Dynamic Earth script for dubbing

1/3/2012

0.00.33	Imagine the earth is a machine. A system of cogs and motors. Powered by the sun.	
0.00.45	But our world didn't come with an owner's manual.	
0.00.52	How does it operate?	
0.00.55	What are the inner workings of this grand and elaborate system known as planet earth?	
0.01.05	And why is it so conducive to life?	
0.01.15	Scientists have launched an armada of satellites to help us understand what makes our world tick.	
0.01.31	They're discovering the answers strewn across its atmosphere… On every ocean and continent…In the far reaches of the solar system -- and beyond…	
0.01.59	Like any machine, the earth is the sum of its parts.	
0.02.05	They were forged in distant furnaces of our galaxy…	
0.02.12	Supernova explosions.	
0.02.19	When ancient stars erupted, they showered the milky way with heavy elements -- iron, calcium, potassium -- the very stuff our bodies are made of.	
0.02.32	But supernovae are also thought to bombard the galaxy with lethal high-energy particles.	
0.02.41	What safeguards our solar system… Is our star.	
0.02.52	The sun provides a shield, stretching beyond the last planet in its orbit: a force field that deflects these "cosmic rays."	
0.03.06	But these "solar winds" can be dangerous too, especially during	

	outbursts called coronal mass ejections.	
0.03.25	Want a vision of earth-gone-wrong? Just look at what solar storms do to our sister planet, Venus.	
0.03.43	They strip away lighter elements in its upper atmosphere -- hydrogen, oxygen and the molecule they form: water.	
0.03.58	What's left is a witch's brew of noxious chemicals, including thick sulfurous clouds.	
0.04.10	Down at the surface, Venus's atmosphere is choked with high concentrations of carbon dioxide.	
0.04.23	CO2 is a potent greenhouse gas that traps the sun's heat. It has turned Venus into a cauldron.	
0.04.35	With surface temperatures of almost 500 degrees Celsius, this is the hottest planet in the solar system.	
0.04.48	How has earth avoided the grim fate of Venus?	
0.04.58	We can see the answer as the solar storm approaches earth.	
0.05.12	Our planet has a protective shield all its own -- a powerful magnetic field generated deep within its core.	
0.05.23	In fact, that's just our first line of defense.	
0.05.28	Much of the solar energy that gets through is reflected back to space by clouds, ice, and snow.	
0.05.36	The energy that earth absorbs is just enough to power a remarkable planetary engine: the climate.	
0.05.49	It's set in motion by the unevenness of solar heating, due in part to the cycles of day and night, and the seasons. That causes warm, tropical winds to blow toward the poles, and cold polar air toward the equator.	

0.06.08	Wind currents drive surface ocean currents.	
0.06.16	This computer simulation shows the gulf stream winding its way along the coast of north America.	
0.06.36	This great ocean river carries enough heat energy to power the industrial world a hundred times over.	
0.06.46	It breaks down in massive whirlpools that spread warm tropical waters over northern seas.	
0.07.01	Below the surface, they mix with cold deep currents that swirl around undersea ledges and mountains.	
0.07.22	Earth's climate engine has countless moving parts: tides and terrain, cross winds and currents -- all working to equalize temperatures around the globe.	
0.07.39	But when tropical heat builds to extremes, it can be released in a fury.	
0.07.48	In august 2005, within a huge looping section of the gulf stream, the ocean unleashed a monster… Hurricane Katrina.	
0.08.07	This is a supercomputer model of Katrina -- a tool for scientists to better understand the dynamics of the hurricane system.	
0.08.19	To visualize the flow of air into the storm, they release a series of virtual streamers.	
0.08.31	Those with lighter colors are warmer winds. As they rise, they collide with cooler air above and produce clouds.	
0.08.54	The winds increase the evaporation of warm sea water… Which draws more and more heat from the ocean and causes the winds to accelerate.	
0.09.08	Moving around the eye of the storm, winds can reach speeds of	

	up to 250 kilometers per hour.	
0.09.30	A powerful hurricane like katrina can release as much heat energy every twenty minutes as a ten-megaton nuclear bomb.	
0.10.03	While storms release heat stored in the ocean, the moisture they stir into the atmosphere helps keep the rest of the planet warm.	
0.10.13	Water vapor traps solar energy… Along with carbon dioxide, the greenhouse gas that ruined venus.	
0.10.23	The difference is that earth has found a way to keep co_2 in check…	
0.10.29	We can see it for ourselves by flying down to the ocean.	
0.11.32	The special ingredient that sets earth apart is called… “life.”	
0.11.39	The oceans are chock full of it.	
0.11.44	Too small for our eyes to see -- phytoplankton may be the most important living things on the planet.	
0.11.53	They take in CO_2… Driven into the ocean by waves or drawn up from the deep by currents.	
0.12.03	They release the oxygen, while absorbing carbon. The carbon then begins a journey up the food chain.	
0.12.12	Phytoplankton get eaten by zooplankton. To name a few… Radiolarians date back to a time over 500 million years ago when life exploded across earth’s oceans.	
0.12.31	Copepods are tiny bug-like crustaceans. With over 20,000 species, they are the single largest source of protein in the sea.	
0.12.48	Moving up in scale is a host of creatures smaller than the tip of your finger, including these octopus larvae.	
0.13.06	They get eaten by small fish.	

0.13.11	And they, in turn, by larger ones -- like jacks.	
0.13.25	They are consumed by the largest predators in the sea… Orcas… Tuna…Sharks.	
0.13.50	At each step in the food chain, the carbon that began as part of a diffuse gas in the air is passed on to larger and larger animals.	
0.14.01.	The larger the body, the greater the mass of carbon. One creature goes all out.	
0.14.19	A humpback whale eats up to a ton and a half of food per day. That's a lot of carbon.	
0.14.34	From whales down to tiny phytoplankton, marine life is part of a global system of removing co_2 from the atmosphere, then gradually releasing it back.	
0.14.53	The key to this "carbon cycle" is earth's ability to store it long term.	
0.15.00	A NASA satellite tuned to read chlorophyll -- a chemical tracer for plant growth -- shows the global biosphere in action.	
0.15.12	In sync with the seasons, plants take in vast amounts of carbon dioxide, and release the oxygen we breathe.	
0.15.24	On land, the carbon can then find its way into the ground when plants and animals die and decay.	
0.15.34	The earth too gets into the act. Exposed rocks take in co_2 when it rains. Erosion sends it into the oceans.	
0.15.46	If it becomes part of the marine food chain, carbon-rich matter can sink all the way to the sea bottom… In the form of waste.	
0.16.02	Countless organisms, like the salp, a jellyfish-like creature the size of your thumb, live and die each year.	
0.16.17	All the waste, all those bodies,	

	with their stores of carbon, rain down onto the ocean floor.	
0.16.28	They pile up, layer upon layer.	
0.16.31	In time, these carbon-rich sediments can turn to oil… Or to rock, like limestone.	
0.16.40	The carbon can return to the environment as co_2 if the rocks become exposed… Or if they get pushed deep underground by the movement of earth's crust, in a process known as plate tectonics.	
0.16.57	The pressure and heat gradually build…. Until the earth begins to erupt.	
0.17.06	Every year, over one hundred million tons of carbon dioxide is spewed into the oceans and atmosphere by volcanoes.	
0.17.17	Acting on time scales of a day to millions of years, the carbon cycle has helped make our planet habitable.	
0.17.26	But its success depends on life itself.	
0.17.32	*We* are how earth works.	
0.17.35	If, somehow, the carbon cycle went wrong -- what would earth be like?	
0.17.46	The answer is a world away -- on Venus.	
0.17.56	Here, the co_2 belching from volcanoes isn't going anywhere.	
0.18.06	Venus is like a house on fire with the windows forever closed.	
0.18.13	The cause can be traced in part to those incinerating solar winds.	
0.18.21	Sheltered from those winds, earth has kept co_2 levels in balance by absorbing and releasing it in roughly equal amounts.	
0.18.35	Lately, that balance has been shifting.	
0.18.44	The amount of carbon dioxide from human activities… Including cars, power plants, and	

	factories… Now exceeds volcanoes -- by over two hundred times.	
0.18.59	much of that is from the burning of oil and coal stored in the earth for millions of years	
0.19.10	Since the industrial revolution, the amount of co_2in the atmosphere has increased nearly forty percent, with most of that in the last fifty years.	
0.19.26	The result… Global temperatures have risen by almost one degree Celsius. That's enough to accelerate the melting of vast stores of ice on high mountains and in the polar regions.	
0.19.45	Since the 1980's, NASA scientists have methodically tracked the Arctic's seasonal changes. They've found it's lost a quarter of the area covered by ice in summer. What's left has also thinned dramatically.	
0.20.06	That's just the beginning of changes that could transform our world, with some regions getting more rainfall, others, drought.	
0.20.18	Deserts expanding. Natural fires becoming more prevalent. Wildlife habitat shrinking. Polar regions becoming forested.	
0.20.37	And as the ice melts, it drains into the oceans. By the end of the century, sea levels are now expected to rise as much as one meter, inundating coastlines around the world.	
0.21.04	As our impact on the climate has grown…	
0.21.07	We've also gained a new perspective on earth… From space.	
0.21.18	Technology is allowing us to take stock… Of the elaborate,	

	interconnected climate systems that protect our world and sustain it.	
0.21.34	Within the fold of wind…. And water…. Of time….and tectonics… Our planet has nurtured another, extraordinary participant: life.	
0.21.56	Today, we are masters of a world, revealing itself as more and more wondrous than we ever imagined.	
0.22.12	Even as we continue to explore its workings, we ask…	
0.22.18	Is our goal to spend earth… Or save it?	

Promo/trailer text

0.00.07	Welcome to planet earth.	
0.00.15	Join me on a journey into the workings of earth's great life support system: the global climate.	
0.00.28	Learn what makes *our* world so conducive to life...	
0.00.33	And what ruined our sister planet, Venus.	
0.00.40	Explore the winds...	
0.00.45	the oceans...	
0.00.51	and the forces of nature that shape this dynamic earth.	