–FOOTPRINTS–

Science on a Sphere – Final Script

SCRIPT	SHOOTING/EDITING
	Start in black.
	Orbiting electron rises as it travels around the sphere. Orbit should cross equator approx 15 deg north and south (elliptical).
Electrons?	
Moon speeding around a giant planet made of gas?	
Planets orbiting a distant star?	
Satellites…	
	When it gets to the top it "bursts" and turns into feathers which float down gently around the sphere.
	They pass through a forest scene—think Magritte's "Carte Blanche" painting, but denser, darker, more textured tree trunks. Perhaps frame the tree trunks in an equatorial band around the sphere, tilted like the Earth.
This light is an idea…	
…an idea that promises new understanding simply by delivering fresh perspectives…and new	

perceptions.	
What do we know?	Tree trunks cross dissolve into thick vertical bands of light, still presented in the same frame. The trunks of light will thin and the vertical lines remaining will dissolve into wire frame latitude and longitude lines on the sphere, possibly with some minor textual annotations. Muted colors. We might even just show certain parts of the globe in lat/long lines, illuminating them selectively.
What do we *really* know?	
What do we know…	
…to be *true?*	
We perceive light--we *see* it—but what we see and what it means are not the same.	Show an EXTREME close-up of a single, very thick black line taken from a basketball that goes all the way around the sphere. The surrounding orange texture should be huge; the whole should be hard to discern.
Without context, detail means nothing.	
	Start to pull back slowly, then pick up speed. A moment later (4-7 frames?) pull back fast—maybe "light blast" back-- and reveal the sphere of the whole ball. Sound effect here of ball bouncing once on

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	court (perhaps add reverb in audio mix to fade out through time.)
	Drain color out of ball through bottom of sphere. Think of a liquid or melting material draining out.
	Looking at the basketball the black lines can become roads with cars running around. Cars start running on the roads, starting and stopping at the intersections. Then the cars turn into blood cells running around blood vessels.
Oh, there are *so many* factors at play here: what wavelengths of light can we see…	Fill in peripheral area inside the sphere with a human tissue texture
…how well can our brains take what we see and turn it into something we understand…	Transitional moment. Dreamy, highly stylized, ethereal.
And also…	
…how do we compare ourselves to the thing we're observing? What tools do we use to help us capture information? How do we turn light into data, data into pixels…	
… pixels into meaning?	
Start with a moon…or a planet…	Transition from the moving blood cells to the banding of Jupiter's clouds. Dissolve. Then cycle through

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	the planets in a traditional horizontal wipe. Build audio environment/cue here to signal the transition to the "changing the radio station" metaphor.
(Europa, Jupiter, Enceladus, Mimas, Neptune, Venus, Mercury, Gandymede, Callisto…) *(2nd voice over saying names as we cycle through planets.)*	Computer voice quickly naming each planet as it appears, with audio ever-so-slightly overlaying the preceding clip (think commercial radio advertisement) Ritard tempo as we settle in to Earth. Might want to mix a touch of video and audio static in the wipes to suggest a radio tuner. Also embed an audio "click" in the changes, too.
…for example…Earth. *(2md voice over repeats the name Earth here, too.)* *(*Earth*)*	…then fade up more slowly on Earth. Earth comes on screen in muted colors, silvery and gray and in pale blues. Bring up full color like a heralded announcement, an epiphany.
	Quick—maybe 5 frame(!)—cuts through a dozen planets and moons…
And as long as we're at it, let's tip the Earth to spin properly on its axis.	Post production "light sparkle" will initiate the planet tipping.
Now…recall our original point of light—our *idea*.	Orbiting light from the beginning appears on screen on top of the pale Earth map.

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These are satellites in orbit.	Scale up the dot and reveal a traditional satellite (TBD) in an ACCURATE orbit.
Satellites collect data as the Earth rotates beneath them.	OR…the dot will grow to be a satellite model that quickly orbits the planet as a layer over the Earth.
Think of satellites as paint brushes working in reverse: instead of painting planets with light, satellites collect light reflected from below.	Start drawing data swath onto the globe in full color.
With enough data we can paint a world.	Reveal a full planet in full color.
Data that make this image come from instruments on two NASA satellites called AQUA and TERRA. These instruments see the Earth in what we might regard as "natural color".	MODIS Blue Marble. Globe rotates. Can we show AQUA and TERRA in proper orbits?
They can also see certain events as they happen.	Darken the whole globe and place a highlight over Hurricane Katrina. Show MODIS time sequence of storm progressing across the Atlantic. The time series needs to take the entire duration of 1.5 rotations of the sphere to give everyone in the room a sense of the storm's motion.
There…splattered like white paint on a blue canvas… something important:	

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Hurricane Katrina.	
These satellites are only two of many that can see hurricanes. But to look inside, we need something specially built for the job.	
Here we go.	
The stripes you see building up come from a unique spacecraft called TRMM. Among the many remarkable things TRMM can do, it can look inside hurricanes like nothing else in the world.	Overlay TRMM data on top of AQUA MODIS data like Horace's hyperwall demonstration.
See for yourself.	Zoom out and cross dissolve to large blow-ups of Hurricane Katrina CAT scans, in motion. Show it simultaneously on two sides of the sphere, darkening the north and south poles, so that the CATs appear roughly no more than 30 deg N and 30 deg S. Also put diffuse borders of some sort (water textures?) between the matched images so they don't butt directly into each other.)
TRMM sees the actual body of the beast in three dimensions. Orange and red zones indicate higher rainfall rates; cloud spires called hot towers drive the storm's greedy grab for energy.	

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Removing the clouds, a separate instrument on the AQUA satellite measures ocean temperature. This is important. Warm water is the gasoline that powers hurricane engines. This thermal footprint shows fuel in the tank—vital information for forecasters and scientists.	AMSR SST in spatial and temporal match render.
The Earth changes.	CG cloud texture wipe through the video.
It breathes.	Reveal water texture on sphere.
And it surprises.	
Though we live on a planet largely covered by water, we often forget that huge tracts...are frozen solid.	Dissolve to ice texture on sphere.
	Can we crack the surface, make the ice fall away to reveal the next globe?
	Wipe to cryosphere globe (Blue Marble?).
Let's change the perspective.	Globe tips to show the polar caps around mid-latitude. Planet should never stop rotating as it tips.
Ice covers much of the world. The eternally frozen parts are called the Cryosphere. It's the planet's thermostat, and a hydrological warehouse, and	

in terms of a changing climate, it's the canary in a coal mine.	
You may live your whole life and never visit these places, but these places *will* affect your life nonetheless.	
	AUDIO: wind sound with music. SFX of the image "blowing or gusting" off the sphere—wiping off in some way. Return to a neutral sphere and introduce the next image as a new thought, a new chapter.
	Tip globe back to normal orientation. As the Earth is just about to reach its normal position, make the following transition: take a blowing dust texture and gently "blow off" the blue marble texture. As a the sphere begins to clear, fade in a grey dusty texture, letting it rain down from the north to the south. Then begin to fade make the transition to the image listed next. Might also do a vertical drop of objects into powder to reveal craters. Then take 3-5 frames on each side of the "cratering moment", slow it down, and then dissolve on the craters.
You know this place.	Grey dust texture appears in motion

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	around the lower third of sphere. Dark, harshly lit upper two thirds begins to resolve. (Star field out of focus to start, then gradually resolving?) We bring the lower and upper thirds into focus, revealing the surface of the moon in panorama around the lower portion.
We haven't been here in a while, but that's about to change.	
The Moon.	Spin sphere, blurring the images, then cross dissolve to Clementine moon.
Earth's closest neighbor is little more than a beautiful stranger across an airless room.	
There are mysteries here…and answers…and, like love, perhaps …destiny.	Wash the sphere in blue tint.
These are the six lunar neighborhoods astronauts visited decades ago.	Overlay stylized, animated landing zone target over the six Apollo sites.
Pack your bags. We're going back soon.	
	Music cue, starting to build energy. Consider transition in editing to reveal the Earth at night as if shadow "shutters" were sliding over the

	moon and then revealing the Earth.
Back on Earth, day and night change like moods, with points of light pricking the darkness like vaguely remembered dreams. City lights shine into space at night, like ancient camp fires, like candles of civilization.	Dissolve from Clementine moon to Earth at night. Then match dissolve the day/night terminator of the Earth at Night data set.
No other place beyond the Earth shows signs of life like this…or shows signs of life at all.	
But we're looking.	
Before we can find life elsewhere, we need to be good at reading its signs at home first.	
And on Earth, life is everywhere.	Transition to global biosphere globe. (transition tbd) SeaWiFS data.
This is the living Earth: the biosphere. Phytoplankton bloom in vast oceanic fields. Land plants pulse rhythmically with seasonal growth. Together, these sound the global heartbeat, the pulse of life powered by the sun.	Deliver the land and the oceans in two layers so that we can dim each one in turn as the narration calls out each in turn. Then we can bring both back on full to paint the entire globe.

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The Sun.	Wipe from SeaWiFS data to cloud texture or time lapse cloud video. As the lighting changes subtly to suggest dusk, CG leaves and vines grow onto the sphere from the bottom and take over the globe. In the tiny spaces between the leaves that reveal the sky, we start to see an intense bloom of "sunlight". Reveal the sun by the leaves turning to birds and flying away, suddenly making the sun burst out of the relatively muted colors in 5-10 frames
	Strong transition to the sun. Match transition from CG to burning parchment—the sepia/ink thing with birds over parchment (assuming all things are possible!)--then to the sun.
All energy on Earth comes from the sun.	
	Put the following images as graphics ON TOP of the sun layer while the active solar surface continues.
The car you rode in this morning…the unabashed tomatos and basil you coax from your garden each summer…the two bars out of five on your cell phone… they're all quantities of energy…and that means… they're all connected to the sun.	Show graphical impression of these three images. Cell phone bars tomatos and basil leaves on the sphere. Then show dotted line in the center of a highway. Car drives around equator of sun—shoot car from the side and in editing have the car blur as it drives. Can we add a mask to "drive" the blur filter

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	so that as the car drives around the sun, the image of the sun blurs behind the car. The car could be a video or a still image… Cell phone graphic (Silvia builds this. We map it near the bottom of the sphere.)
If you live on Earth, this is the night light that matters most.	
	Transition. Wipe from one sphere to the next in sequence with the narrator. After third globe, show a composite sphere made of three stripes of data, taken from each.
The Moon…the Earth…the Sun: celestial spheres we see and feel everyday.	Color drains out of the globe, back to muted colors.
But in our solar neighborhood, there are other places, too.	
Fabulous places…	Flame effect burns from the center line out, revealing Mars underneath.
mysterious places…	Underneath the flame transition will be a muted Viking Mars. Ramp color into full as soon as the last of the flames or charred paper falls away.
As a tourist destination, Mars has an impressive brochure.	Full Martian Viking sphere.
	Darken the majority of the planet and put a highlight on Valles.
The longest, deepest canyon	Valles Marineris, rotating on the

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in the solar system…	surface of the sphere. Fade the north and south poles to darkness, allowing just the mid-latitudes (where the canyon is) to be illuminated.
…a crater so vast that its edge stretches over the horizon…	Highlight Hellas Basin.
…a volcano so high it's peak climbs above most of the Martian atmosphere.	Highlight Olympus Mons.
Nothing like these places exist on Earth.	
Nothing.	
This is Mars seen differently. You're looking at an elevation map made with an orbiting laser. Red and white areas reach high above the average; blues and purples show lowlands. If Mars were covered in oceans, the northern hemisphere would be under water.	Dissolve to MOLA data.
	Strong transition.
What is the world we create in our minds?	Watery, loose watercolor Earth as a globe undulates and moves. Lots of light colors, possibly even white space. Can we paint this image onto the globe as if it were being painted?
We create…depending on what we want to see.	
At first, it was enough just to walk, to run, to get wet in the	Show footprints in a dusty surface walk around the entirety of the

rain—to simply touch the forces of nature.	globe?
	Original footage. Might be able to show the blowing dust/sand texture over this element or as a transitional moment. This can help integrate the image of the prints and the transitions.
But once in motion: imagination.	Video footage, wrapped to the globe, and "filter" the footage to freeze the motion and make it look painterly.
Then: space…	
…perspective.	
We see what we set out to find; we see what we choose to see.	
There are often surprises.	Take real earth video and drain it out—as if from a funnel—out through the south polar region.
This is from a NASA mission called WMAP. If the whole universe were a person, this would be its first baby picture.	Replace from the north by pouring in muted colors of WMAP data. Put this in gentle motion and keep it in motion through the next few transitions. Then bring up full color saturation.
There are no stars here…no galaxies…certainly no planets. But there is energy...	
The rest came soon enough…once the new kid	"Morph" WMAP into early star clusters and galactic formations.

could collect herself.	
This is the universe we see today.	Clarify the scene and resolve the images to show pictures from Hubble or The Hipparcos Catalogue.
It's a lively place.	Add a "floating HUD navigation ring" to the lower part of the sphere (approx 40 degrees south).
That's a gamma ray burst, spotted by NASA's "SWIFT" satellite. These cosmic blasts have long puzzled scientists. They may be stars collapsing in upon themselves…or two densely packed remnants of stars merging together. But in either case, scientists believe they herald the births of black holes. We do know they're the most powerful explosions in the universe after the Big Bang. And they seem to happen all the time--as often as once a day.	Show a gamma ray burst on the Hubble deep field and slew the globe quickly, moving the navigation ring with it.
Satellites like WMAP and SWIFT are rapidly coloring our perceptions about our place in the universe.	Dissolve from SWIFT sequence to nothing but chaotic motes of white light dissipating chaotically, mapped onto black or neutral sphere. Give them a brief decay period—no more than 45 frames?
What we know is a function of what we think to ask, what we challenge ourselves to see.	

We look outwards as much as we look inwards, for if there is any certainty in the journey of knowledge it's that travel in any direction….can lead to the same destination.	Fade up on opening white light orbiting the sphere.
We see only what we look for…and in space and on Earth, we seek the wisdom to ask the right questions.	Consider multiple orbiting points of light moving around the sphere. Then have them shrink and ultimately disappear. The moment they fade off into full black give synced audio cue and very frame bring up four NASA logos 90 deg separated around the equator.
	Fade out.

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