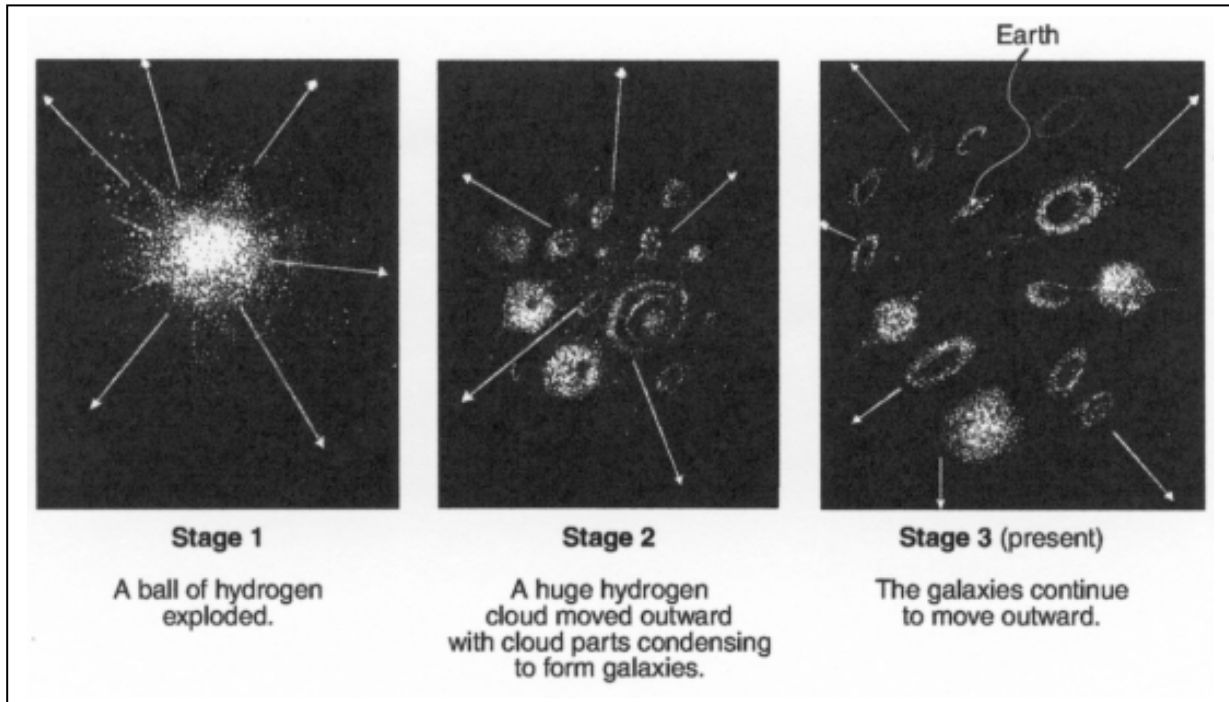


WEB DEMO and TOPICS

Earth Science Objective and Essay Questions

1) The diagram below illustrates three stages of a current theory of the formation of the universe.



A major piece of scientific evidence supporting this theory is the fact that wavelengths of light from galaxies moving away from Earth in stage 3 are observed to be

- 1) shorter than normal (a red shift)
- 2) shorter than normal (a blue shift)
- 3) longer than normal (a red shift)
- 4) longer than normal (a blue shift)

2) Gases in the air that trap heat waves in the lower atmosphere as a glass traps heat in a greenhouse are

- 1) oxygen and nitrogen
- 2) water and carbon dioxide
- 3) hydrogen and ozone
- 4) argon and neon

3) Which property of a well-sorted loose material will increase as the particle size decreases?

- 1) capillarity
- 2) permeability
- 3) porosity
- 4) infiltration

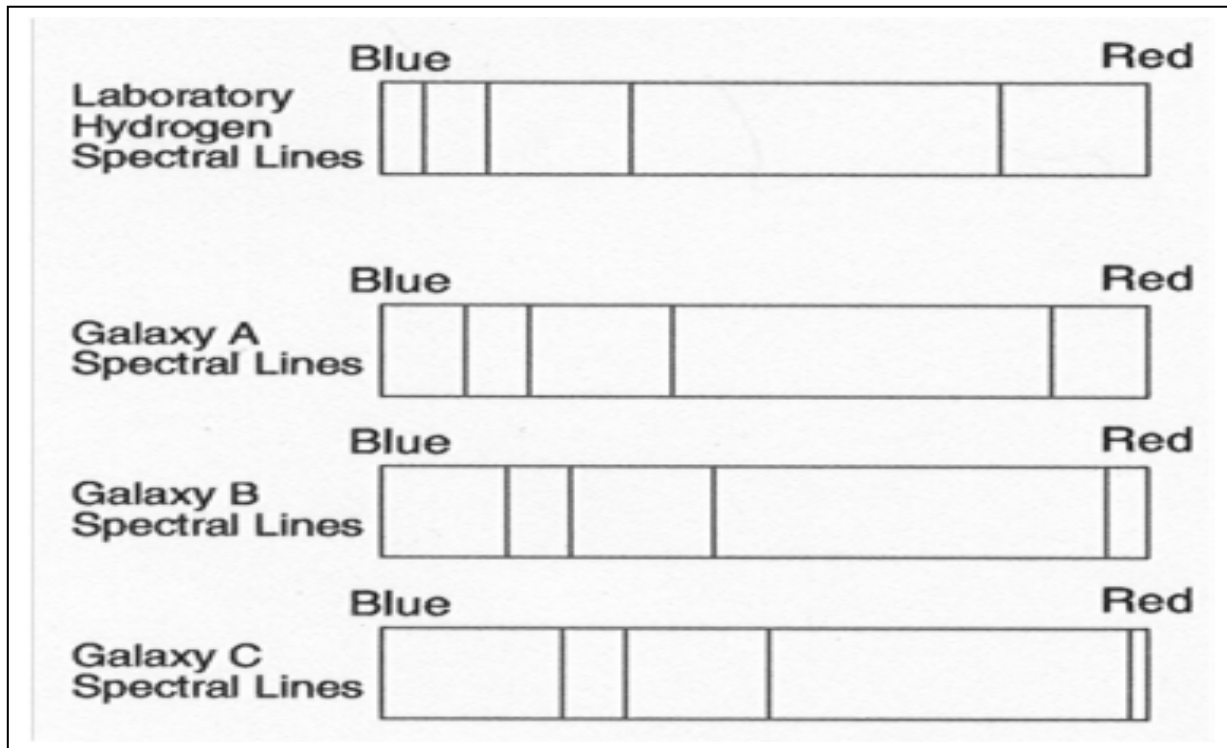
4) During which geologic time period did the earliest reptiles and great coal forming forests exist?

- 1) Devonian
- 2) Quaternary
- 3) Mississippian
- 4) Pennsylvanian

5) The Earth reaches its greatest orbital speed when it is

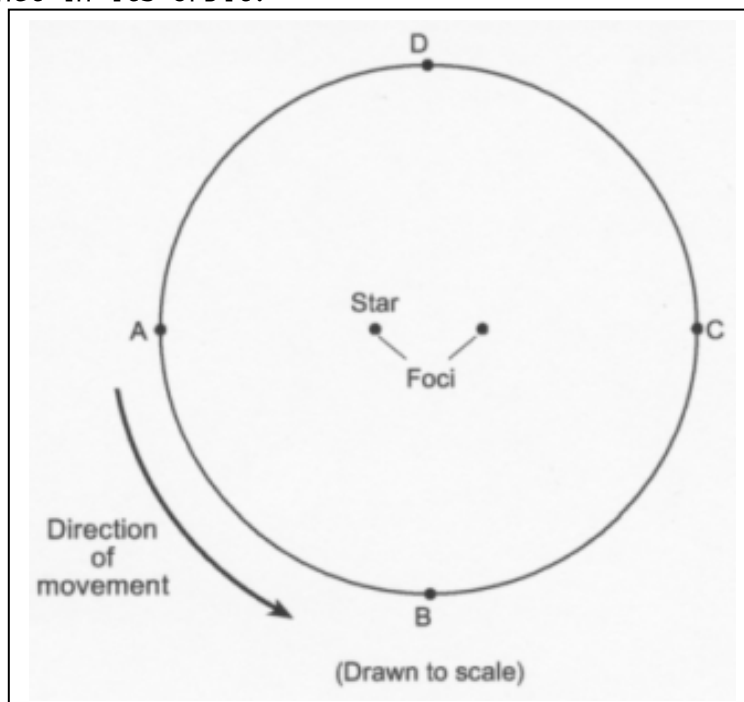
- 1) closest to the Moon
- 2) farthest from the Moon
- 3) closest to the Sun
- 4) farthest from the Sun

6) In the diagram below the spectral lines of hydrogen gas from three galaxies, A, B, and C, are compared to the spectral lines of hydrogen gas observed in a laboratory.



What is the best inference that can be made concerning the movement of galaxies A, B, and C?

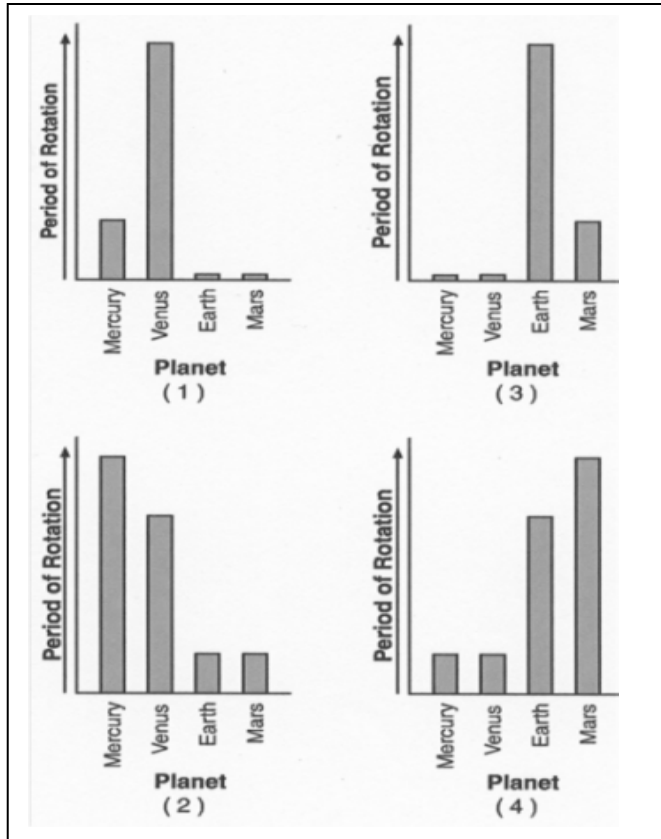
- 1) Galaxy A is moving away from Earth, but galaxies B and C are moving toward Earth.
- 2) Galaxy B is moving away from Earth, but galaxies A and C are moving toward Earth.
- 3) Galaxy A, B, and C are moving toward from Earth
- 4) Galaxy A, B, and C are moving away from Earth
- 7) The diagram below represents the elliptical orbit of a planet traveling around a star. Points A, B, C, and D are four positions of this planet in its orbit.



As the planet revolves in orbit from position A to position D, the orbital velocity will

- 1) continually decrease
- 2) continually increase
- 3) decrease, then increase
- 4) increase, then decrease

8) Which graph best represents the relative periods of rotation of Mercury, Venus, Earth, and Mars?



9) Compared to Jupiter and Saturn, Venus and Mars have greater

- 1) periods of revolution
- 2) orbital velocities
- 3) mean distances from the Sun
- 4) equatorial diameters

10) During which geologic time period did the earliest reptiles and great coal forming forests exist?

- 1) Devonian
- 2) Quaternary
- 3) Mississippian
- 4) Pennsylvanian

11) The Earth reaches its greatest orbital speed when it is

- 1) closest to the Moon
- 2) farthest from the Moon
- 3) closest to the Sun
- 4) farthest from the Sun

10) The geocentric model of the solar system does not explain

- 1) star trails
- 2) day and night
- 3) planetary motion
- 4) Foucault's pendulum

12) Present-day weather predictions are based primarily upon

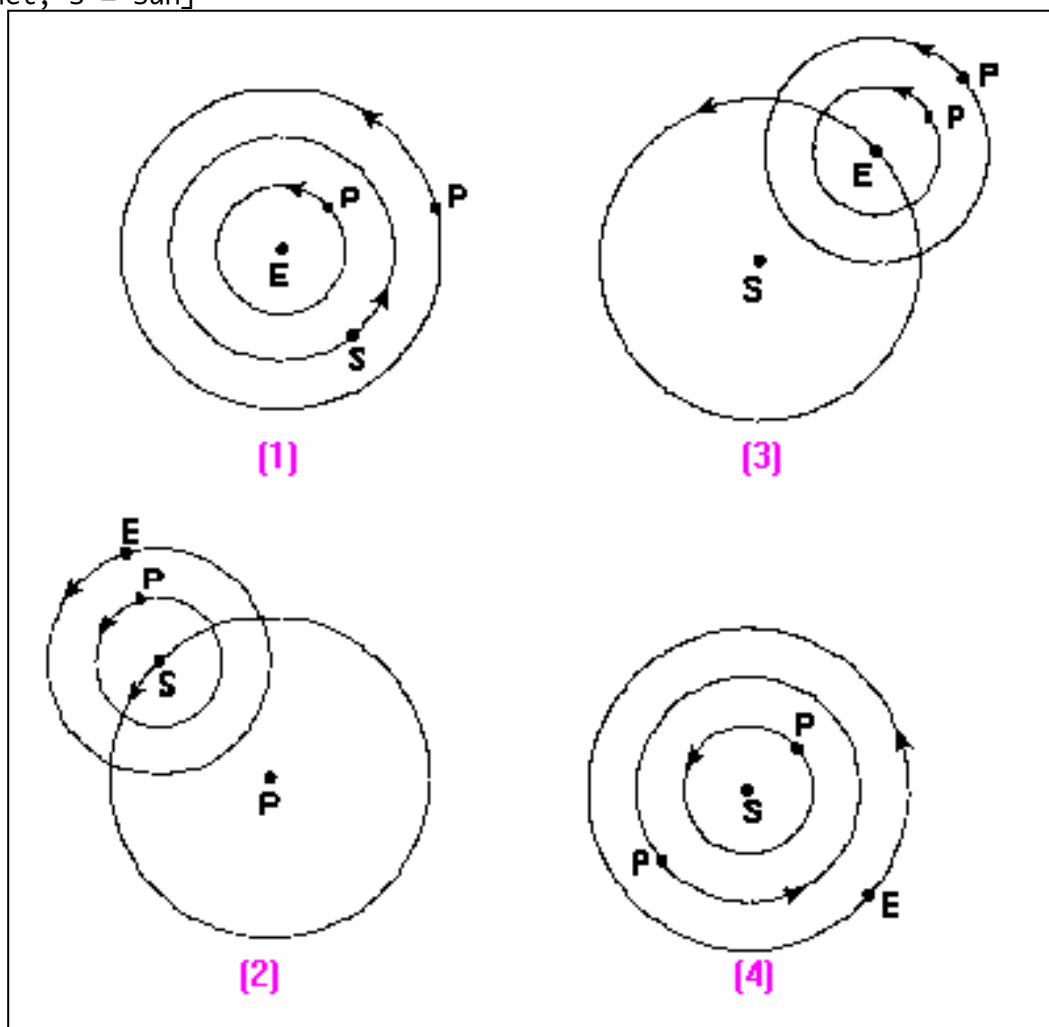
- 1) land and sea breezes
- 2) cloud height
- 3) ocean currents
- 4) air-mass movement

- 13) Land surface of Earth heat more rapidly than water surfaces because
- 1) more energy from the Sun falls on land than on water
 - 2) land has a lower specific heat than water
 - 3) sunlight penetrates to greater depths in land than in water
 - 4) less of Earth's surface is covered by land than by water

14) A piece of a plant in a classroom fish tank moved upward and across the tank, away from the water heater. When the plant reached the other side of the tank, it sank before moving back toward the heater. What type of energy transfer does this movement represent?

- 1) convection
- 2) conduction
- 3) refraction
- 4) radiation

15) Which diagram best represents a geocentric model of the solar system? [Diagrams are not drawn to scale. Key E = Earth; P = Planet; S = Sun]

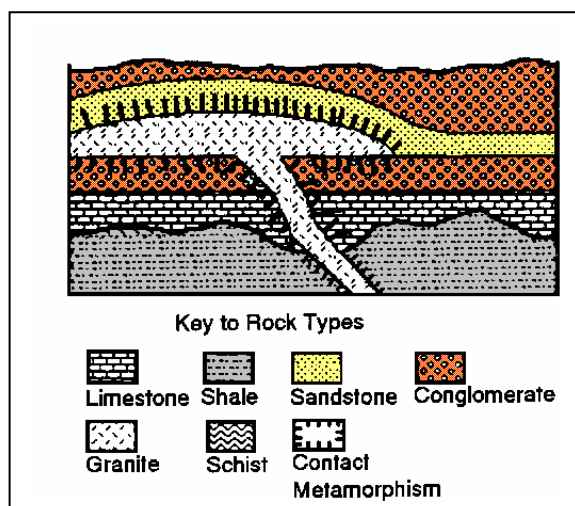


- 16) An increase in carbon dioxide in the atmosphere may lead to an increase in global temperatures because carbon dioxide
- 1) absorbs heat radiation thus preventing it from escaping Earth's atmosphere
 - 2) blocks harmful ultraviolet radiation from reaching Earth's surface and being absorbed
 - 3) interferes with the formation of clouds which block sunlight and cause cooling
 - 4) enters the atmosphere at a high temperature from combustion and respiration

- 17) Surface ocean currents located at 40 degrees south latitude, 90 degrees west longitude generally flow toward the
- 1) northeast
 - 2) southeast
 - 3) southwest
 - 4) west
- 18) The percentage of open space between grains of soil is called the soil's
- 1) permeability
 - 2) porosity
 - 3) discharge
 - 4) capillarity
- 19) The velocity of a stream is decreasing. As the velocity approaches zero, which size particle will most likely remain in suspension?
- 1) clay
 - 2) sand
 - 3) pebble
 - 4) boulder
- 20) Which statement best describes sediments deposited by glaciers and rivers?
- 1) Glacial deposits and river deposits are both sorted.
 - 2) Glacial deposits and river deposits are unsorted.
 - 3) Glacial deposits are unsorted and river deposits are sorted.
 - 4) Glacial deposits and river deposits are both unsorted.
- 21) A seismograph record the arrival of a P-wave at 11:13 a.m. If the earthquake occurred at 4,000 kilometers from the recording station, when did the earthquake occur?
- 1) 11:06 a.m
 - 2) 11:11 a.m.
 - 3) 11:13 a.m.
 - 4) 11:20 a.m.

Sample Earth Science Essay Questions

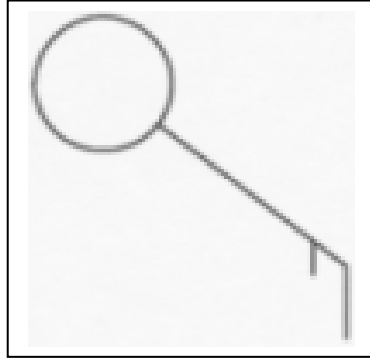
- 1) Base your answer to the question and the diagram below. The diagram shows a profile view of a bedrock outcropping. None of the layers has been overturned.



- A. How can one tell that the sandstone is older than the granite below it? Answer in one or more complete sentences.
- B. List the names of the rocks in the order of their age from the oldest to youngest using the number one for the oldest rock.

Using the proper format, place the following data on the weather station model provided below.

Dewpoint = 74 degrees C
Cloud cover = 100%



- 3) What weather instrument is usually attached to a weather balloon to measure air pressure.
- A) State the relationship shown in the table between altitude above sea level and air pressure recorded by the rising weather balloon.
- B) This rising weather balloon also recorded dewpoint temperatures. If the dewpoint at 1,500 meters was 12 degrees C, what was the relative humidity of the air at 1,500 meters above sea level.
- 4) Base your answer to the question on the weather station data shown in the table below.

Air temperature	21 degrees C
Barometric Pressure	933.1 mb
Wind Direction	From the east
Windspeed	25 knots

Draw a station model showing wind direction with feathers to indicate wind direction and speed.

5) A parcel of air has a dry-bulb temperature of 18 degrees C and a wet-bulb temperature of 10 degrees C. State the relative humidity of this parcel of air.

6) List the 5 stars below in order of decreasing relative luminosity with letter A being the brightest E being the least bright.

(Luminosity and Temperature of Stars)

Aldebarren, Betelgeuse, Polaris, Sirius, and Sun

7) A parcel of air has a dry-bulb temperature of 18 degrees C and a wet-bulb temperature of 10 degrees C. State the relative humidity of this parcel of air.

8) An island measures 10 kilometers from east to west and 8 kilometers for north to south. A single hill on the east side of the island has a maximum elevation of 57 meters and is steepest to the north. In the box below, draw a simple contour map to represent this island, using a distance scale of 1 centimeter = 1 kilometer and a contour interval of 10 meters.



9) The data table below shows the volume and mass of three different samples, A, B, and C, of the mineral pyrite.

Pyrite		
Sample	Volume (cm ³)	Mass (g)
A	2.5	12.5
B	6.0	30.0
C	20.0	100.0

State the mass of a 10.0 cm³ sample of pyrite.

10) Astronomers Peer Closer to Big Bang

WASHINGTON - The faintest and most distant object ever sighter - galaxies of stars more than 12 billion light years away - have been detected by an infrared camera on the Hubble Space Telescope.

The sighting penetrates for the first time to within about one billion light years of the very beginning of the universe, astronomers said, and shows that even at that very early time there already were galaxies with huge families of stars.

"We are seeing farther than ever before," said Rodger I. Thompson, a University of Arizona astronomer and the principal researcher in the study.

Thompson and his team focused an infrared instrument on the Hubble on a narrow patch of the sky that had been previously photographed in visible light. The instrument detected about 100 galaxies that were not seen in the visible light and 10 of these were at extreme distance.

He said the galaxies are seen as they were when the universe was only about 5 percent of its present age. Astronomers generally believe the universe began with a massive explosion, called the "big bang", that occurred about 14 billion years ago.

Since the big bang, astronomers believe that galaxies are moving rapidly away from each other, spreading out and becoming more distant.

A) The big bang theory is widely believed by astronomers to explain the beginning of the universe. Why does the light from distant galaxies support the big bang theory?

- B) Compare the age of Earth and our solar system to the age of these distant galaxies of stars

Earth Science Topics

Classification Systems - Purpose
Density - Calculations
Density - Earth Layers
Density - Graph Relationships
Density - Liquids
Density - Problems
Density - Solids - Gases
Factors not Affecting Density
Celestial Motion
Constellations
Coriolis Effect
Distances & Measurement
Planets & Stars
Earth Dimensions - Altitude of Polaris
Earth Dimensions - Circumference
Earth Dimensions - Oblate
Earth Dimensions - Other Evidence
Earth Dimensions - Pole Measurements
Earth Dimensions - Rate of Rotation
Earth Dimensions
Earth at Night
Electromagnetic Spectrum
Extent of Atmosphere
Fields
Foucault Pendulum
Galaxies
Geocentric Model
Geometry of Orbits
Gravitational Forces of Attraction
Heliocentric Model
Hydrosphere
Inner Planets
Isolines & Gradients
Isolines
Kepler's First Law
Kepler's Second Law
Using Coordinate systems
Variations of Sun Motion
Vector - Scalar Properties
Angle of Insolation
Calorimetry Problems - Different Substances
Calorimetry Problems
Conservation of Energy - Closed & Open Systems
Conservation of Energy - Energy Flow
Duration of Insolation
Earth Surface Radiation
Electromagnetic Energy - Earth's Energy
Electromagnetic Energy - Properties
Electromagnetic Energy - Solar Energy
Electromagnetic Spectrum
Energy Transfer - Convection
Energy Transfer - Conduction
Energy Transfer - Radiation
Energy Transformation & Phase Changes
Energy Transformation - Movement of Matter
Energy Transformation - Potential Energy Changes
Energy Transformation - Wavelength Absorption & Radiation
Inferences
Measurement - Area - Volume
Measurement - Comparison
Percent Error
Pressure Units
Sensory Limitations
Sensory Perception
Mean Time - Solar Time
Outer Planets
Overhead High Noon Position
Planetary Motions
Position of the Earth Determination -
Red shift
Satellite Notions
Scientific Notation -> Numbers
Shadows
Solar Eclipse
Solar System
Star Paths
Stars
Stratified Atmospheric Layers
Sun Motion
Sun's Altitude
Sun's Apparent Diameter
Sun - Sunspots
Tides
Time - Earth Motions
Universe
Kepler's Third Law
Length of Day
Lithosphere
Lunar Eclipse
Models
Moon - Phases
Moon's Apparent Diameter

Greenhouse Effect

Heats of Fusion - Solidification - Condensation - Vaporation

Insolation Factor - Absorption

Insolation Factor - Reflection Atmospheric - Temperature Variations

Intensity of Insolation

Latitude - Seasons

Maximum & Minimum Insolation

Maximum Surface Temperature

Radiation Absorption - Gases

Radiation Balance

Specific Heat

Temperature - Kelvin - Celsius

Water & Specific Heat

Insolation Factor - Scattering

Diabatic Changes

Air-Mass Source Characteristics

Atmospheric - Pressure Variations

Earth's Rotation & Wind Direction

Energy Exchanges - Vapor Pressure

Energy Input into the Atmosphere

Evaporation - Transpiration & Energy

Evaporation Rate Factors

Frontal Air Movement

Ground Water - CAPILLARITY

Ground Water - INFILTRATION

Ground Water - PERMEABILITY

Ground Water - POROSITY

Hurricanes

Improving Atmospheric Transparency

Layers of the Atmosphere

Pollution: Source - Type - ETC.

Precipitation Possibility

Pressure - Wind Speed & Direction

Probability of Occurrence

Probability of Precipitation

Saturation Vapor Pressure

SOURCE OF MOISTURE

Stream Discharge & Dry Seasons

Stream Discharge & Water Budget

Surface Water - Runoff

Erosional - Depositional System - Dynamic Equilibrium

Erosional - Depositional System - Energy Relationships

Erosional - Dominant Process

Evidence of Erosion - Displaced Sediments

Evidence of Erosion - Properties of Transported Materials

Factors Affecting Transportation - Effect of Erosional Agents

Factors Affecting Transportation - Predominant Agent

Factors Affecting Transportation - Water Erosion

Glaciers

Soil Formation

Solution & Water Erosion

Stream Velocity & Particle Size

Stream Velocity & Stream Direction

Stream Velocity & Stream Slope

Water Erosion & Gravity

Weathering - Soil Solution

Weathering - Weathering Process

Weathering Rates

Coastal Features

Earth's Crust and Interior - Crustal Composition

Earth's Crust and Interior - Crustal Thickness - Moho

Earth's Crust and Interior - Interior Composition

Earth's Crust and Interior - Solid & Liquid Zones

Earth's Crust and Interior : Density - Temperature & Pressure

Atmospheric Release of Moisture

Atmospheric Transparency

Atmospheric Variable - Dew-Point

Atmospheric Variable - Wind Movement

Climate - Large Bodies of Water

Climate - Mountain Barriers

Climate - Storm Tracks

Climate Pattern Factors - Elevation

Climate Pattern Factors - Latitude

Climate Regions

Cloud Types

Condensation & Sublimation

Water Budget - EVAPOTRANSPIRATION

Water Budget - MOISTURE DEFICIT

Water Budget - MOISTURE RECHARGE

Water Budget - MOISTURE STORAGE

Water Budget - MOISTURE SURPLUS

Water Budget - MOISTURE UTILIZATION

Water Budget - PRECIPITATION

Water Content & DENSITY DIFFERENCES

Weather - AIR-MASS CHARACTERISTICS

Weather - FRONTAL SURFACES

Weather - HIGH PRESSURE AIRMASSSES

Weather - LOW PRESSURE AIRMASSSES

Weather Satellite

Wind Belts & Water Interaction

Deposition Factor - DENSITY

Deposition Factor - SHAPE

Deposition Factor - SIZE

Deposition Factor - VELOCITY

Erosional - Depositional CHANGE

Earthquake - Epicenters
Earthquake – Origin Time
Earthquake - Transmission - P- Waves
Earthquake - Transmission - S- Waves
Earthquakes – VELOCITIES
Environment of Formation – Inferred Characteristics
Environment of Formation - Distribution
Glaciers
Major Crustal Changes – Appearance of Continental Drift
Major Crustal Changes – Evidence of Continental Drift
Major Crustal Changes – Evidence of Magnetic Reversal
Major Crustal Changes - Geosynclines
Major Crustal Changes – Ocean Floor Spreading
Major Crustal Changes – Vertical Movement
Major Crustal Changes – Zones of Crustal Activity
Mineral Chemical Composition
Mineral Crystalline Structure
Mineral Identification : Physical – Chemical Properties
Mineral Identification
Minerals - Composition
Minerals – Monominerals
Minor Crustal Change – Deformed Rock Strata
Minor Crustal Change – Displaced Fossils
Minor Crustal Change – Displaced Strata
Non-sedimentary Rocks – Crystal Size
Non-sedimentary Rocks – Recrystallization Process
Non-sedimentary Rocks – Solidification Process
Ocean Currents
Ocean Salinity
Plate Boundaries
Rock - Differences
Rock cycles - Evidence – Rock Composition
Rock Cycles - Evidence – Transition Zones
Rocks and Sediments - Similarities
Rocks with Minerals in Common
Sedimentary Rocks – Biological Process
Sedimentary Rocks – Compression Cementation
Sedimentary Rocks - Evaporation - Precipitation
Theories of Crustal Change – Geosynclinal Development
Theories of Crustal Change - Isostasy
Theories of Crustal Change – Mantle convection Cells
Tsunamis
Waves
Zones of Crust Changes
Climate & Bedrock Erosion
Climate & Soil Development on Landscape Development
Climate & Streams on Landscape Development
Climate - Glaciation Landscape Development
Climate - V – Shaped Valleys
Climate - Rate of Landscape Development
Climate - Steepness Landscape Effects
Conservation & Landscape Development
Correlation of Fossil Clues
Correlation of Sedimentary Rock
Correlation Techniques – Anomalies to Correlate
Correlation Techniques – Fossil in Sedimentary Rock
Correlation Techniques – Volcanic Time Markers
Determining Geologic Ages – Erosional Record
Determining Geologic Ages – Generalized Landscape
Determining Geologic Ages : Scale of Geologic Time
Distinct Regional Types of Landscape
Dry & Wet Climates – Landscape Development
Duration of Time Environmental and Change
Environmental Air Pollution & Landscape Change

Environmental Landscape Development - Man
Fossil evidence to Determine Geologic Age
Fossil Records – Evolutionary Development
Fossil Records – Variety of Life Forms
Fossil Records Missing
Geologic Ages – Devoid Fossil Records
Geologic Events – Igneous Intrusions and Extrusions
Geologic History of an Area
Geologic Time – Mna’s Geologic Time
Human Population Rate Increase
Interpretating Graphs
Landscape characteristics - Hill Slopes
Landscape Regional Boundaries
Landscape Regional Characteristics
Man’s environmental Changes & Landscape Change
Niagara Falls
Radioactive Dating
Radioactive Decay - Half Life Differences
Radioactive Decay - Half Life Problems
Radioactive Decay – Half Life Rates
Radioactive Decay PRODUCTS
Regional Landscape
Sequence of Geologic Events – Chronology of Events
Sequence of Geologic Events – Internal Characteristics
Soil Type Dependent on Climate and Bedrock
Uplifting and Leveling Forces - Dominance
Uplifting and Leveling Forces - Rate
Uplifting and Leveling Forces
Variations Observed in Evolutionary Development
Characteristics of Change – Cycles – Non-cycles
Characteristics of Change – Frames of Reference
Characteristics of Change – Occurrence if Events
Characteristics of Change – Predictability of Change
Characteristics of Change – Rate of Change
Energy & Change – Energy Flow & Exchange
Environmental Change – Environmental Balance
Environmental Change – Pollution
Apparent Celestial Motion
Asteroid Belt
Factors Affecting Density
Calculating Orbital Velocity

EARTH SCIENCE ESSAY TOPICS

Agents of Erosion
Angle of Incidence
Apparent Path of the Sun
Calculations
Climate
Coal Formation
Comparison - Solar System
Constellations
Construct a Contour Map
Construct a Topographic Profile
Crustal Changes
Data Table Interpretations
Depositional Systems
Earthquakes
Earth’s Orbital Relationships
Eccentricity
Eclipse
Emergency Preparedness
Environmental Change
Erosion Process

Isotherms
Lab Investigation
Making Inferences
Meteor Crater
Metamorphism
Mineral & Rock Characteristics
Mountain Classification
Ocean Ridges
Paragraph Interpretation
Phases of the Moon
Planet - Orbits
Reading Comprehension
Rocks
Solar System
Solar Eclipses
Solar Noon
Solubility - Gases
Standard Time Meridians
Stars
Sunrise

Geologic History
Determining the Gradient
Flowchart Interpretation
Geologic Periods
Graph Construction and Interpretation
Graph Interpretation
Greenhouse Effect
Hurricanes
Index Fossils
Inferred Characteristics
Interpreting a Weather Map
Interpreting Gradients
Interpreting Rock Layers Age - Movement
Half Life

Table Interpretations
Tectonic Plate Boundaries
Temperature Fields
Tsunami
Topographic Maps
Volcanic Eruptions
Valleys
Weather Map
Weather Map Symbols
Weather Balloons
Weather
Weather Satellite
Weather Station Model