Kingson High School Regents Earth Science Sequence of Topics

Topic 1: Prologue

Key Ideas

1. Nature of Scientific Method
   - Observation vs. Inference
   - Measurement
   - Branches of Earth Science
2. Graphing
   - Cause & Effect
   - Graphing Relationships
   - Rate of Change

Topic 2: Rocks & Minerals

Key Ideas

1. Minerals
   - Classification of minerals by properties
   - Internal arrangement of atoms
2. Rocks
   - Relation to minerals
   - Classification of rocks
   - Rock Cycle

Topic 3: Dynamic Crust

Key Ideas

1. Plate Tectonics
   - Evidence of crustal movement
   - Plate tectonics vs. continental drift
   - Plate movement & hotspots
2. Earthquakes & Earth's Interior
   - Distribution of Earthquakes & Volcanoes on earth's surface
   - Using earthquake waves to determine distance to epicenter
   - Using earthquake waves to study earth's interior
   - Emergency preparedness for earthquakes, volcanic activity & tsunamis

Topic 4: Weather

Key Ideas

1. **Weather Variables**
    - Temperature
    - Moisture
    - Air Pressure
    - Wind
2. **The Atmosphere**
    - Layers of the Atmosphere
    - Measurements and Structure
3. **Weather Systems & Forecasting**
    - Air Masses
    - Fronts
    - Cyclones
    - Planetary winds/Jet Streams
    - Hurricanes, Tornadoes and storms
4. **Weather Hazards**
    - Safety precautions

Topic 5: Climate

Key Ideas

1. Insolaton heats Earth's Surface and atmosphere unequally
    - Intensity varies due angle of sun, time of day, latitude, and season
    - Surface absorption factors including color, texture, transparency, state of matter and specific heat
    - Duration of insolation varies with latitude and seasons
2. Transfer of heat energy within the atmosphere, the hydrosphere and Earth's surface occurs as a result of radiation, convection and conduction
    - Heating of Earth's surface and atmosphere by the Sun drives convection within the atmosphere and oceans, producing winds and ocean currents
3. Climate is influenced by
    - Latitude
    - Proximity to large bodies of water
    - Ocean currents
    - Prevailing winds
    - Elevation
    - Mountain ranges
4. Seasonal shifts
    - temperature zones, planetary winds and ocean currents (monsoons, hurricanes, tornadoes, flooding)
5. Major climate issues
    - Global climate change due to increasing greenhouse gases
    - Ozone depletion

- Natural events: El Nino, volcanic eruptions, asteroid impacts

Topic 6: Energy

Key Ideas

1. Types of energy heat transfer
   - Convection, Radiation, Conduction
2. Electromagnetic Spectrum
   - Role of infrared, ultraviolet & visible wavelengths in weather & climate
3. Absorption & Radiation
   - Specific heat & surface characteristics
   - Properties of Water, phase change & Latent Heat

Topic 7: Surface Processes

Key Ideas

1. Hydrologic Cycle
2. Physical and Chemical Weathering
3. Agents of Erosion and Deposition

Topic 8: Glaciers, Oceans and Landscapes

Key Ideas

1. Glaciers
   - Types, formation and movement of glaciers
   - Weathering and erosion by glaciers
   - Topographical features created by glaciers
2. Oceans
   - Parts of the ocean floor
   - Gyres, surface and deep ocean currents
   - Longshore drift
   - Coastal features
   - Tsunamis
3. Landscapes
   - Mountains, plateaus, plains
   - Watersheds and stream drainage patterns
   - Stages of stream development
   - Climate and landscape development

Topic 9: Earth's History

Key Ideas

1. Principles of Historical Geology
    - Uniformitarianism, Superposition, Cross-Cutting, Original Horizontally
2. Interpreting the history of geologic cross sections
3. Correlation
    - Index fossils, volcanic time markers
4. Geologic Time Scale
5. Radioactive Dating

Topic 10: Astronomy

Key Ideas

3. The Universe
    - Big Bang Theory & expansion of the Universe
    - Relative scale of universe, galaxy, solar system
    - Comparing characteristics stars
    - Nuclear fusion as source of energy in stars
4. The Solar System
    - Formation of Solar System
    - Comparison of Terrestrial & Jovian planets, asteroids, comets
    - Geocentric & Heliocentric models
    - Kepler's Laws & calculation of eccentricity
    - Moon: phases, eclipses, tides
5. Earth in Space
    - Celestial sphere model for Sun's path across the sky
    - Proof of Earth's rotation & revolution
    - Changes in seasons angle & duration of insolation due to Earth's tilt
    - Using Polaris & the Sun as basis for latitude, longitude & time zones

Topic 11: Mapping

Key Ideas

1. Earth's shape
    - Gravity measurements, altitude of Polaris
2. Describing positions on Earth using latitude and longitude.
    - $1^{\circ} = 60'$ (minutes)
    - Time zones are based off longitude.
    - Longitude can be calculated by comparing local time to GMT.
3. Using Topographic Maps to understand the shape of Earth's surface.