

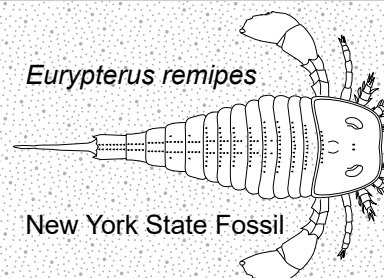
Reference Tables for EARTH & SPACE SCIENCES

Table of Contents

Page	Title	Primary PE
2	Solar System Objects Data Table	(HS-ESS 1-4)
2	Generalized Nucleosynthesis in a Massive Star	(HS-ESS 1-3)
3	Generalized Portion of Electromagnetic Spectrum Related to Earth and Space Sciences	(HS-ESS 1-2)
3	Emission Spectra of Some Elements from Stars	(HS-ESS 1-2)
4	H-R Diagram	(HS-ESS 1-3)
5	Life Cycles of Stars Model	(HS-ESS 1-3)
6-7	Geologic History of New York State	(HS-ESS 2-7)
8	Generalized Surface Bedrock Geology of New York State	(HS-ESS 2-1)
9	Energy and Mineral Resources of New York State	(HS-ESS 3-1)
10	Geographic Province and Landscape Regions of New York State	(HS-ESS 2-1)
11	Model of Earth's Interior Structure	(HS-ESS 2-3)
11	Generalized Cross Section Model of Earth's Surface and Interior	(HS-ESS 2-1)
12	Geologically Important Radioactive Elements Used for Radiometric Dating	(HS-ESS 1-6)
12	Locations of Selected Hotspots	(HS-ESS 1-5)
13	Global Tectonic Activity of the Last One Million Years	(HS-ESS 1-5)
14	Model of Bowen's Reaction Series	(HS-ESS 2-3)
14	Mineral Composition of Igneous Rocks	(HS-ESS 2-3)
15	Rock Cycle Infographic	(HS-ESS 2-5)
16-17	Mineral Identification Flowchart	(HS-ESS 2-3)
18	Key to Weather Map Symbols	(HS-ESS 2-8)
19	Model of Generalized Planetary Wind Belts in the Troposphere	(HS-ESS 2-8)
19	Cross Section Model of Earth's Lower Atmosphere	(HS-ESS 2-8)
20	Surface Ocean Currents Model	(HS-ESS 2-4)

2026 Revised EDITION

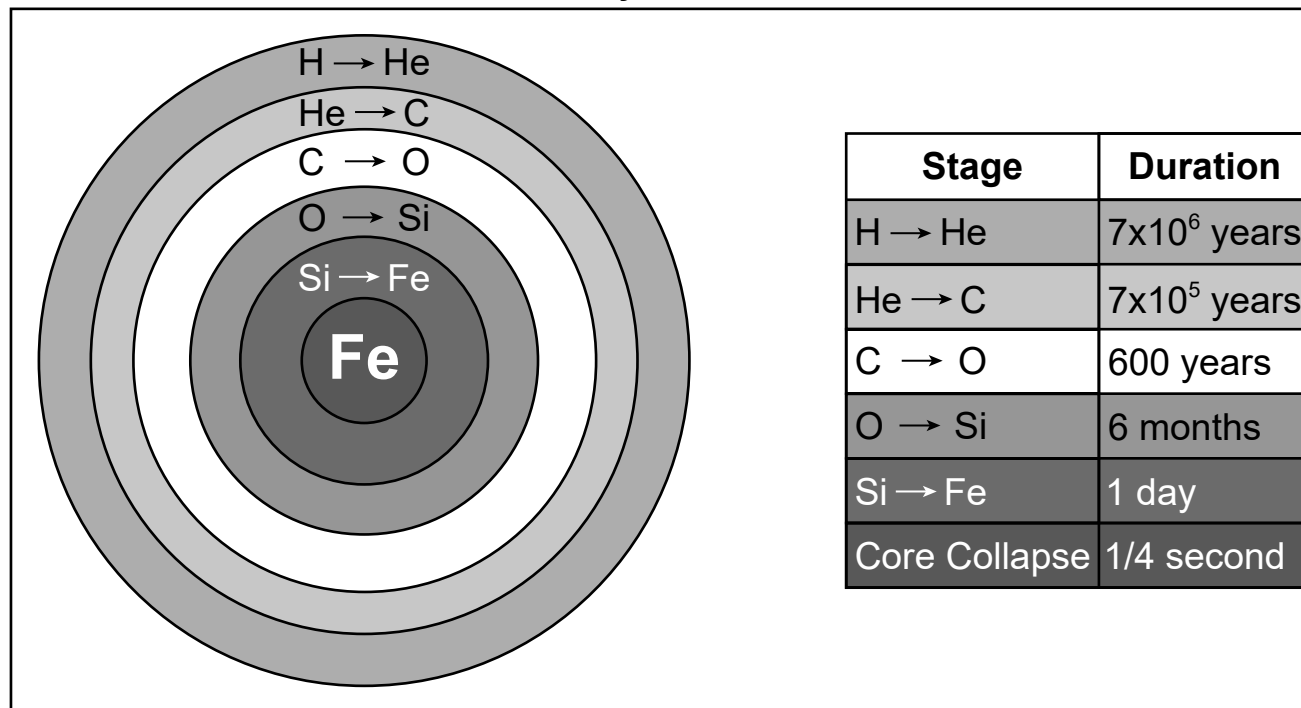
This edition of the Earth and Space Sciences Reference Tables should be used in the classroom beginning in the 2026–27 school year. The first examination for which these tables will be used is the January 2027 Regents Examination in Earth and Space Sciences.



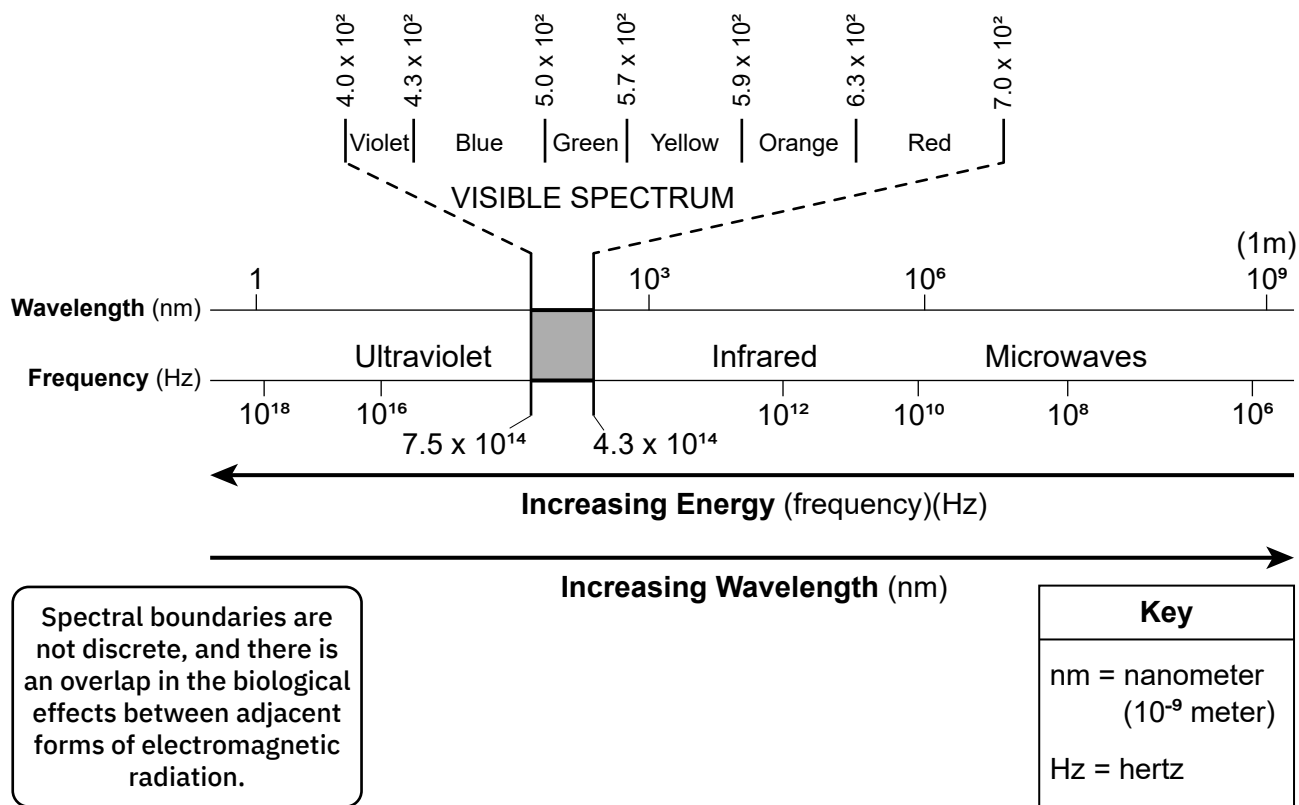
Solar System Objects Data Table

Celestial Object	Mean Distance from Sun (million km)	Period of Revolution (d=Earth days) (y=Earth years)	Period of Rotation at Equator	Eccentricity of Orbit	Equatorial Diameter (km)	Axial Tilt (°)
SUN	---	---	25.4 d	---	~1,391,400	7.25
MERCURY	57.9	88.0 d	58.7 d	0.206	4879	0.03
VENUS	108.2	224.7 d	243.7 d	0.007	12,104	177.36
EARTH	149.6	365.26 d	23 h 56 min	0.017	12,756	23.44
EARTH'S MOON	149.6 (0.384 from Earth)	27.3 d	27.3 d	0.055	3475	6.68
MARS	228.0	1.9 y	24 h 37 min	0.094	6792	25.19
CERES	414.0	4.6 y	9 h 5 min	0.079	~939	4.00
PALLAS	414.0	4.6 y	7 h 49 min	0.231	~513	84.00
JUPITER	778.5	11.9 y	9 h 54 min	0.049	142,976	3.13
SATURN	1432.0	29.4 y	10 h 39 min	0.054	120,536	26.73
URANUS	2867.0	84.0 y	17 h 15 min	0.047	51,118	97.77
NEPTUNE	4515.0	164.8 y	16 h 6 min	0.009	49,528	28.32
PLUTO	5906.4	248.0 y	6.4 d	0.244	2376	119.51
ERIS	~10,000.0	~557.6 y	1.1 d	0.436	2400	~78.30

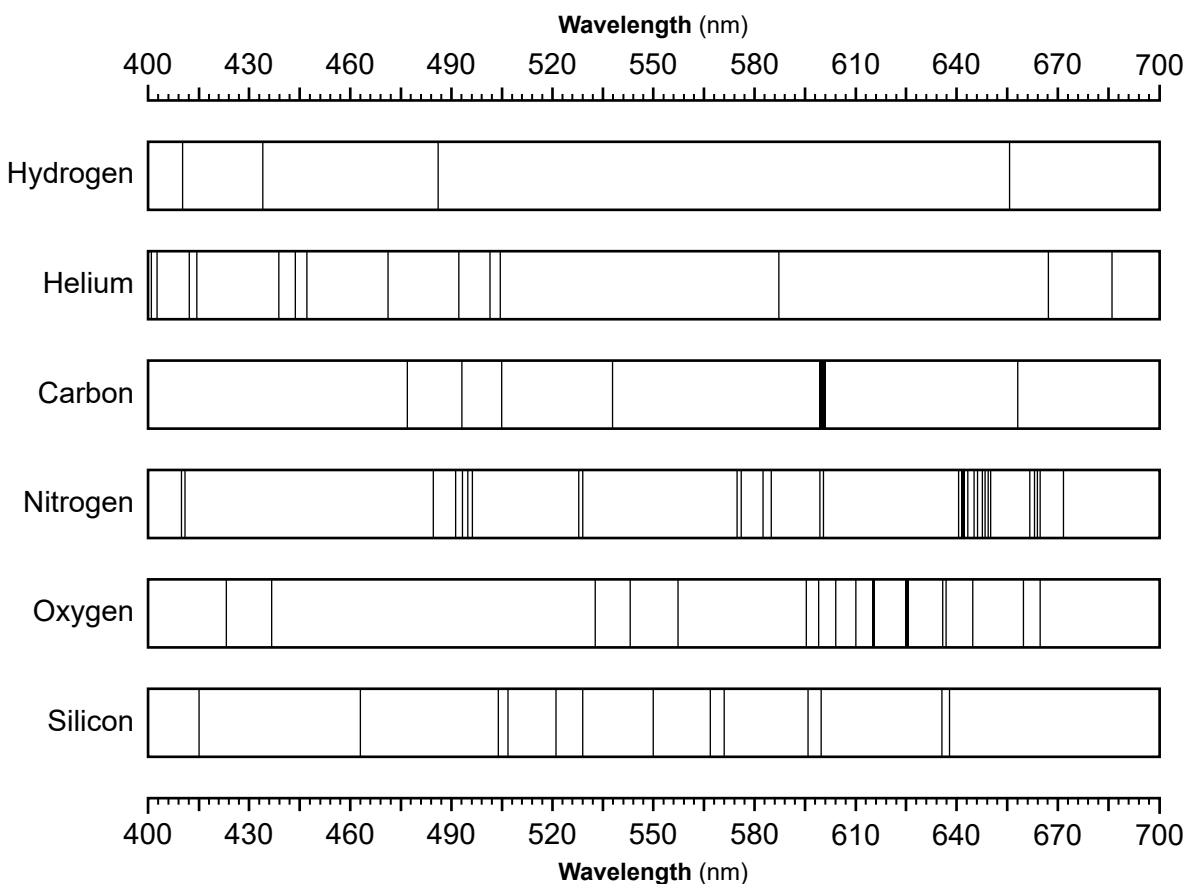
Generalized Nucleosynthesis in a Massive Star

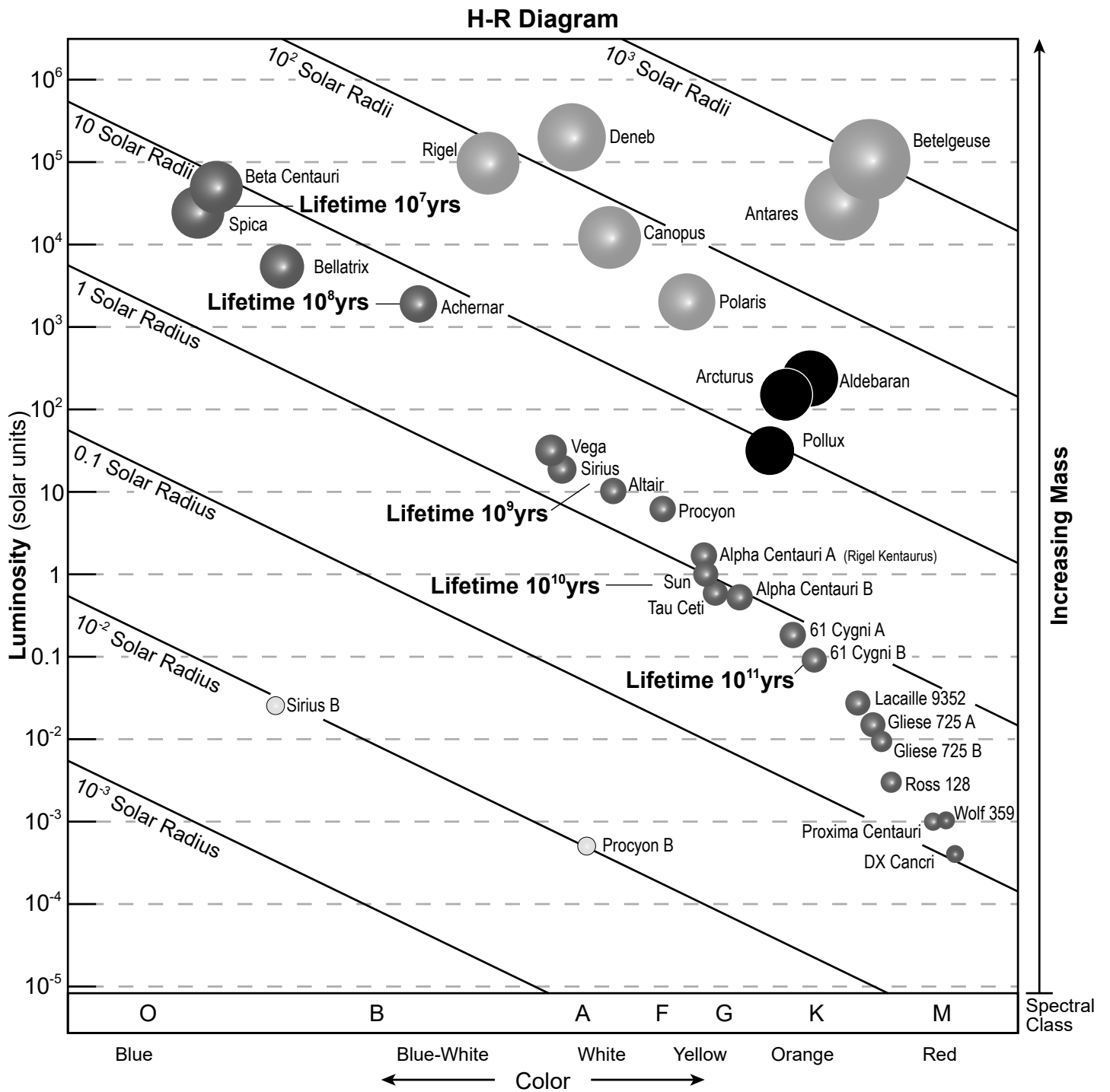


Generalized Portion of Electromagnetic Spectrum Related to Earth and Space Sciences



Emission Spectra of Some Elements from Stars

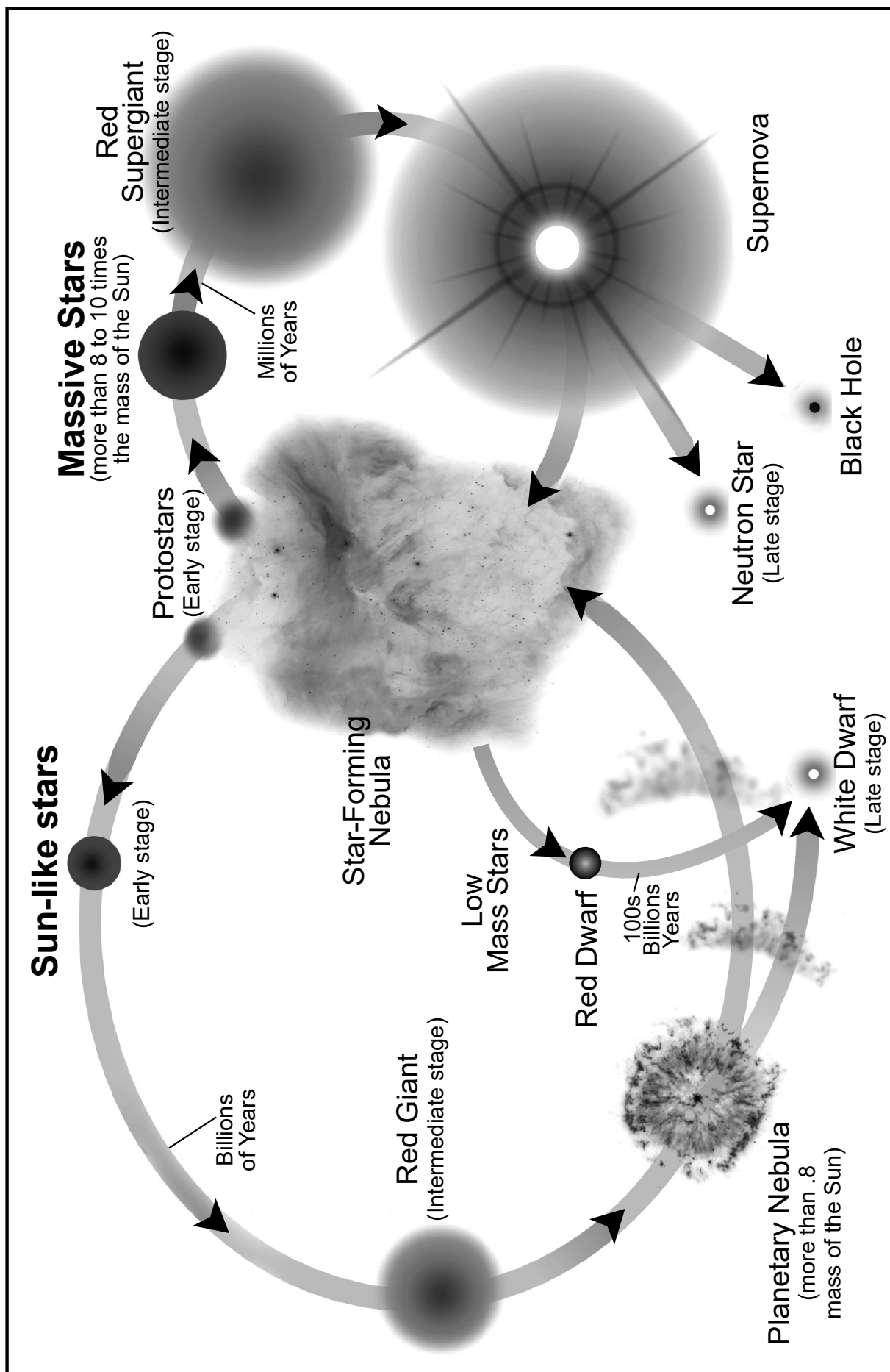


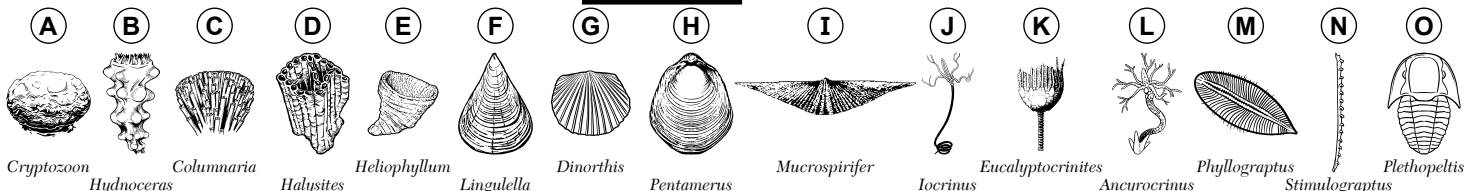
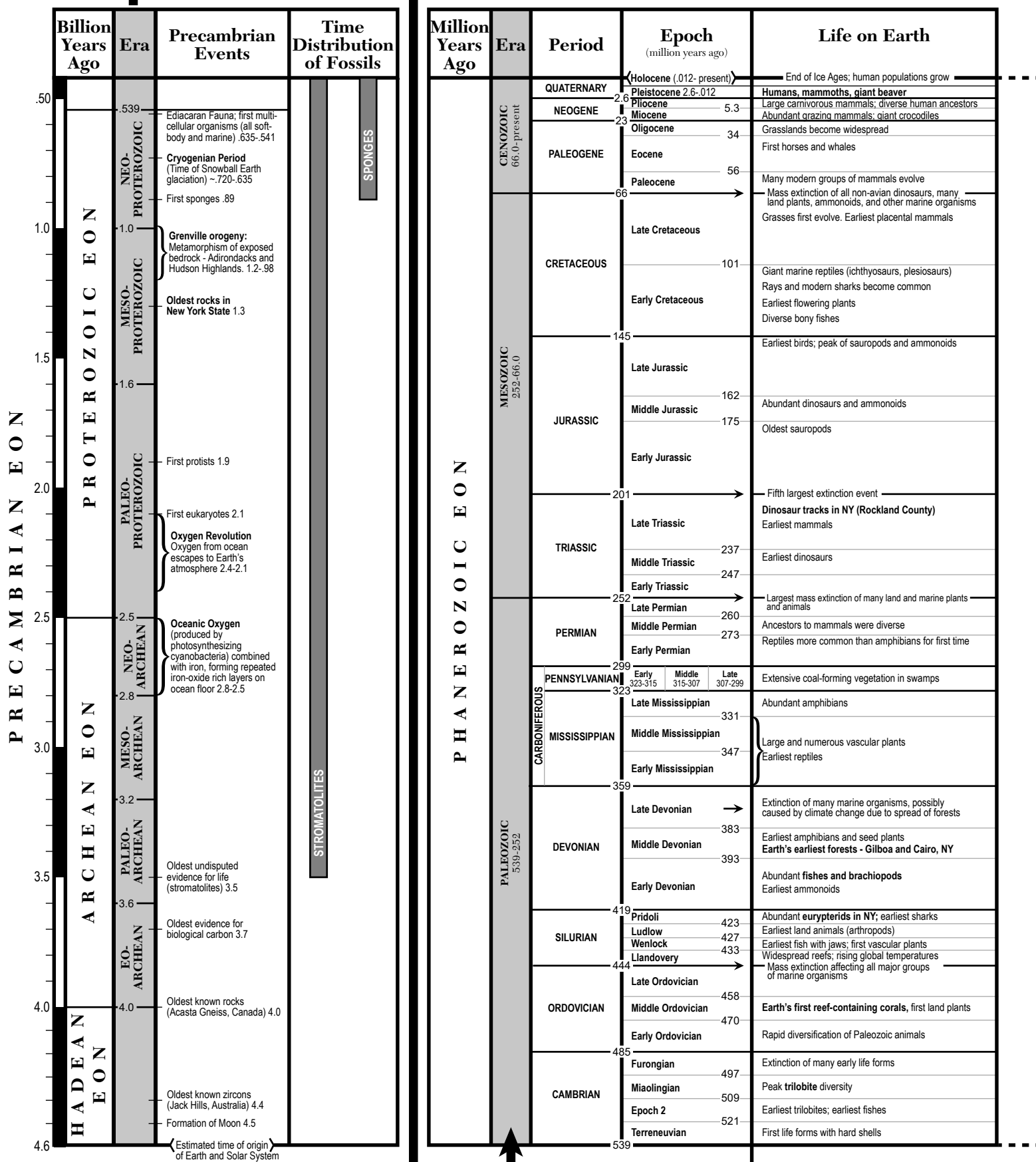


Approximate Surface Temperature Range (K) of Stars	
O	$\geq 28,000$
B	10,000 – 27,999
A	7500 – 9999
F	6000 – 7499
G	5000 – 5999
K	3500 – 4999
M	2000 – 3499

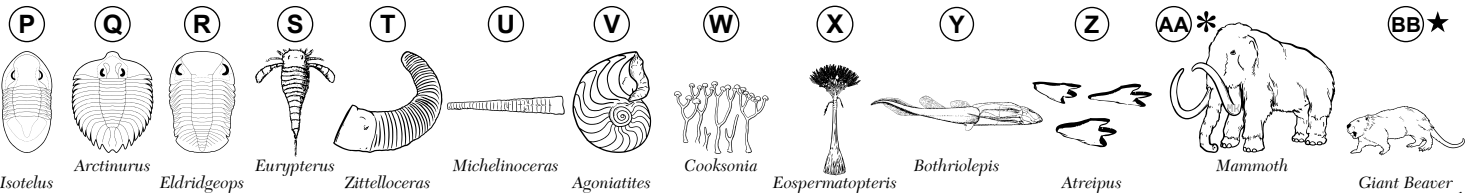
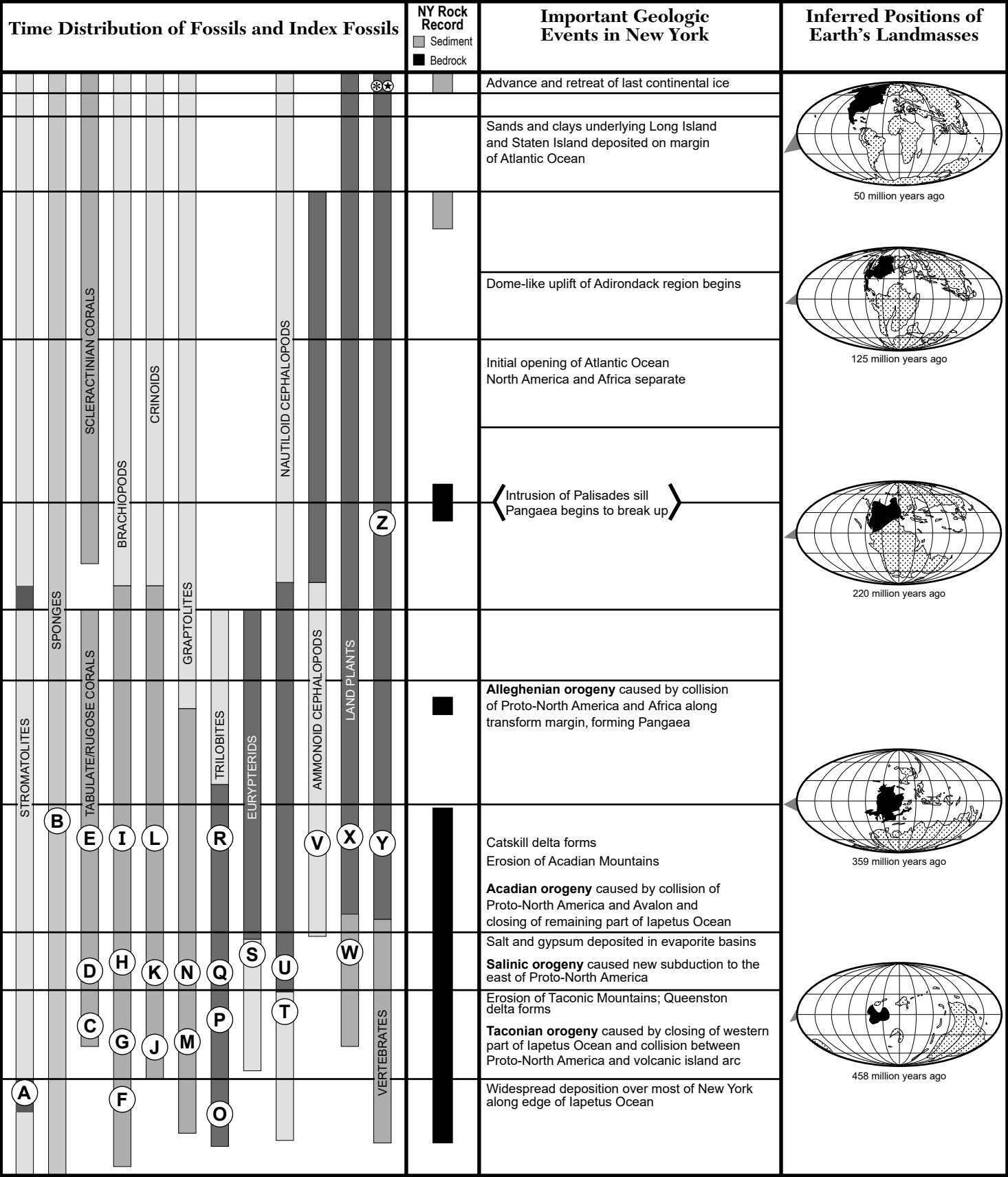
Key	
	SUPERGIANTS
	WHITE DWARFS
	MAIN SEQUENCE
	GIANTS

Life Cycles of Stars Model



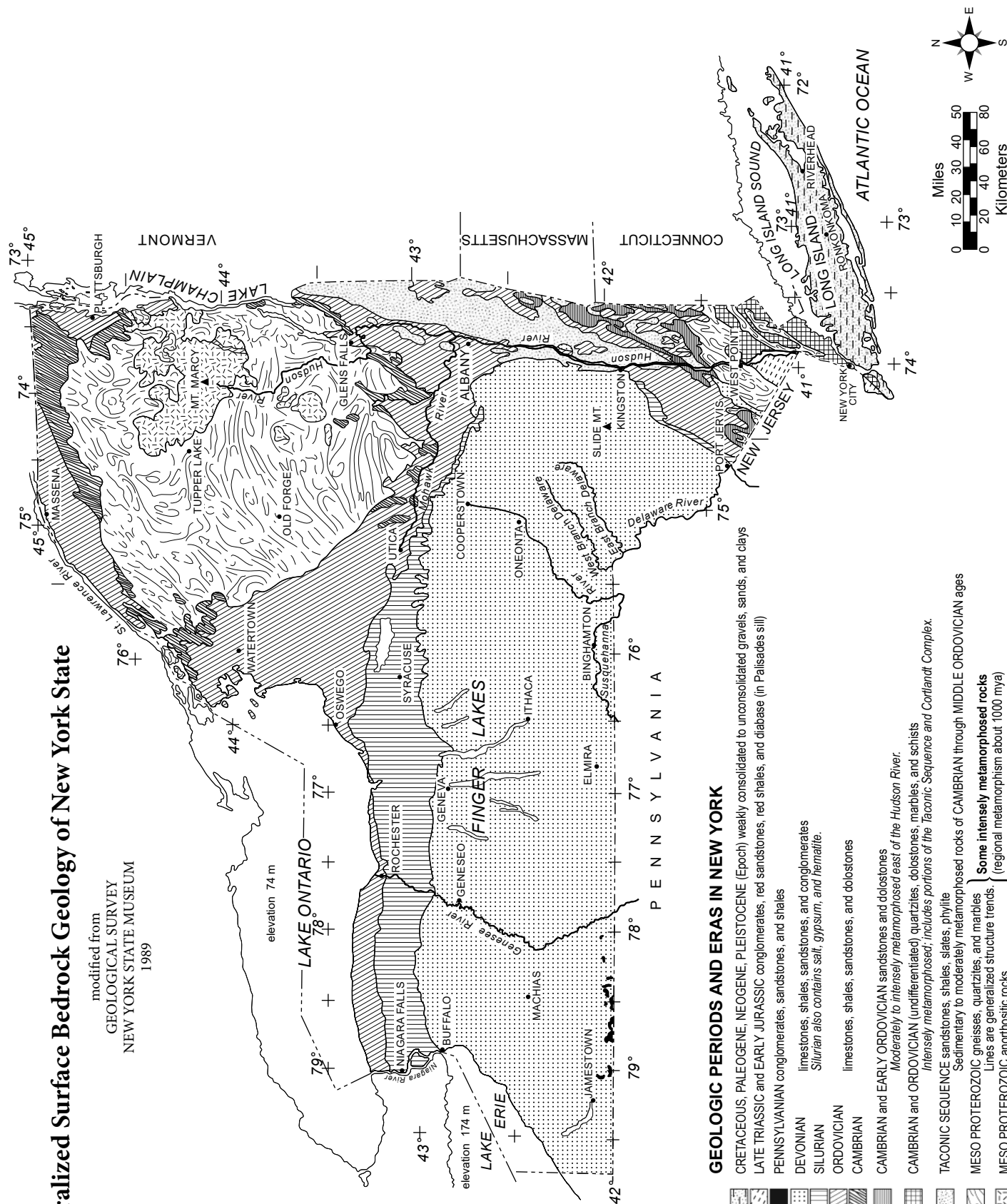


OF NEW YORK STATE



Generalized Surface Bedrock Geology of New York State

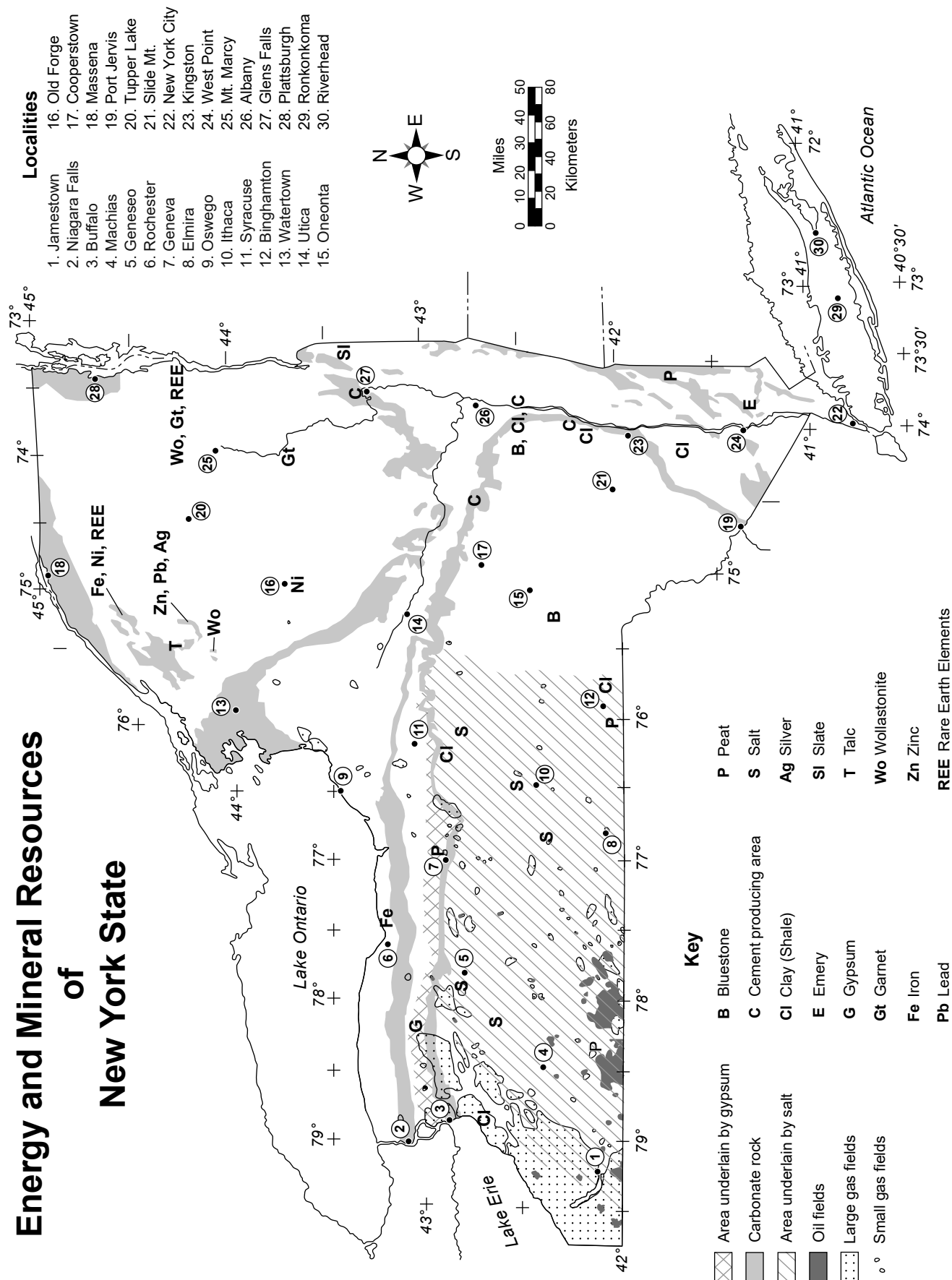
modified from
GEOLOGICAL SURVEY
NEW YORK STATE MUSEUM
1989



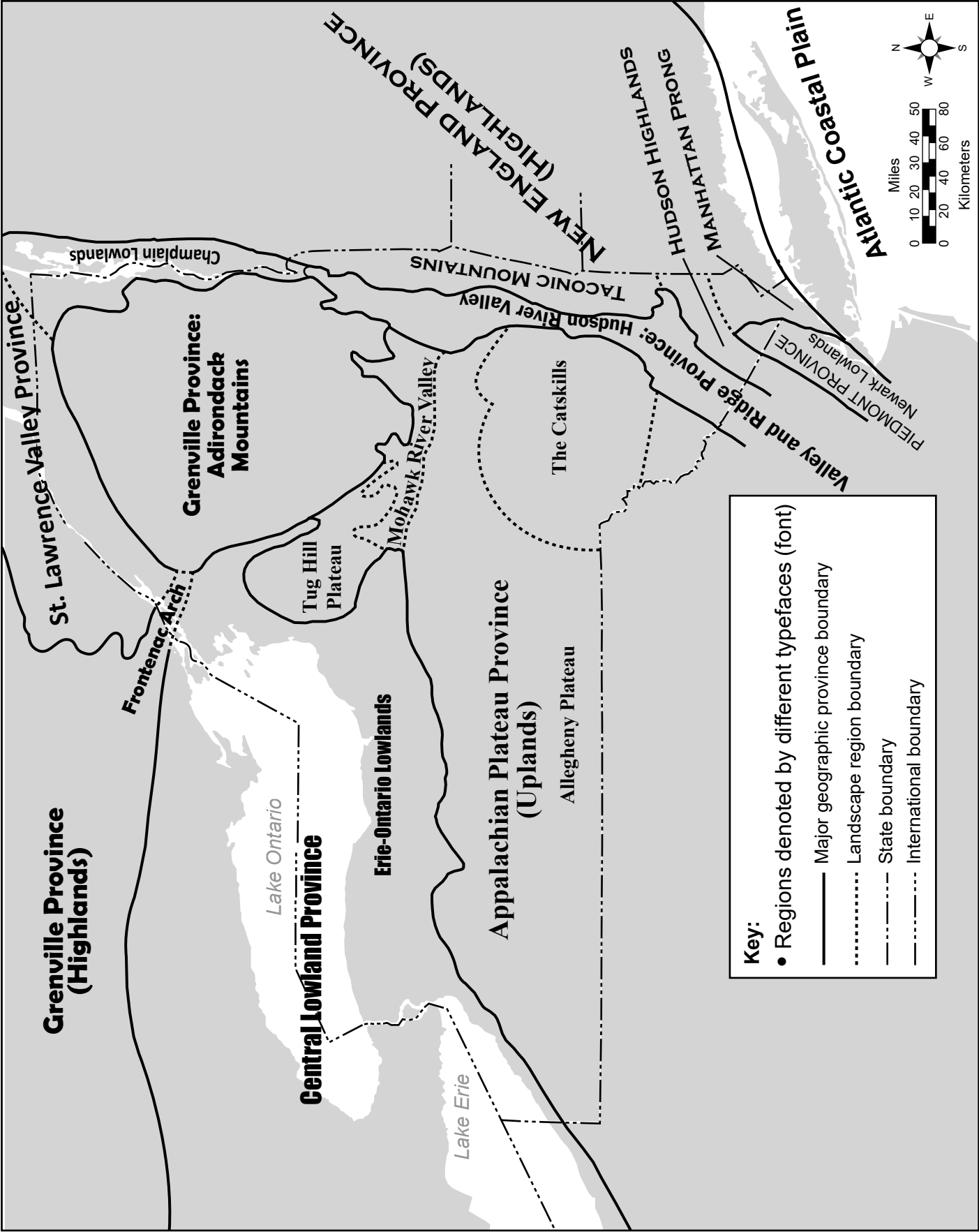
GEOLOGIC PERIODS AND ERAS IN NEW YORK

- CRETACEOUS, PALEOGENE, NEOGENE, PLEISTOCENE (Epoch) weakly consolidated to unconsolidated gravels, sands, and clays
- LATE TRIASSIC and EARLY JURASSIC conglomerates, red sandstones, red shales, and diabase (in Palisades sill)
- PENNSYLVANIAN conglomerates, sandstones, and shales
- DEVONIAN limestones, shales, sandstones, and conglomerates
- SILURIAN Silurian also contains salt, gypsum, and hematite.
- ORDOVICIAN limestones, shales, sandstones, and dolostones
- CAMBRIAN
- CAMBRIAN and EARLY ORDOVICIAN sandstones and dolostones
- Moderately to intensely metamorphosed east of the Hudson River.
- CAMBRIAN and ORDOVICIAN (undifferentiated) quartzites, dolostones, marbles, and schists
- Intensely metamorphosed; includes portions of the Taconic Sequence and Cortlandt Complex.
- TACONIC SEQUENCE sandstones, shales, slates, phyllite
- Sedimentary to moderately metamorphosed rocks of CAMBRIAN through MIDDLE ORDOVICIAN ages
- MESO PROTEROZOIC gneisses, quartzites, and marbles
- Lines are generalized structure trends
- MESO PROTEROZOIC anorthositic rocks
- Some intensely metamorphosed rocks (regional metamorphism about 1000 mya)

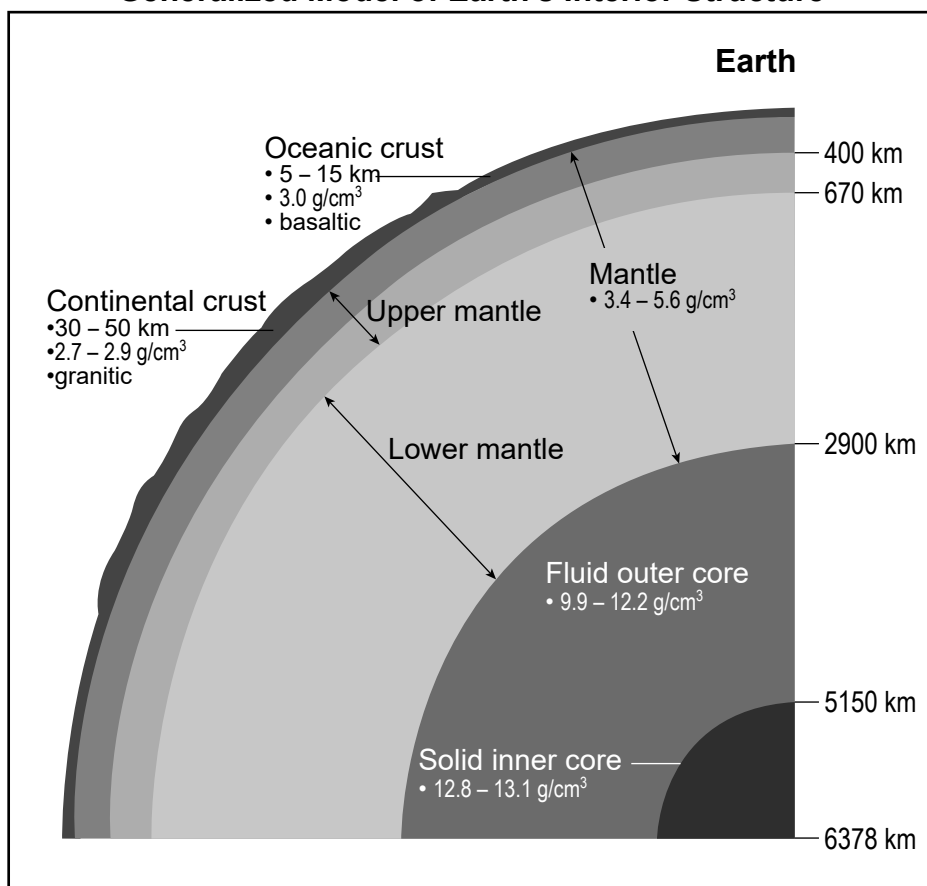
Energy and Mineral Resources of New York State



Geographic Province and Landscape Regions of New York State

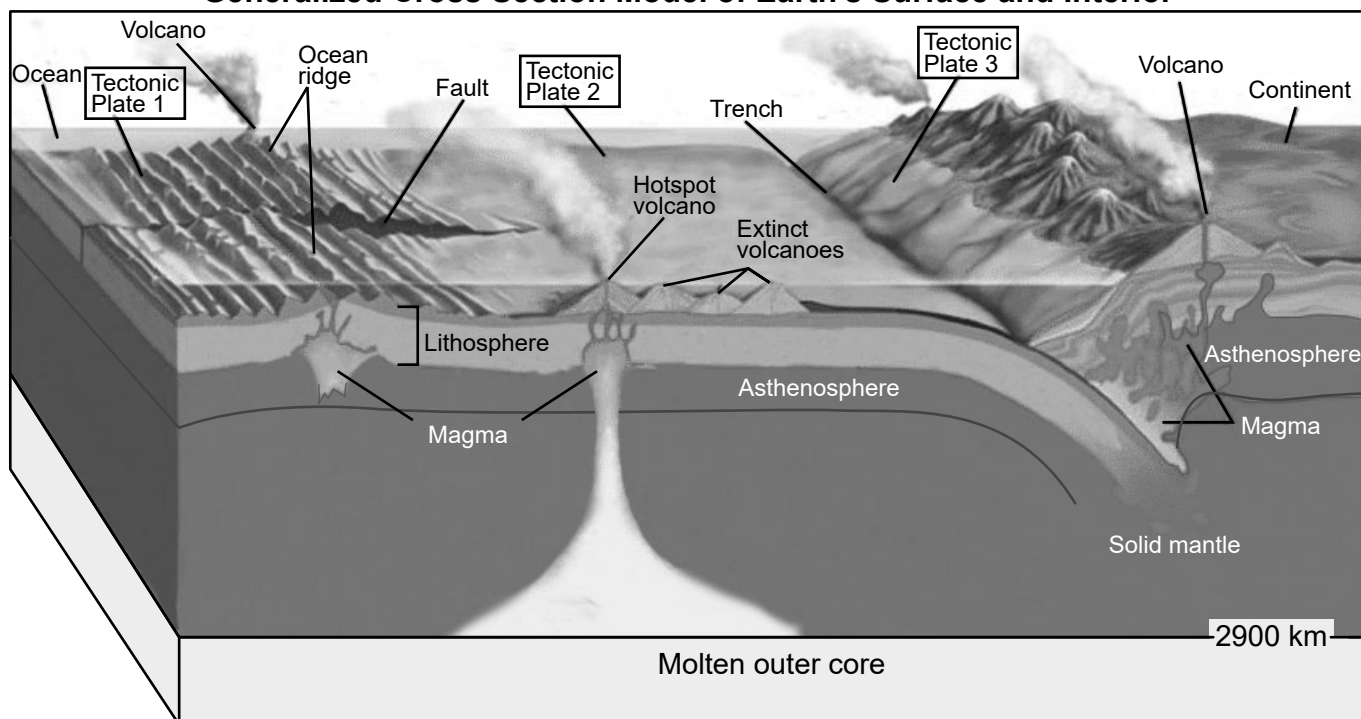


Generalized Model of Earth's Interior Structure



(Not drawn to scale)

Generalized Cross Section Model of Earth's Surface and Interior

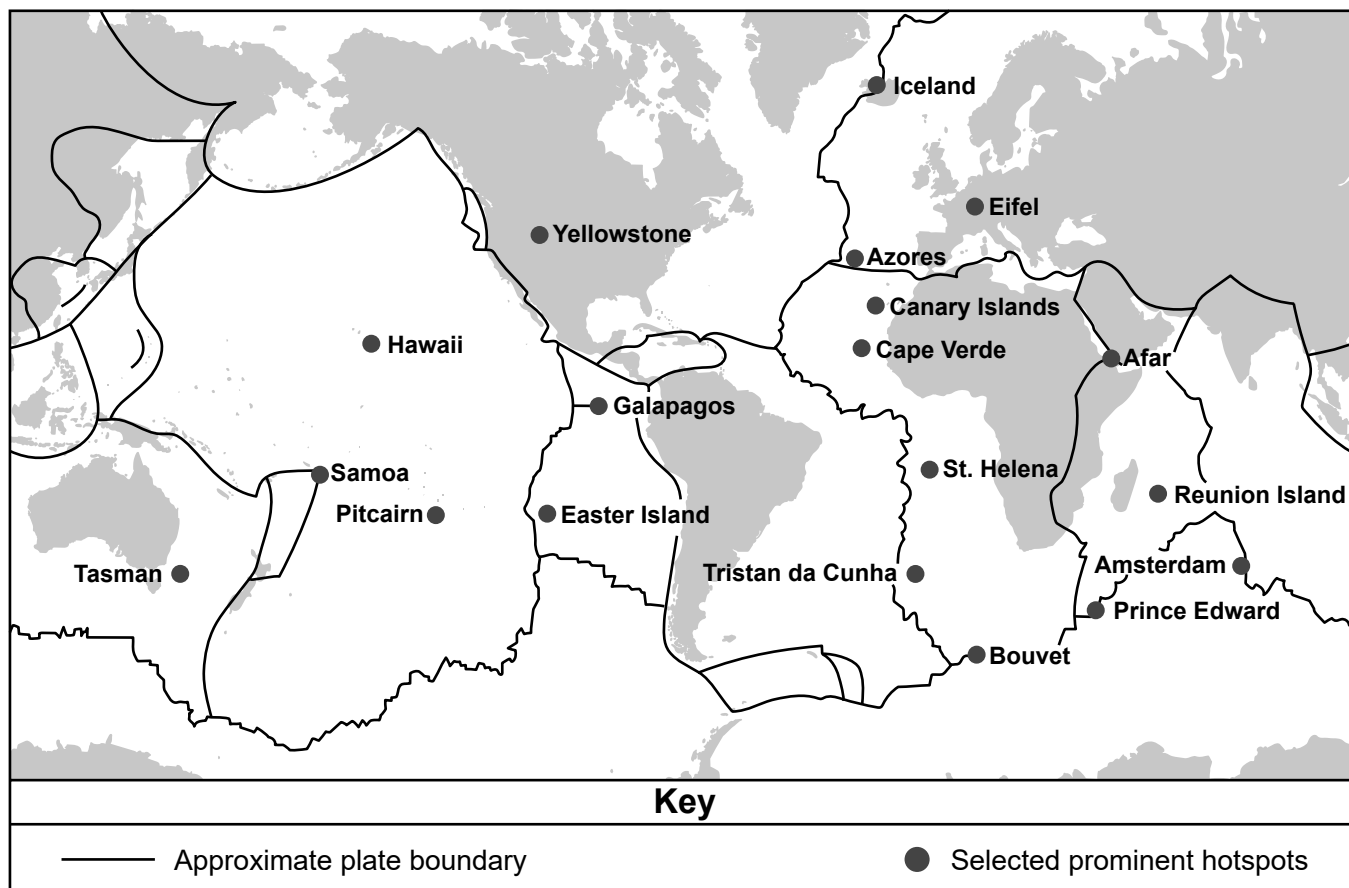


(Not drawn to scale)

Geologically Important Radioactive Elements Used for Radiometric Dating

Parent Isotope	Daughter Decay Product	Approximate Half-life (years)	Useful Dating Range (years)	Materials That Can be Dated
Samarium-147 ^{147}Sm	Neodymium-143 ^{143}Nd	106 billion	10 million - 4.6 billion	Garnets, lunar fragments, and meteorites
Rubidium-87 ^{87}Rb	Strontium-87 ^{87}Sr	49.7 billion	10 million - 4.6 billion	Potassium-bearing minerals (mica, feldspar, hornblende), whole igneous or metamorphic rock
Uranium-238 ^{238}U	Lead-206 ^{206}Pb	4.5 billion	10 million - 4.6 billion	Uranium-bearing minerals (zircon, apatite, uraninite)
Uranium-235 ^{235}U	Lead-207 ^{207}Pb	703 million	10 million - 4.6 billion	Uranium-bearing minerals (zircon, apatite, uraninite)
Potassium-40 ^{40}K	Argon-40 ^{40}Ar	1.3 billion	100,000 - 4.6 billion	Potassium-bearing minerals (mica, feldspar, hornblende), igneous or metamorphic rock
Carbon-14 ^{14}C	Nitrogen-14 ^{14}N	5730	100 - 70,000	Organic materials, glacial ice containing carbon dioxide, groundwater, and ocean water

Locations of Selected Hotspots



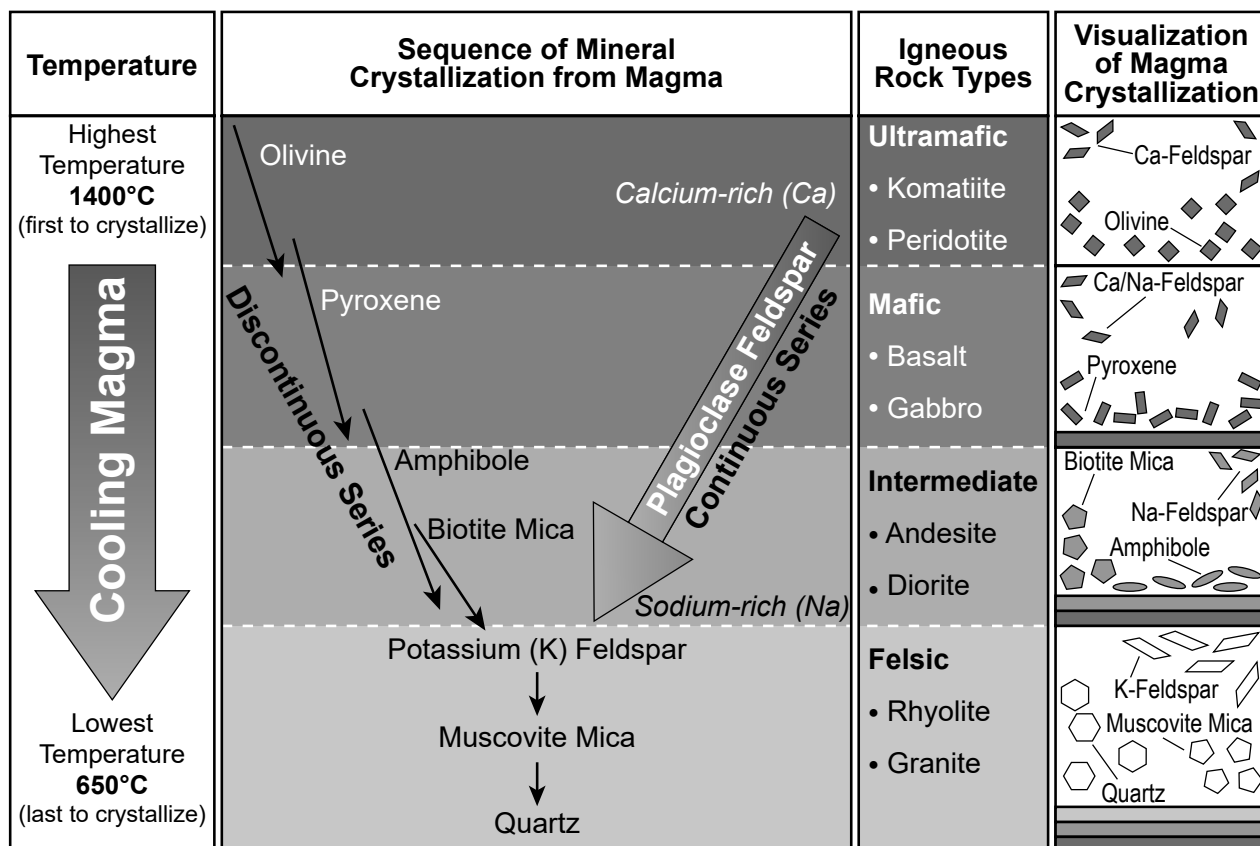
Source: Paul D. Lowman, Jr.
NASA/Goddard Space Flight Center

KEY

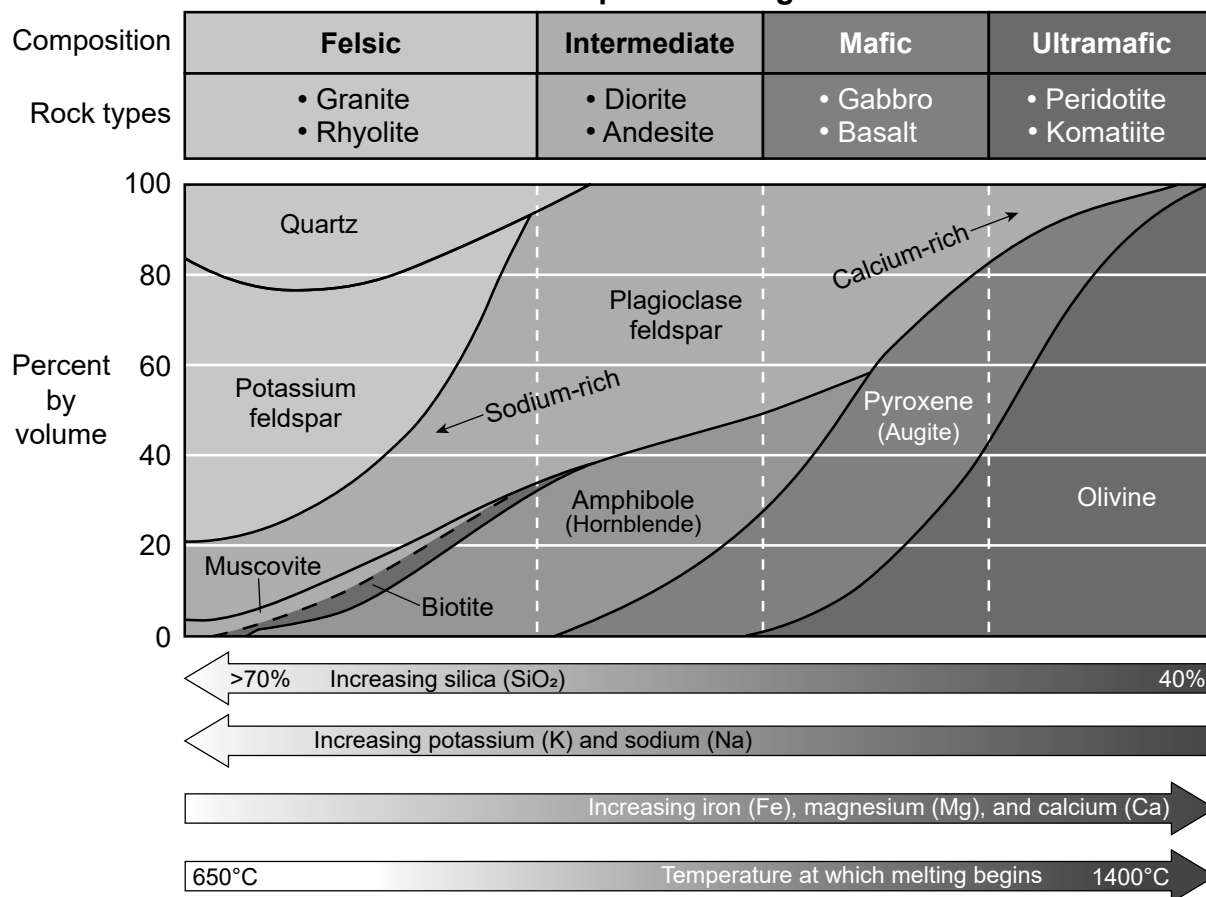
Nature, location, or activity uncertain

Major active transform fault or fault zone

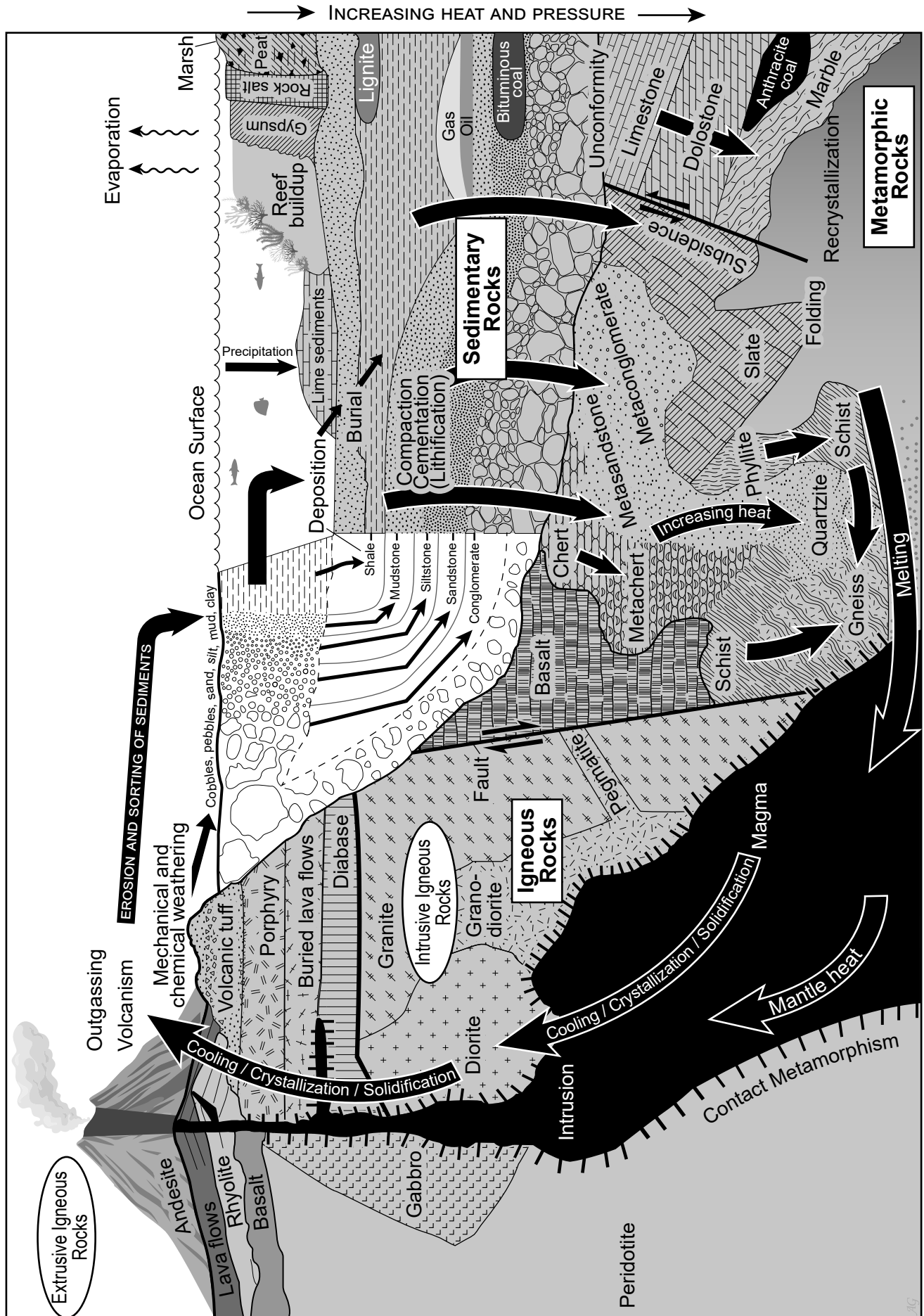
Model of Bowen's Reaction Series



Mineral Composition of Igneous Rocks



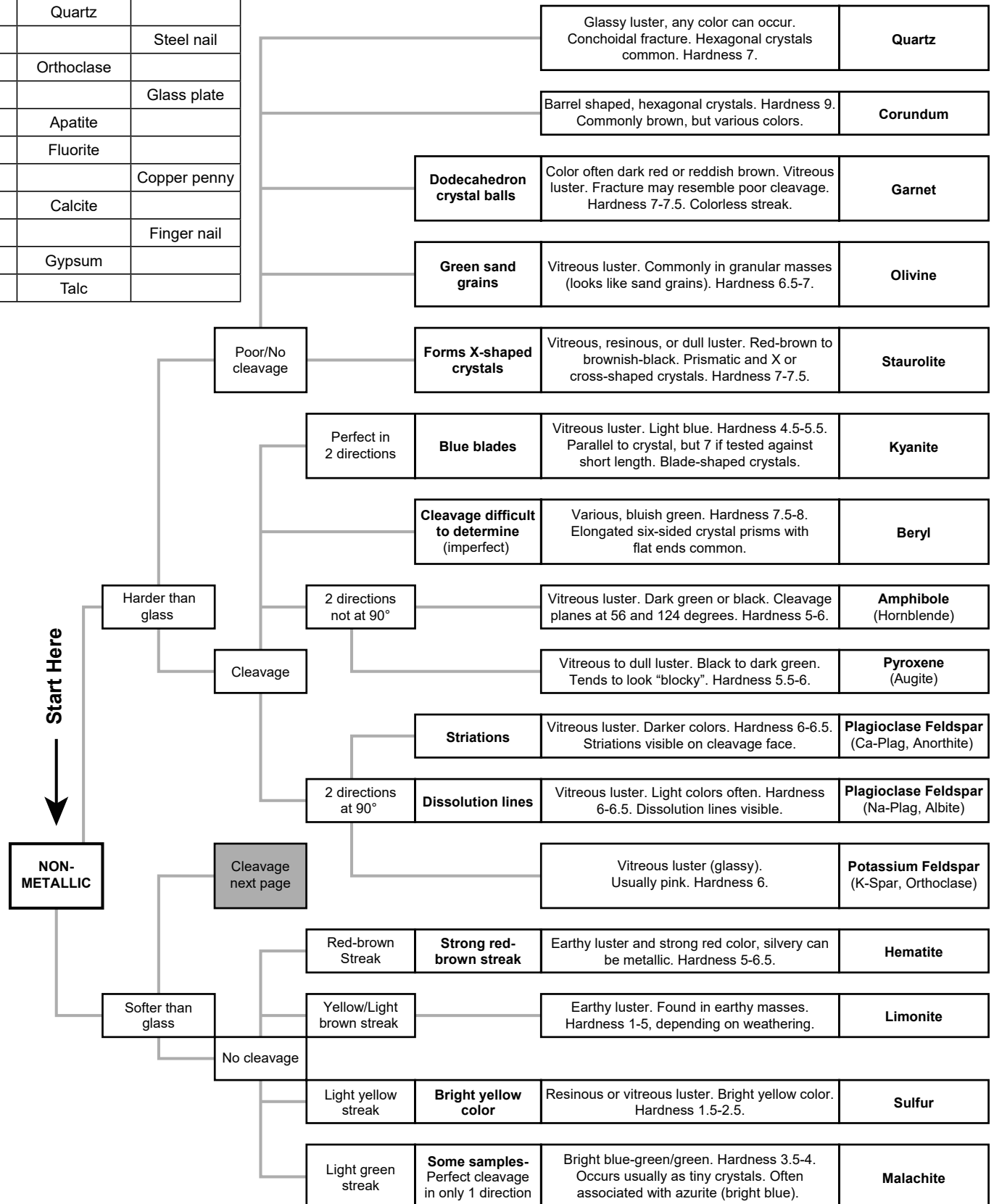
Rock Cycle Infographic



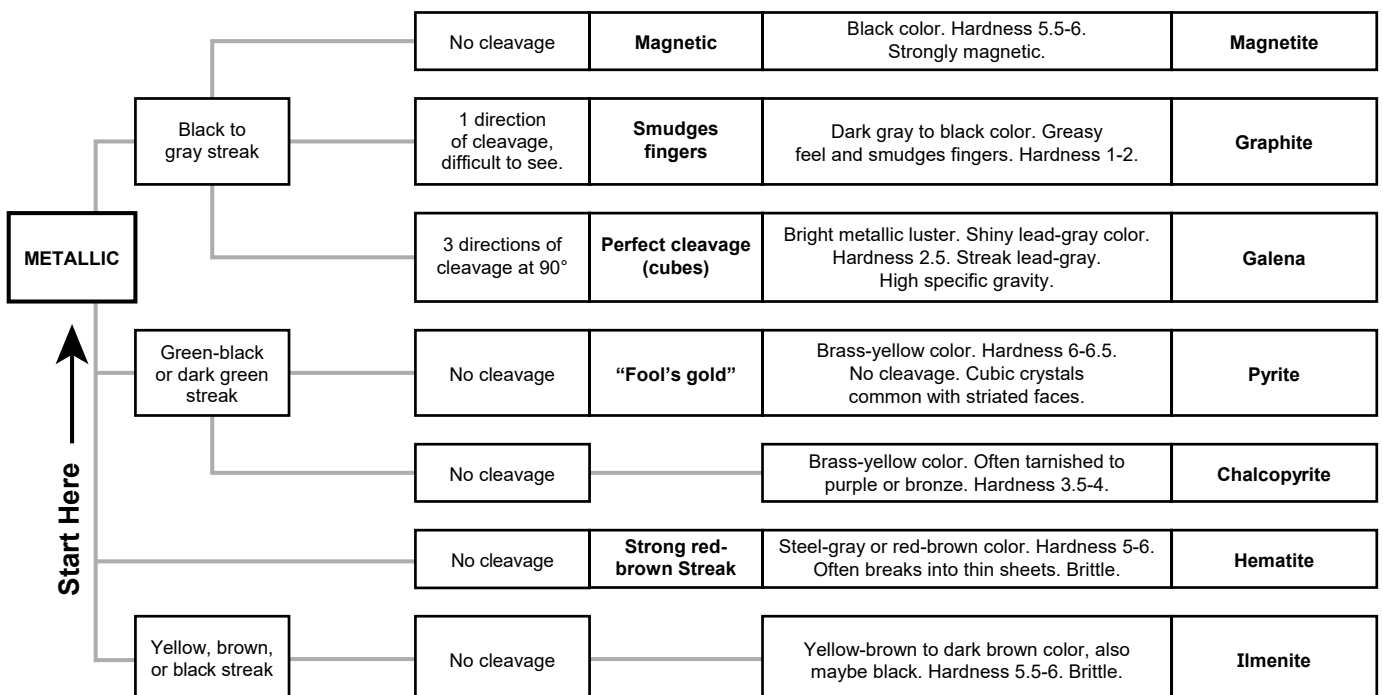
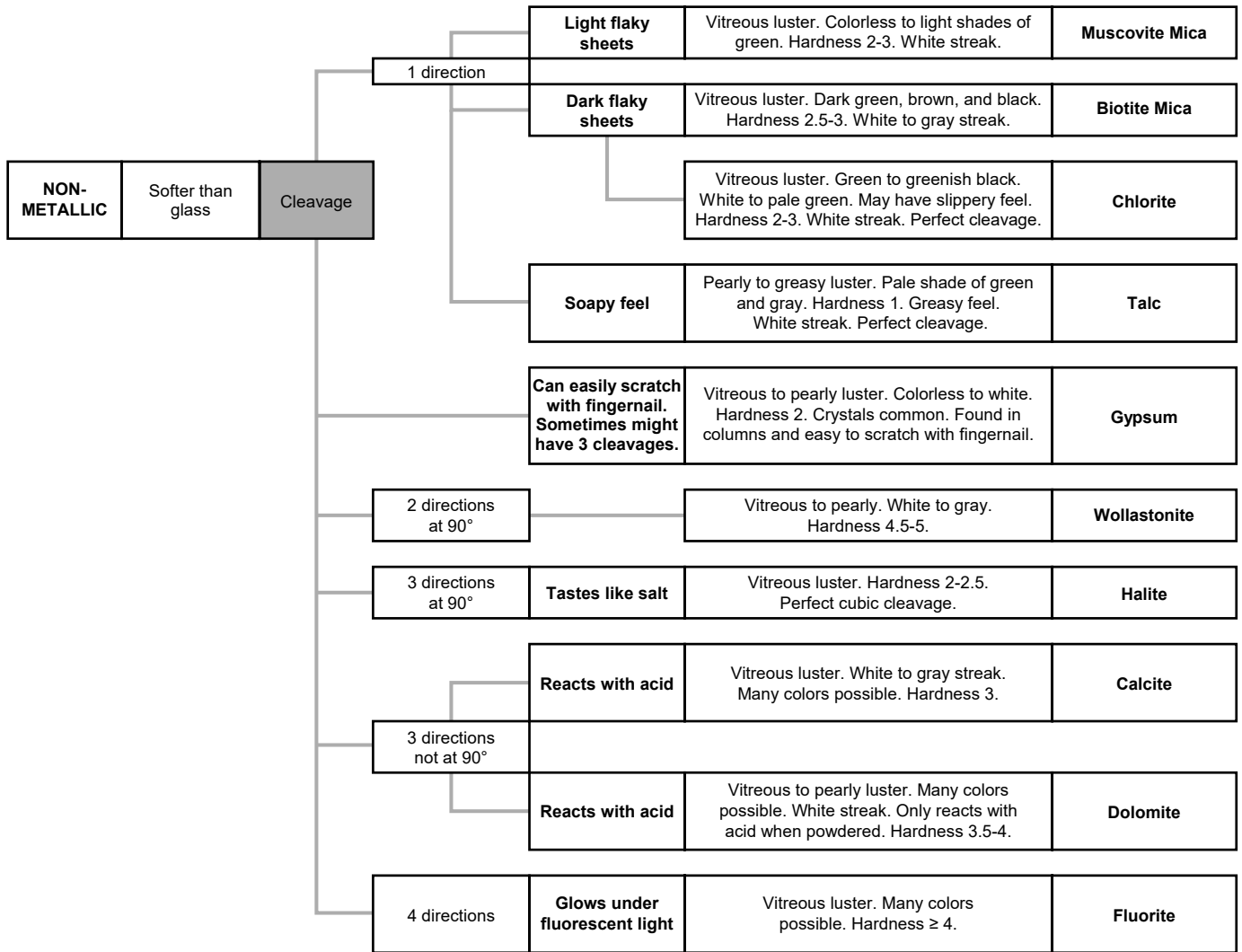
Mohs Hardness Scale

Hardness	Mineral Name	Tools
10.0	Diamond	
9.0	Corundum	
8.0	Topaz	
7.0	Quartz	
6.5		Steel nail
6.0	Orthoclase	
5.5		Glass plate
5.0	Apatite	
4.0	Fluorite	
3.5		Copper penny
3.0	Calcite	
2.5		Finger nail
2.0	Gypsum	
1.0	Talc	

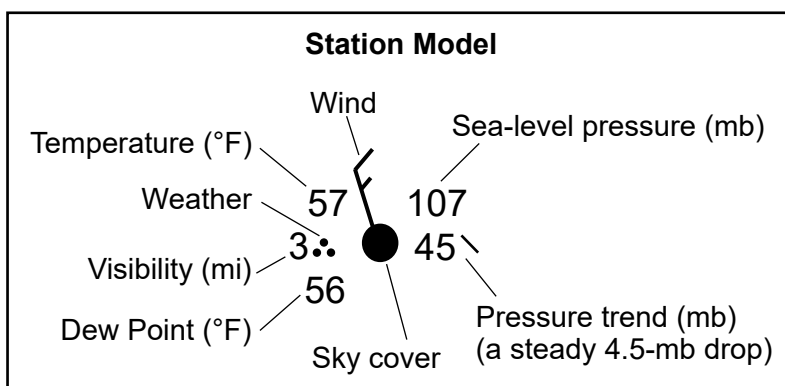
Mineral Identification Flowchart



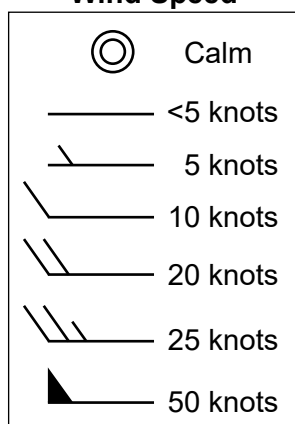
Mineral Identification Flowchart (Continued)



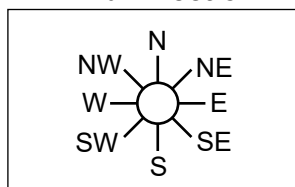
Key to Weather Map Symbols



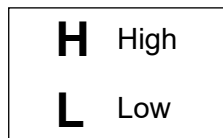
Wind Speed



Wind Direction



Air Pressure



Pressure

Sea-level pressure is plotted in tenths of millibars (mb) with the leading 10 or 9 omitted.

410: 1041.0 mb

103: 1010.3 mb

987: 998.7 mb

872: 987.2 mb

Weather Conditions

	Intermittent		
	Light	Moderate	Heavy
Rain	•	••	•••
Snow	*	**	***
Drizzle	••	•••	••••
	Steady		
	Light	Moderate	Heavy
Rain	••	•••	••••
Snow	**	**	***
Drizzle	••	•••	••••
	Thunderstorms		
	Light	Heavy	
Rain	•	•	
Snow	*	*	
Hail	△	△	
Hail	△	△	
Tornado	]]		
Hurricane	•		
Sleet	△		
Snow grains	△		
Drifting snow	+		

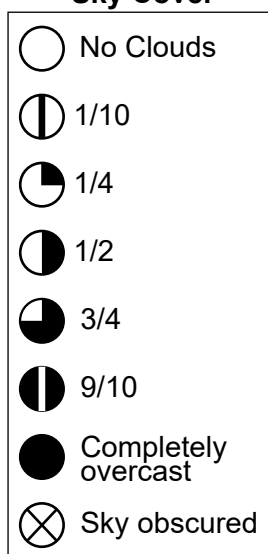
Freezing Drizzle:

Light Heavy

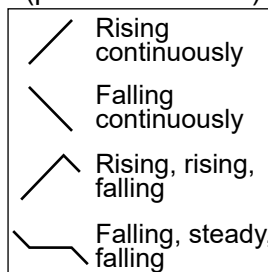
Freezing Rain:

Light Heavy

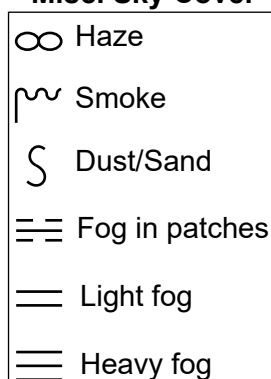
Sky Cover



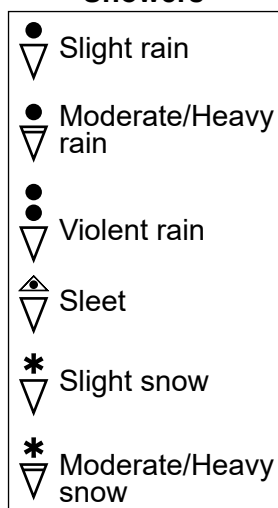
Pressure Trend (previous 3 hours)



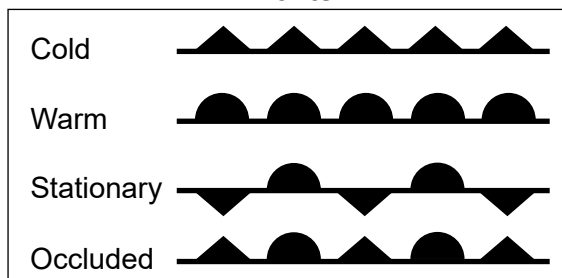
Misc. Sky Cover



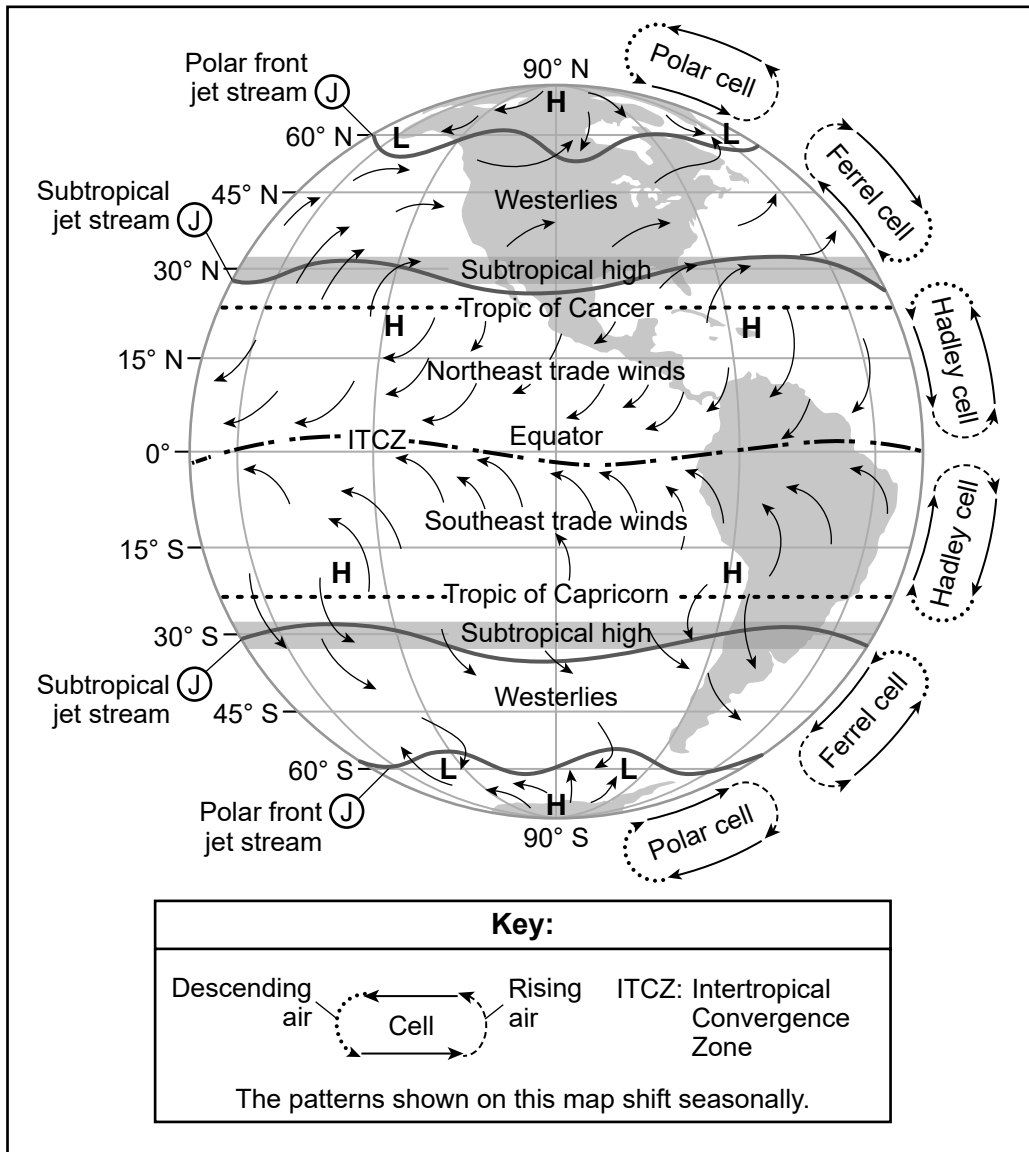
Showers



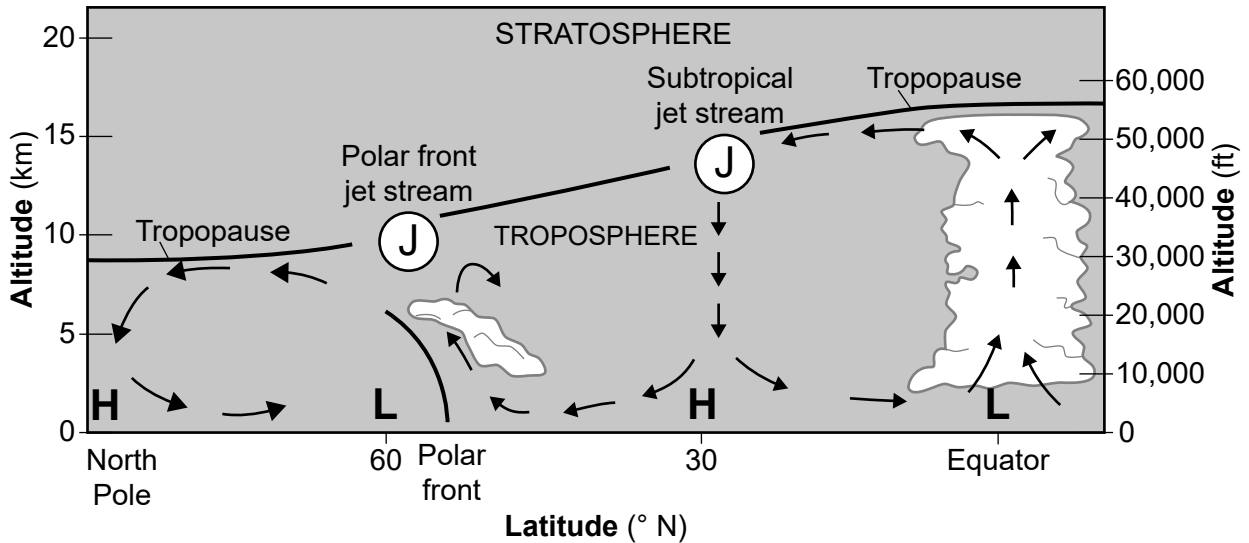
Fronts



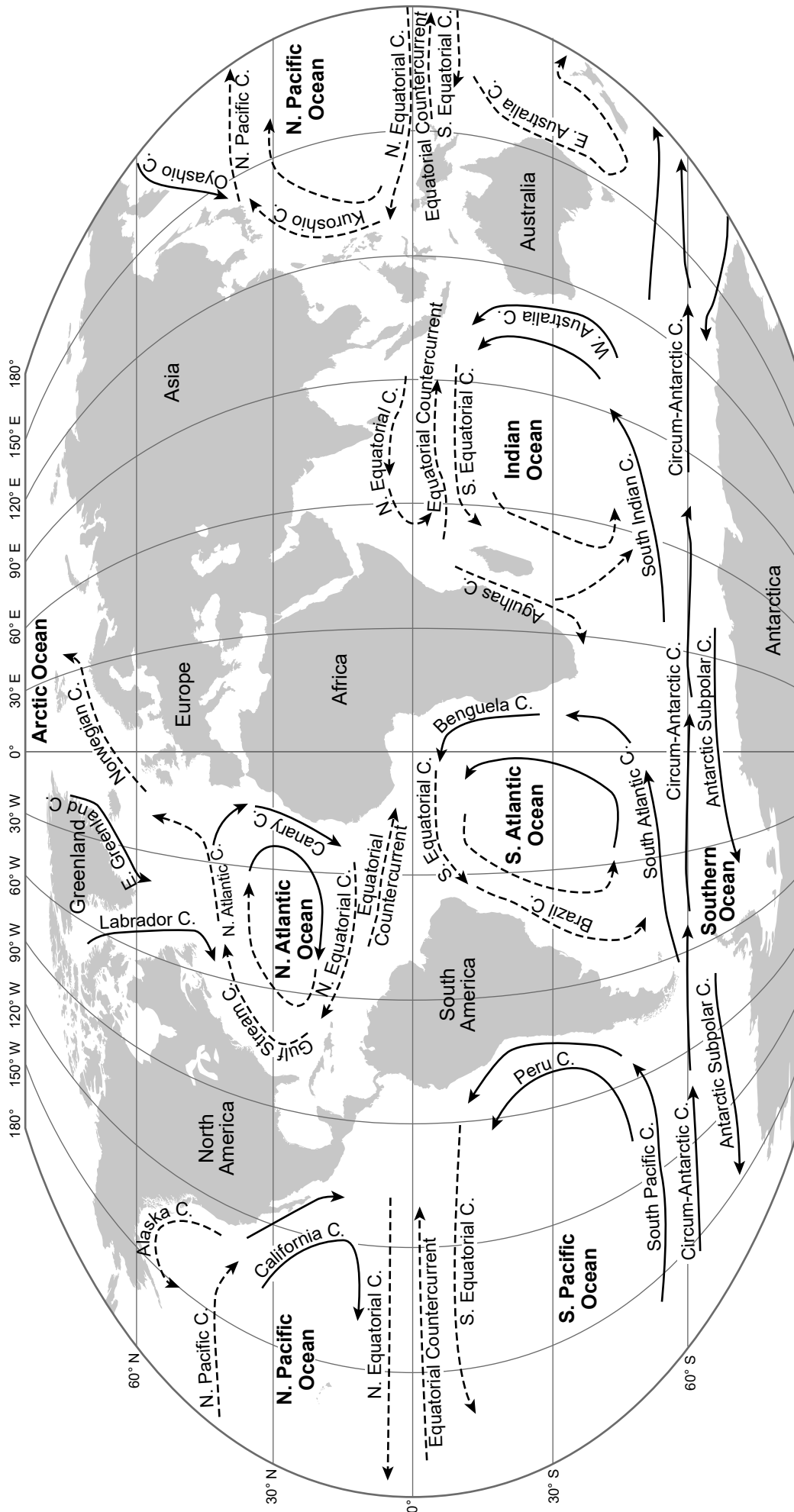
Model of Generalized Planetary Wind Belts in the Troposphere



Cross Section Model of Earth's Lower Atmosphere



Surface Ocean Currents Model



Key	
----->	Warm currents
————>	Cold currents