

21.1 Early Earth – The Rock Record

Chemistry

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction



Summarize your understanding of each paragraph.

Earth is about 4.4 billion years old. Among other forms of evidence, scientists confirmed the age of an individual atom of lead contained in a tiny zircon crystal. To-date, the crystal is the oldest rock fragment ever found on Earth — 4.375 billion years old.

Geologists have carefully sorted out more than 100,000 microscopic Jack Hills zircons that date back to Earth's early epochs, from 3 billion to nearly 4.4 billion years ago. The crystals contain microscopic inclusions, providing a window into conditions on early Earth.

The geologic record in stratigraphy, paleontology and other natural sciences refers to the entirety of the layers of rock strata — deposits laid down by volcanism or by deposition of sediment derived from weathering detritus (clays, sands etc.) including all its fossil content.

At a certain locality on the Earth's surface, the rock column provides a cross section of the natural history in the area during the time covered by the age of the rocks. This is sometimes called the rock history and gives a window into the natural history of the location.

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.

Wikipedia - Stratigraphy.

Stratigraphy is a branch of geology concerned with the study of rock layers (strata) and layering (stratification). It is primarily used in the study of sedimentary and layered volcanic rocks. Stratigraphy has two related subfields: lithologic stratigraphy or lithostratigraphy, and biologic stratigraphy or biostratigraphy.

Variation in rock units, most obviously displayed as visible layering, is due to physical contrasts in rock type (lithology). This variation can occur vertically as layering (bedding), or laterally, and reflects changes in environments of deposition (known as facies change).

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

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.

Wikipedia: Stratum

In geology and related fields, a stratum (plural: strata) is a layer of sedimentary rock or soil, or igneous rock where formed at the earth's surface^[1], with internally consistent characteristics that distinguish it from other layers. The "stratum" is the fundamental unit in a stratigraphic column and forms the basis of the study of stratigraphy.

Characteristics

Each layer is generally one of a number of parallel layers that lie one upon another, laid down by natural processes. They may extend over hundreds of thousands of square kilometers of the Earth's surface. Strata are typically seen as bands of different colored or differently structured material exposed in cliffs, road cuts, quarries, and river banks. Individual bands may vary in thickness from a few millimeters to a kilometer or more. Each band represents a specific mode of deposition: river silt, beach sand, coal swamp, sand dune, lava bed, etc.

Naming

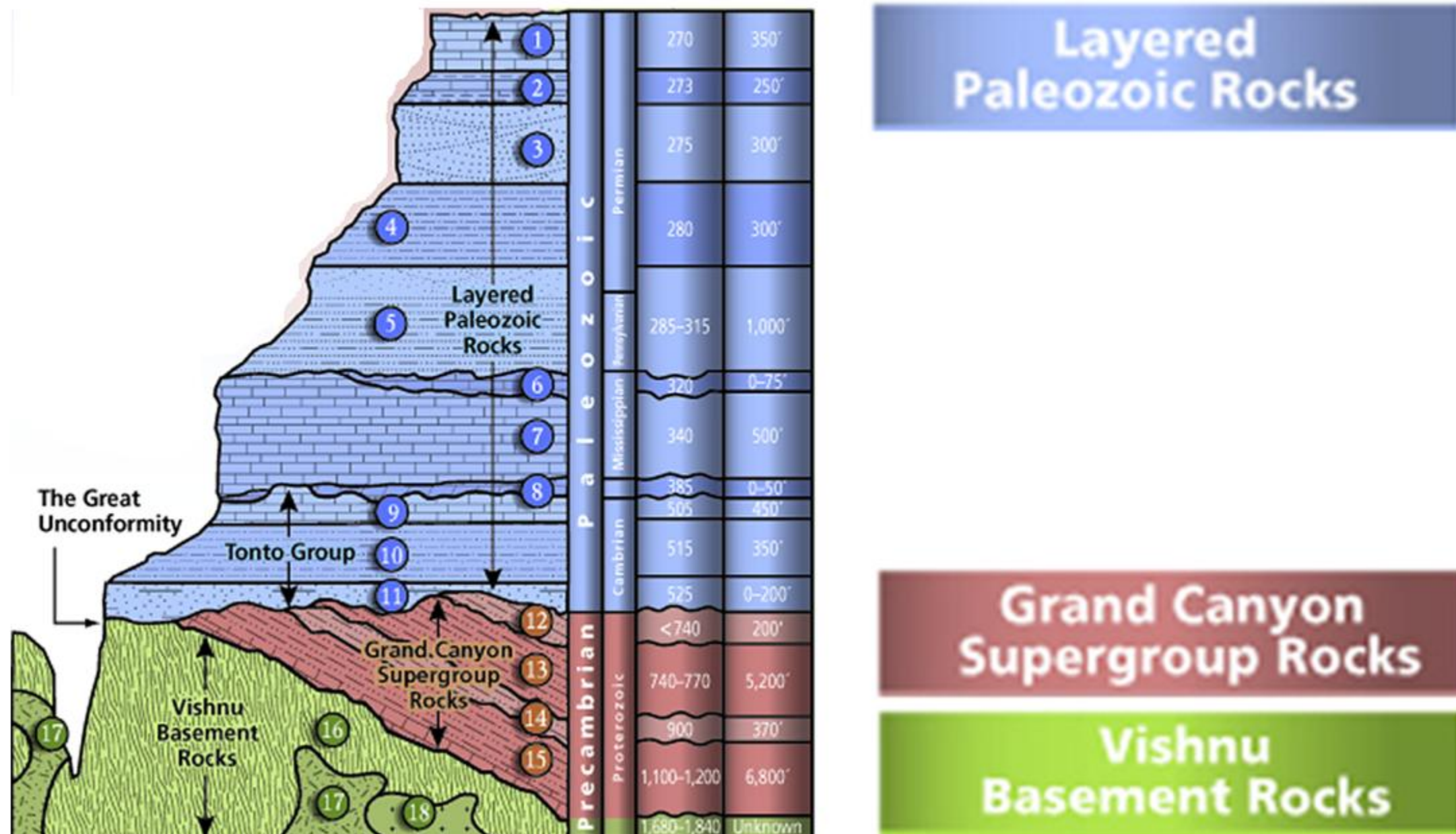
Geologists study rock strata and categorize them by the material of beds. Each distinct layer is typically assigned to the name of sheet, usually based on a town, river, mountain, or region where the formation is exposed and available for study. For example, the Burgess Shale is a thick exposure of dark, occasionally fossiliferous, shale exposed high in the Canadian Rockies near Burgess Pass. Slight distinctions in material in a formation may be described as "members" (or sometimes "beds"). Formations are collected into "groups" while groups may be collected into "supergroups".

Draw Illustration



Copy and Label the Illustration in the Space Provided

Grand Canyon's Three Sets of Rocks



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

Draw (Copy) the Illustration Here

Interpret a Chart



The Name of this Chart is “Geological Time Scale”

Discuss this chart with a teacher-assigned “shoulder-buddy” ...
Summarize what this graph represents or conveys.

<https://www.britannica.com/science/Holocene-Epoch>

Geologic time scale

Eonothem/Eon	Erathem/Era	System/Period	Series/Epoch	Stage/Age	mya ¹	
Phanerozoic	Cenozoic	Quaternary	Holocene		0.0117	
			Pleistocene	Upper	0.126	
				Middle	0.781	
				Lower	1.80	
		Pliocene	Calabrian	1.80		
			Gelasian	2.58		
			Piacenzian	3.600		
			Zanclean	5.333		
		Neogene	Miocene	Messinian	7.246	
				Tortonian	11.63	
				Serravallian	13.82	
			Pliocene	Langhian	15.97	
				Burdigalian	20.44	
				Aquitanian	23.03	
				Chattian	28.1	
				Rupelian	33.9	
				Priabonian	37.8	
				Bartonian	41.2	
				Lutetian	47.8	
				Ypresian	56.0	
		Paleogene	Eocene	Thanetian	59.2	
				Selandian	61.6	
				Danian	66.0	
				Maastrichtian	72.1 ± 0.2	
			Oligocene	Campanian	83.6 ± 0.2	
				Santonian	86.3 ± 0.5	
				Coniacian	89.8 ± 0.3	
				Turonian	93.9	
				Cenomanian	100.5	
				Albian	~113	
				Aptian	~125.0	
				Barremian	~129.4	
				Hauterivian	~132.9	
				Valanginian	~139.8	
				Berriasian	~145.0	
				Mesozoic	Jurassic	Upper
		Kimmeridgian	152.1 ± 0.9			
		Oxfordian	157.3 ± 1.0			
		Middle	Callovian			163.5 ± 1.0
			Bathonian			166.1 ± 1.2
	Bajocian		168.3 ± 1.3			
	Aalenian		170.3 ± 1.4			
	Toarcian		174.1 ± 1.0			
	Pliensbachian		182.7 ± 0.7			
	Lower	Sinemurian	190.8 ± 1.0			
		Hettangian	199.3 ± 0.3			
		Rhaetian	201.3 ± 0.2			
		Norian	~208.5			
		Carnian	~228.0			
		Ladinian	~235.0			
		Anisian	~242.0			
		Olenekian	247.2			
		Induan	251.2			
		Changhsingian	252.2 ± 0.5			
		Wuchiapingian	254.2 ± 0.1			
		Triassic	Upper		Capitanian	259.9 ± 0.4
	Wordian				265.1 ± 0.4	
	Roadian				268.8 ± 0.5	
	Kungurian				272.3 ± 0.5	
	Middle		Artinskian		279.3 ± 0.6	
			Sakmarian		290.1 ± 0.1	
			Asselian		295.5 ± 0.4	
			Gzhelian		298.9 ± 0.2	
	Lower		Kasimovian		303.7 ± 0.1	
			Moscovian		307.0 ± 0.1	
			Bashkirian		315.2 ± 0.2	
			Serpukhovian		323.2 ± 0.4	
			Visean		330.9 ± 0.2	
			Tournaisian		346.7 ± 0.4	
			Carboniferous		358.9 ± 0.4	
			Permian		358.9 ± 0.4	
	Paleozoic	Silurian	Upper		Famennian	358.9 ± 0.4
					Frasnian	372.2 ± 1.6
					Givetian	382.7 ± 1.6
					Eifelian	387.7 ± 0.8
			Middle	Emsian	393.3 ± 1.2	
				Pragian	407.6 ± 2.6	
				Lochkovian	410.8 ± 2.8	
				Ludfordian	419.2 ± 3.2	
			Lower	Ludlow	423.0 ± 2.3	
				Priddoli	425.6 ± 0.9	
				Gorstian	427.4 ± 0.5	
				Homerian	430.5 ± 0.7	
		Sheinwoodian		443.8 ± 1.5		
		Telychian		448.5 ± 1.1		
		Aeronian		440.8 ± 1.2		
		Rhuddanian		443.8 ± 1.5		
		Devonian	Upper	Hirnantian	445.2 ± 1.4	
				Katian	453.0 ± 0.7	
				Sandbian	458.4 ± 0.9	
				Darriwilian	467.3 ± 1.1	
			Middle	Dapingian	470.0 ± 1.4	
				Floian	477.7 ± 1.4	
				Tremadocian	485.4 ± 1.9	
				Stage 10	~489.5	
			Lower	Jiangshanian	~494.0	
				Paibian	~497.0	
				Guzhangian	~500.5	
				Drumian	~504.5	
				Stage 5	~509.0	
Stage 4				~514.0		
Stage 3				~521.0		
Stage 2				~529.0		
Carboniferous		Upper	Fortunian	541.0 ± 1.0		
			Series 2			
			Series 3			
			Series 3			
		Middle	Ordovician			
			Llandovery			
			Wenlock			
			Priddoli			
	Ludlow					
	Priddoli					
	Ludlow					
	Priddoli					
Permian	Upper	Ediacaran	~541.0 ± 1.0			
		Frasnian	~635			
		Cryogenian	~720			
		Tonian	1,000			
	Middle	Stenian	1,200			
		Ectasian	1,400			
		Calymmian	1,600			
		Statherian	1,800			
	Lower	Orosirian	2,050			
		Rhyacian	2,300			
		Siderian	2,500			
		Neoproterozoic				
		Paleoproterozoic				
		Archean				
		Neoarchean				
		Mesoarchean				
Proterozoic	Upper	Stage 10	~489.5			
		Jiangshanian	~494.0			
		Paibian	~497.0			
		Guzhangian	~500.5			
	Middle	Drumian	~504.5			
		Stage 5	~509.0			
		Stage 4	~514.0			
		Stage 3	~521.0			
	Lower	Stage 2	~529.0			
		Fortunian	541.0 ± 1.0			
		Series 2				
		Series 3				
		Series 3				
		Series 3				
		Series 3				
		Series 3				
Precambrian	Archean	Hadean ⁴		~4,600		
	Paleoproterozoic	Eoarchean				
	Mesoproterozoic	Neoarchean				
	Neoproterozoic	Eoarchean				

¹ Millions of years ago.

² Both the Mississippian and Pennsylvanian time units are formally designated as subperiods within the Carboniferous Period.

³ Several Cambrian unit age boundaries are informal and are awaiting ratified definitions.

⁴ The Hadean Eon is an informal interval of geologic time.

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?

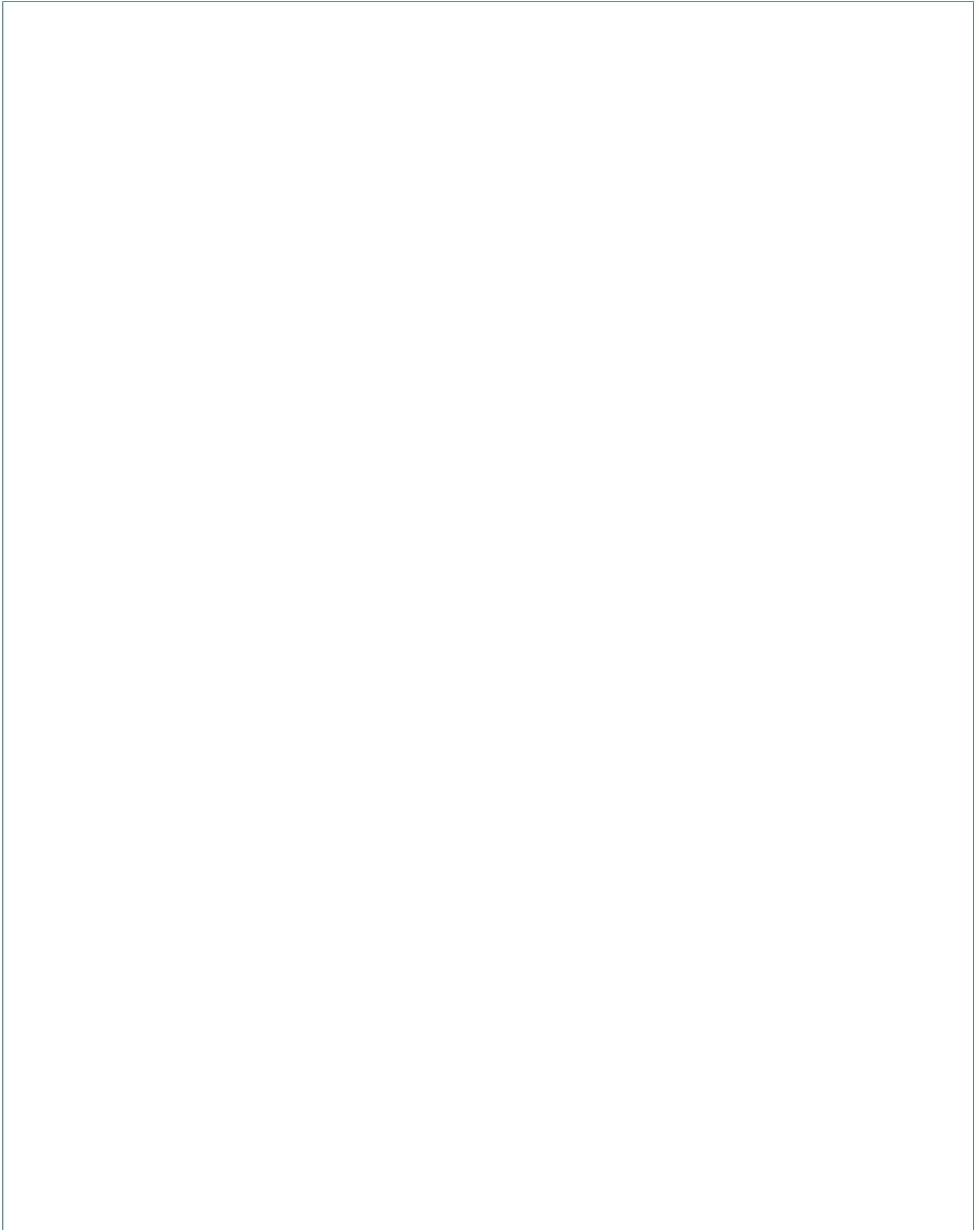
Q5. How does this topic connect to other science topics or math?

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.