My Cosmala

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My set of Great Story beads (I call it a **"Cosmala" – a set of spiritual beads depicting the story of the Cosmos**) serves as a convenient inspirational source, and to do that, it must contain a lot of information, while practical. If you'd rather skip right to the timeline (the Cosmala Plan Spreadsheet), next is the link. Some practical considerations follow that.

TIMELINE: **Cosmala Plan Spreadsheet** (right-click to download the Excel document)

Accuracy

All the dates conveyed in my beads are correct to the best of my knowledge aside from two considerations. First, research is updating the dates for many events on a regular basis, and I may not have heard the latest revision or made the correction yet. Next, some dates are approximate on my Cosmala, often due to current scientific uncertainty over the date, or spacer size (for instance, if my spacer beads in the Precambrian are worth 50 million years each, and I've got an event at 830 million years ago (mya), then on my Cosmala it's either at 850 or 800 mya). In some sections, events within a period of time (such as, say, the Silurian period) are present in the Silurian, without exact order to show which came first among them – the exact order or exact date may be uncertain in the scientific community, or unknown to me. The overarching rule here is that **the beads are to be as accurate as is practical, remembering that the main purpose of the Cosmala is to provide inspiration, not to be perfectly accurate**. Similarly, the terms "Era, Eon, Age, etc." have specific definitions on the geologic timescale and my Cosmala itself, though they are used generically in this descriptive text.

Intentionally Anachronistic Beads

A consistent feature of many beads on my Cosmala is that the bead itself may be anachronistic. For example, take the bead for the evolution of the first turtle (*Odontochelys*) around 220 mya. This bead depicts a modern looking turtle. However, *Odontochelys* was certainly not a modern looking turtle! It didn't have a top shell and still had teeth. So what to do? If I put an *Odontochelys*-like proto-turtle at 220 mya, then shouldn't I put a more modern looking turtle in when they evolve a top shell? If do that, then shouldn't I put finer transitional turtles in, such when a half top shell evolved, or when the teeth were lost? What about the ancestor of *Odontochelys* who was more lizard like, but was clearly different from ancestral reptiles? Should she get a bead? No. If I did all that, my Cosmala still be incomplete due to the continuous nature of evolution, and my Cosmala would reach around the block! So in case after case, I've put a bead to represent a major evolutionary innovation, and left it at that. Another good example is the first use of money, which is represented by a modern coin, despite the fact that metal coins were not used until much later. The anachronistic beads give me an opportunity to explain this issue, and thus to explain the continuous, often gradual, nature of evolution – which is an important concept when looking at deep time.

Length

I've tried to keep my Cosmala as short as I can while still including beads for important evolutionary innovations. Even with a Cosmala over 18' long, I've found this process difficult. I'm often asked "do you have a bead for (some big event)?", only to answer sheepishly, "no, that's one I didn't make room to include.". Examples include major events like the formation of the supercontinent Gondwana, the evolution of snakes, some mass extinctions, Hammurabi's code, the Magna Carta, World War II, and so on.

Safety

For those who travel a lot and don't have young children, it's probably best to use strong cord so as to keep the Cosmala from breaking and spilling beads as described on the main great story bead website. However, I do have a toddler and a small child in the house, and as a paranoid father, I knew I'd much rather worry about spilled beads than about accidental strangulation hazards. So my Cosmala is strung with weak (15 pound test) hemp cord. I also make sure that the larger beads are never left out loose where they could be choking hazards.

Spacer Bead Value

My Cosmala consists of (around 250) beads to represent events, separated by small (size 6), colorful spacer beads. The spacer beads each represent a certain amount of time, thus allowing one to compare the time between events based on the spacer beads. Because evolutionary emergence has sped up over time, the spacer beads are each worth a larger amount of time each in the beginning of the Cosmala. The huge change in how much each spacer bead is worth demonstrates both the vast gulf of time behind us, as well as the remarkable increase in the speed of change. After the Great Radiance and formation of galaxies (which I'll cover below), the spacer beads show a continuous decrease in the length of time each represents, from 1 billion years each (1,000 My) to just 5 years for each bead at the end. If I had made my Cosmala using uniform spacer beads worth 5 years each, then it would reach from Detroit to north of the Mackinac Bridge!

(This small paragraph can be skipped by those averse to math). The only exception to that gradual decrease in the value of the spacer beads happens in the first 0.7 million years of the existence of our universe, where I use exponential seconds due to the very wide range of timescales involved. For instance, the inflationary time during the Great Radiance (the Big Bang) is represented by 18 dark rainbow beads, each representing a 10^{-2} multiplier (a negative exponent), resulting in 10^{-36} seconds of inflation. Then, the red beads represent the positive exponent of the number of seconds. For instance, the second set of red beads (13 beads) represents 10^{13} seconds, which is 300,000 years. From the yellow spacer beads on to the current year, all beads represent a linear, not exponential, time value.

Ancestor Spacer Beads

As J. Primack & N. Abrams describe in their book "The View from the Center of the Universe", we hold a prominent place in the Great Story. While there may well be other intelligent societies

elsewhere, this is the only one we know of. We are the Cosmos able to understand and be amazed by its own story. As such, our Ancestors are significant, and have been denoted in my Cosmala using a clear spacer bead on either side of any bead that represents an Ancestor of ours. This includes different types of Ancestors, (chemical, biological, intellectual, etc.), as can be seen on the Cosmala. Ancestor beads are denoted by light blue shading on the Cosmala Plan Spreadsheet.

Eon Spacer Beads

In addition to the uses of spacer beads described above, white spacer beads denote many of the main boundaries in named time eras that we humans have used to describe times in our history. Because we do not yet have a uniform naming convention, these names can sometimes overlap or have divisions in different places. For this reason and for brevity, only a few major divisions are used. Geologists have often made divisions at mass extinctions, so often these will coincide on the Cosmala. On the Cosmala Plan Spreadsheet, they are denoted by italicized text.

Extinction Beads

Some of the major or at least significant extinctions are noted with black beads. Local (as opposed to global) extinctions are sometimes shown as black spacer beads. Two of the largest extinctions (the Permian and Cretaceous extinctions) have real tektites beads.

Spacer Bead Color

The colors of the spacer beads repeatedly "make a rainbow" - progressing from low frequency (red) to high frequency (violet), to symbolize the increase in the speed of evolutionary change. This color change also makes it easy to keep major time eras separate, and to help in remembering the meaning of specific beads. The changes in the color often occur at geologic or other changes in time eras, and as such are often preceded by a letter for that time era. The five times the colors go through this progression denote the five major Ages used in my Cosmala. The spacer bead color is denoted by the color of the background in the "number of spacer beads" on the Cosmala Plan Spreadsheet.

The 5 Major Ages

The five major Ages are separated by the six major events described in the table below. Though these may not be the most important events on the whole Cosmala, they are significant events, and break the Cosmala into convenient, memorable Ages. Note that for each Age, the things that gave the Age its name are present in all subsequent ages. Even the dinosaurs are present today as birds. Why these six events? Why five Ages? Because it worked. Feel free to improve on this by using a different set of events and Ages if you choose.

Date	**Event/*SuperAge***

(mya)	
13,700	Great Radiance (Big Bang)
to	*The Age of Galaxies*
540	Cambrian Explosion
to	*The Age of Metazoans*
250	Permian Extinction
to	*The Age of Dinosaurs*
65	Cretaceous Extinction
to	*The Age of Mammals*
~ 1.5	Human Control of Fire
to	*The Age of Thought*
0	Today

The Cosmala Plan Spreadsheet

While making the Cosmala, I needed a reference to keep track of the information being put into it, and found that a compact spreadsheet worked well. My Cosmala spreadsheet has each line (row) specifying an event bead (as well as the number of colored spacer beads to precede that event). This spreadsheet is also useful as a reference when using the Cosmala for discussion, should a question about a specific date come up (I've memorized all the beads, but not all the dates!). I could put numbered date beads in, but that would add avoidable length. Plus, with dates of the five main boundary events memorized, and the spacer bead value known as well, it's usually not too hard to quickly calculate an approximate date – which is often well within scientific uncertainty for the date in question anyway. After all, the approximate flow of time and sequential order is more important than the exact date on a Cosmala. When printed out, the spreadsheet fits nicely on five pages, which can be taped together in one column and rolled like a scroll, allowing a compact and easy way to examine a given section of the Cosmala as needed. Quick reference tables of the Five Major Ages, as well as a summary overview of the Cosmala Spreadsheet are located on the last page for easy reference.

Age/Epoch Name – Column A

Column A contains the name of the Age, Epoch, or other time division (in italics). It also contains the numerical value of each colored spacer bead in millions of years. For example, cell A17 contains the value of 1,000, which is 1,000 My, or 1 Gy (= 1 billion years). Cells in column A with spacer bead values are shaded yellow. Also, after the start of the Holocene, the date on the Cosmala in the BCE/CE date convention is listed in column A. The BCE/CE date is calculated by subtracting 10,000 from the Holocene Calendar Date. For the advantages of the Holocene Calendar, google "Holocene Calendar". As with the other columns, any cell in column A with a calculation result instead of a normal entry is shaded pale green.

Actual Best Estimate of Date – Column B

Column B is simply the best estimate for the date of the event on that line. These are to the best of my knowledge, so they could be off, and of course many are very approximate as limited by scientific knowledge, my knowledge, or both. These "Anchor Dates" are in bold. These dates are listed in mybp (millions of years before present), or in the Holocene, using the BCE/CE convention.

Calculated Date – Column C

Because each spacer bead has a certain value, the date of any event can be calculated by adding or subtracting the time shown by spacer beads between the event in question and some known date on the Cosmala (such as, say, the Permian Extinction). These calculated dates (shown in column C) should be reasonably close to the range of likely actual dates shown in column B. Column C is next to column B for easy comparison. In the Holocene epoch, this same comparison can be made by comparing Columns A and B, which are both expressed in the BCE/CE convention, while Column C shows the calculated HE date. The cells in column C calculate the age by subtracting the last set of spacer beads from the previously calculated date. For instance, the value shown in cell C36=C35-D36. Note that because each line is affected by the calculation on the previous line, a mistake back in, say, the Cambrian will mess up everything from then on, well into the Oligocene.

Spacer Time Length – Column D

The value shown in column D is the total time shown in spacer beads between the previous bead and the bead represented by this row. For instance, the 200 shown in cell D48 is obtained by multiplying the number of spacer beads (from F48) by the time represented by each spacer bead (from cell A20). As mentioned earlier, the pale green color of the cells in this column show that each cell shows the numerical result of a calculation.

Event Description – Column E

The event descriptions in column E are generally self – explanatory, describing the event commemorated by the bead on that line (row). Due to the large number of events in our Universe's history, each bead will often represent two or more events. If the date is not exactly known, the range of time that probably included the event is listed in this cell as well. Markers to designate some time divisions are also listed (in *italics*) in this column.

Number of Spacer Beads – Column F

The cells in Column F list the number of spacer beads preceding the event described on a given line (row). The color of the background of each cell in column F shows the color of the spacer beads in each case. The values in column F are used to calculate the amount of time described by each group of spacer beads, with the result being shown in column D.

Bead Description – Column G

A very brief description of the event bead is given in column G, mostly as a record in the event that the string breaks or such. Because the appearance of the marker beads is obvious (just a letter bead), the time value of the marker bead (in **bold**) is given instead of a description. A pale blue background here shows which beads celebrate the appearance of an Ancestor (see the Ancestor spacer bead description above).

In Closing

As the process of evolution itself shows, the best creations are made by starting in one form, and making small, incremental improvements to fit each niche. That is how this Cosmala came to be, after I first copied the innovations of Michael and Connie, and then added new feature after new feature to fit my situation. In the same way, I hope these ideas are useful to you, and hope to see Cosmalas proliferate to fill various spiritual niches. Also, if you see errors or places for new ideas, I'm eager to hear them.