

Chemistry Summer Assignment

The learning of chemistry requires a set of very important learning skills. This summer assignment will cover these skills by exploring a series of different science related themes. I will note what Skills you are practicing for each Theme. **Each one of the assignments is due on the First Day of School.** You will have a test that covers the material so be sure to complete all of your work. Each assignment is about 60 – 90 minutes long so you should have plenty of time during the summer to complete them. If you have any problems then email me at ccarambo@philasd.org for help. Challenge yourselves and start your sophomore year off right by completing all of these assignments on time. Following is a list of the themes and the skills that they teach.

Theme One: The Nature of Science

Skills: Reading and Analyzing Scientific Texts, Summarizing, and Citing Evidence

Theme Two: Chemistry in Our Lives

Skills: Close Reading, Annotating, Analyzing and Summarizing Text

Theme Three: Scientific Reasoning: Claim Evidence and Reasoning

Skills: Using the C.E.R. Process, Reasoning, Graph Analysis

Theme Four: Research: Element Webquest

Skills: Research and Informative Writing

CLOSE READING:

An important learning skill is reading scientific literature. Each of the assignments will have some form of reading as part of it. When you read you should always make sure to underline / or highlight all vocabulary words you don't know and look them up. Some of the articles may have certain important science words highlighted and referenced for you. Whenever you read a science text make sure that you know the meaning of all words in the text. If you don't then use a dictionary or a reference website.

You should also begin to write notes about what you read. This strategy is called "annotating text" where you write questions or summary ideas in the margins as you read. We will practice **annotation** when we do the Close Reading or the articles on *Climate Change* and the *Periodic Table*, but it is a good idea to always annotate whenever you read.

There are **Four Themes** to this summer assignment. Each theme has several parts so you should pay close attention to the instructions. Each theme focuses on specific science learning skills.

On the following pages you will find detailed instructions for each theme. You should write your work on a computer so that it is neatly organized and legible. If you cannot do so then make sure to write neatly on (preferably college ruled) paper. Make sure to keep your work organized and neat. **All work is due on the first day of school.**

(Note: there are many links to websites throughout this assignment. I have provided the URL to all websites on the assignment. If a link is inactive, then cut and paste the URL into your browser.)

THEME ONE: The Nature of Science:

SKILLS:

- **SUMMARIZING**
- **CITING EVIDENCE**
- **ANALYZING TEXT**

Science is defined as both a body of knowledge about the natural world AND a specific set of practices that are used to investigate our world. **The first assignment covers the NATURE OF SCIENCE and SCIENTIFIC METHODS.** You will read Four articles and answer questions about each of them.

First Article: Understanding Science Overview

Read the article: [Understanding Science: An Overview](https://undsci.berkeley.edu/article/intro_01)

(URL: https://undsci.berkeley.edu/article/intro_01)

Then answer the following analysis questions:

1. What are the two ways that science is defined?
2. How is science different from other ways of learning?
3. Why do you think science is important?
4. Why is science useful or important to the world?
5. Describe two ways that science is important in your life.
6. What are the five important characteristics of science? (Remember to translate what you read into your own words).
7. The last characteristic says that science is a “*community endeavor*” that is facilitated by *diversity within the scientific community, which offers a broad range of perspectives*”. What does this mean? What is diversity in science and why is it important?

These five characteristics are part of the **Science Checklist** that you will use to determine if an experiment / or idea is scientific or not. Click on the following link to see the Science Checklist.

[Science Checklist:](https://undsci.berkeley.edu/images/science_checklist.pdf)

(URL: https://undsci.berkeley.edu/images/science_checklist.pdf)

8. Describe the two additional characteristics of science that are included in the Science Checklist. Your checklist will now have 7 characteristics.

Applying the Science Checklist:

Following are two articles that explore different ways of learning about planets and stars. One explains what astrology does, the other explains how we study variable stars.

(IMPORTANT SKILL: CITING EVIDENCE FROM A TEXT).

You should find evidence in the readings to support your analysis. You should use details from the article as evidence to support each one of the science checklist characteristics. For example: If you think that astrology **studies the natural world** then you should use details from the article to support that opinion. If you think the study of variable stars **uses testable ideas**, then provide evidence from the article. **Remember every characteristic from the checklist must be**

supported by evidence from the article. Each article contains the checklist to make your analysis more efficient.

Click on the link to read the articles and apply the science checklist.

Second Article: [Astrology: Is it Scientific?](#)

(URL: https://undsci.berkeley.edu/images/astrology_checklist.pdf)

Third Article : [Studying Variable Stars](#)

(URL: https://undsci.berkeley.edu/images/checklist_leavitt.pdf)

Summary Paragraph: Which of the two articles was scientific? The astrology or the variable stars? Explain your reasoning using evidence from the characteristics on the science checklist.

THEME TWO: CHEMISTRY IN OUR LIVES

SKILLS:

- CLOSE READING
- ANNOTATING TEXT
- ANALYZING TEXT
- SUMMARIZING TEXT

CLOSE READ

Below Are the Instructions on How to Do A Close Read. Use This as A Guide for Your Reading of The Following Two Articles:

“COW POWER: A CLIMATE CHANGE SOLUTION” and
“THE PERIODIC TABLE TURNS 150”

Close Read

Read with a pencil/highlighter in hand and annotate the text.

- Annotating *means* underlining or highlighting key words and phrases—anything that strikes you as surprising or important, or that raises questions.
- Annotating *includes* writing your thoughts and reactions in the margins next to what you have highlighted or underlined. These need to be rich comments. Rich comments might begin with the word, what or why or any of the phrases that could also be used to start your reflection statement.
- Highlight or circle words you don't know and look them up! Write down the definition in the margin next to the word.
- You should have at least four annotations and at least 2 highlighted vocabulary words per page

(Note: If you can print the text then write your annotations and vocabulary in the margins. If you cannot print the text, then you will have to write your annotations and vocabulary on a separate sheet of paper. Make sure to write the page number of the page where the annotations go.)

Summary Statement Write a summary statement for the article in which you include:

- The author and title.
- The purpose of the article (see sample list below)
- The general content of the article: what was the main idea / content of the article. Make sure to describe the scientific ideas that were used in the article.

Purpose	Explanation
Express and reflect	The writer <ul style="list-style-type: none">• Expresses or reflects on his or her own life and experiences.• Often looks backward in order to look forward
Inquire and explore	The writer <ul style="list-style-type: none">• Wrestles with a question or problem• Hooks with the problem and lets the reader watch him or her wrestle with it.
Inform and explain	The writer <ul style="list-style-type: none">• States a main point and purpose

	<ul style="list-style-type: none"> • Tries to present the information in a surprising way
Analyze and interpret	The writer <ul style="list-style-type: none"> • Seeks to analyze and interpret phenomena that are difficult to understand or explain
Take a stand	The writer <ul style="list-style-type: none"> • Seeks to persuade audiences to accept a particular position on a controversial issue
Evaluate and judge	The writer <ul style="list-style-type: none"> • Focuses on the worth of person, object, idea, or other phenomenon • Usually specifies the criteria for the object to be seen as good or bad
Propose a solution	The writer <ul style="list-style-type: none"> • Is calling for action • Describes the problem, proposes a solution, and provides justification
Seek common ground	The writer <ul style="list-style-type: none"> • Aims to calm the intensity • Respects the values of all readers

from *Teaching Adolescent Readers* by Kelly Gallagher, p.183

Reflection Statement:

Write a reflection statement for the article. The statement should state what you learned from the reading and include a personal reflection statement (some example starters are listed below)

- | | |
|-----------------------------|--------------------------|
| A) I noticed. . . | E) I'd like to know. . . |
| B) I wonder. . . | F) I realized. . . |
| C) I was reminded of. . . | G) If I were. . . |
| D) I am surprised that. . . | H) I am not sure. . . |

The summary and reflection statements should be at least two paragraphs long.

FIRST ARTICLE: COW POWER:

Click on The Title to Access the Article. You May Read the Article Online, or You May Download and Print It.

Instructions:

- Read and Annotate the Article
- Then Answer the Comprehension Questions and Write the Summary Statements.

COW POWER:

(URL: <https://www.acs.org/content/acs/en/education/resources/highschool/chemmatters/past-issues/2019-2020/apri-2020/cow-power.html>)

COMPREHENSION QUESTIONS:

Directions: Use the article to answer the questions below. Remember to write in complete sentences with correct spelling and proper grammar.

1. How many biogas systems were in operation in the U.S. in 2017?
2. How much manure do the cows at Noblehurst Farms produce each day?
3. What is the approximate monthly reduction in carbon dioxide production by Noblehurst Farms after implementing a methane digester?
4. Which two industries account for 10% of the methane generated by human activities in the U.S.?

5. How much money does Noblehurst Farms save by using methane digesters?
6. How do cows contribute to the production of greenhouse gases?
7. Which elements combine to make methane?
8. Define global warming potential.
9. Aside from dairy farms, list three other potential sources of biogas.
10. What is enteric fermentation?

SECOND ARTICLE: Periodic Table Turns 150.

Click on The Title to Access the Article. You May Read the Article Online, or You May Download and Print It.

Instructions:

- Read and Annotate the Article
- Then Answer the Comprehension Questions and Write the Summary Statements. (Follow the same instructions for the summary and reflections statement as you did for the “*Cow Power*” article.)

[PERIODIC TABLE TURNS 150](https://www.acs.org/content/acs/en/education/resources/highschool/chemmatters/past-issues/2018-2019/february-2019/periodic-table-turns-150.html)

(URL: <https://www.acs.org/content/acs/en/education/resources/highschool/chemmatters/past-issues/2018-2019/february-2019/periodic-table-turns-150.html>)

Comprehension Questions

1. What was Dmitri Mendeleev’s dream that reportedly was the start of his periodic table?
2. What is periodicity?
3. How did (a) Antoine Lavoisier, (b) Johann Döbereiner, and (c) John Newlands attempt to organize the elements?
4. What is a hydride, and (b) how did Mendeleev use hydrides in developing his table?
5. What was Mendeleev’s most insightful decision in organizing his early periodic table, and (b) why?
6. What revision to Mendeleev’s original periodic table did he make in 1871?
7. How did Henry Moseley change the periodic table in 1913 to its modern form?
8. Why is the placement of hydrogen on the periodic table a debate for some scientists?
9. Although the elements in the lanthanide and actinide series sit below the main table, where do they really belong?
10. Explain (a) Seaborg’s “island of stability” concept, and (b) how it involves the nucleus of the atom.

THEME THREE: SCIENTIFIC REASONING

Scientific Reasoning is one of the most important science learning skills. We use a process called **Claim, Evidence and Reasoning or (CER)** to answer scientific question or explain experimental results. Once you learn how to use the process you will be able to use it to write lab conclusions, to explain concepts in class and in your independent research.

Your first task will be to watch a video on the process. As you watch the video, you will answer a set of questions that will help you understand each part of the process.

Your second task will be to use CER to explain the relationship between carbon dioxide emissions and global warming.

First Task: Analyze “ [How to Write a CER Video](https://www.youtube.com/watch?v=JMn-aO_AEuQ)”
(URL: https://www.youtube.com/watch?v=JMn-aO_AEuQ)

Video Analysis Questions: The answers to the questions are in the video and in the table at the end of the video. You will need to use both to fully answer the questions. Please answer the questions in complete sentences.

1. What is the Claim? What is it trying to answer?
2. What are the three important characteristics of a Claim?
3. What is the Evidence.? What are two important characteristics of Evidence?
4. Where does evidence in the lab come from?
5. Where else can we get evidence from? Name at least five sources.

(Important note: Evidence can come from your own experience! This is your prior knowledge)

1. Can you have only one piece of evidence to support your claim? How much evidence should you have?
2. What is reasoning?
3. What must your reasoning show? What must you use in your reasoning?
4. What three factors does the reasoning include? (Refer to the table at the end).
5. What must your reasoning show about your evidence?

(Important note: The scientific knowledge in your reasoning usually comes from learning in school, but it can also come from your own knowledge or past experiences.)

Second Task: Claim Evidence Reasoning Analysis of Climate Change.

QUESTION:

Why is the Earth's Temperature Rising?

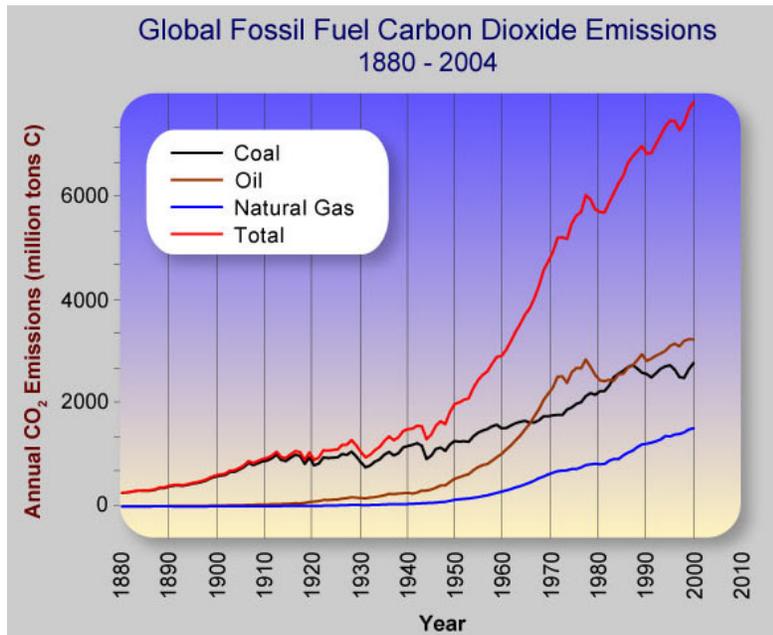
CLAIM:

Increasing Carbon Dioxide Emissions are Responsible for Global Warming

EVIDENCE: Use the following sets of graphs as evidence to support your Claim. Each graph shows how Carbon Dioxide emissions are affecting the Earth. You should use them to gather three pieces of Evidence.

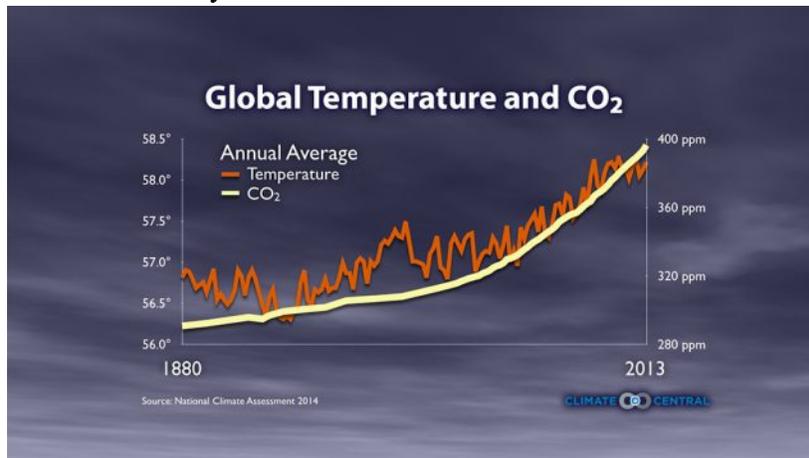
First Graph: Fossil Fuels and Carbon Dioxide Emissions:

To start you should remember that Carbon Dioxide comes from the burning of fossil fuels. This first graph shows how these fossil fuels contribute to Carbon Dioxide Emissions. The red line is the total carbon dioxide emissions per year.



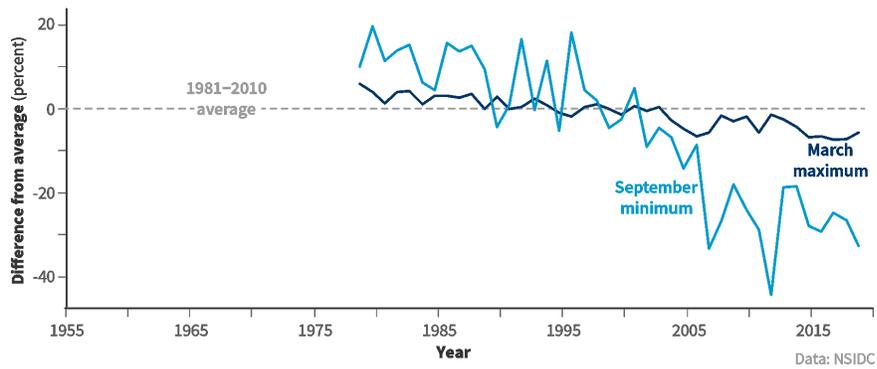
Second Graph: Carbon Dioxide Emissions and Global Temperatures.

This graph shows the relationship between carbon dioxide emissions and global temperatures. Notice the steady rise in both variables.

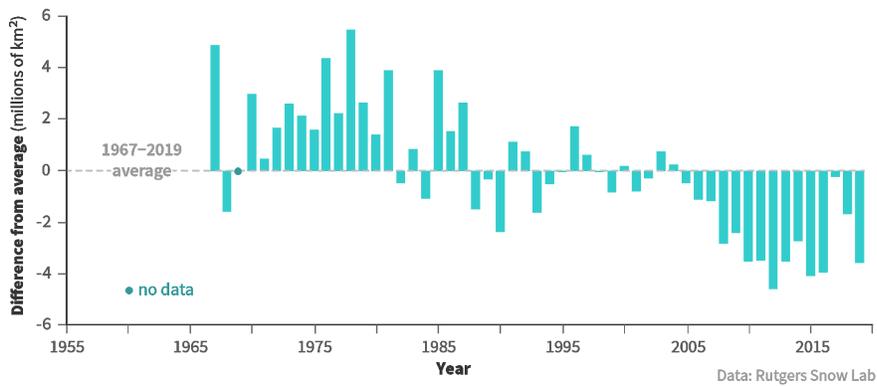


The following graphs show the effect of increasing temperatures on the Earth's Snow Cover and Oceans.

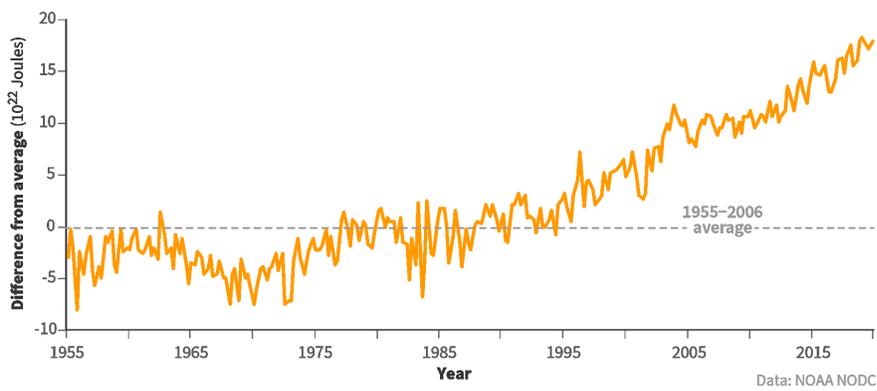
Arctic sea ice extent in winter and summer (1979–2019)



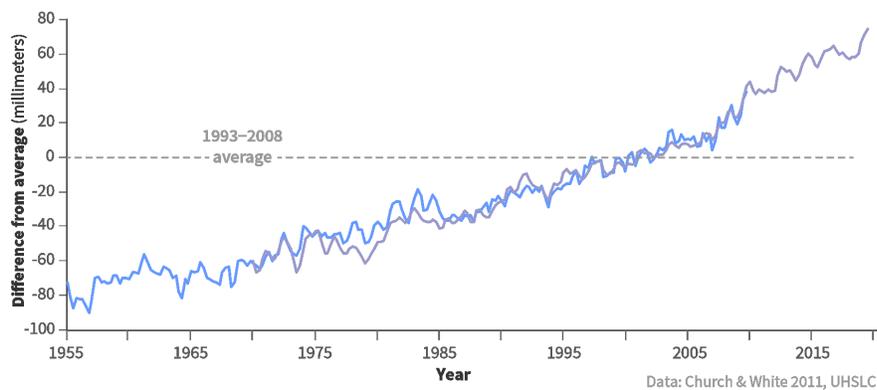
Northern Hemisphere June snow cover (1967–2019)



Upper ocean heat content (1955–2019)



Global sea level (1955–2019)



Remember that you must use some type of scientific knowledge in your reasoning. This knowledge can come from what you learn in school, what you learn on your own and it can also come from your own prior knowledge. Since we are not in school, I have provided some scientific concepts that will help your reasoning. To learn how carbon dioxide emissions affect temperature, you will need to watch a brief video on greenhouse gas emission.

Scientific Principles to use in your Reasoning

A. Carbon Dioxide is a Green House gas that traps heat.

Watch Video on Effect of Carbon Dioxide in the Atmosphere

<https://www.youtube.com/watch?v=3JX-ioSmNW8>

B. Carbon Dioxide is produced when we burn fossil fuels. (Refer to the first graph)

Your Prior Knowledge: (You already know these scientific concepts)

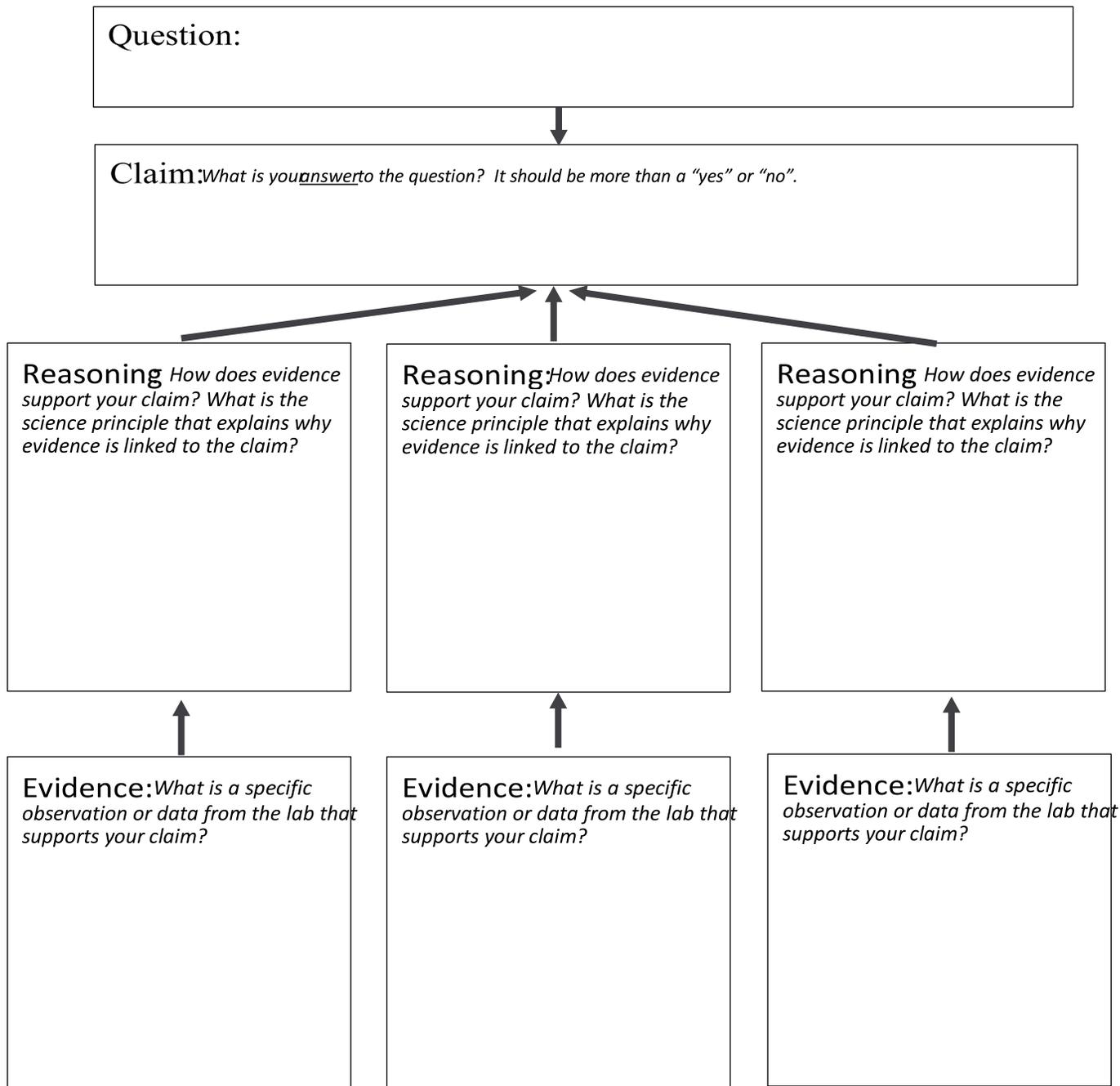
- Increased Global Temperatures Melt Ice Caps, Increase Sea levels, and Increase Evaporation of Water and Precipitation.
- Burning fossil fuels (gasoline, methane gas, and coal) produces carbon dioxide and increase carbon dioxide concentrations in the atmosphere.

Use the information from the video, your prior knowledge, and the evidence from the graphs to support the claim that Carbon Dioxide Emissions are responsible for Global Warming.

Claim Evidence Reasoning Graphic Organizer:

You can use the following chart to organize your C.E.R. You should have at least three pieces of evidence to support your claim. Remember you will also need to use each piece of evidence as part of your reasoning. Reasoning must include a scientific concept to explain why the evidence supports your claim. Once you have your ideas organized, write a summary of your CER. Remember to use the scientific principles in your reasoning.

CER GRAPHIC ORGANIZER



THEME FOUR: INDEPENDENT RESEARCH: ELEMENT WEBQUEST

To determine your element: Write your birthdate in the following form: Month (2 digits), Day, and Year (4 digits) then add them up. For example, June 12, 2015 is $06/12/2015 = 26$. This is the element Fe #26 on the Periodic Table.

Use the number from your birthdate to determine which element you will research. Use the websites on the WebQuest to research your element. Then use the information to write an essay on your element as described below.

ELEMENT PROJECT INFORMATION:

Use the websites on the Webquest to research your element.

- Name: What Is The Meaning Of The Name of your element?
- History: Who Discovered It? When Was it discovered? And How It Was First Isolated?
- Brief Biography Of Scientist Who First discovered the element
- What are the Physical and Chemical Properties of your element?
- Where is it found on the earth? In what form is it found?
- Is it useful in its natural form or must it be isolated or processed for our use? Explain.
- What Is The Major Use Of This Element In Our Society?
- What is the atomic structure of the element (number of protons, neutrons, and electrons)
- Does the element have any naturally occurring isotopes? *
 - An isotope is an atom of the same element with a different number of neutrons, but the same number of protons.

Format for Your Writing

- Write All of The Information in Clear Well Constructed Sentences And Paragraphs.
- Write an Introduction and at least three body paragraphs.
- Include a bibliography that cites the Websites you use for your project.

ELEMENT PROJECT WEBQUEST: Use any of the following websites for information on your element. Remember to note the websites you use. You will need the information for your bibliography. URL 's are listed.

- <https://ptable.com/>
- <https://www.chemicool.com/>

Click on an element for its properties, its history, and major uses.

- [https://education.jlab.org/itselemental/:](https://education.jlab.org/itselemental/)

Click on an element for historical information. Also includes information on the element's isotopes.

- <http://www.rsc.org/periodic-table/history>

Hover over on an element for the meaning of its name and the scientist who discovered it. Click on the element for more detailed information on its uses and its history.

- <https://ptable.com/#Compound/Li>

Click on any element for a list of the compounds of importance. Then click on a compound to get information on the compound.