**5th Hr. Earth Science Exam Review – Concept List**

* Renewable resources are materials that are replaced at the same rate that they are used.
  + Sustainable yield is production = consumption
* Types of ways we get power: hydroelectric, nuclear, solar, wind, fossil, geothermal
* There are several types of fuels humans utilize for energy:
  + Biomass – burning of organic materials (e.g. trees, feces)
  + Biofuels – refines fuels that come from biomass (e.g. ethanol). +
* Humans pollute the Earth in two ways: point source and nonpoint source
  + PS 🡪 pollution enters soil, water, or air at one location.
  + NPS 🡪 pollution spread over a large area (ex: acid rain over a forest, fertilizing fields.)
* The atmosphere is a layer of protective gas. It consists of 5 distinct layers with different properties:
  + Troposphere – where weather occurs , temp gets colder with height
  + Stratosphere – has the ozone layer, (temp increases with height)
  + Mesosphere – middle layer, temp gets colder with height
  + Thermosphere – has the ionosphere (layer of charged particles that we bounce radio waves off of), hottest layer (temp increases with height)
  + Exosphere – transition zone into space.
* Atmospheric pressure is created by mass of the air. Earth’s gravity pulls on air particles which exert a force on an area (P=F/A) measured in Pascal (Pa), mmHg, atm, PSI. Atmospheric pressure is measured with a barometer.
* Weather forecasts include:
  + Temperature / precipitation
    - 4 types of precipitation – rain, snow, sleet (rain freezes before it hits ground), hail (melted snow that is refrozen and melts repeatedly.
  + wind speed – wind is created as a result of uneven heating of Earth’s surface, air will flow from High to Low pressure.
  + Humidity – water in the air (warm air holds more water, exerts less pressure)
  + Relative humidity – amount of water in the air compared the amount needed for it to rain at a given temperature
  + Dew point – temperature at which water condenses
* There are four stages countries experience with population growth
  + Pre-industrial – low pop growth due to high death rate, also has high birth rate, agriculture based
  + Transitional – high birth rates, but decreasing death rates due to improved conditions like education, health care, etc. so population increases
  + Industrial – still low death rate but birth rate drops dues to “kids being a burden.”
  + Post-Industrial – father drops in death and birth rates, little population growth
* Geological time scale is based on the life forms found in rock strata.
  + Divisions of GT include: Eons, Eras, Periods, Epochs (longest to shortest)
* Ages of Rocks are determined relatively and absolutely
  + Relative dating: how old rocks are in relation to other rocks
    - Six Laws of RD: crosscutting, inclusions, superposition, etc.
    - There are 3 types of unconformities, represent gaps in geological time. Layers were eroded and redeposited.
      * Angular unconformities – rock layers that are tilted are eroded and there horizontal layers on top.
      * Nonconformities – occurs when igneous or metamorphic rocks are eroded
      * Disconformities – between sedimentary rock layers
  + Absolute Dating uses the decay rates of radioisotopes to find the “exact” age of rock
    - C-14 – uses the half-life to find out how long an organism has been dead for.
      * Accurate to a point (50,000 years)
      * It assumes all organisms have the same constant amount of C-14 at death
      * Find age by comparing the current amount of C-14 to the original.
* Hazardous waste is considered hazardous if: it can catch fire, causes cancer or sickness, or explodes
* Plate Tectonic Theory explains how the continents move and create phenomena like earthquakes, volcanoes, mountains. It says that the Earth is made of lithospheric plates and these plates move on the asthenosphere.
  + There are three main plate boundaries
    - Convergent – compressional forces move plates toward each other.
    - Divergent – Tensional forces move plates apart
    - Transform – shear forces cause plates to slide by each other.
  + Plates move due to convection currents of magma, this is driven by the radioactivity produced from Earth’s core.
  + Faults are breaks or cracks in the crust, there are three types
    - Reverse – caused by compression force
    - Normal – caused by tensional force
    - Strike-slip (left and right oriented)
  + Evidence for plate tectonics: continental fit, seismic activity occurs where plates boundaries would be, similar rock formation on the shores of East South America and Western Africa, Fossil evidence (same species found on different continents, also warm weather species found in Antarctica.
* Volcanoes are openings in the Earth that oozes lava
  + Shield volcanoes – like the type on Hawaii,
  + Cindercone volcanoes – sides are made of tephra (loose volcanic rock)
  + Composite – made of alternating layers of tephra and lava
  + Parts of the volcano include: lava dome, caldera (collapses top of the volcano), fissure
  + Igneous intrusions created from volcanic activity: dike (magma cooling vertical cracks), sill (horizontal cracks), batholith (cooled magma chamber). Volcanic neck.
* Volcanic eruptions are influenced by silica content and trapped gases
  + Types of eruptions: Hawaiian 🡪 Stromboilian 🡪 Vulcanian 🡪 Pelean
  + Can
* Evolution is a change in a gene pool over time
  + Microevolution – generation to generation change in a gene pool
  + Macroevolution – creates new species as a result of accumulated traits
    - Speciation – the process of creating a new species
  + Ideas that influence evolutionary theory: catastrophism (changes on Earth due to large scale events), gradualism (changes are slow and take very long time), uniformitarianism (process on Earth have always been the same).
* Individuals adapt and species evolve
* Coriolis Effect is the movement of air due to the rotation of Earth
* There are four global wind patterns: the Polar easterlies, prevailing westerlies, trade winds, and doldrums
* The Jet stream is a current of air in the atmosphere flexes up and down, bringing cold air from the north and warm air from the south
* The Earth is closer in the winter (perihelion) and farther away in the summer (aphelion)
* Early volcanoes released gases like carbon dioxide, methane, and water vapor that light broke down (photochemical dissociation) allowing oxygen to form
* Red shift and Blue shift occur when a light sources moves away from or toward the Earth respectively.
* Miller-Urey experiment was intended to demonstrate how life on Earth began. It rain an electric current through atmospheric gases that eventually produces simple amino acids, the building blocks of life.
* Neutron stars are too dense to have any charged particle like protons or electrons within them.
* When a super massive star (supergiant) goes supernova it can become a black hole or a neutron star.
* Stars begin as nebulas, which are large collections of dust and gas that contract and get hot enough to start nuclear fusion.
* Stars begin as nebulas then main sequence stars, 1) massive stars can explode (supernova) and then contract into black hole or neutron stars. 2) smaller stars become planetary nebulas, then go through a series of dwarf stars.
* Most stars, including our sun, are classified as a main sequence star. The other classification of stars Red Giants (and Super giants) which are cool and bright, White dwarfs are hot and dim.
* The sun emits many types of radiation, like UV light, IR light, and Visible light. Light is emitted from the sun’s photosphere. The other parts of the sun’s atmosphere include the chromosphere, and the corona.
  + Interior of the sun consists of the core (powered by fusion), the radiative zone, and then the convection zone.
  + On the surfaces of the sun we see solar flares, solar prominences (arching columns of hot gas), and sunspots
* Stars are often measured in solar masses, which compare the mass of any star to our sun. 3 solar masses mean the star is 3 times the mass of our sun.
* Galaxies are collections of stars. There are three types: Spiral, Elliptical, and Irregular.
* Stars can form patterns in the sky called constellation.
* Objects in our solar system include: The sun, Planets (there are 8 total, not 9), and …
  + Planets: Venus is the hottest due to the CO2 atmosphere and the extreme greenhouse effect.
  + Dwarf planets – like Pluto are small and have orbits that are different from the other 8 planets
  + Asteroids – large “potato shaped” rock, leftovers of the solar system. Smaller than a planet but large enough to have a moon or two. There is a belt of asteroids between Mars and Jupiter.
  + Meteoroids – fragments of asteroids, when these enter the Earth’s atmosphere they begin to burn up, it is now called a meteor. If meteors hit the Earth’s surface and are called meteorites
  + Comets – originate in the Oort cloud and revolve around the sun. Their ion/plasma tails are always facing away from the sun.
* Distances in space are measured in light-years (distance light travels in a year).