

# 27.1 Energy Temperature and Heat

Chemistry

Summarize main points from each video.

Video Title / topic \_\_\_\_\_

Video Title / topic \_\_\_\_\_

Video Title / topic \_\_\_\_\_

# Topic Introduction



Summarize your understanding of each paragraph.

***What is the difference between temperature and heat?***

The hotter an object is, the faster the motion of the molecules inside it. Thus, the heat of an object is the total energy of all the molecular motion inside that object. ...

... Temperature, on the other hand, is a measure of the average heat or thermal energy of the molecules in a substance.

[www.spitzer.caltech.edu/en](http://www.spitzer.caltech.edu/en)

Heat and temperature are NOT the same thing. Heat and temperature are related to each other, but are different concepts. Heat is the total energy of molecular motion in a substance while temperature is a measure of the average energy of molecular motion in a substance.

It is heat that will increase or decrease the temperature. If we add heat, the temperature will become higher. If we remove heat the temperature will become lower. Higher temperatures mean that the molecules are moving, vibrating and rotating with more energy.

# 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.

## *Temperature*

1

Temperature is a physical quantity expressing the subjective perceptions of hot and cold. Temperature is measured with a thermometer, historically calibrated in various temperature scales and units of measurement.

2

The most commonly used scales are the Celsius scale, denoted in °C (informally, degrees centigrade), the Fahrenheit scale (°F), and the Kelvin scale. The kelvin (K) is the unit of temperature in the International System of Units (SI), in which temperature is one of the seven fundamental base units.

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

## *Re-write words you underlined*

3

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## *Using a complete sentence, summarize or rephrase the passage*

4

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# 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.

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**Temperature scales differ in two ways: the point chosen as zero degrees, and the magnitudes of incremental units or degrees on the scale.**

The Celsius scale ( $^{\circ}\text{C}$ ) is used for common temperature measurements in most of the world. It is an empirical scale. It developed by a historical progress, which led to its zero point  $0^{\circ}\text{C}$  being defined by the freezing point of water, with additional degrees defined so that  $100^{\circ}\text{C}$  was the boiling point of water, both at sea-level atmospheric pressure. Because of the 100 degree interval, it is called a centigrade scale. Since the standardization of the kelvin in the International System of Units, it has subsequently been redefined in terms of the equivalent fixing points on the Kelvin scale, and so that a temperature increment of one degree Celsius is the same as an increment of one kelvin, though they differ by an additive offset of 273.15.

The United States commonly uses the Fahrenheit scale, on which water freezes at  $32^{\circ}\text{F}$  and boils at  $212^{\circ}\text{F}$  at sea-level atmospheric pressure.

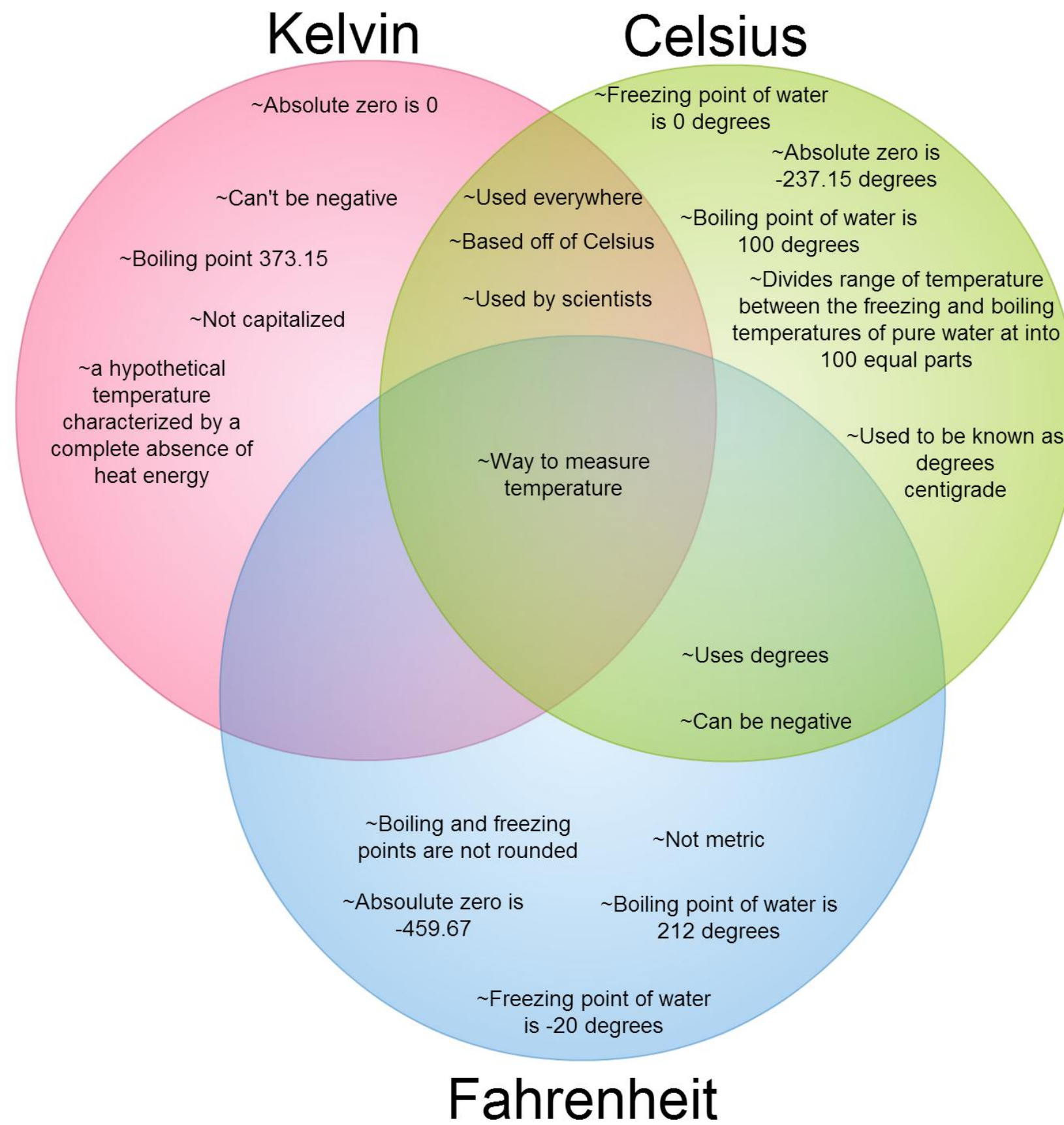
Many scientific measurements use the Kelvin temperature scale (unit symbol: K), named in honor of the Scottish physicist who first defined it. It is a thermodynamic or absolute temperature scale. Its zero point, 0K, is defined to coincide with the coldest physically-possible temperature (called absolute zero). Its degrees are defined through thermodynamics. The temperature of absolute zero occurs at  $0\text{K} = -273.15^{\circ}\text{C}$  (or  $-459.67^{\circ}\text{F}$ ), and the freezing point of water at sea-level atmospheric pressure occurs at  $273.15\text{K} = 0^{\circ}\text{C}$ .

The International System of Units (SI) defines a scale and unit for the kelvin or thermodynamic temperature by using the reliably reproducible temperature of the triple point of water as a second reference point (the first reference point being 0 K at absolute zero). The triple point is a singular state with its own unique and invariant temperature and pressure, along with, for a fixed mass of water in a vessel of fixed volume, an autonomically and stably self-determining partition into three mutually contacting phases, vapour, liquid, and solid, dynamically depending only on the total internal energy of the mass of water. For historical reasons, the triple point temperature of water is fixed at 273.16 units of the measurement increment.

# Draw Illustration



Copy and Label the Illustration in the Space Provided



[s://creately.com](https://creately.com)

[online diagramming & design] [creately.com](https://creately.com)

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

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<http://www.hlswilliwaw.com>

	Fahrenheit	Rankine	Kelvin	Celsius
Boiling Point Water	212 °F	671.67 °R	373.15 K	100 °C
Freezing Point Water	32 °F	491.67 °R	273.15 K	0 °C
Absolute Zero	-459.67 °F	0 °R	0 K	-273.15 °C

# 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?**

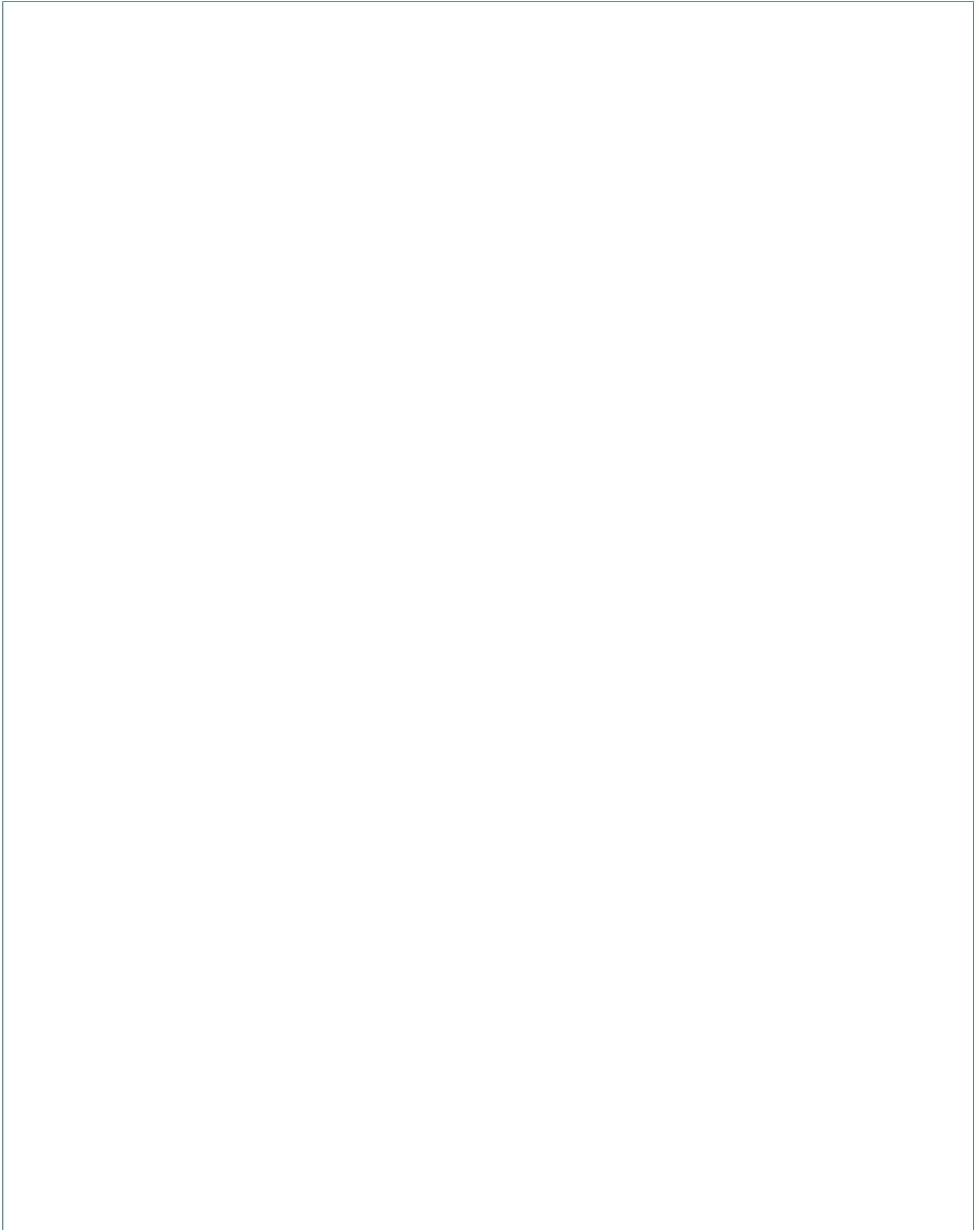
**Q5. How does this topic connect to other science topics or math?**

*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.