Gravity

As the little spec of creation we call our universe decompresses to the speed of light, expanding and condensing until gravity finally sucks it out a black hole on the other side, our planet coalesces in its orbit around the sun and cools. As it cools, a thin crust forms and insulates the surface from the heat within. As it continues to cool, a thin film of water condenses on the surface and begins to leach minerals from the rock beneath. A delicate film of gasses, composed of nitrogen, water vapor, carbon dioxide, sulfur dioxide, argon, chlorine, ammonia, methane, hydrogen, and lesser amounts of other gasses settles above the water. Water vapor begins to condense into clouds, causing the earth's albedo to increase, and the rate of cooling accelerates.

The absence of oxygen in the early atmosphere and oceans allows the formation of amino acids, and the first anaerobic life appears. When temperature and mineral complexity in the oceans permit, carbon, hydrogen, oxygen, nitrogen, and magnesium combine to form chlorophyll which begins to catalyze carbon dioxide, water, and photons into glucose and oxygen. The solar energy transferred to the hydrocarbon bond of glucose creates tension between hydrocarbon and oxygen and the first sparks of aerobic life appear. Oxygen combines with iron and thick beds of iron oxide are laid down. Eventually, when most of the available iron and many other elements are oxidized, atmospheric oxygen levels slowly begin to rise, and aerobic life proliferates. Phytoplankton evolve into zooplankton, and the first animals evolve. Food chains appear. As genetic structures evolve, life becomes increasingly complex. Calcium bonds with carbon to form shell and bone, and the conversion of carbon dioxide and calcium to oxygen and limestone begins.

As the earth cools, the crust thickens and begins to wrinkle. Land appears, and life thrusts up into the carbon rich atmosphere and flourishes. With so much carbon for plant growth and so little oxygen for decay, hydrocarbon piles up deeper and deeper. Where land covered with hydrocarbon subsides it is covered by fresh layers of sediment and eventually turns to coal. Where life in the ocean dies and settles to the bottom, it is covered by limestone and eventually turns to oil and gas.

As the crust continues to cool, mountains begin to rise and erosion begins. Where limestone erodes, carbon is reintroduced into the atmosphere. Where igneous rock erodes, carbon is bound up and removed from the atmosphere. The oceans get deeper and cover less of the surface. Ice begins to form where the tilt of the earth’s axis shades the poles. The earth’s color gradually changes from blue and white to blue, brown, green, and white. The blue oceans absorb solar energy below the blue spectrum and convert the energy to heat, which stratifies and disperses over the surface, then into the atmosphere. On land, the brown rock converts solar radiation to infrared and reradiates it, transferring some of its energy to a variety of atmospheric greenhouse gasses, predominately water vapor. The green chlorophyll absorbs energy into hydrocarbon bonds and stores it until decomposition when it’s released as infrared. The white of clouds, snow

and ice reflect solar radiation relatively unchanged with very little absorption. As temperature differentials in the atmosphere above land, sea, and ice increase, weather becomes more turbulent. As mountains rise, deserts form in their wake. Rivers run down their slopes and build alluvial plains. Swamps give way to forest and the complexity of life expands and adapts.

Modified by fluctuations in the diameter and other physical characteristics of the earth's orbit around the sun, in conjunction with complex fluctuations in albedo, ice begins to periodically scour the emerging continents near the poles.

As our sun orbits around the Milky Way galaxy, it crosses through the mid-plane of the galaxy about every 34 million years, and the spiral arms about every 140 million years. These are areas where sub-atomic particles which seed clouds in the earth's lower atmosphere are thick. Occasional starbursts flood the nearby galaxy with bursts of cosmic particles lasting hundreds of years. The increased albedo of more clouds causes more of the earth's surface to cool and turn increasingly white; chilling the biosphere until we come out the other side or the starburst dissipates.

As the earth's crust cools and thickens, volcanism decreases. Less gasses enter the atmosphere, less minerals dissolve into the ocean. Life begins to remove more carbon from the atmosphere than is replaced by volcanoes. Life in the ocean binds it with calcium and hydrogen, life on land binds it with hydrogen. As oxygen levels rise, hydrocarbon deposition slows as oxidation balances photosynthesis, but life still relentlessly pulls carbon from the atmosphere. As the carbon based greenhouse gasses decrease, the atmosphere cools. The crust is now so thick that volcanism is rare and very little carbon is released. Eventually, almost all of the earth's supply of carbon originally available to the atmosphere has been bound into limestone, coal, oil, and gas. Volcanism and limestone erosion are releasing carbon into the atmosphere about as fast as life on land and in the oceans is removing it. With the exception of a minute amount of peat, almost no hydrocarbon is being deposited. Most of the existing hydrocarbon deposits are covered by limestone and volcanic and alluvial deposits.

As temperatures cool and oxygen levels rise, mammals evolve. Soon it becomes too cool and dry for the dinosaurs and, except for a few smaller ones, they don't recover from a major catastrophe. Forests begin to give way to grasslands. Conditions are favorable for the mammals and they proliferate and diversify. Eventually, genetic mutation amongst the apes evolves a skull configuration that favors a large brain cavity instead of large jaw muscles, and the human species evolves. Humans are not yet at the top of the food chain. What they have to eat and what eats them are often larger than they are. They adapt by developing increasingly complex brains to operate more complex bodies. Complex hands with opposable thumbs with which they can operate more complex tools. Complex tongue neurology for complex language.

As the earth cools, the ice ages lengthen and warm periods shorten. Antarctica becomes a semi-permanent dish of ice. The warm cycles become so short that progressively less of the ice on Greenland melts during the interglacial periods. Eventually, by the time the Arctic Ocean melts, the earth's

orbit is already expanding. In winter, the continents around it are cold enough that the north polar atmospheric vortex inverts, and it begins to snow heavily on the northern landmasses. Glaciers begin to grow even as the rest of the earth's surface briefly continues to warm. As the earth approaches its maximum orbital diameter, the oceans cool and less snow falls, until much of the earth is cold desert. As the earth approaches its minimum orbital diameter, the ice recedes, exposing rich new soil, and life moves back toward the poles.

At the end of the last ice age, as the human species moves northward, edible plants become seasonal and they develop more sophisticated hunting and harvesting tools. Foresight and community become necessary to get through the winter. They learn the uses of wood, stone, fire, and metal. The evolution of tools increases their ability to live longer, healthier lives, and they prosper and multiply. As the temperate landmasses warm, farming evolves and people begin to settle down and store food and tools. They learn to domesticate animals. They invent the plow and learn to store grain and grind flour. Larger numbers of people congregate and the complexity of culture and language increases. With the ability to accumulate more things comes the ability to count. Eventually they invent the zero, giving them the ability to measure. Mathematics evolves, enabling much more complicated tools and machinery. They learn to build boats. They learn the basic arts of navigation and begin to explore the planet.