COWSS Suggested Pacing Guide

How do we know the age of the universe?

Unit 1 - Suggested time frame: 5 weeks	Objectives	Extensions
Week 1-2 Big Bang and Galaxy Exploration, History of Astronomy	1.1 & 1.3 Big Bang, HR diagram, Red shift, Galaxy type and formation	1.11
Week 3-4 Life Cycle of Stars Solar System	1.2, 1.5, 1.6/1.7: Star life cycles, Distances, Space exploration, Probes/satellites	1.8, 1.9, 1.10
Week 5	Projects/presentations	

1.1   Investigate the Big Bang Theory~ analyze the evidence provided by the
        electromagnetic spectrum, including red shift, to support Big Bang Theory
1.2   Describe the life cycle of stars using the Hertzprung-Russell diagram (Sun,
Betelgeuse, Polaris, Alpha Centauri, etc..)
1.3   Classify and evaluate galaxy types and their formation
1.4   Investigate and Interpret the nebular hypothesis for solar system and planetary
body formation
1.5   Construct a model to illustrate the distance between astronomical bodies using
units relative to the proximity of Earth (astronomical units, light years, lunar distance,
kilometers)
1.6   Sequence the history of space exploration
1.7   Identify current and future space probes/satellites and their missions
1.8   Analyze the data obtained by Hubble/James Webb, other telescopes, and current
projects
1.9   Record and predict sky observations: lunar cycle,constellations
1.10   Apply the Drake Equation for estimating past and present civilizations
1.11   Analyze the evidence of Bolide Impacts (comets and asteroids)on Earth/Moon

How do we know Earth's Geosphere is changing?

Unit 2 - Suggested time frame: 5 weeks	Objectives	Extensions
Week 1-2 (6-7) Plate Tectonics	2.1 Plate tectonics, Geological structures	
Week 3-4 (8-9) Rock Types/ Cycles	2.3 Physical changes	2.2
Week 5 (10)	Projects/presentations	

2.1   Connect the causes and effects of physical changes related to the theory of plate tectonics
- 2.1.1.   Investigate the crystal formation and properties of mineral families
- 2.1.2.   Model the rock cycle using samples
- 2.1.3.   Elaborate on the theories of Continental Drift and the Wilson Cycle
    - 2.1.1.   Analyze supporting evidence; including plate boundaries,volcanoes, earthquakes, mountain formation
- 2.1.4.   Utilize maps to locate evidence of physiographic change
    - 2.1.1.   identify regional physiographic provinces
    - 2.1.2.   illustrate bathymetric topography
- 2.1.5.   Identify and differentiate the formation processes of geological resources (precious metals, energy resources, gemstones, construction materials, minerals)

2.2   Explain the Effects of Life on Earth's geosphere
- 2.2.1   Investigate limestone and fossil fuel formation

2.3   Connect the causes and effects of physical change related to weathering, erosion, and deposition
- 2.3.1   identify changes and effects on topography, soils, groundwater, stream mechanics, subterranean features

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What techniques are used to determine the age of the Earth

Unit 3 - Suggested time frame: 5 weeks	Objectives	Extensions
Week 1 (11)	3.1, 3.3 Geologic time scale mass extinctions	3.2
Week 2 (12)	3.4 Impacts and Collisions	
Week 3 (13)	Projects/presentations	

    3.1   Recognize geologic time scale
        3.1.1.   Identify the rise of major life forms and mass extinction events
    3.2   Interpret paleontological evidence using index fossils and stratigraphy
    3.3   Assess the applications of different types of radiometric dating
    3.4   Investigate asteroid impacts and their correlation to Earth's geologic history

What techniques are used to determine the age of the Earth?

Unit 4 - Suggested time frame: 5 weeks	Objectives	Extensions
Week (14-15)	4.2, 4.5, 4.6 Past and future climate	4.1
Week 3-4 (16-17)	4.3, 4.4 Climate and Weather	4.1 4.6
Week 5 (18)	Projects/presentations	

4.1   Identify characteristics of atmospheric layers and determine their effects on climate

4.2   Interpret climate data collected from ice cores, sediment layers, paleobiology

4.3   Investigate how ocean/air currents affect different climates on Earth

4.4   Connect how weather and climate are related

   4.4.1   Discuss weather as oscillating patterns such as El Nino and La Nina, the North Atlantic Oscillation, and jet streams

   4.4.2   Determine a correlation between extreme weather and climate change

   4.4.3   Investigate the human influence on: local weather patterns such as heat island,clear cutting, irrigation, agriculture, development

   4.4.4   Predict weather using data collected from a variety of resources to include weather stations, personal observations and remote sensing

   4.4.5   Investigate differences in weather patterns based on regional influences such as land and sea breezes, topography, and lake effect

4.5   Investigate long and short-term climate variation by comparing natural climate cycles to human efforts which affect current climate trends

4.6   Validate the variations in climate by using historic data from natural cycles such as Milankovitch cycles and solar cycle.