

13.1 Properties of Matter

Chemistry

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction



Summarize your understanding of each paragraph.

Often (typically) introductory courses to chemistry focus on “inorganic” chemistry. Even so, principles of inorganic chemistry generally ALSO apply to organic chemistry. Inorganic compounds might contain hydrogen or carbon, but if they have both, they are organic.

Organic chemistry is the study of molecules that contain carbon compounds. In contrast, inorganic chemistry is the study of all compounds that do NOT contain carbon compounds.

In chemistry terms, organic means that a molecule has a “carbon backbone” with “some hydrogens thrown in” for good measure. Living creatures are made of various kinds of organic compounds. Inorganic molecules are composed of other elements.

The molecule CO_2 (carbon dioxide) is generally considered inorganic. CO_2 at high pressure and temperature is used to remove the organic caffeine molecule from coffee. Read through the longer article in this packet for information about this process.

Read/Summarize Text



1. Read the passage.
2. Underline key expressions in each sentence.
3. Re-write each word (or expression) you underlined.
4. Summarize the passage.

Title of Passage.

In thermodynamics, the triple point of a substance is the temperature and pressure at which the three phases (gas, liquid, and solid) of that substance coexist in thermodynamic equilibrium.

0.01 °C & 612 pascals. The single combination of pressure and temperature at which liquid water, solid ice, and water vapor can coexist in a stable equilibrium occurs at exactly 273.16 K (0.01 °C; 32.02 °F) and a partial vapor pressure of 611.657 pascals (6.11657 mbar; 0.00603659 atm). At that point, it is possible to change all of the substance to ice, water, or vapor by making arbitrarily small changes in pressure and temperature.

https://en.wikipedia.org/wiki/Triple_point

Re-write words you underlined

Using a complete sentence, summarize or rephrase the passage

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

A chemical compound is termed inorganic if it fulfills one or more of the following criteria:

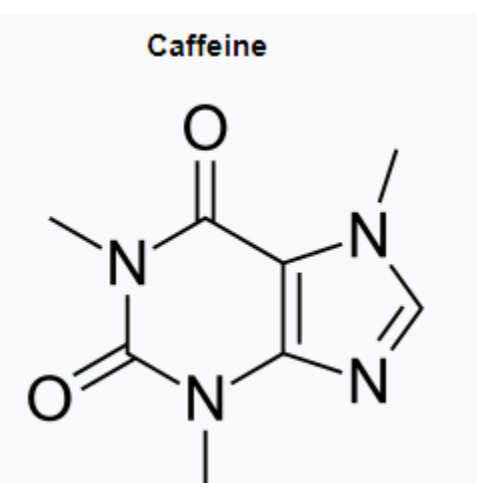
- There is an absence of carbon in its composition
- It is of a non-biologic origin
- It cannot be found or incorporated into a living organism

There is no clear or universally agreed-upon distinction between organic and inorganic compounds. Organic chemists traditionally and generally refer to any molecule containing carbon as an organic compound and by default this means that inorganic chemistry deals with molecules lacking carbon

As many minerals are of biological origin, biologists may distinguish organic from inorganic compounds in a different way that does not hinge on the presence of a carbon atom. Pools of organic matter, for example, that have been metabolically incorporated into living tissues persist in decomposing tissues, but as molecules become oxidized into the open environment, such as atmospheric CO₂, this creates a separate pool of inorganic compounds

Caffeine – an organic molecule – is removed from coffee beans through use an inorganic molecule - carbon dioxide (CO₂) – under high pressure.

Supercritical fluid extraction using carbon dioxide is now being widely used as a more effective and environmentally friendly decaffeination method. At temperatures above 304.2 K and pressures above 7376 kPa, CO₂ is a supercritical fluid, with properties of both gas and liquid. Like a gas, it penetrates deep into the coffee beans; like a liquid, it effectively dissolves certain substances. Supercritical carbon dioxide extraction of steamed coffee beans removes 97–99% of the caffeine, leaving coffee's flavor and aroma compounds intact.



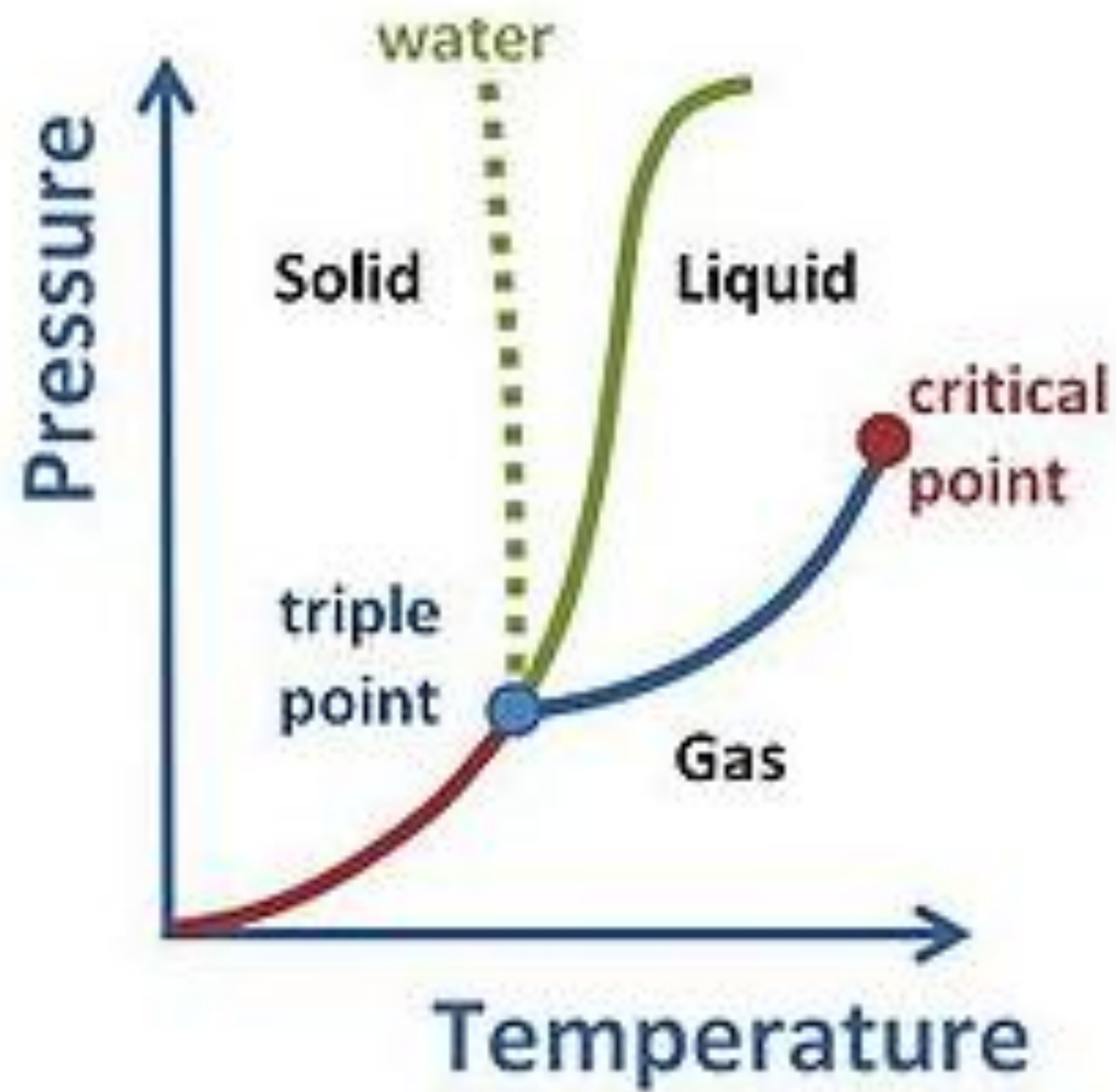
Because CO₂ is a gas under standard conditions, its removal from the extracted coffee beans is easily accomplished, as is the recovery of the caffeine from the extract. The caffeine recovered from coffee beans via this process is a valuable product that can be used subsequently as an additive to other foods or drugs.

Draw Illustration



Copy and Label the Illustration in the Space Provided

Illustration



<https://en.wikipedia.org/wiki/Matter>

Draw (Copy) the Illustration Here

Interpret a Graph



Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

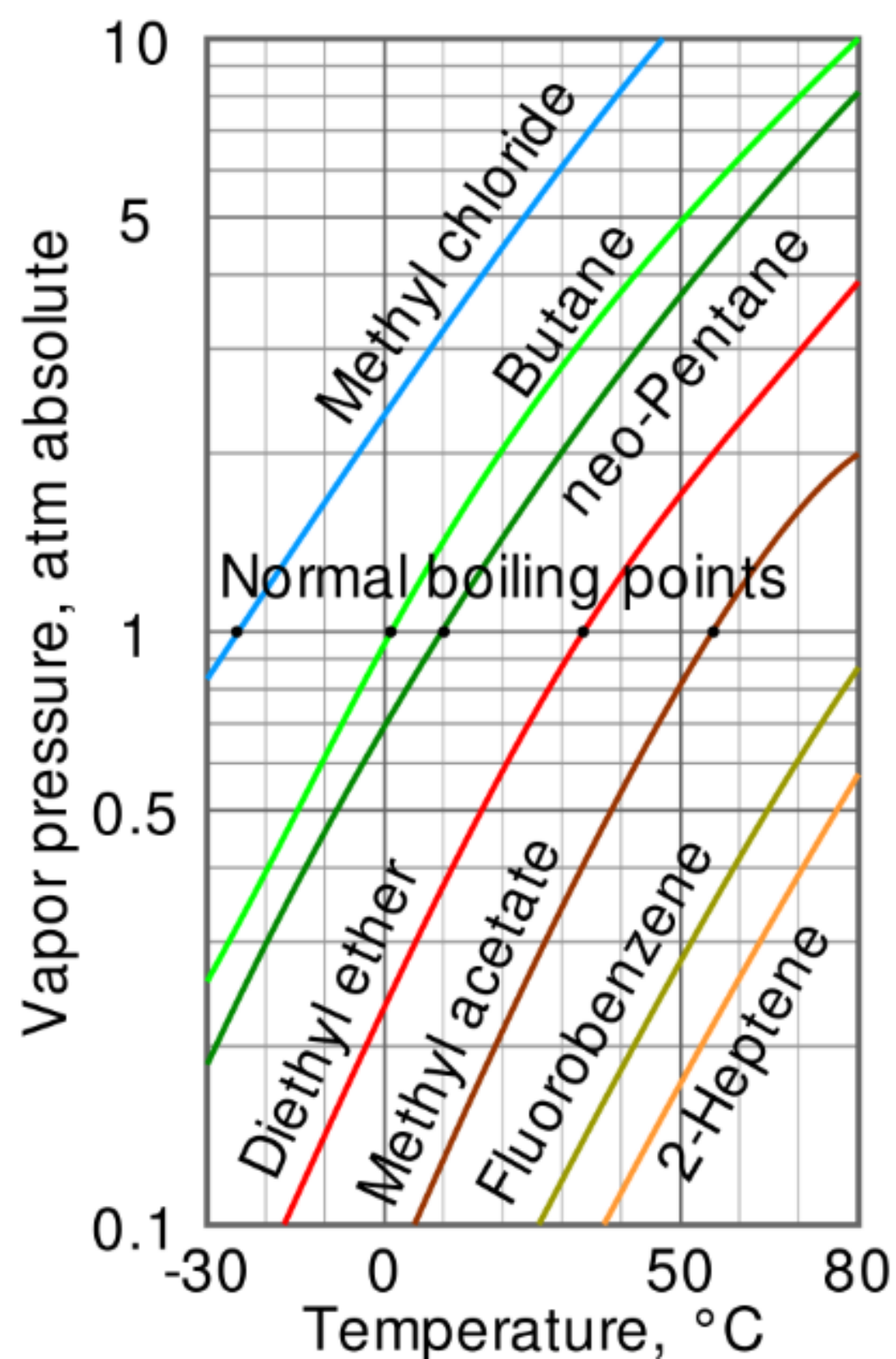
What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

[https://en.wikipedia.org/wiki/Volatility_\(chemistry\)](https://en.wikipedia.org/wiki/Volatility_(chemistry))

Volatility Graph for Common Organic Compounds



Show-Off Your Smarts!



Instructions

- Complete as an individual or small group.
- Discuss your ideas/answers/responses in a small group.
- Select one person to present your responses to the class.

Q1. How can this information be applied to a young-person's life?

Q2. How does this information apply to (or impact) communities?

Q3. When do scientists need to apply this information? How?

Q4. How would a person from 100 years ago view this information?

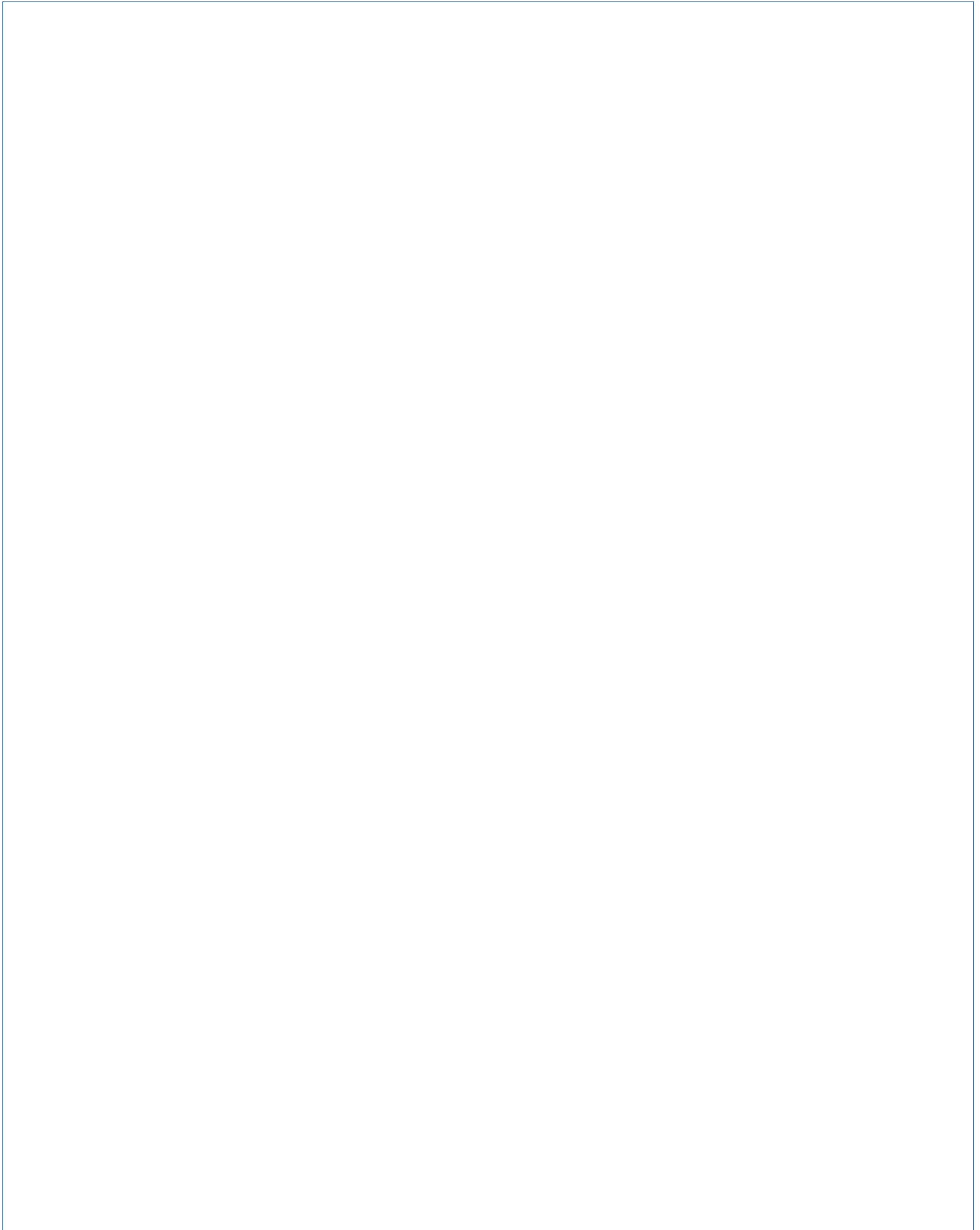
Q5. How does this topic connect to other science topics or math?

Write down at least three words introduced or covered by this topic.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Make a Poster

In the space provided here, create/draw a poster which conveys the concepts you have learned on this topic.

A large, empty rectangular box with a thin blue border, intended for the student to create a poster. The box occupies most of the page below the instructions.