the atmosphere, the lithosphere and the hydrosphere are fully					
represented.					
Quality, Layout and Formatting Features	20 points possible				
• The infographic has a descriptive title and an opening sequence which serves as	Excellent $= 20$				
a hook for the audience: the intent, purpose is made clear for the audience. The	Adequate= 16-19				
information flows with the main, most important ideas given prominence.	Needs Improvement =12-16				
• The content is presented in a unique, dynamic and creative manner through the	Missing = < 12				
use of graphics such as pictures, tables, graphs, word art.					
• The artistic quality of graphics does not detract from their presentation. Images					
are crisp and appropriate to the topic. Text is clear and legible. Color choices,					
font size and format are appropriate to the topic and overall presentation.					
• Images are copyright free or student created. Student or the artist is given credit					
beneath the image. Care and effort is taken with hand drawn images.					
• The mathematical relationship between quantities or properties is shown					
graphically not in tables. Graphs and tables are properly formatted.					
Understandable and accurate labels and units are included on graphs and tables.					
All graphs or tables are created by the students, and the information used to					
create them is credited beneath the graphic.					
Citing Sources	5 points				
• Multiple, <u>credible</u> sources of data and information are used.	Excellent $= 5$				
• The name and date of each source of information is cited below the element in	Adequate = 4				
which it is used in font size 6 or 8.	Needs Improvement $= 3$				
• The full MLA formatted work cited is provided as a separate word document	Missing = < 2				
with the URL provided for each electronic source. This document includes a					
heading and is final, not draft quality					
Gallery Walk Presentation	5 points				
• Each member of the team is available and presents during the gallery walk.	Excellent $= 5$				
• Presentations are prepared in advance and are the same for each presenter.	Adequate = 4				
• Presentations are crisp, clean and last no more than 2 minutes.	Needs Improvement $= 3$				
• Team members are respectful of audience members and of other student's	Missing = < 2				
presentations.					
Total Points Possible	50 points				









# Global, Local and Individual Changes to Mitigate Global Climate Change Infographic Project Dr. R. Davidson, 2016

**Objectives:** 

- You will understand how human activities have interrupted the natural carbon cycle on Earth.
- You will understand how Earth's climate is changing as a result of changes to the carbon cycle.
- You will understand how changes made at the global, local and individual level can mitigate human impact on the carbon cycle.

Outcomes:

- You will locate global scientific climate data which illustrate the impact, and the extent of the • impact which a specific human activity is having on the climate of our planet and the natural systems.
- You will be able to describe the impact which humans are having on the environment and natural systems of Earth.
- You will locate recommendations made by expert scientists of steps which can be taken to mitigate the impact which humans are having on Earth's system.
- You will describe changes in human activities which can take place at the global level, the local level and the individual level to mitigate the impact of human activity on Earth's system.
- You will communicate your research findings by creating an infographic.
- You will defend your understanding during a Gallery Walk of the infographics prepared by the members of the class.

**Student Directions:** 

- 1. Watch the video, Keeping up with Carbon, available at: https://www.youtube.com/watch?v=HrIr3xDhO0E
- 2. Complete the carbon footprint activity available at: <u>http://www.earthday.org/take-</u> action/footprint-calculator/ or http://coolclimate.berkeley.edu/calculator or http://www3.epa.gov/carbon-footprint-calculator/
- 3. Teams of one or two students will gather information on one of the human activities listed in the table below. These are human activities which are impacting the natural carbon cycle. Select one of these human activities to explore and sign up on the google document using the link posted on Blackboard. Each team must have
- 4. The team will determine the mechanism by which that human activity contributes to global climate change.
- 5. The team will determine changes which could be made on the global level, USA, to reduce the impact of that human activity on the global climate.
- 6. The team will determine changes which could be made on the local, St. Louis and Missouri level to reduce the impact of that human activity on the global climate.
- 7. The team will determine changes which could be made on the individual, family level to reduce the impact of that human activity on the global climate.
- 8. The team will create an infographic which communicates the changes which could be made globally, locally and individually to reduce the impact of that human activity on the global climate.







- 9. The Venngage program will be used to create the infographic, the final submitted project must take the format of a pdf file formatted to 8.5 x 11 inches.
- 10. This infographic will be presented in a gallery walk and must be submitted to Dr. Davidson by the deadline so that it can be printed in advance. Late infographics or work cited will not be accepted.
- 11. It is your team's responsibility to insure that both team members have access to the final product and are prepared for their presentation during the gallery walk

	Human Activity Choices
А	Use of petroleum for transportation
В	Reliance on the individual automobile for transportation
С	The life style preference of many individuals to own larger, luxury, sport utility vehicles.
D	The life style preference of many individuals to take many vacation trips via airplanes, cars
	and trains each year.
E	The lifestyle of many individuals to throw away or replace rather than maintaining electrical
	devices, cars, household appliances
F	Use of coal to generate electricity
G	The heavy reliance on electricity for heating, and cooling our homes
Η	Use of coal in manufacturing goods for human use
Ι	Use of non-renewable resources as materials for manufactured goods
J	The high consumer mentality of most humans: buy lots of stuff, always have the latest
	gadget
Κ	Urban sprawl: replacing green space with cities and homes
L	The life style preference of many humans to own big homes/estates with large lots and grass
	lawns
Μ	Replacement of natural habitats with cropland and grazing areas to provide food for humans
Ν	Run off of sediments and pollutants into natural waterways and eventually the ocean caused
	by farming to provide food for humans and construction to provide homes for humans
0	Use of wood in fireplaces and cooking fires
Р	The meat-centric diet of most humans
Q	The fast food/processed food heavy diet of most humans
R	Use of wood for paper products
S	Use of methane in furnaces to heat homes and water
Т	The failure of most humans to systematically reduce, reuse and recycle manufactured goods.
U	The production of methane by grazing cattle (reliance on meat based diet)
V	Homes and Buildings that are not energy efficient, do not retain heat

### **Resources:**

http://www.nrdc.org/globalwarming/gsteps.asp http://www.ucsusa.org/our-work/globalwarming/solutions/global-warming-solutions-reduceemissions#.VsXZ1vkrJD8 http://www3.epa.gov/climatechange/wycd/ https://www.skepticalscience.com/global-warming-toohard.htm http://ec.europa.eu/clima/policies/international/negotiatio ns/paris/index\_en.htm





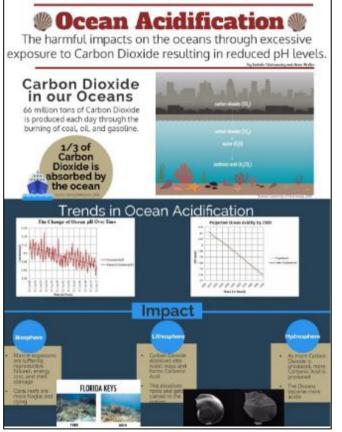
Global, Local, Individual Infographic Scoring Guide	
Excellent: meets all described features completely and shows originality and creativity us add to the presentation. The information is presented at the honors, high school level of Adequate: meets all the described features but is lacking in originality, creativity, or rigo Needs Improvement: the coverage is lacking key facets of the material or formatting feat Missing: the presence of that particular feature is not found and all points will be deducted	rigor. r. ures.
Content Features	20 Points possible
<ul> <li>The science content represented in the infographic has significance and is appropriate to the topic. Extraneous, nonessential or nonscientific information which detracts is not included.</li> <li>The mechanism by which that human activity contributes to global climate change is fully described.</li> </ul>	Excellent = 20 Adequate = 16-19 Needs Improvement = 12-16 Missing = < 12
<ul> <li>The mechanism's extent is illustrated mathematically, with a graph.</li> <li>The changes which could be made on the global level to reduce the impact of that human activity on the global climate are represented fully.</li> <li>The changes which could be made on the local, St. Louis and Missouri level to reduce the impact of that human activity on the global climate are fully represented.</li> <li>The changes which could be made on the individual, family level to reduce the impact of that human activity on the global climate are fully represented.</li> </ul>	
Quality, Layout and Formatting Features	20 points possible
<ul> <li>The infographic has a descriptive title and an opening sequence which serves as a hook for the audience: the intent, purpose is made clear for the audience. The information flows with the main, most important ideas given prominence.</li> <li>The content is presented in a unique, dynamic and creative manner through the use of graphics such as pictures, tables, graphs, word art.</li> <li>The artistic quality of graphics does not detract from their presentation. Images are crisp and appropriate to the topic. Text is clear and legible. Color choices, font size and format are appropriate to the topic and overall presentation.</li> <li>Images are copyright free or student created. Student or the artist is given credit beneath the image. Care and effort is taken with hand drawn images.</li> <li>The mathematical relationship between quantities or properties is shown graphically, not in tables. Graphs and tables are properly formatted. Understandable and accurate labels and units are included on graphs and tables. All graphs or tables are created by the students, and the information used to create them is credited beneath the graphic.</li> </ul>	Excellent = 20 Adequate= 16-19 Needs Improvement = 12-16 Missing = < 12
Citing Sources	5 points
<ul> <li>Multiple, <u>credible</u> sources of data and information are used.</li> <li>The name and date of each source of information is cited below the element in which it is used in font size 6 or 8.</li> <li>The full MLA formatted work cited is provided as a separate word document with the URL provided for each electronic source. This document includes a heading and is final, not draft quality</li> </ul>	Excellent = 5 Adequate= 4 Needs Improvement = 3 Missing = < 2
Gallery Walk Presentation	5 points
<ul> <li>Each member of the team is available and presents during the gallery walk.</li> <li>Presentations are prepared in advance and are the same for each presenter.</li> <li>Presentations are crisp, clean and last no more than 2 minutes.</li> <li>Team members are respectful of audience members and of other student's presentations.</li> </ul>	Excellent = 5 Adequate = 4 Needs Improvement = 3 Missing = < 2
Total Points Possible	50 points

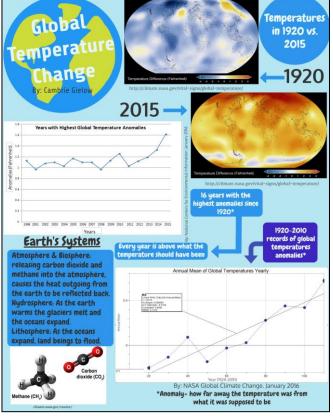






### Examples of Student Work

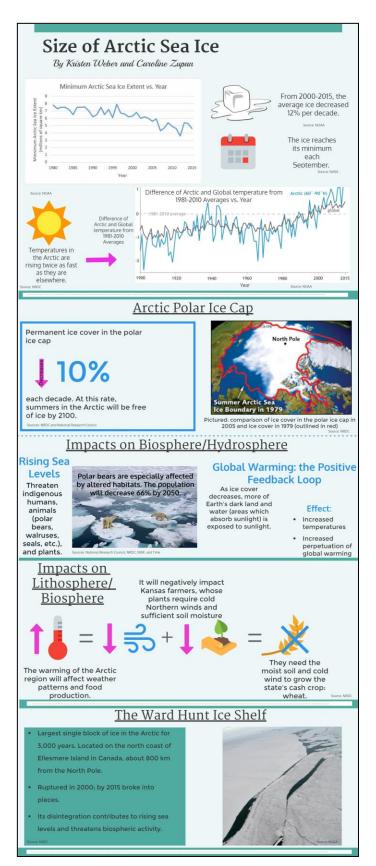












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Coal Use

410/0 of global electricity.

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terest uses of all

Coal plays a vital role in electricity generation worldwide.

 $= 1 CO_2$ 

Reducing CO<sub>2</sub>

which to over 19 efficient appliance



